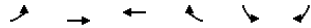


PM Existing  
5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	2	91	53	3	4	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	99	58	3	4	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	61				162	59
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	61				162	59
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)	1542				827	1006
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	101	61	5			
Volume Left	2	0	4			
Volume Right	0	3	1			
cSH	1542	1700	858			
Volume to Capacity	0.00	0.04	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.2	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	0.2	0.0	9.2			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization			16.4%	ICU Level of Service	A	
Analysis Period (min)			15			

PM Existing  
6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	175	15	24	96	13	8	110	18	20	128	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0				4.0			4.0
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00				1.00
Frt	1.00	0.99		1.00	0.98			0.98				0.99
Flt Protected	0.95	1.00		0.95	1.00			1.00				0.99
Satd. Flow (prot)	1770	1841		1770	1830			1823				1829
Flt Permitted	0.95	1.00		0.95	1.00			1.00				0.99
Satd. Flow (perm)	1770	1841		1770	1830			1823				1829
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	190	16	26	104	14	9	120	20	22	139	16
RTOR Reduction (vph)	0	2	0	0	4	0	0	5	0	0	3	0
Lane Group Flow (vph)	41	204	0	26	114	0	0	144	0	0	174	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	13.5	13.5		8.0	8.0			11.4				12.5
Effective Green, g (s)	13.5	13.5		8.0	8.0			11.4				12.5
Actuated g/C Ratio	0.22	0.22		0.13	0.13			0.19				0.20
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0				4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0				3.0
Lane Grp Cap (vph)	389	405		231	238			338				372
v/s Ratio Prot	0.02	c0.11		0.01	c0.06			c0.08				c0.10
v/s Ratio Perm												
v/c Ratio	0.11	0.50		0.11	0.48			0.43				0.47
Uniform Delay, d1	19.1	21.0		23.6	24.8			22.1				21.5
Progression Factor	1.00	1.00		1.00	1.00			1.00				1.00
Incremental Delay, d2	0.1	1.0		0.2	1.5			0.9				0.9
Delay (s)	19.2	22.0		23.8	26.3			23.0				22.4
Level of Service	B	C		C	C			C				C
Approach Delay (s)	21.5			25.8				23.0				22.4
Approach LOS	C			C				C				C
<b>Intersection Summary</b>												
HCM Average Control Delay			22.9	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			61.4	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			37.8%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

PM Existing  
7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	0	0	0	8	0	160	0	101	0	0	257	54	
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	0	174	0	110	0	0	279	59	
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)												656	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97	0.97							
vC, conflicting volume	505	418	309	418	448	110	338				110		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	476	387	274	387	417	110	304				110		
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	100	82	100				100		
cM capacity (veh/h)	395	532	743	555	512	944	1221				1480		
<b>Direction, Lane #</b>													
	WB 1	NB 1	SB 1										
Volume Total	183	110	338										
Volume Left	9	0	0										
Volume Right	174	0	59										
cSH	991	1221	1700										
Volume to Capacity	0.18	0.00	0.20										
Queue Length 95th (ft)	17	0	0										
Control Delay (s)	9.8	0.0	0.0										
Lane LOS	A												
Approach Delay (s)	9.8	0.0	0.0										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay			2.8										
Intersection Capacity Utilization			26.8%	ICU Level of Service	A								
Analysis Period (min)			15										

PM Existing  
8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	76	1	3	0	0	0	0	26	9	232	31	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)	83	1	3	0	0	0	0	28	10	252	34	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)												1040	
pX, platoon unblocked													
vC, conflicting volume	571	576	34	573	571	33	34				38		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	571	576	34	573	571	33	34				38		
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 %	78	100	100	100	100	100	100				84		
cM capacity (veh/h)	378	359	1040	375	362	1040	1578				1572		
<b>Direction, Lane #</b>													
	EB 1	NB 1	SB 1										
Volume Total	87	38	286										
Volume Left	83	0	252										
Volume Right	3	10	0										
cSH	393	1700	1572										
Volume to Capacity	0.22	0.02	0.16										
Queue Length 95th (ft)	21	0	14										
Control Delay (s)	16.9	0.0	7.0										
Lane LOS	C		A										
Approach Delay (s)	16.9	0.0	7.0										
Approach LOS	C												
<b>Intersection Summary</b>													
Average Delay			8.4										
Intersection Capacity Utilization			32.1%	ICU Level of Service	A								
Analysis Period (min)			15										

PM Existing  
9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	3	1	0	1	0	1	0	0	2	1	0
Sign Control	Free				Free		Stop				Stop	
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	3	1	0	1	0	1	0	0	2	1	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	1			4			5	5	4	5	5	1
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1			4			5	5	4	5	5	1
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1622			1617			1014	890	1080	1016	890	1083
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	1	1	3								
Volume Left	0	0	1	2								
Volume Right	1	0	0	0								
cSH	1622	1617	1014	970								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	8.6	8.7								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	8.6	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			13.3%	ICU Level of Service	A							
Analysis Period (min)			15									

PM Existing  
10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	164	0	0	17	0	4
Sign Control	Free				Stop	
Grade	0%				0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	178	0	0	18	0	4
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			178		197	178
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			178		197	178
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		100	99
cM capacity (veh/h)			1398		792	865
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	178	18	4			
Volume Left	0	0	0			
Volume Right	0	0	4			
cSH	1700	1398	865			
Volume to Capacity	0.10	0.00	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	9.2			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			18.6%	ICU Level of Service	A	
Analysis Period (min)			15			

PM Existing

11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	190	0	4	44	0	4
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)	207	0	4	48	0	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	790					
pX, platoon unblocked						
vC, conflicting volume			207	263	207	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			207	263	207	
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	100	99	
cM capacity (veh/h)			1365	724	834	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	207	52	4			
Volume Left	0	4	0			
Volume Right	0	0	4			
cSH	1700	1365	834			
Volume to Capacity	0.12	0.00	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.7	9.3			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.7	9.3			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.3			
Intersection Capacity Utilization		20.0%		ICU Level of Service		A
Analysis Period (min)			15			

## **Appendix J**

### **Project Description Details**

**Appendix C**  
**Construction Summary for**  
**Campo Verde Solar Project**

11/15/11

**TABLE OF CONTENTS**

---

C.1 CONSTRUCTION SCHEDULE AND PHASING..... 2

C.2 WEEKLY WORK SCHEDULES..... 2

C.3 DETAILED CONSTRUCTION SCHEDULE..... 2

C.4 EQUIPMENT QUANTITIES AND SPECIFICATIONS..... 4

C.5 WORKFORCE ESTIMATES..... 4

C.6 CONSTRUCTION ACCESS.....4

C.7 CONSTRUCTION PARKING, DELIVERIES, STORAGE, AND STAGING AREAS..... 5

Attachment C-1. Construction Equipment Lists

This Appendix provides detailed information regarding construction equipment, workforce estimates, and other construction-related activities for the Campo Verde Solar Project. The information presented in this Appendix is generally categorized based on the four primary project components, including the PV arrays, the on-site substation/switchyard, the transmission line and the operation and maintenance building(s).

### **C.1 CONSTRUCTION SCHEDULE**

Construction of the approximately 140 MW Project is planned to occur over 12 to 24 months.

### **C.2 WEEKLY WORK SCHEDULES**

Consistent with the construction schedule estimates, the scenarios presented in this Appendix assume that construction crews will work a maximum of 12-hour days (typically Monday through Friday), generally beginning work at 6 AM and concluding at 6 PM each day. A split schedule with night shift and/or weekend hours may be implemented. Early start days may be utilized during summer months.

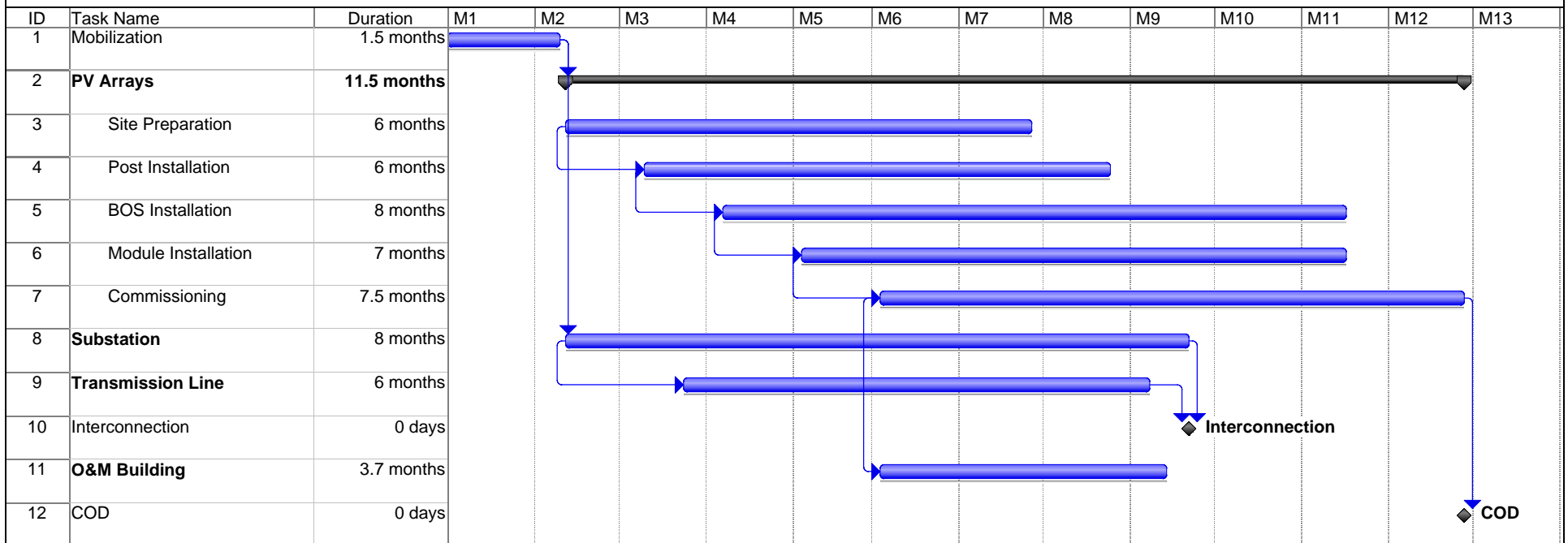
### **C.3 DETAILED CONSTRUCTION SCHEDULE**

As discussed above, construction is expected to occur for approximately 12 to 24 months. The Project will be constructed so that individual photovoltaic (PV) arrays can be energized and begin generating electricity as they are completed. The transmission line, substation and interconnection to IV Substation will be completed and commissioned prior to the operation of any PV arrays.

Figure C-1 provides a representative construction schedule for the Project for the accelerated 12 month duration. It anticipates that construction will start in the second quarter of 2012 following CUP approval. However, the actual start of construction will be determined based on the receipt of all construction permits and approvals and securing financing for the Project.



Figure C-1  
Construction Schedule  
Campo Verde Solar



Project: Campo Verde Schedule  
Date: Tue 11/15/11

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

## **C.4 EQUIPMENT QUANTITIES AND SPECIFICATIONS**

To focus on the expected maximum impacts, this data assumes that construction activities may occur on the PV Areas, the substation, the transmission line and the O&M building(s) simultaneously. This peak construction activity is shown as month 7 on the representative construction schedule provided as C-1. The highest construction workforce levels and equipment operating hours occur during this period. Equipment lists for the peak construction activities (month 7) are provided in Attachment C-1 Table C-1 for PV Areas, Table C-2-A for the substation, Table C-3 for the transmission line and Table C-4 for common services. Table C-2-B is substation equipment list for non-peak month. Actual schedule and equipment may change during detail design, permitting and construction management to meet commercial requirements.

## **C.5 WORKFORCE ESTIMATES**

Based on the construction schedule provided in Figure C-1 for 12 month construction duration, the construction employment will be approximately 30 workers in month 1, ramping up to a peak of approximately 500 workers during month 7 of construction. The workforce is expected to average approximately 250 workers from months 2 through 11. The workforce will decrease as the transmission line and substation are completed. The construction workforce will decline in month 9 until construction is completed.

Given the long construction duration, it is expected that approximately 60% of the construction workforce will come from a combination of (i) existing residents in the Imperial Valley and (ii) construction workers that temporarily reside in the Imperial County during construction such that their week day commutes originate in the Imperial County.

Voluntary carpooling by workforce is expected to be consistent with other large scale solar construction projects at about 40-50%. Therefore, the peak daily workforce may generate up to 325 trips per day.

## **C.6 CONSTRUCTION ACCESS**

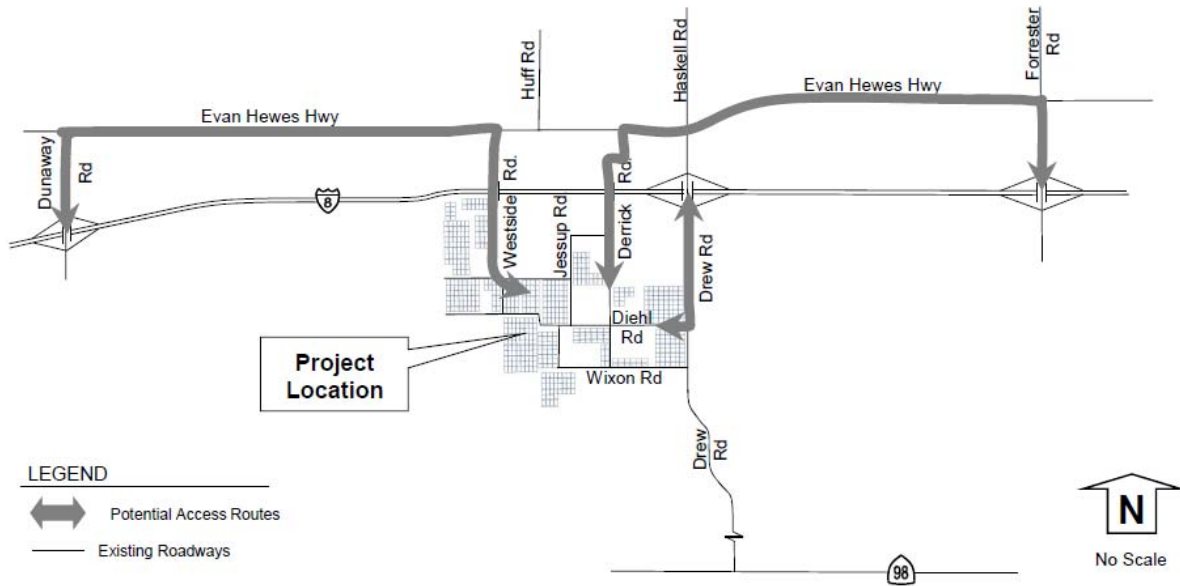
Access to the Project area will be provided from Interstate 8 via Drew Road exit to West Diehl Road and Wixom Road. Alternate access is via Dunaway Road or Forrester Road exits. This is shown on Figure C-3. All entrances to the Campo Verde Project are proposed to use local roads. The construction logistics areas may be located off West Diehl Road/Westside Road/Vaugh Road and/or Wixom Road. The exact locations of construction logistic areas and driveways to be determined during detailed design.

Each block of land will have gates that will be used to access. Secondary gates may be installed if required for emergency access.

Liebert Road would be used to access the substation and the common services areas. For the transmission line, existing access roads off of Liebert Road and IID access roads would be used. Access points for the portion of the transmission line on federal lands are shown in the Plan of Development which has been submitted to the BLM.

**Figure C-3. Construction Access Points**

**Potential Access Routes To/From Interstate 8  
LOS Engineering, Inc. (10/6/11)**



### **C.7 CONSTRUCTION PARKING, DELIVERIES, STORAGE, AND STAGING AREAS**

One or more dedicated construction logistics areas will be graveled for uses related to support construction. The uses of these areas will include temporary construction trailers, construction employee parking, equipment and material staging and storage, trash and recycling area. In addition, each PV array land block will have a small staging area with a mobile construction trailer during construction duration of that land block. These locations are to be determined within the Project boundaries. An area near the substation will be used for constructing staging and assembly for the substation. An area near the substation and/or an area off-site on private land will be used for constructing staging and assembly for the transmission area.

Construction workers will be directed to park their personal vehicles in one of the construction logistics areas. From these locations construction workers will be transported by shuttle bus or van, or when in close proximity, walk to the active construction area.

Deliveries of equipment and materials are expected to occur during normal work hours and may occur at any time throughout the work day. All delivery vehicles will report to the construction logistics area and then go to the subject work area for unloading. Equipment that will be stored longer will be delivered to and stored at the construction logistics areas.

At the peak of construction for accelerated duration, approximately 50 deliveries per day are estimated to be made to the various construction areas. On average, 30 deliveries per day are expected during construction. Deliveries will be made via dump truck, box truck, semi tractor, or flatbed truck.

For portions of the transmission line on federal land, the pulling and tensioning sites and wire splicing sites will not be utilized for temporary storage during construction. For portions of the transmission line on federal land, temporary storage of equipment and materials will occur within the Project site or within easement or at temporary laydown areas within Rabley Holdings, Inc. property.

## **Attachment C-1. Construction Equipment Lists**

---

TABLE C-1. EQUIPMENT LIST FOR PV AREAS CONSTRUCTION (Month 7)							
Equipment Description	Daily Quantity	Horsepower	Fuel Type	Equivalent Full-Load Operating Time (hr/day)	Vehicle Weight (pounds)	Vehicle Miles (VMT) per Day on Unpaved Surface	Estimated Workforce for this Activity
<b>Install SWPPP Measures (Part of Site Preparation)</b>							
Rough Terrain Forklift	2	75	Diesel	1.7	10,000	10	10
Delivery / Work Trucks	3	200	Diesel	2	20,000	5	
<b>Site Prep - Arrays</b>							
Truck, Pick-Up (Survey Crew)	2	180	Gas	1.7	5,300	5	30
Grader	6	200	Diesel	6.8	41,000	20	
Backhoe/Front Loader	2	120	Diesel	3.4	41,000	10	
Tractor / Disc	3	210	Diesel	6.8	15,000	20	
Scraper	4	265	Diesel	3.4	65,000	15	
Compactor	2	120	Diesel	1.7	25,000	10	
Water Truck	2	175	Diesel	6.8	N/A	N/A	
<b>Site Prep - Roads</b>							
Grader	3	200	Diesel	6.8	41,000	20	24
Backhoe/Front Loader	1	120	Diesel	6.8	41,000	10	
Compactor	2	120	Diesel	6.8	25,000	20	
Water Truck	2	175	Diesel	6.8	N/A	N/A	
Dump Truck	5	235	Diesel	2.7	30,000	10	
<b>Install Fencing</b>							
Rough Terrain Forklift	2	75	Diesel	1.7	10,000	10	10
Delivery / Work Trucks	3	200	Diesel	1	20,000	5	
<b>Post Installation</b>							
Delivery / Work Trucks	2	200	Diesel	1	20,000	5	32
Post Machine	7	45	Diesel	8.1	10,000	1	
Rough Terrain Forklift	2	75	Diesel	6.8	10,000	10	
<b>Install Support Structure</b>							
Rough Terrain Forklift	6	75	Diesel	6.8	10,000	10	68
Delivery / Work Trucks	2	200	Diesel	1	20,000	5	
<b>Install Inverters and Switchgear &amp; sub-structure</b>							
Crane	2	125	Diesel	4.5	65,500	1	12
Backhoe/Front End Loader	2	120	Diesel	6.8	41,000	10	
Delivery / Work Trucks	2	200	Diesel	1	20,000	5	
<b>DC and AC Wire Installation (UG)</b>							
Backhoe/Front Loader	4	120	Diesel	6.8	41,000	10	45
Crawling Trencher	2	100	Diesel	4.1	8,000	1	
Mini-Excavator	4	42	Diesel	6.8	12,000	10	
Delivery / Work Trucks	2	200	Diesel	1	20,000	5	
<b>DC and AC Wire Installation (AG)</b>							
Rough Terrain Forklift	3	75	Diesel	1.7	10,000	10	24
Delivery / Work Trucks	2	200	Diesel	1	20,000	5	
<b>Module Installation</b>							
Rough Terrain Forklift	15	75	Diesel	1.7	10,000	10	120
Delivery / Work Trucks	5	200	Diesel	1	20,000	5	
<b>O&amp;M Building</b>							
Rough Terrain Forklift	1	75	Diesel	1	10,000	1	35
Manlift	2	110	Diesel	3	24,000	1	
<b>Misc. (Across Project Site)</b>							
Rough Terrain Forklift	5	75	Diesel	1.7	10,000	5	n/a
AWD Gator/Cart	40	15	Diesel	8.1	2,000	10	
Water Truck	4	175	Diesel	6.8	N/A	N/A	
Delivery / Work Trucks	10	200	Diesel	1	20,000	5	

**TABLE C-2-A. EQUIPMENT LIST FOR SUBSTATION CONSTRUCTION (Month 7)**

Equipment Description	Daily Quantity	Horsepower	Fuel Type	Equivalent Full-Load Operating Time (hr/day)	Vehicle Weight (pounds)	Vehicle Miles (VMT) per Day on Unpaved Surface	Estimated Workforce for this Activity
<b><i>Steel Structures</i></b>							
Boom Truck - 33 Ton	1	290	Diesel	1.5	52,000	1	10
Manlift	1	110	Diesel	1.2	24,000	1	
Material Delivery - Hwy Tractor w 40' Flat	3	220	Diesel	0.2	20,000	4	
<b><i>Insulators, Bus, &amp; Electrical Equipment</i></b>							
Boom Truck	1	220	Diesel	1.5	51,800	1	10
Manlift	2	110	Diesel	1.2	24,000	1	
Welder Truck	2	210	Diesel	1.2	18,000	4	
Material Delivery - Hwy Tractor w 40' Flat	4	310	Diesel	0.2	20,000	4	
Material Delivery - Heavy Haul	1	300	Diesel	1.5	40,000	4	
Crane	1	500	Diesel	1	N/A	N/A	
<b><i>Control Wiring</i></b>							
Boom Truck	1	220	Diesel	0.6	51,800	1	8
Manlift	2	110	Diesel	0.8	24,000	1	
1 ton crew vehicle	1	260	Diesel	0.2	30,000	4	
Fiber Splicer Van	1	180	Gas	0.6	5,300	4	
Test Equipment Van	1	180	Gas	1.7	5,300	4	
Rough Terrain Forklift	1	75	Diesel	1.7	10,000	6	

**TABLE C-2-B. EQUIPMENT LIST FOR SUBSTATION CONSTRUCTION (Non-peak month)**

Equipment Description	Daily Quantity	Horsepower	Fuel Type	Equivalent Full-Load Operating Time (hr/day)	Vehicle Weight (pounds)	Vehicle Miles (VMT) per Day on Unpaved Surface	Estimated Workforce for this Activity
<b>Site Development</b>							
Dozer	1	300	Diesel	3	88,000	8	10
Roller Compactor	1	156	Diesel	4.5	25,000	8	
Excavator	1	304	Diesel	3	106,000	1	
Water Truck	1	175	Diesel	5	N/A	N/A	
Fuel Truck	1	260	Diesel	3	36,000	1	
<b>Foundations</b>							
Drill	1	158	Diesel	2	61,900	1	10
Boom Truck	1	220	Diesel	0.5	51,800	4	
Excavator	1	148	Diesel	2	38,000	1	
Roller Compactor	1	50	Diesel	1.5	25,000	4	
Plate Compactor	1	12	Diesel	3	25,000	4	
Rubber Tire Backhoe	1	102	Diesel	2	16,000	1	
End Dump	1	230	Diesel	0.2	30,000	4	
Concrete Truck	1	310	Diesel	0.4	65,000	4	
Fuel Truck	1	210	Diesel	0.2	36,000	1	
<b>Grounding</b>							
MiniEx	1	34	Diesel	3	9,200	1	8
Dozer	1	80	Diesel	3	17,000	3	
Rubber Tire Backhoe	1	102	Diesel	1	16,000	1	
Air Compressor	1	80	Diesel	1.5	2,500	N/A	
Boom Truck	1	220	Diesel	0.5	51,800	1	
<b>Underground Raceways</b>							
Excavator	1	148	Diesel	3	38,000	4	17
Roller Compactor	1	50	Diesel	1.5	25,000	4	
Plate Compactor	2	12	Diesel	1.5	25,000	4	
Rubber Tire Backhoe	1	102	Diesel	1.5	16,000	1	
Dump Truck	1	235	Diesel	0.2	30,000	4	
Fuel Truck	1	210	Diesel	0.2	36,000	1	
Air Compressor	1	50	Diesel	1.5	2,500	N/A	
Flatbed Truck	2	260	Diesel	0.2	30,000	4	
Boom Truck	1	220	Diesel	0.8	51,800	1	
Material Delivery - Hwy Tractor w 40' Flat	2	310	Diesel	0.2	20,000	4	



**TABLE C-3. EQUIPMENT LIST FOR TRANSMISSION LINE CONSTRUCTION (Month 7)**

Equipment Description	Daily Quantity	Horsepower	Fuel Type	Equivalent Full-Load Operating Time (hr/day)	Vehicle Weight (pounds)	Vehicle Miles (VMT) per Day on Unpaved Surface	Estimated Workforce for this Activity
<b><i>Steel (Hauling, Shake-Out, Assembly and Erection)</i></b>							
Crane, Hydraulic, 150/300 Ton	1	250	Diesel	1.8	135,000	5	35
Crane, Hydraulic, Rough Terrain, 25 Ton	1	125	Diesel	1.8	65,500	5	
Truck, Flatbed w/Boom, 12 Ton	1	235	Diesel	1	51,800	10	
Truck, Crew Cab, Flatbed, 1 Ton	6	180	Gas	1.1	12,000	10	
Truck, Semi Tractor	1	310	Diesel	6	20,000	10	
Trailer, Flatbed, 40'	1	N/A	N/A		10,000	10	
Water Truck	1	175	Diesel	4.5	N/A	N/A	
Motor, Auxillary Power	1	5	Gas	1	150	0	
Compressor, Air	1	75	Gas	2	1,500	15	
<b><i>Conductor / Shield Wire / OPGW (Stringing, Sagging, Deadending and Clipping)</i></b>							
Truck, Flatbed, w/ Bucket	3	235	Diesel	3	51,800	15	15
Tension Machine, Conductor	1	135	Diesel	1.5	42,000	1	
Tension Machine, Static	1	135	Diesel	0.2	32,000	1	
Truck, Sock Line, Puller, 3 Drum	1	310	Diesel	2.3	55,000	1	
Truck, Wire Puller, 1 Drum	1	310	Diesel	2.3	72,000	1	
Truck, Semi, Tractor	2	310	Diesel	6	20,000	10	
Water Truck	1	175	Diesel	4.5	N/A	N/A	
Truck, Crew Cab, Flatbed, 1 Ton	3	180	Gas	1.4	12,000	10	
Back Hoe, w/ Bucket	1	85	Diesel	3	15,770	1	
Truck, Mechanics	1	260	Diesel	3	18,000	15	
Crane, Hydraulic, Rough Terrain	1	125	Diesel	1	65,500	10	
Motor, Auxillary Power	2	5	Gas	2.3	N/A	N/A	
<b><i>Cleanup &amp; Restoration</i></b>							
Truck, Flatbed, w/ Bucket, 5 Ton	1	235	Diesel	2	51,800	5	4
Excavator, Bucket Type	1	165	Diesel	4.5	41,000	5	
Truck, Semi, Tractor	1	310	Diesel	4.5	20,000	10	
Truck, Dump, 10 Ton	1	235	Diesel	3	30,000	10	
Motor Grader	1	110	Diesel	8	32,460	20	
Truck, Flatbed	1	210	Diesel	2.1	12,000	10	
Truck, Pick-Up	1	210	Diesel	2.1	5,300	10	
Motor, Auxillary Power	1	5	Gas	0.5	N/A	N/A	

**TABLE C-4. EQUIPMENT LIST FOR COMMON SERVICES CONSTRUCTION (Month 7)**

Equipment Description	Daily Quantity	Horsepower	Fuel Type	Equivalent Full-Load Operating Time (hr/day)	Vehicle Weight (pounds)	Vehicle Miles (VMT) per Day on Unpaved Surface	Estimated Workforce for this Activity
<b><i>Dedicated Storage Areas During Construction</i></b>							
Crane, Hydraulic, Rough Terrain	1	125	Diesel	1.5	N/A	N/A	8
Delivery: Truck, Semi, Tractor	1	310	Diesel	0.5	20,000	5	
Delivery: Truck, Flatbed, 1 Ton	1	180	Gas	0.5	12,000	5	
Forklift, less than 5 Ton	3	75	Diesel	3.8	16,400	5	
Forklift, greater than 5 Ton	2	85	Diesel	3.8	21,500	5	
Motor, Auxillary Generator Power	3	24	Gas	8	N/A	N/A	
Trailer, Office, 40'	14	N/A	N/A	N/A	N/A	N/A	
Trailer, Office, 20'	4	N/A	N/A	N/A	N/A	N/A	

## **Appendix K**

### **Existing + Project Intersection LOS Calculations**

AM Existing + Project

1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	5	59	36	24	106	3	69	11	17	6	18	10
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)	5	64	39	26	115	3	75	12	18	7	20	11
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	38	71	84	61	105	37						
Volume Left (vph)	5	0	26	0	75	7						
Volume Right (vph)	0	39	0	3	18	11						
Hadj (s)	0.11	-0.35	0.19	0.00	0.07	-0.11						
Departure Headway (s)	5.1	4.6	5.1	4.9	4.6	4.5						
Degree Utilization, x	0.05	0.09	0.12	0.08	0.13	0.05						
Capacity (veh/h)	683	745	672	701	741	742						
Control Delay (s)	7.2	6.9	7.6	7.2	8.3	7.7						
Approach Delay (s)	7.0		7.4		8.3	7.7						
Approach LOS	A		A		A	A						
<b>Intersection Summary</b>												
Delay			7.6									
HCM Level of Service			A									
Intersection Capacity Utilization			26.8%		ICU Level of Service		A					
Analysis Period (min)			15									

AM Existing + Project

2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔				↔	
Volume (veh/h)	0	0	0	186	0	56	11	23	0	0	48	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	202	0	61	12	25	0	0	52	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	140	110	61	110	118	25	70						25
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	140	110	61	110	118	25	70						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	77	100	94	99						100
cM capacity (veh/h)	777	774	1004	863	766	1051	1531						1589
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	263	37	70										
Volume Left	202	12	0										
Volume Right	61	0	17										
cSH	1123	1531	1700										
Volume to Capacity	0.23	0.01	0.04										
Queue Length 95th (ft)	23	1	0										
Control Delay (s)	10.0	2.4	0.0										
Lane LOS	B	A											
Approach Delay (s)	10.0	2.4	0.0										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay			7.4										
Intersection Capacity Utilization			25.5%		ICU Level of Service		A						
Analysis Period (min)			15										

AM Existing + Project  
3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

	↖	→	↗	↙	←	↘	↖	↗	↙	↘	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕					↕			↕	
Volume (veh/h)	6	0	95	0	0	0	0	31	35	37	197	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)	7	0	103	0	0	0	0	34	38	40	214	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	347	366	214	399	347	53	214			72		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	347	366	214	399	347	53	214			72		
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	87	100	100	100	100			97		
cM capacity (veh/h)	595	547	826	481	561	1015	1356			1528		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	110	72	254									
Volume Left	7	0	40									
Volume Right	103	38	0									
cSH	878	1700	1528									
Volume to Capacity	0.13	0.04	0.03									
Queue Length 95th (ft)	11	0	2									
Control Delay (s)	10.0	0.0	1.4									
Lane LOS	B		A									
Approach Delay (s)	10.0	0.0	1.4									
Approach LOS	B		A									
<b>Intersection Summary</b>												
Average Delay			3.3									
Intersection Capacity Utilization			29.1%	ICU Level of Service	A							
Analysis Period (min)			15									

AM Existing + Project  
4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

	↖	→	↗	↙	←	↘	↖	↗	↙	↘	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Volume (veh/h)	15	0	6	0	0	1	52	26	0	0	11	278
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	0	7	0	0	1	57	28	0	0	12	302
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	305	304	163	311	455	28	314			28		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	305	304	163	311	455	28	314			28		
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 %	97	100	99	100	100	100	95			100		
cM capacity (veh/h)	624	581	882	615	478	1047	1246			1585		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	23	1	85	314								
Volume Left	16	0	57	0								
Volume Right	7	1	0	302								
cSH	681	1047	1246	1585								
Volume to Capacity	0.03	0.00	0.05	0.00								
Queue Length 95th (ft)	3	0	4	0								
Control Delay (s)	10.5	8.4	5.5	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	10.5	8.4	5.5	0.0								
Approach LOS	B	A										
<b>Intersection Summary</b>												
Average Delay			1.7									
Intersection Capacity Utilization			39.9%	ICU Level of Service	A							
Analysis Period (min)			15									

AM Existing + Project  
5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	1	27	51	52	0	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)	1	29	55	57	0	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	112				115	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				115	84
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				100	100
cM capacity (veh/h)	1478				880	976
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	30	112	2			
Volume Left	1	0	0			
Volume Right	0	57	2			
cSH	1478	1700	976			
Volume to Capacity	0.00	0.07	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.3	0.0	8.7			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	8.7			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			15.9%	ICU Level of Service	A	
Analysis Period (min)			15			

AM Existing + Project  
6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕					↕	↕	↕
Volume (vph)	13	52	8	22	116	8	13	102	15	15	150	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0					4.0		4.0
Lane Util. Factor	1.00	1.00		1.00	1.00					1.00		1.00
Frt	1.00	0.98		1.00	0.99					0.98		0.98
Flt Protected	0.95	1.00		0.95	1.00					1.00		1.00
Satd. Flow (prot)	1770	1825		1770	1844					1825		1820
Flt Permitted	0.95	1.00		0.95	1.00					1.00		1.00
Satd. Flow (perm)	1770	1825		1770	1844					1825		1820
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	57	9	24	126	9	14	111	16	16	163	30
RTOR Reduction (vph)	0	8	0	0	3	0	0	6	0	0	7	0
Lane Group Flow (vph)	14	58	0	24	132	0	0	135	0	0	202	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	4.0	4.0		7.3	7.3			7.5			8.8	
Effective Green, g (s)	4.0	4.0		7.3	7.3			7.5			8.8	
Actuated g/C Ratio	0.09	0.09		0.17	0.17			0.17			0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	162	167		296	309			314			367	
v/s Ratio Prot	0.01	c0.03		0.01	c0.07			c0.07			c0.11	
v/s Ratio Perm												
v/c Ratio	0.09	0.35		0.08	0.43			0.43			0.55	
Uniform Delay, d1	18.1	18.6		15.3	16.3			16.1			15.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	1.3		0.1	0.9			1.0			1.7	
Delay (s)	18.4	19.8		15.4	17.2			17.1			17.3	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)	19.6			17.0			17.1			17.3		
Approach LOS	B			B			B			B		
<b>Intersection Summary</b>												
HCM Average Control Delay			17.5	HCM Level of Service								B
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			43.6	Sum of lost time (s)								16.0
Intersection Capacity Utilization			30.4%	ICU Level of Service								A
Analysis Period (min)			15									
c Critical Lane Group												

AM Existing + Project

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔			↔		
Volume (veh/h)	0	0	0	15	0	200	4	81	0	0	110	112	
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	16	0	217	4	88	0	0	120	122	
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)												656	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99							0.99	
vC, conflicting volume	386	277	180	277	338	88	241						88
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	370	259	161	259	321	88	223						88
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	100	78	100						100
cM capacity (veh/h)	448	634	871	682	585	970	1327						1508
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	234	92	241										
Volume Left	16	4	0										
Volume Right	217	0	122										
cSH	1043	1327	1700										
Volume to Capacity	0.22	0.00	0.14										
Queue Length 95th (ft)	21	0	0										
Control Delay (s)	9.8	0.4	0.0										
Lane LOS	A	A											
Approach Delay (s)	9.8	0.4	0.0										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay	4.1												
Intersection Capacity Utilization	23.5%			ICU Level of Service			A						
Analysis Period (min)	15												

AM Existing + Project

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔	↔					↔			↔	↔	
Volume (veh/h)	47	0	3	0	0	0	0	35	5	91	33	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)	51	0	3	0	0	0	0	38	5	99	36	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)												1040	
pX, platoon unblocked													
vC, conflicting volume	274	277	36	276	274	41	36						43
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	274	277	36	276	274	41	36						43
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 %	92	100	100	100	100	100	100						94
cM capacity (veh/h)	645	591	1037	642	593	1030	1575						1565
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	54	43	135										
Volume Left	51	0	99										
Volume Right	3	5	0										
cSH	686	1700	1565										
Volume to Capacity	0.08	0.03	0.06										
Queue Length 95th (ft)	6	0	5										
Control Delay (s)	10.9	0.0	5.6										
Lane LOS	B		A										
Approach Delay (s)	10.9	0.0	5.6										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay	5.8												
Intersection Capacity Utilization	23.4%			ICU Level of Service			A						
Analysis Period (min)	15												

AM Existing + Project  
9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↔			↔			↔			↔			
Volume (veh/h)	5	18	5	20	194	21	6	5	5	23	21	20		
Sign Control	Free			Free			Stop			Stop				
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)	5	20	5	22	211	23	7	5	5	25	23	22		
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	234				25				332	310	22	307	302	222
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	234				25				332	310	22	307	302	222
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100				99				99	99	99	96	96	97
cM capacity (veh/h)	1334				1589				579	594	1055	629	600	817
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	30	255	17	70										
Volume Left	5	22	7	25										
Volume Right	5	23	5	22										
cSH	1334	1589	680	666										
Volume to Capacity	0.00	0.01	0.03	0.10										
Queue Length 95th (ft)	0	1	2	9										
Control Delay (s)	1.4	0.7	10.4	11.0										
Lane LOS	A	A	B	B										
Approach Delay (s)	1.4	0.7	10.4	11.0										
Approach LOS	B			B										
<b>Intersection Summary</b>														
Average Delay				3.2										
Intersection Capacity Utilization				25.6%	ICU Level of Service	A								
Analysis Period (min)				15										

AM Existing + Project  
10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↔			↔	↔		
Volume (veh/h)	50	7	3	268	1	3	
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)	54	8	3	291	1	3	
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			62			356	58
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			62			356	58
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			100	100
cM capacity (veh/h)			1541			641	1008
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>				
Volume Total	62	295	4				
Volume Left	0	3	1				
Volume Right	8	0	3				
cSH	1700	1541	882				
Volume to Capacity	0.04	0.00	0.00				
Queue Length 95th (ft)	0	0	0				
Control Delay (s)	0.0	0.1	9.1				
Lane LOS	A		A				
Approach Delay (s)	0.0	0.1	9.1				
Approach LOS	A						
<b>Intersection Summary</b>							
Average Delay			0.2				
Intersection Capacity Utilization			26.5%	ICU Level of Service	A		
Analysis Period (min)			15				



AM Existing + Project

11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	52	1	14	142	1	5
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)	57	1	15	154	1	5
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			58		242	57
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			58		242	57
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1547		739	1009
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	58	170	7			
Volume Left	0	15	1			
Volume Right	1	0	5			
cSH	1700	1547	951			
Volume to Capacity	0.03	0.01	0.01			
Queue Length 95th (ft)	0	1	1			
Control Delay (s)	0.0	0.7	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.7	8.8			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.8			
Intersection Capacity Utilization		24.9%		ICU Level of Service		A
Analysis Period (min)			15			

PM Existing + Project

1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop				Stop		Stop				Stop	
Volume (vph)	8	124	92	13	33	19	42	19	13	14	10	12
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)	9	135	100	14	36	21	46	21	14	15	11	13
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	76	167	32	39	80	39						
Volume Left (vph)	9	0	14	0	46	15						
Volume Right (vph)	0	100	0	21	14	13						
Hadj (s)	0.09	-0.38	0.25	-0.34	0.04	-0.09						
Departure Headway (s)	5.0	4.5	5.3	4.7	4.7	4.6						
Degree Utilization, x	0.10	0.21	0.05	0.05	0.10	0.05						
Capacity (veh/h)	710	780	656	740	724	725						
Control Delay (s)	7.3	7.4	7.3	6.7	8.2	7.8						
Approach Delay (s)	7.4	7.0	7.0	7.0	8.2	7.8						
Approach LOS	A	A	A	A	A	A						
<b>Intersection Summary</b>												
Delay	7.5											
HCM Level of Service	A											
Intersection Capacity Utilization	24.4%		ICU Level of Service		A							
Analysis Period (min)	15											

PM Existing + Project

2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔						↔
Volume (veh/h)	0	0	0	22	0	37	95	15	0	0	84	6
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	24	0	40	103	16	0	0	91	7
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	338	317	95	317	321	16	98				16	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	338	317	95	317	321	16	98				16	
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	96	93				100	
cM capacity (veh/h)	562	557	962	602	555	1063	1495				1601	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	64	120	98									
Volume Left	24	103	0									
Volume Right	40	0	7									
cSH	1614	1495	1700									
Volume to Capacity	0.04	0.07	0.06									
Queue Length 95th (ft)	3	6	0									
Control Delay (s)	9.5	6.6	0.0									
Lane LOS	A	A										
Approach Delay (s)	9.5	6.6	0.0									
Approach LOS	A											
<b>Intersection Summary</b>												
Average Delay	5.0											
Intersection Capacity Utilization	22.7%		ICU Level of Service		A							
Analysis Period (min)	15											

PM Existing + Project  
3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	7	0	9	0	0	0	0	104	192	59	41	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)	8	0	10	0	0	0	0	113	209	64	45	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	390	495	45	395	390	217	45						322
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	390	495	45	395	390	217	45						322
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	99	100	100	100	100						95
cM capacity (veh/h)	546	451	1025	537	517	822	1564						1238
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	17	322	109										
Volume Left	8	0	64										
Volume Right	10	209	0										
cSH	1249	1700	1238										
Volume to Capacity	0.01	0.19	0.05										
Queue Length 95th (ft)	1	0	4										
Control Delay (s)	9.9	0.0	4.9										
Lane LOS	A		A										
Approach Delay (s)	9.9	0.0	4.9										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay			1.6										
Intersection Capacity Utilization			36.0%	ICU Level of Service									A
Analysis Period (min)			15										

PM Existing + Project  
4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕						↕			↕		
Volume (veh/h)	274	0	51	0	0	0	1	8	0	0	24	13	
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)	298	0	55	0	0	0	1	9	0	0	26	14	
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	44	44	33	99	51	9	40						9
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	44	44	33	99	51	9	40						9
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 %	69	100	95	100	100	100	100						100
cM capacity (veh/h)	958	847	1040	835	840	1073	1569						1611
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	353	0	10	40									
Volume Left	298	0	1	0									
Volume Right	55	0	0	14									
cSH	970	1700	1569	1611									
Volume to Capacity	0.36	0.00	0.00	0.00									
Queue Length 95th (ft)	42	0	0	0									
Control Delay (s)	10.8	0.0	0.8	0.0									
Lane LOS	B	A	A										
Approach Delay (s)	10.8	0.0	0.8	0.0									
Approach LOS	B	A											
<b>Intersection Summary</b>													
Average Delay			9.5										
Intersection Capacity Utilization			28.3%	ICU Level of Service									A
Analysis Period (min)			15										

PM Existing + Project

5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	2	91	53	3	53	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	99	58	3	58	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	61				162	59
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	61				162	59
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	100
cM capacity (veh/h)	1542				827	1006
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	101	61	59			
Volume Left	2	0	58			
Volume Right	0	3	1			
cSH	1542	1700	830			
Volume to Capacity	0.00	0.04	0.07			
Queue Length 95th (ft)	0	0	6			
Control Delay (s)	0.2	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.2	0.0	9.7			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay	2.6					
Intersection Capacity Utilization	16.4%			ICU Level of Service	A	
Analysis Period (min)	15					

PM Existing + Project

6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕					↕	↕	↕
Volume (vph)	41	185	15	24	96	13	8	156	28	20	135	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1770	1842		1770	1830			1823			1830	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (perm)	1770	1842		1770	1830			1823			1830	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	201	16	26	104	14	9	170	30	22	147	16
RTOR Reduction (vph)	0	3	0	0	7	0	0	7	0	0	4	0
Lane Group Flow (vph)	45	214	0	26	111	0	0	202	0	0	181	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	13.1	13.1		7.2	7.2			12.7			8.8	
Effective Green, g (s)	13.1	13.1		7.2	7.2			12.7			8.8	
Actuated g/C Ratio	0.23	0.23		0.12	0.12			0.22			0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	401	417		220	228			401			279	
v/s Ratio Prot	0.03	c0.12		0.01	c0.06			c0.11			c0.10	
v/s Ratio Perm												
v/c Ratio	0.11	0.51		0.12	0.49			0.50			0.65	
Uniform Delay, d1	17.7	19.6		22.5	23.6			19.8			23.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.1		0.2	1.6			1.0			5.1	
Delay (s)	17.9	20.6		22.7	25.2			20.8			28.1	
Level of Service	B	C		C	C			C			C	
Approach Delay (s)	20.2			24.8				20.8			28.1	
Approach LOS	C			C				C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay	23.0			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	57.8			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	40.0%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

PM Existing + Project

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔			↔	
Volume (veh/h)	0	0	0	8	0	160	0	157	0	0	257	61
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	0	174	0	171	0	0	279	66
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)	656											
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	570	483	312	483	516	171	346			171		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	533	442	265	442	477	171	299			171		
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	100	80	100			100		
cM capacity (veh/h)	352	490	744	505	468	873	1213			1407		
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	183	171	346									
Volume Left	9	0	0									
Volume Right	174	0	66									
cSH	917	1213	1700									
Volume to Capacity	0.20	0.00	0.20									
Queue Length 95th (ft)	19	0	0									
Control Delay (s)	10.2	0.0	0.0									
Lane LOS	B											
Approach Delay (s)	10.2	0.0	0.0									
Approach LOS	B											
<b>Intersection Summary</b>												
Average Delay	2.7											
Intersection Capacity Utilization	27.2%			ICU Level of Service			A					
Analysis Period (min)	15											

PM Existing + Project

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔					↔			↔	
Volume (veh/h)	132	1	3	0	0	0	0	26	9	232	31	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)	143	1	3	0	0	0	0	28	10	252	34	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)	1040											
pX, platoon unblocked												
vC, conflicting volume	571	576	34	573	571	33	34			38		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	571	576	34	573	571	33	34			38		
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 %	62	100	100	100	100	100	100			84		
cM capacity (veh/h)	378	359	1040	375	362	1040	1578			1572		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	148	38	286									
Volume Left	143	0	252									
Volume Right	3	10	0									
cSH	387	1700	1572									
Volume to Capacity	0.38	0.02	0.16									
Queue Length 95th (ft)	44	0	14									
Control Delay (s)	20.0	0.0	7.0									
Lane LOS	C		A									
Approach Delay (s)	20.0	0.0	7.0									
Approach LOS	C											
<b>Intersection Summary</b>												
Average Delay	10.5											
Intersection Capacity Utilization	35.2%			ICU Level of Service			A					
Analysis Period (min)	15											

PM Existing + Project  
9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	20	189	21	5	12	5	21	20	20	7	6	5
Sign Control		Free			Free			Stop			Stop	
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)	22	205	23	5	13	5	23	22	22	8	7	5
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	18			228			296	290	217	320	298	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	18			228			296	290	217	320	298	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	96	97	99	99	99
cM capacity (veh/h)	1598			1340			639	610	823	592	603	1064
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	250	24	66	20								
Volume Left	22	5	23	8								
Volume Right	23	5	22	5								
cSH	1598	1340	678	680								
Volume to Capacity	0.01	0.00	0.10	0.03								
Queue Length 95th (ft)	1	0	8	2								
Control Delay (s)	0.7	1.8	10.9	10.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	1.8	10.9	10.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			24.5%		ICU Level of Service			A				
Analysis Period (min)			15									

PM Existing + Project  
10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	164	0	0	17	7	4
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)	178	0	0	18	8	4
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				178	197	178
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				178	197	178
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	99
cM capacity (veh/h)				1398	792	865
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	178	18	12			
Volume Left	0	0	8			
Volume Right	0	0	4			
cSH	1700	1398	817			
Volume to Capacity	0.10	0.00	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.0	9.5			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			18.6%		ICU Level of Service	A
Analysis Period (min)			15			

PM Existing + Project

11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	190	0	4	44	0	14
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)	207	0	4	48	0	15
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			207		263	207
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			207		263	207
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		100	98
cM capacity (veh/h)			1365		724	834
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	207	52	15			
Volume Left	0	4	0			
Volume Right	0	0	15			
cSH	1700	1365	834			
Volume to Capacity	0.12	0.00	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.7	9.4			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.7	9.4			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.6			
Intersection Capacity Utilization			20.0%		ICU Level of Service	A
Analysis Period (min)			15			

## **Appendix L**

### **Growth Factor Support Data**



**LAND USE ELEMENT**  
**of the Imperial County**  
**GENERAL PLAN**

**Prepared by:**

Planning & Development Services Department  
County of Imperial  
801 Main St.  
El Centro, California 92243-2875  
Phone: (760) 482-4236  
Fax: (760) 353-8338

**JURG HEUBERGER, AICP, CEP, CBO**  
Planning & Development Services Director

**Approved By:**

Board of Supervisors

October 17, 2006

## II. EXISTING CONDITIONS AND TRENDS

### A. Preface

Knowledge, experience and reasoned expectations of future conditions determines the scope of the issues that the Land Use Element must address. This chapter includes a generalized description of existing physical, cultural, and land use features within the County, from both a historic and expected future perspective.

### B. Land Use/Population

Imperial County is, and will continue for the foreseeable future to be, a predominantly agricultural area, **although in 2003 a significant increase in urbanization began to show.** Presently, approximately one-fifth (534,328) of the nearly 3 million acres of the County is irrigated for agricultural purposes. In addition, approximately 50 percent of County lands are largely undeveloped and under federal ownership. The developed area where the County's incorporated cities, 'nincorporated communities, and supporting facilities are situated comprise less than one percent of the land (see Table 1).

Imperial County Planning & Development Services Department bases its population estimates on building permits and housing unit change. From this annual compilation, the Population Research Unit of the California Department of Finance (DOF) estimates the annual change in population. According to the Department of Finance's January 1, 2006, estimates, the population for the unincorporated area is 36,166 with the total population for Imperial County being 166,585. This compares to the 1990 census results of 27,339 for the unincorporated area with the total population for the County being 109,303 and the 2000 census results of 32,772 for the unincorporated area and 147,361 for the entire County (see Table 2). According to DOF 2006 figures, the average household size county-wide is approximately 3.32 persons per household, with the average in cities being 3.42 persons per household and the average in the unincorporated area being 2.96 persons per household.

Population in the unincorporated areas of the County tends to concentrate in agricultural areas and in recreation/retirement communities. Agricultural related communities include the townsites of Heber, Niland and Seeley in the Imperial Valley. Along the Colorado River, in the eastern portion of the County, small population clusters exist within the townsites of Palo Verde and Winterhaven. Recreation/retirement communities include Ocotillo/Nomirage located in the southwest portion of the County, and Hot Mineral Spa and Bombay Beach, on the northeastern shore of the Salton Sea. The West Shores communities of Salton City, Salton Sea Beach, and Desert Shores are also largely retirement and recreation communities, though increasingly their populations are becoming more diversified. These communities experience a noticeable increase in population during the winter months when visitors converge to the area to avoid cold/wet winters in other parts of the country.

E-2. California County Population Estimates and Components of Change  
 Revised July 1, 2006 and Provisional July 1, 2007  
 Table 1.

County	Total Population		Change 2006-2007		Components of Change					
	Revised July 1, 2006	Provisional July 1, 2007	Number	Percent	Births	Deaths	Natural Increase	Net Migration	Net Immigration	Net Domestic Migration
Alameda	1,513,859	1,530,620	16,761	1.11	20,906	9,384	11,522	5,239	10,033	-4,794
Alpine	1,254	1,261	7	0.56	16	9	7	0	2	-2
Amador	38,083	38,320	237	0.62	291	418	-127	364	19	345
Butte	217,548	219,101	1,553	0.71	2,584	2,148	436	1,117	312	805
Calaveras	45,663	45,950	287	0.63	390	429	-39	326	32	294
Colusa	21,551	21,945	394	1.83	400	142	258	136	108	28
Contra Costa	1,031,012	1,044,201	13,189	1.28	13,584	6,836	6,748	6,441	4,168	2,273
Del Norte	29,009	29,207	198	0.68	374	290	84	114	25	89
El Dorado	176,969	178,689	1,720	0.97	1,981	1,250	731	989	290	699
Fresno	906,365	923,052	16,687	1.84	17,110	5,951	11,159	5,528	4,365	1,163
Glenn	28,628	29,018	390	1.36	455	249	206	184	99	85
Humboldt	131,876	132,364	488	0.37	1,605	1,255	350	138	77	61
Imperial	168,979	174,322	5,343	3.16	3,280	914	2,366	2,977	2,373	604
Inyo	18,221	18,253	32	0.18	242	239	3	29	28	1
Kern	790,246	809,903	19,657	2.49	15,446	5,406	10,040	9,617	3,114	6,503
Kings	149,883	153,268	3,385	2.26	2,742	841	1,901	1,484	564	920
Lake	63,618	63,821	203	0.32	737	850	-113	316	155	161
Lassen	35,521	36,223	702	1.98	268	209	59	643	19	624
Los Angeles	10,247,672	10,294,280	46,608	0.45	152,479	60,800	91,679	-45,071	69,567	-114,638
Madera	146,064	149,916	3,852	2.64	2,565	921	1,644	2,208	505	1,703
Marin	254,000	256,310	2,310	0.91	2,625	1,787	838	1,472	534	938
Mariposa	18,187	18,356	169	0.93	148	176	-28	197	13	184
Mendocino	89,264	89,669	405	0.45	1,137	857	280	125	238	-113
Merced	248,258	252,544	4,286	1.73	4,867	1,435	3,432	854	1,271	-417
Modoc	9,690	9,747	57	0.59	77	114	-37	94	3	91
Mono	14,019	14,055	36	0.26	167	47	120	-84	43	-127
Monterey	421,463	425,356	3,893	0.92	7,371	2,431	4,940	-1,047	2,490	-3,537
Napa	134,186	135,554	1,368	1.02	1,760	1,266	494	874	615	259
Nevada	99,248	99,587	339	0.34	773	982	-209	548	95	453
Orange	3,075,341	3,098,183	22,842	0.74	44,582	17,389	27,193	-4,351	17,584	-21,935
Placer	322,953	329,818	6,865	2.13	3,897	2,257	1,640	5,225	699	4,526
Plumas	21,013	20,891	-122	-0.58	174	226	-52	-70	29	-99
Riverside	2,004,174	2,070,315	66,141	3.30	35,144	13,539	21,605	44,536	7,898	36,638
Sacramento	1,396,496	1,415,117	18,621	1.33	21,703	9,716	11,987	6,634	5,424	1,210
San Benito	57,128	57,493	365	0.64	886	275	611	-246	245	-491
San Bernardino	2,011,404	2,039,467	28,063	1.40	35,351	12,227	23,124	4,939	6,907	-1,968
San Diego	3,077,877	3,120,088	42,211	1.37	46,460	20,298	26,162	16,049	13,067	2,982
San Francisco	806,210	817,537	11,327	1.40	8,683	6,105	2,578	8,749	9,192	-443
San Joaquin	671,115	680,183	9,068	1.35	11,880	4,392	7,488	1,580	3,572	-1,992
San Luis Obispo	264,972	267,154	2,182	0.82	2,740	2,082	658	1,524	431	1,093
San Mateo	726,260	734,453	8,193	1.13	9,667	4,626	5,041	3,152	4,820	-1,668
Santa Barbara	421,337	425,710	4,373	1.04	5,998	2,884	3,114	1,259	1,884	-625
Santa Clara	1,790,272	1,820,176	29,904	1.67	26,347	8,454	17,893	12,011	12,867	-856
Santa Cruz	262,150	265,183	3,033	1.16	3,583	1,666	1,917	1,116	1,340	-224
Shasta	180,129	181,380	1,251	0.69	2,213	1,838	375	876	107	769
Sierra	3,464	3,400	-64	-1.85	14	37	-23	-41	1	-42
Siskiyou	45,618	45,695	77	0.17	532	533	-1	78	43	35
Solano	421,815	423,970	2,155	0.51	5,909	2,668	3,241	-1,086	1,637	-2,723
Sonoma	477,615	482,034	4,419	0.93	5,874	3,836	2,038	2,381	1,226	1,155
Stanislaus	515,660	523,095	7,435	1.44	8,918	3,598	5,320	2,115	1,959	156
Sutter	92,715	95,516	2,801	3.02	1,634	725	909	1,892	871	1,021
Tehama	61,369	62,093	724	1.18	839	641	198	526	109	417
Trinity	13,959	14,012	53	0.38	124	153	-29	82	6	76
Tulare	422,594	430,974	8,380	1.98	8,633	2,668	5,965	2,415	2,106	309
Tuolumne	56,882	56,910	28	0.05	497	620	-123	151	42	109
Ventura	818,803	826,550	7,747	0.95	12,442	5,120	7,322	425	3,575	-3,150
Yolo	193,262	197,530	4,268	2.21	2,689	1,121	1,568	2,700	949	1,751
Yuba	70,053	71,612	1,559	2.23	1,376	554	822	737	184	553
California	37,332,976	37,771,431	438,455	1.17	565,169	237,884	327,285	111,170	199,931	-88,761

**POPULATION PROJECTIONS BY RACE/ETHNICITY FOR  
CALIFORNIA AND ITS COUNTIES 2000-2050  
REPORT 06 P-1**

TABLE 1	TOTAL POPULATION					
	2000	2010	2020	2030	2040	2050
ALAMEDA	1,453,078	1,550,133	1,663,481	1,791,721	1,923,505	2,047,658
ALPINE	1,261	1,369	1,453	1,462	1,411	1,377
AMADOR	35,357	40,337	47,593	54,788	61,550	68,487
BUTTE	204,065	230,116	281,442	334,842	387,743	441,596
CALAVERAS	40,870	47,750	56,318	64,572	72,230	80,424
COLUSA	19,027	23,787	29,588	34,488	38,131	41,662
CONTRA COSTA	956,497	1,075,931	1,237,544	1,422,840	1,609,257	1,812,242
DEL NORTE	27,680	30,983	36,077	42,420	49,029	56,218
EL DORADO	158,621	189,308	221,140	247,570	280,720	314,126
FRESNO	804,508	983,478	1,201,792	1,429,228	1,670,542	1,928,411
GLENN	26,764	30,880	37,959	45,181	54,000	63,586
HUMBOLDT	126,839	134,785	142,167	147,217	150,121	152,333
IMPERIAL	143,763	189,675	239,149	283,693	334,951	387,763
INYO	18,181	19,183	20,495	22,132	23,520	25,112
KERN	665,519	871,728	1,086,113	1,352,627	1,707,239	2,106,024
KINGS	130,202	164,535	205,707	250,516	299,770	352,750
LAKE	58,724	67,530	77,912	87,066	96,885	106,887
LASSEN	34,108	37,918	42,394	47,240	51,596	55,989
LOS ANGELES	9,578,960	10,514,663	11,214,237	11,920,289	12,491,606	13,061,787
MADERA	124,696	162,114	212,874	273,456	344,455	413,569
MARIN	248,449	253,682	260,305	273,151	287,153	307,868
MARIPOSA	17,150	19,108	21,743	23,981	26,169	28,091
MENDOCINO	86,736	93,166	102,017	111,151	121,780	134,358
MERCED	211,481	273,935	348,690	439,905	541,161	652,355
MODOC	9,628	10,809	13,134	16,250	20,064	24,085
MONO	13,013	14,833	18,080	22,894	29,099	36,081
MONTEREY	404,031	433,283	476,642	529,145	584,878	646,590
NAPA	125,146	142,767	165,786	191,734	219,156	251,630
NEVADA	92,532	102,649	114,451	123,940	130,404	136,113
ORANGE	2,863,834	3,227,836	3,520,265	3,705,322	3,849,650	3,987,625
PLACER	252,223	347,543	428,535	512,509	625,964	751,208
PLUMAS	20,868	21,824	22,934	24,530	26,279	28,478
RIVERSIDE	1,559,039	2,239,053	2,904,848	3,507,498	4,103,182	4,730,922
SACRAMENTO	1,233,575	1,451,866	1,622,306	1,803,872	1,989,221	2,176,508
SAN BENITO	53,927	64,230	83,792	103,340	123,406	145,570
SAN BERNARDINO	1,721,942	2,177,596	2,581,371	2,958,939	3,309,292	3,662,193
SAN DIEGO	2,836,303	3,199,706	3,550,714	3,950,757	4,241,399	4,508,728
SAN FRANCISCO	781,209	818,163	844,466	854,675	858,532	854,852
SAN JOAQUIN	569,083	741,417	965,094	1,205,198	1,477,473	1,783,973
SAN LUIS OBISPO	248,322	269,734	293,540	316,613	338,760	364,748
SAN MATEO	711,031	736,667	761,455	786,069	807,587	819,125
SANTA BARBARA	401,115	434,497	459,498	484,570	509,920	534,447
SANTA CLARA	1,693,128	1,837,361	1,992,805	2,192,501	2,412,411	2,624,670
SANTA CRUZ	256,695	268,016	287,480	304,465	318,413	333,083
SHASTA	164,794	191,722	224,386	260,179	295,281	331,724
SIERRA	3,701	3,628	3,508	3,290	3,356	3,547
SISKIYOU	44,634	47,109	51,283	55,727	60,656	66,588
SOLANO	396,995	441,061	503,248	590,166	697,206	815,524
SONOMA	461,618	495,412	546,151	606,346	676,179	761,177
STANISLAUS	451,190	559,708	699,144	857,893	1,014,365	1,191,344
SUTTER	79,632	102,326	141,159	182,401	229,620	282,894
TEHAMA	56,130	65,593	79,484	93,477	108,345	124,475
TRINITY	13,155	15,172	18,236	22,136	26,030	30,209
TULARE	369,873	466,893	599,117	742,969	879,480	1,026,755
TUOLUMNE	54,863	58,721	64,161	67,510	70,325	73,291
VENTURA	758,884	855,876	956,392	1,049,758	1,135,684	1,229,737
YOLO	170,190	206,100	245,052	275,360	301,934	327,982
YUBA	60,598	80,411	109,216	137,322	168,040	201,327
CALIFORNIA	34,105,437	39,135,676	44,135,923	49,240,891	54,226,115	59,507,876

**COUNTY OF IMPERIAL**  
**2000-2005 HOUSING ELEMENT**

**JURG HEUBERGER, AICP, CEP**  
**Planning Director**

**Prepared By:**

**Cotton/Beland/Associates, Inc.**  
**6336 Greenwich Drive, Suite F**  
**San Diego, California 92122**  
**#1177.00**

The exception of this low density aspect can be found in the several small rural unincorporated communities such as Heber, Seeley, Niland, Salton City and Palo Verde that have the basic infrastructure (to a lesser extent) associated with the incorporated cities. These small rural communities tend to be isolated from the cities. Beyond these small rural communities and located in the agricultural lands and the desert open space areas of the unincorporated County, there is a relatively small and geographically dispersed population that lacks the infrastructure associated with either the incorporated cities or the small rural communities.

The majority of the growth that occurs in the County tends to happen in the incorporated cities or in the areas surrounding the cities. The County has essentially established urban buffer areas around all the cities and communities located in agricultural areas (Please see the "Urban Areas" illustrated in the County General Plan Land Use Map provided in Appendix A of this Element). It is these buffer areas where growth outside of the incorporated cities tends to occur. Development in these areas is accomplished through the connection of services from a neighboring city, annexation into the city, or the establishment of new services to support the development. Growth outside of the "urban area" tends to be on a single lot basis. With the exception of a few small districts, neither major subdivisions nor major developments typically occur in the unincorporated areas outside of the "urban areas" due to the County's rural character, lack of available infrastructure and the agricultural based activities.

## **2. County Growth Trends**

The best available source of demographic information is the federal census, which is conducted once every ten years. The Population Research Unit of the California Department of Finance is the best source for annual population estimates. One problem with the federal census is that it does not take into account the seasonal population changes. Imperial County attracts many seasonal migratory workers and retired people, especially during the months of November through February.

### ***Population Characteristics***

Based on the 1990 census, the total population of Imperial County increased from 92,500 to 109,303 between 1980 and 1990, an increase of 16,803 persons or 18.2 percent. The unincorporated area increased from 24,459 to 27,339 persons in the same period of time. This 11.8 percent increase represents a population growth of 2,880 persons in the unincorporated area and highlights the lower population growth in the unincorporated areas when compared to the County as a whole. Based on April 1998 SCAG estimates, the year 2000 population of Imperial County is 148,980, with an estimated 39,422 people living in unincorporated areas.

There are a number of potential factors that may support an accelerated population growth in the near future. These factors include: growth of the geothermal industry in the County; additional prisons; an additional USA/Mexico border crossing; the possible expansion of the U.S. Naval Air Facility; and a possible regional airport.

### ***Household Characteristics***

A household is any group of people living together in a residence, whether related or unrelated. A survey of household characteristics is useful to determine household size trends, income, overcrowding or under-utilization of housing, and the number of special needs households such as large families and female-headed households.

According to the 1997 Housing Survey there were an estimated 4,388 households in the unincorporated portions of the County in 1997. Approximately 24.5 percent of the households were renter-occupied, while the remaining 75.5 percent were owner-occupied.

The average household size was estimated to be 3.45 persons per household. Further, larger households with five or more persons per household comprised 29.7 percent of the community, while three or four person households constituted 36.8 percent of the households in the unincorporated County.

As depicted in Table 1, approximately 66 percent of the owner- and renter-occupied households in the unincorporated County have annual incomes below 80 percent of the area median income, meaning 2/3 of the households are considered lower income households. In addition, Table 1 also shows that a majority of renter households have annual incomes less than 50 percent of the median income, or 60 percent of the renter households are considered very low income.

# 2004 Regional Transportation Plan/ Growth Vision:

## SOCIO-ECONOMIC FORECAST REPORT

June 2004





# Counties and Subregions

## Imperial County Subregion

### Population and Households

Imperial County shares a border with Mexico and is primarily agricultural. The county currently has about 1 percent of the SCAG regional population and about 1 percent of the households. The 2000 July figure shows that the population is 147,000 with 39,500 households.

Imperial County's population is projected to be 270,000 in 2030, an 84 percent increase from its 2000 population. The number of households is projected to be 84,000 in 2030, up 112 percent from 2000. Based on the SCAG adopted 2004 RTP Socioeconomic Forecast, the Imperial County population and households are expected to grow at a faster pace than the regional average. Population is projected to grow at an annual rate of 2.8 percent and households are projected to grow at annual rate of 3.7 percent.

The County's rapid growth rate is primarily a result of the large Hispanic population in the county. In 2000, seventy two percent of the Imperial County population was Hispanic. Hispanics have the highest fertility rate,

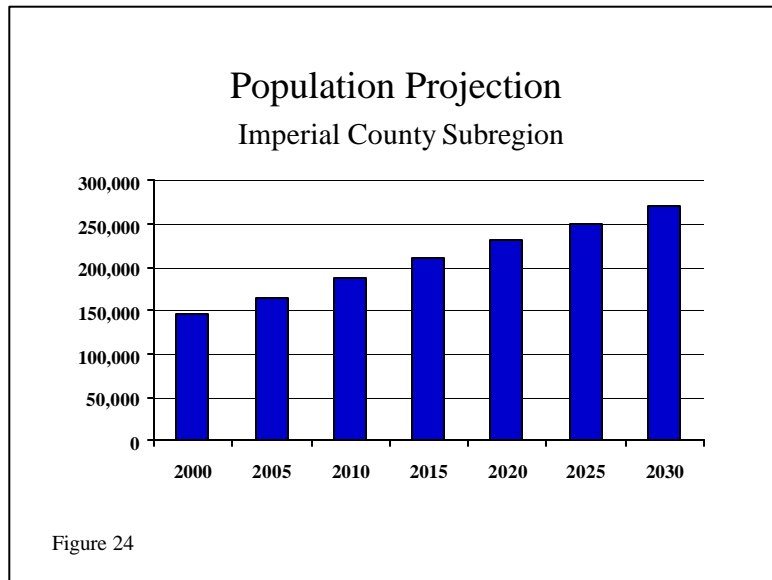


Figure 24

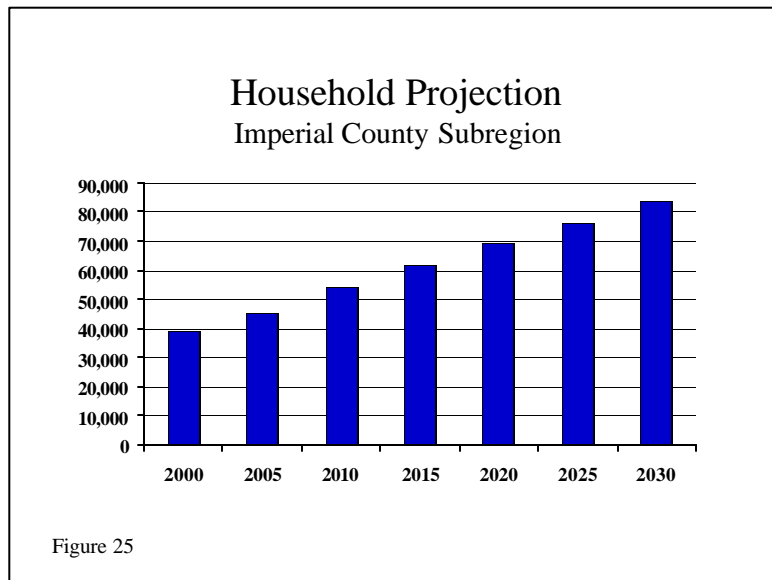


Figure 25

## **Appendix M**

### **Year 2013 Intersection LOS Calculations**

AM Year 2013

1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	5	62	38	22	101	3	73	12	18	6	19	11
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)	5	67	41	24	110	3	79	13	20	7	21	12
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	39	75	79	58	112	39						
Volume Left (vph)	5	0	24	0	79	7						
Volume Right (vph)	0	41	0	3	20	12						
Hadj (s)	0.10	-0.35	0.19	-0.01	0.07	-0.12						
Departure Headway (s)	5.1	4.6	5.2	5.0	4.6	4.5						
Degree Utilization, x	0.06	0.10	0.11	0.08	0.14	0.05						
Capacity (veh/h)	681	741	668	696	741	743						
Control Delay (s)	7.2	6.9	7.6	7.2	8.4	7.7						
Approach Delay (s)	7.0		7.4		8.4	7.7						
Approach LOS	A		A		A	A						
<b>Intersection Summary</b>												
Delay			7.6									
HCM Level of Service			A									
Intersection Capacity Utilization			27.0%		ICU Level of Service		A					
Analysis Period (min)			15									

AM Year 2013

2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔				↔	
Volume (veh/h)	0	0	0	13	0	59	7	24	0	0	48	17	
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	14	0	64	8	26	0	0	52	18	
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	135	103	61	103	112	26	71						26
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	135	103	61	103	112	26	71						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	98	100	94	100						100
cM capacity (veh/h)	783	783	1004	874	774	1050	1530						1588
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	78	34	71										
Volume Left	14	8	0										
Volume Right	64	0	18										
cSH	1281	1530	1700										
Volume to Capacity	0.06	0.00	0.04										
Queue Length 95th (ft)	5	0	0										
Control Delay (s)	8.7	1.7	0.0										
Lane LOS	A	A											
Approach Delay (s)	8.7	1.7	0.0										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay			4.1										
Intersection Capacity Utilization			17.3%		ICU Level of Service		A						
Analysis Period (min)			15										

AM Year 2013  
3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	6	0	0	0	0	0	0	29	29	39	21	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)	7	0	0	0	0	0	0	32	32	42	23	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	155	171	23	155	155	47	23						63
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	155	171	23	155	155	47	23						63
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						97
cM capacity (veh/h)	795	702	1054	795	717	1022	1592						1540
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	7	63	65										
Volume Left	7	0	42										
Volume Right	0	32	0										
cSH	711	1700	1540										
Volume to Capacity	0.01	0.04	0.03										
Queue Length 95th (ft)	1	0	2										
Control Delay (s)	10.1	0.0	4.9										
Lane LOS	B		A										
Approach Delay (s)	10.1	0.0	4.9										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay	2.9												
Intersection Capacity Utilization	19.9%		ICU Level of Service			A							
Analysis Period (min)	15												

AM Year 2013  
4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Volume (veh/h)	3	0	6	0	0	1	3	27	0	0	12	6	
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)	3	0	7	0	0	1	3	29	0	0	13	7	
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	53	52	16	59	55	29	20						29
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	53	52	16	59	55	29	20						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 %	100	100	99	100	100	100	100						100
cM capacity (veh/h)	943	837	1063	930	834	1045	1597						1584
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	10	1	33	20									
Volume Left	3	0	3	0									
Volume Right	7	1	0	7									
cSH	1020	1045	1597	1584									
Volume to Capacity	0.01	0.00	0.00	0.00									
Queue Length 95th (ft)	1	0	0	0									
Control Delay (s)	8.6	8.4	0.7	0.0									
Lane LOS	A	A	A										
Approach Delay (s)	8.6	8.4	0.7	0.0									
Approach LOS	A	A											
<b>Intersection Summary</b>													
Average Delay	1.9												
Intersection Capacity Utilization	13.9%		ICU Level of Service			A							
Analysis Period (min)	15												

AM Year 2013  
5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	1	29	54	3	0	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)	1	32	59	3	0	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	62				94	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	62				94	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				100	100
cM capacity (veh/h)	1541				905	1005
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	33	62	2			
Volume Left	1	0	0			
Volume Right	0	3	2			
cSH	1541	1700	1005			
Volume to Capacity	0.00	0.04	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.2	0.0	8.6			
Lane LOS	A		A			
Approach Delay (s)	0.2	0.0	8.6			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.3			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			

AM Year 2013  
6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕					↕	↕	↕
Volume (vph)	14	55	8	13	112	8	14	100	16	16	110	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0					4.0		4.0
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00				1.00
Frt	1.00	0.98		1.00	0.99			0.98				0.98
Flt Protected	0.95	1.00		0.95	1.00			0.99				0.99
Satd. Flow (prot)	1770	1826		1770	1844			1823				1811
Flt Permitted	0.95	1.00		0.95	1.00			0.99				0.99
Satd. Flow (perm)	1770	1826		1770	1844			1823				1811
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	60	9	14	122	9	15	109	17	17	120	28
RTOR Reduction (vph)	0	4	0	0	3	0	0	4	0	0	7	0
Lane Group Flow (vph)	15	65	0	14	128	0	0	137	0	0	158	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	5.7	5.7		7.3	7.3			7.5				8.1
Effective Green, g (s)	5.7	5.7		7.3	7.3			7.5				8.1
Actuated g/C Ratio	0.13	0.13		0.16	0.16			0.17				0.18
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0				4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0				3.0
Lane Grp Cap (vph)	226	233		290	302			307				329
v/s Ratio Prot	0.01	c0.04		0.01	c0.07			c0.08				c0.09
v/s Ratio Perm												
v/c Ratio	0.07	0.28		0.05	0.43			0.45				0.48
Uniform Delay, d1	17.1	17.6		15.7	16.8			16.7				16.4
Progression Factor	1.00	1.00		1.00	1.00			1.00				1.00
Incremental Delay, d2	0.1	0.7		0.1	1.0			1.0				1.1
Delay (s)	17.2	18.2		15.8	17.7			17.7				17.5
Level of Service	B	B		B	B			B				B
Approach Delay (s)	18.1			17.5			17.7			17.5		
Approach LOS	B			B			B			B		
<b>Intersection Summary</b>												
HCM Average Control Delay			17.7	HCM Level of Service								B
HCM Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			44.6	Sum of lost time (s)								16.0
Intersection Capacity Utilization			25.0%	ICU Level of Service								A
Analysis Period (min)			15									
c Critical Lane Group												

AM Year 2013

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔			↔	↔	
Volume (veh/h)	0	0	0	16	0	211	4	78	0	0	116	59	
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	17	0	229	4	85	0	0	126	64	
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)	656												
pX, platoon unblocked													
vC, conflicting volume	366	252	158	252	284	85	190						85
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	366	252	158	252	284	85	190						85
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	100	76	100						100
cM capacity (veh/h)	450	649	887	700	623	974	1384						1512
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	247	89	190										
Volume Left	17	4	0										
Volume Right	229	0	64										
cSH	1048	1384	1700										
Volume to Capacity	0.24	0.00	0.11										
Queue Length 95th (ft)	23	0	0										
Control Delay (s)	9.9	0.4	0.0										
Lane LOS	A	A											
Approach Delay (s)	9.9	0.4	0.0										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay	4.7												
Intersection Capacity Utilization	24.1%			ICU Level of Service			A						
Analysis Period (min)	15												

AM Year 2013

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔	↔					↔			↔	↔	
Volume (veh/h)	42	0	3	0	0	0	0	37	5	96	35	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)	46	0	3	0	0	0	0	40	5	104	38	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)	1040												
pX, platoon unblocked													
vC, conflicting volume	290	292	38	291	290	43	38						46
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	290	292	38	291	290	43	38						46
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						93
cM capacity (veh/h)	629	577	1034	625	579	1027	1572						1562
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	49	46	142										
Volume Left	46	0	104										
Volume Right	3	5	0										
cSH	674	1700	1562										
Volume to Capacity	0.07	0.03	0.07										
Queue Length 95th (ft)	6	0	5										
Control Delay (s)	11.0	0.0	5.6										
Lane LOS	B		A										
Approach Delay (s)	11.0	0.0	5.6										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay	5.6												
Intersection Capacity Utilization	23.8%			ICU Level of Service			A						
Analysis Period (min)	15												

AM Year 2013  
9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	0	7	0	0	8	1	1	0	0	3	1	0
Sign Control		Free			Free			Stop			Stop	
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	8	0	0	9	1	1	0	0	3	1	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	10			8			17	17	8	17	17	9
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	10			8			17	17	8	17	17	9
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1610			1613			996	877	1075	998	877	1072
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	8	10	1	4								
Volume Left	0	0	1	3								
Volume Right	0	1	0	0								
cSH	1610	1613	996	965								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	8.6	8.7								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	8.6	8.7								
Approach LOS			A	A								
<b>Intersection Summary</b>												
Average Delay	2.1											
Intersection Capacity Utilization	13.3%				ICU Level of Service				A			
Analysis Period (min)	15											

AM Year 2013  
10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	53	0	3	284	1	3
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)	58	0	3	309	1	3
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				58	373	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				58	373	58
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	100	100
cM capacity (veh/h)				1547	627	1009
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	58	312	4			
Volume Left	0	3	1			
Volume Right	0	0	3			
cSH	1700	1547	875			
Volume to Capacity	0.03	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.1	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.1	9.1			
Approach LOS		A				
<b>Intersection Summary</b>						
Average Delay	0.2					
Intersection Capacity Utilization	27.3%			ICU Level of Service		
Analysis Period (min)	15			A		

AM Year 2013

11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	55	1	4	150	1	5
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)	60	1	4	163	1	5
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			61		232	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			61		232	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		100	99
cM capacity (veh/h)			1542		754	1005
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	61	167	7			
Volume Left	0	4	1			
Volume Right	1	0	5			
cSH	1700	1542	952			
Volume to Capacity	0.04	0.00	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.2	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.2	8.8			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization		21.1%		ICU Level of Service		A
Analysis Period (min)			15			



PM Year 2013

1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop		Stop		Stop		Stop		Stop		Stop	
Volume (vph)	8	120	97	14	35	20	44	20	11	15	11	13
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)	9	130	105	15	38	22	48	22	12	16	12	14
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	74	171	34	41	82	42						
Volume Left (vph)	9	0	15	0	48	16						
Volume Right (vph)	0	105	0	22	12	14						
Hadj (s)	0.09	-0.40	0.26	-0.34	0.06	-0.09						
Departure Headway (s)	5.0	4.5	5.3	4.7	4.7	4.6						
Degree Utilization, x	0.10	0.21	0.05	0.05	0.11	0.05						
Capacity (veh/h)	707	779	653	737	717	722						
Control Delay (s)	7.3	7.5	7.4	6.7	8.3	7.9						
Approach Delay (s)	7.4	7.0	7.0	7.0	8.3	7.9						
Approach LOS	A	A	A	A	A	A						
<b>Intersection Summary</b>												
Delay	7.6											
HCM Level of Service	A											
Intersection Capacity Utilization	25.5%		ICU Level of Service		A							
Analysis Period (min)	15											

PM Year 2013

2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔			↔	↔
Volume (veh/h)	0	0	0	15	0	39	0	13	0	0	89	6
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	0	42	0	14	0	0	97	7
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	135	114	100	114	117	14	103			14		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	135	114	100	114	117	14	103			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	100	96	100			100		
cM capacity (veh/h)	803	776	956	863	773	1066	1489			1604		
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	59	14	103									
Volume Left	16	0	0									
Volume Right	42	0	7									
cSH	1476	1489	1700									
Volume to Capacity	0.04	0.00	0.06									
Queue Length 95th (ft)	3	0	0									
Control Delay (s)	8.7	0.0	0.0									
Lane LOS	A											
Approach Delay (s)	8.7	0.0	0.0									
Approach LOS	A											
<b>Intersection Summary</b>												
Average Delay	2.9											
Intersection Capacity Utilization	15.0%		ICU Level of Service		A							
Analysis Period (min)	15											

PM Year 2013  
3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	7	0	5	0	0	0	0	6	19	62	35	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)	8	0	5	0	0	0	0	7	21	67	38	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	190	200	38	192	190	17	38						27
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	190	200	38	192	190	17	38						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 %	99	100	99	100	100	100	100						96
cM capacity (veh/h)	745	666	1034	738	675	1062	1572						1587
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	13	27	105										
Volume Left	8	0	67										
Volume Right	5	21	0										
cSH	1278	1700	1587										
Volume to Capacity	0.01	0.02	0.04										
Queue Length 95th (ft)	1	0	3										
Control Delay (s)	9.3	0.0	4.8										
Lane LOS	A		A										
Approach Delay (s)	9.3	0.0	4.8										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay	4.3												
Intersection Capacity Utilization	21.9%			ICU Level of Service			A						
Analysis Period (min)	15												

PM Year 2013  
4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕						↕			↕		
Volume (veh/h)	2	0	2	0	0	0	1	8	0	0	25	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)	2	0	2	0	0	0	1	9	0	0	27	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	39	39	28	41	39	9	28						9
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	39	39	28	41	39	9	28						9
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	100	100	100	100						100
cM capacity (veh/h)	966	853	1048	960	852	1073	1585						1611
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	4	0	10	28									
Volume Left	2	0	1	0									
Volume Right	2	0	0	1									
cSH	1005	1700	1585	1611									
Volume to Capacity	0.00	0.00	0.00	0.00									
Queue Length 95th (ft)	0	0	0	0									
Control Delay (s)	8.6	0.0	0.8	0.0									
Lane LOS	A	A	A										
Approach Delay (s)	8.6	0.0	0.8	0.0									
Approach LOS	A	A											
<b>Intersection Summary</b>													
Average Delay	1.1												
Intersection Capacity Utilization	13.3%				ICU Level of Service			A					
Analysis Period (min)	15												

PM Year 2013  
5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	2	96	56	3	4	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	104	61	3	4	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	64				171	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	64				171	62
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)	1538				818	1002
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	107	64	5			
Volume Left	2	0	4			
Volume Right	0	3	1			
cSH	1538	1700	849			
Volume to Capacity	0.00	0.04	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.2	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s)	0.2	0.0	9.3			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization			16.7%	ICU Level of Service	A	
Analysis Period (min)			15			

PM Year 2013  
6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕					↕	↕	↕
Volume (vph)	40	185	16	25	101	14	8	116	19	21	135	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0				4.0		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00				1.00		1.00	
Frt	1.00	0.99		1.00	0.98				0.98		0.99	
Flt Protected	0.95	1.00		0.95	1.00				1.00		0.99	
Satd. Flow (prot)	1770	1841		1770	1829				1824		1829	
Flt Permitted	0.95	1.00		0.95	1.00				1.00		0.99	
Satd. Flow (perm)	1770	1841		1770	1829				1824		1829	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	201	17	27	110	15	9	126	21	23	147	17
RTOR Reduction (vph)	0	2	0	0	4	0	0	5	0	0	3	0
Lane Group Flow (vph)	43	216	0	27	121	0	0	151	0	0	184	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	14.3	14.3		8.3	8.3			11.9			13.1	
Effective Green, g (s)	14.3	14.3		8.3	8.3			11.9			13.1	
Actuated g/C Ratio	0.22	0.22		0.13	0.13			0.19			0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	398	414		231	239			341			377	
v/s Ratio Prot	0.02	c0.12		0.02	c0.07			c0.08			c0.10	
v/s Ratio Perm												
v/c Ratio	0.11	0.52		0.12	0.50			0.44			0.49	
Uniform Delay, d1	19.6	21.6		24.4	25.7			22.9			22.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.2		0.2	1.7			0.9			1.0	
Delay (s)	19.7	22.8		24.6	27.4			23.8			23.3	
Level of Service	B	C		C	C			C			C	
Approach Delay (s)	22.3			26.9				23.8			23.3	
Approach LOS	C			C				C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			23.8	HCM Level of Service		C						
HCM Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			63.6	Sum of lost time (s)		16.0						
Intersection Capacity Utilization			39.3%	ICU Level of Service		A						
Analysis Period (min)			15									
c Critical Lane Group												

PM Year 2013

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔			↔	
Volume (veh/h)	0	0	0	8	0	169	0	107	0	0	272	57
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	0	184	0	116	0	0	296	62
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)	656											
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	535	443	327	443	474	116	358			116		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497	401	280	401	434	116	313			116		
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	100	80	100			100		
cM capacity (veh/h)	374	517	730	538	496	936	1200			1472		
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	192	116	358									
Volume Left	9	0	0									
Volume Right	184	0	62									
cSH	980	1200	1700									
Volume to Capacity	0.20	0.00	0.21									
Queue Length 95th (ft)	18	0	0									
Control Delay (s)	9.9	0.0	0.0									
Lane LOS	A											
Approach Delay (s)	9.9	0.0	0.0									
Approach LOS	A											
<b>Intersection Summary</b>												
Average Delay	2.9											
Intersection Capacity Utilization	27.8%			ICU Level of Service			A					
Analysis Period (min)	15											

PM Year 2013

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔					↔			↔	
Volume (veh/h)	80	1	3	0	0	0	0	27	10	245	33	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)	87	1	3	0	0	0	0	29	11	266	36	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)	1040											
pX, platoon unblocked												
vC, conflicting volume	603	609	36	605	603	35	36			40		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	603	609	36	605	603	35	36			40		
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 %	76	100	100	100	100	100	100			83		
cM capacity (veh/h)	357	340	1037	354	343	1038	1575			1569		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	91	40	302									
Volume Left	87	0	266									
Volume Right	3	11	0									
cSH	370	1700	1569									
Volume to Capacity	0.25	0.02	0.17									
Queue Length 95th (ft)	24	0	15									
Control Delay (s)	18.0	0.0	7.0									
Lane LOS	C		A									
Approach Delay (s)	18.0	0.0	7.0									
Approach LOS	C											
<b>Intersection Summary</b>												
Average Delay	8.7											
Intersection Capacity Utilization	33.1%			ICU Level of Service			A					
Analysis Period (min)	15											

PM Year 2013  
9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	0	3	1	0	1	0	1	0	0	2	1	0
Sign Control		Free			Free			Stop			Stop	
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	3	1	0	1	0	1	0	0	2	1	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	1			4			5	5	4	5	5	1
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1			4			5	5	4	5	5	1
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1622			1617			1014	890	1080	1016	890	1083
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	4	1	1	3								
Volume Left	0	0	1	2								
Volume Right	1	0	0	0								
cSH	1622	1617	1014	970								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.0	0.0	8.6	8.7								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	8.6	8.7								
Approach LOS			A	A								
<b>Intersection Summary</b>												
Average Delay	3.9											
Intersection Capacity Utilization	13.3%			ICU Level of Service			A					
Analysis Period (min)	15											

PM Year 2013  
10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	173	0	0	18	0	5
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)	188	0	0	20	0	5
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				188	208	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				188	208	188
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	100	99
cM capacity (veh/h)				1386	781	854
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	188	20	5			
Volume Left	0	0	0			
Volume Right	0	0	5			
cSH	1700	1386	854			
Volume to Capacity	0.11	0.00	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	9.2			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.2			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay	0.2					
Intersection Capacity Utilization	19.1%			ICU Level of Service		
Analysis Period (min)	15					

PM Year 2013

11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	201	0	4	47	0	4
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)	218	0	4	51	0	4
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			218		278	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			218		278	218
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		100	99
cM capacity (veh/h)			1351		709	821
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	218	55	4			
Volume Left	0	4	0			
Volume Right	0	0	4			
cSH	1700	1351	821			
Volume to Capacity	0.13	0.00	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.6	9.4			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.6	9.4			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.3			
Intersection Capacity Utilization		20.6%		ICU Level of Service		A
Analysis Period (min)			15			

## **Appendix N**

### **Year 2013 + Project Intersection LOS Calculations**

AM Year 2013 + Project  
1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	5	62	38	25	111	3	73	12	18	6	19	11
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)	5	67	41	27	121	3	79	13	20	7	21	12
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	39	75	88	64	112	39						
Volume Left (vph)	5	0	27	0	79	7						
Volume Right (vph)	0	41	0	3	20	12						
Hadj (s)	0.10	-0.35	0.19	0.00	0.07	-0.12						
Departure Headway (s)	5.1	4.7	5.2	5.0	4.6	4.5						
Degree Utilization, x	0.06	0.10	0.13	0.09	0.14	0.05						
Capacity (veh/h)	678	738	668	695	735	736						
Control Delay (s)	7.2	7.0	7.7	7.3	8.4	7.8						
Approach Delay (s)	7.1	7.1	7.5	7.5	8.4	7.8						
Approach LOS	A	A	A	A	A	A						
<b>Intersection Summary</b>												
Delay	7.7											
HCM Level of Service	A											
Intersection Capacity Utilization	27.2%		ICU Level of Service				A					
Analysis Period (min)	15											

AM Year 2013 + Project  
2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔				↔
Volume (veh/h)	0	0	0	187	0	59	11	24	0	0	0	51
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	203	0	64	12	26	0	0	0	55
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	147	115	65	115	124	26	74				26	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	147	115	65	115	124	26	74				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	76	100	94	99				100	
cM capacity (veh/h)	767	769	999	857	760	1050	1526				1588	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	267	38	74									
Volume Left	203	12	0									
Volume Right	64	0	18									
cSH	1127	1526	1700									
Volume to Capacity	0.24	0.01	0.04									
Queue Length 95th (ft)	23	1	0									
Control Delay (s)	10.1	2.4	0.0									
Lane LOS	B	A										
Approach Delay (s)	10.1	2.4	0.0									
Approach LOS	B											
<b>Intersection Summary</b>												
Average Delay	7.3											
Intersection Capacity Utilization	25.6%		ICU Level of Service				A					
Analysis Period (min)	15											



AM Year 2013 + Project  
3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	6	0	95	0	0	0	0	33	37	39	198	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)	7	0	103	0	0	0	0	36	40	42	215	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	356	376	215	408	356	56	215						76
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	356	376	215	408	356	56	215						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 %	99	100	87	100	100	100	100						97
cM capacity (veh/h)	586	540	825	474	554	1011	1355						1523
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	110	76	258										
Volume Left	7	0	42										
Volume Right	103	40	0										
cSH	877	1700	1523										
Volume to Capacity	0.13	0.04	0.03										
Queue Length 95th (ft)	11	0	2										
Control Delay (s)	10.1	0.0	1.4										
Lane LOS	B		A										
Approach Delay (s)	10.1	0.0	1.4										
Approach LOS	B		A										
<b>Intersection Summary</b>													
Average Delay	3.3												
Intersection Capacity Utilization	29.2%			ICU Level of Service			A						
Analysis Period (min)	15												

AM Year 2013 + Project  
4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Volume (veh/h)	15	0	6	0	0	1	52	27	0	0	12	278	
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	0	7	0	0	1	57	29	0	0	13	302	
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	308	307	164	313	458	29	315						29
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	308	307	164	313	458	29	315						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 %	97	100	99	100	100	100	95						100
cM capacity (veh/h)	622	580	880	613	477	1045	1245						1584
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	23	1	86	315									
Volume Left	16	0	57	0									
Volume Right	7	1	0	302									
cSH	679	1045	1245	1584									
Volume to Capacity	0.03	0.00	0.05	0.00									
Queue Length 95th (ft)	3	0	4	0									
Control Delay (s)	10.5	8.4	5.4	0.0									
Lane LOS	B	A	A										
Approach Delay (s)	10.5	8.4	5.4	0.0									
Approach LOS	B	A											
<b>Intersection Summary</b>													
Average Delay	1.7												
Intersection Capacity Utilization	40.0%				ICU Level of Service				A				
Analysis Period (min)	15												

AM Year 2013 + Project

5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	1	29	54	52	0	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)	1	32	59	57	0	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	115				121	87
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	115				121	87
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				100	100
cM capacity (veh/h)	1474				874	972
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	33	115	2			
Volume Left	1	0	0			
Volume Right	0	57	2			
cSH	1474	1700	972			
Volume to Capacity	0.00	0.07	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.3	0.0	8.7			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	8.7			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			16.0%	ICU Level of Service	A	
Analysis Period (min)			15			

AM Year 2013 + Project

6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕					↕	↕	↕
Volume (vph)	14	55	8	23	122	8	14	107	16	16	156	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0				4.0		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00				1.00		1.00	
Frt	1.00	0.98		1.00	0.99				0.98		0.98	
Flt Protected	0.95	1.00		0.95	1.00				0.99		1.00	
Satd. Flow (prot)	1770	1826		1770	1845				1825		1819	
Flt Permitted	0.95	1.00		0.95	1.00				0.99		1.00	
Satd. Flow (perm)	1770	1826		1770	1845				1825		1819	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	60	9	25	133	9	15	116	17	17	170	32
RTOR Reduction (vph)	0	7	0	0	3	0	0	6	0	0	8	0
Lane Group Flow (vph)	15	62	0	25	139	0	0	142	0	0	211	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	4.1	4.1		7.5	7.5			7.7			8.9	
Effective Green, g (s)	4.1	4.1		7.5	7.5			7.7			8.9	
Actuated g/C Ratio	0.09	0.09		0.17	0.17			0.17			0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	164	169		300	313			318			366	
v/s Ratio Prot	0.01	c0.03		0.01	c0.08			c0.08			c0.12	
v/s Ratio Perm												
v/c Ratio	0.09	0.37		0.08	0.44			0.45			0.58	
Uniform Delay, d1	18.3	18.8		15.5	16.5			16.3			15.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	1.3		0.1	1.0			1.0			2.2	
Delay (s)	18.6	20.2		15.6	17.5			17.3			18.1	
Level of Service	B	C		B	B			B			B	
Approach Delay (s)	19.9			17.2			17.3			18.1		
Approach LOS	B			B			B			B		
<b>Intersection Summary</b>												
HCM Average Control Delay			17.9	HCM Level of Service								B
HCM Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			44.2	Sum of lost time (s)								16.0
Intersection Capacity Utilization			31.8%	ICU Level of Service								A
Analysis Period (min)			15									
c Critical Lane Group												

AM Year 2013 + Project

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔			↔	↔	
Volume (veh/h)	0	0	0	16	0	211	4	85	0	0	116	115	
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	17	0	229	4	92	0	0	126	125	
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)												656	
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98							0.98	
vC, conflicting volume	404	290	189	290	352	92	251						92
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	379	261	158	261	325	92	222						92
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	100	76	100						100
cM capacity (veh/h)	430	627	867	674	577	965	1316						1502
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	247	97	251										
Volume Left	17	4	0										
Volume Right	229	0	125										
cSH	1038	1316	1700										
Volume to Capacity	0.24	0.00	0.15										
Queue Length 95th (ft)	23	0	0										
Control Delay (s)	9.9	0.4	0.0										
Lane LOS	A	A											
Approach Delay (s)	9.9	0.4	0.0										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay	4.2												
Intersection Capacity Utilization	24.4%			ICU Level of Service			A						
Analysis Period (min)	15												

AM Year 2013 + Project

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔	↔					↔			↔	↔	
Volume (veh/h)	49	0	3	0	0	0	0	37	5	96	35	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)	53	0	3	0	0	0	0	40	5	104	38	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)												1040	
pX, platoon unblocked													
vC, conflicting volume	290	292	38	291	290	43	38						46
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	290	292	38	291	290	43	38						46
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 %	92	100	100	100	100	100	100						93
cM capacity (veh/h)	629	577	1034	625	579	1027	1572						1562
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	57	46	142										
Volume Left	53	0	104										
Volume Right	3	5	0										
cSH	667	1700	1562										
Volume to Capacity	0.08	0.03	0.07										
Queue Length 95th (ft)	7	0	5										
Control Delay (s)	11.1	0.0	5.6										
Lane LOS	B		A										
Approach Delay (s)	11.1	0.0	5.6										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay	5.8												
Intersection Capacity Utilization	23.8%			ICU Level of Service			A						
Analysis Period (min)	15												

AM Year 2013 + Project  
9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	5	18	5	20	194	21	6	5	5	23	21	20
Sign Control	Free				Free			Stop			Stop	
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)	5	20	5	22	211	23	7	5	5	25	23	22
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	234		25		332		310		22		307	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234		25		332		310		22		307	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1	
tC, 2 stage (s)												
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5	
p0 queue free %	100		99		99		99		99		96	
cM capacity (veh/h)	1334		1589		579		594		1055		629	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	30	255	17	70								
Volume Left	5	22	7	25								
Volume Right	5	23	5	22								
cSH	1334	1589	680	666								
Volume to Capacity	0.00	0.01	0.03	0.10								
Queue Length 95th (ft)	0	1	2	9								
Control Delay (s)	1.4	0.7	10.4	11.0								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.4	0.7	10.4	11.0								
Approach LOS			B	B								
Intersection Summary												
Average Delay	3.2											
Intersection Capacity Utilization	25.6%				ICU Level of Service				A			
Analysis Period (min)	15											

AM Year 2013 + Project  
10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	53	7	3	284	1	3
Sign Control	Free		Free		Stop	Stop
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	8	3	309	1	3
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			65		377	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			65		377	
tC, single (s)			4.1		6.4	
tC, 2 stage (s)						
tF (s)			2.2		3.5	
p0 queue free %			100		100	
cM capacity (veh/h)			1537		624	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	65	312	4			
Volume Left	0	3	1			
Volume Right	8	0	3			
cSH	1700	1537	871			
Volume to Capacity	0.04	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.1	9.2			
Lane LOS	A		A			
Approach Delay (s)	0.0	0.1	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	27.3%		ICU Level of Service		A	
Analysis Period (min)	15					

AM Year 2013 + Project  
11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	55	1	14	150	1	5
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)	60	1	15	163	1	5
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			61	254	60	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			61	254	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 %			99	100	99	
cM capacity (veh/h)			1542	728	1005	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	61	178	7			
Volume Left	0	15	1			
Volume Right	1	0	5			
cSH	1700	1542	945			
Volume to Capacity	0.04	0.01	0.01			
Queue Length 95th (ft)	0	1	1			
Control Delay (s)	0.0	0.7	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.7	8.8			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.7			
Intersection Capacity Utilization		25.3%		ICU Level of Service		A
Analysis Period (min)			15			

PM Year 2013 + Project  
1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	8	130	97	14	35	20	44	20	14	15	11	13
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)	9	141	105	15	38	22	48	22	15	16	12	14
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	79	176	34	41	85	42						
Volume Left (vph)	9	0	15	0	48	16						
Volume Right (vph)	0	105	0	22	15	14						
Hadj (s)	0.09	-0.39	0.26	-0.34	0.04	-0.09						
Departure Headway (s)	5.0	4.5	5.3	4.7	4.7	4.6						
Degree Utilization, x	0.11	0.22	0.05	0.05	0.11	0.05						
Capacity (veh/h)	706	776	650	733	717	717						
Control Delay (s)	7.4	7.6	7.4	6.8	8.3	7.9						
Approach Delay (s)	7.5	7.0	7.0	8.3	7.9							
Approach LOS	A		A		A	A						
<b>Intersection Summary</b>												
Delay			7.6									
HCM Level of Service			A									
Intersection Capacity Utilization			25.6%		ICU Level of Service		A					
Analysis Period (min)			15									

PM Year 2013 + Project  
2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔				↔
Volume (veh/h)	0	0	0	23	0	39	95	16	0	0	89	6
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	25	0	42	103	17	0	0	97	7
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	345	324	100	324	327	17	103					
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	345	324	100	324	327	17	103					
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
p0 queue free %	100	100	100	96	100	96	93					
cM capacity (veh/h)	554	553	956	596	550	1061	1489					
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	67	121	103									
Volume Left	25	103	0									
Volume Right	42	0	7									
cSH	1606	1489	1700									
Volume to Capacity	0.04	0.07	0.06									
Queue Length 95th (ft)	3	6	0									
Control Delay (s)	9.6	6.6	0.0									
Lane LOS	A	A										
Approach Delay (s)	9.6	6.6	0.0									
Approach LOS	A											
<b>Intersection Summary</b>												
Average Delay			4.9									
Intersection Capacity Utilization			22.8%		ICU Level of Service		A					
Analysis Period (min)			15									

PM Year 2013 + Project  
3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	7	0	9	0	0	0	0	104	193	62	43	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)	8	0	10	0	0	0	0	113	210	67	47	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	399	504	47	404	399	218	47						323
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	399	504	47	404	399	218	47						323
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	99	100	100	100	100						95
cM capacity (veh/h)	538	444	1023	528	509	822	1561						1237
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	17	323	114										
Volume Left	8	0	67										
Volume Right	10	210	0										
cSH	1229	1700	1237										
Volume to Capacity	0.01	0.19	0.05										
Queue Length 95th (ft)	1	0	4										
Control Delay (s)	10.0	0.0	5.0										
Lane LOS	A		A										
Approach Delay (s)	10.0	0.0	5.0										
Approach LOS	A												
<b>Intersection Summary</b>													
Average Delay			1.6										
Intersection Capacity Utilization			36.3%	ICU Level of Service									A
Analysis Period (min)			15										

PM Year 2013 + Project  
4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕						↕			↕		
Volume (veh/h)	274	0	51	0	0	0	1	8	0	0	25	13	
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)	298	0	55	0	0	0	1	9	0	0	27	14	
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	45	45	34	101	52	9	41						9
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	45	45	34	101	52	9	41						9
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 %	69	100	95	100	100	100	100						100
cM capacity (veh/h)	956	846	1039	833	839	1073	1568						1611
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	353	0	10	41									
Volume Left	298	0	1	0									
Volume Right	55	0	0	14									
cSH	968	1700	1568	1611									
Volume to Capacity	0.36	0.00	0.00	0.00									
Queue Length 95th (ft)	42	0	0	0									
Control Delay (s)	10.8	0.0	0.8	0.0									
Lane LOS	B	A	A										
Approach Delay (s)	10.8	0.0	0.8	0.0									
Approach LOS	B	A											
<b>Intersection Summary</b>													
Average Delay			9.5										
Intersection Capacity Utilization			28.3%	ICU Level of Service									A
Analysis Period (min)			15										

PM Year 2013 + Project  
5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	2	96	56	3	53	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	104	61	3	58	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	64				171	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	64				171	62
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	100
cM capacity (veh/h)	1538				818	1002
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	107	64	59			
Volume Left	2	0	58			
Volume Right	0	3	1			
cSH	1538	1700	821			
Volume to Capacity	0.00	0.04	0.07			
Queue Length 95th (ft)	0	0	6			
Control Delay (s)	0.2	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.2	0.0	9.7			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay	2.6					
Intersection Capacity Utilization	16.7%		ICU Level of Service	A		
Analysis Period (min)	15					

PM Year 2013 + Project  
6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕					↕	↕	↕
Volume (vph)	43	195	16	25	101	14	8	162	29	21	142	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0				4.0		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00				1.00		1.00	
Frt	1.00	0.99		1.00	0.98				0.98		0.99	
Flt Protected	0.95	1.00		0.95	1.00				1.00		0.99	
Satd. Flow (prot)	1770	1842		1770	1829				1822		1830	
Flt Permitted	0.95	1.00		0.95	1.00				1.00		0.99	
Satd. Flow (perm)	1770	1842		1770	1829				1822		1830	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	212	17	27	110	15	9	176	32	23	154	17
RTOR Reduction (vph)	0	4	0	0	7	0	0	8	0	0	4	0
Lane Group Flow (vph)	47	225	0	27	118	0	0	209	0	0	190	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	13.4	13.4		7.4	7.4			13.0			9.0	
Effective Green, g (s)	13.4	13.4		7.4	7.4			13.0			9.0	
Actuated g/C Ratio	0.23	0.23		0.13	0.13			0.22			0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	403	420		223	230			403			280	
v/s Ratio Prot	0.03	c0.12		0.02	c0.06			c0.11			c0.10	
v/s Ratio Perm												
v/c Ratio	0.12	0.54		0.12	0.51			0.52			0.68	
Uniform Delay, d1	18.0	20.0		22.8	24.0			20.1			23.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.3		0.2	1.9			1.1			6.4	
Delay (s)	18.1	21.3		23.1	25.9			21.3			29.9	
Level of Service	B	C		C	C			C			C	
Approach Delay (s)	20.7			25.4				21.3			29.9	
Approach LOS	C			C				C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay	23.9		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.56											
Actuated Cycle Length (s)	58.8		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	41.6%		ICU Level of Service		A							
Analysis Period (min)	15											
c Critical Lane Group												



PM Year 2013 + Project

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔			↔		
Volume (veh/h)	0	0	0	8	0	169	0	163	0	0	272	64	
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	0	184	0	177	0	0	296	70	
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)												656	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95							0.95	
vC, conflicting volume	599	508	330	508	542	177	365						177
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	556	459	274	459	496	177	310						177
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	100	79	100						100
cM capacity (veh/h)	332	475	730	488	453	866	1192						1399
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	192	177	365										
Volume Left	9	0	0										
Volume Right	184	0	70										
cSH	907	1192	1700										
Volume to Capacity	0.21	0.00	0.21										
Queue Length 95th (ft)	20	0	0										
Control Delay (s)	10.4	0.0	0.0										
Lane LOS	B												
Approach Delay (s)	10.4	0.0	0.0										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay	2.7												
Intersection Capacity Utilization	28.2%			ICU Level of Service			A						
Analysis Period (min)	15												

PM Year 2013 + Project

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔	↔					↔			↔	↔	
Volume (veh/h)	136	1	3	0	0	0	0	27	10	245	33	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)	148	1	3	0	0	0	0	29	11	266	36	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)												1040	
pX, platoon unblocked													
vC, conflicting volume	603	609	36	605	603	35	36						40
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	603	609	36	605	603	35	36						40
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 %	59	100	100	100	100	100	100						83
cM capacity (veh/h)	357	340	1037	354	343	1038	1575						1569
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	152	40	302										
Volume Left	148	0	266										
Volume Right	3	11	0										
cSH	365	1700	1569										
Volume to Capacity	0.42	0.02	0.17										
Queue Length 95th (ft)	50	0	15										
Control Delay (s)	21.8	0.0	7.0										
Lane LOS	C		A										
Approach Delay (s)	21.8	0.0	7.0										
Approach LOS	C												
<b>Intersection Summary</b>													
Average Delay	11.0												
Intersection Capacity Utilization	36.2%			ICU Level of Service			A						
Analysis Period (min)	15												

PM Year 2013 + Project  
9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	20	189	21	5	12	5	21	20	20	7	6	5
Sign Control		Free			Free			Stop			Stop	
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)	22	205	23	5	13	5	23	22	22	8	7	5
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	18			228			296	290	217	320	298	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	18			228			296	290	217	320	298	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	96	97	99	99	99
cM capacity (veh/h)	1598			1340			639	610	823	592	603	1064
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	250	24	66	20								
Volume Left	22	5	23	8								
Volume Right	23	5	22	5								
cSH	1598	1340	678	680								
Volume to Capacity	0.01	0.00	0.10	0.03								
Queue Length 95th (ft)	1	0	8	2								
Control Delay (s)	0.7	1.8	10.9	10.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	1.8	10.9	10.5								
Approach LOS			B	B								
<b>Intersection Summary</b>												
Average Delay	3.2											
Intersection Capacity Utilization	24.5%			ICU Level of Service	A							
Analysis Period (min)	15											

PM Year 2013 + Project  
10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	173	0	0	18	7	5
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)	188	0	0	20	8	5
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				188	208	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				188	208	188
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	99
cM capacity (veh/h)				1386	781	854
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	188	20	13			
Volume Left	0	0	8			
Volume Right	0	0	5			
cSH	1700	1386	810			
Volume to Capacity	0.11	0.00	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.0	9.5			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.5			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay	0.6					
Intersection Capacity Utilization	19.1%			ICU Level of Service	A	
Analysis Period (min)	15					

PM Year 2013 + Project  
11: Evan Hewes & Derrick Rd

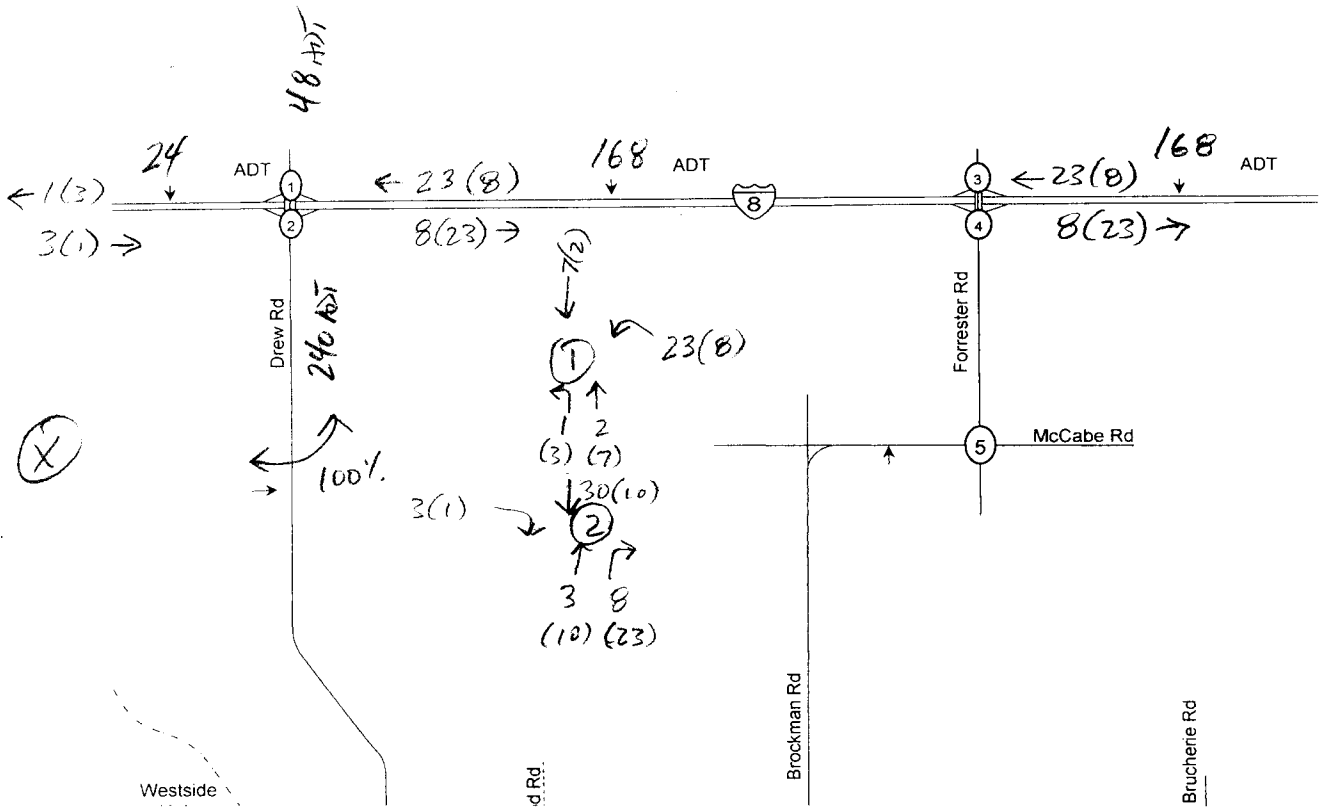
HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	201	0	4	47	0	14
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)	218	0	4	51	0	15
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			218		278	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			218		278	218
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		100	98
cM capacity (veh/h)			1351		709	821
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	218	55	15			
Volume Left	0	4	0			
Volume Right	0	0	15			
cSH	1700	1351	821			
Volume to Capacity	0.13	0.00	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.6	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.6	9.5			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.6			
Intersection Capacity Utilization			20.6%		ICU Level of Service	A
Analysis Period (min)			15			

## **Appendix O**

### **Cumulative Project (New Development) Data**

CUMULATIVE PROJECT #1 → "S" LINE UPGRADE (IID)



## EXECUTIVE SUMMARY

Christopher Meyer

### INTRODUCTION

---

Imperial Valley Solar, LLC (formerly Stirling Energy Systems Solar Two, LLC) is seeking approval to construct and operate the Imperial Valley Solar (formerly the Stirling Energy Systems Solar Two) Project and its ancillary facilities. The applicant is a wholly owned subsidiary of Tessera Solar. The main objective of the Imperial Valley Solar (IVS) Project is to provide clean, renewable, solar-powered electricity to the State of California. The electricity from the IVS Project would assist the State in meeting its objectives as mandated by the California Renewable Portfolio Standard (RPS) Program and the California Global Warming Solutions Act. The IVS Project would also address other local mandates adopted by California's electric utilities for the provision of renewable energy.

San Diego Gas & Electric (SDG&E) selected the IVS Project to help meet its objectives under the legislative requirements of the RPS Program through a least-cost, best-fit competitive solicitation. Because the IVS Project is one of the three projects that SDG&E selected from the solicitation, the applicant and SDG&E entered into a 20-year Power Purchase Agreement (PPA) for the provision of renewable electricity. This PPA would help SDG&E meet both its statutory mandate to purchase at least 20% of its electric power from renewable resources by 2010 and its future electricity requirements. The California Public Utilities Commission approved the PPA on December 1, 2005. The IVS Project represents approximately 44% of SDG&E's RPS goals.

The applicant has submitted an Application for Certification (AFC) to the California Energy Commission (Energy Commission) for the proposed project. The Energy Commission is the lead State agency responsible for evaluating the environmental effects of project and for complying with the California Environmental Quality Act (CEQA). The project proposes the use of land managed by the United States Department of the Interior, Bureau of Land Management (BLM); therefore the applicant has submitted a request for a right-of-way grant to the BLM. The BLM is the federal lead agency for the evaluation of project effects and compliance of the proposed project with the requirements of the National Environmental Policy Act (NEPA) related to possible BLM discretionary actions related to the right-of-way grant request.

The BLM and the Energy Commission prepared separate final documents for compliance with NEPA and CEQA, respectively. Specifically, the BLM is preparing the Final Environmental Impact Statement (FEIS) and the Energy Commission prepared this Supplemental Staff Assessment (SSA). The Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) was the primary reference used by the BLM in preparing the FEIS and is incorporated by reference in the BLM's FEIS for the IVS Project. After the publication of the FEIS, the BLM will prepare a Record of Decision (ROD) regarding the Agency Preferred Alternative. The publication of the ROD in the Federal Register is the final step required of the BLM to meet the requirements of NEPA for the IVS Project. While the Energy Commission SSA is not written jointly with the BLM, the proponent will be required to comply with all terms and conditions required by the BLM, as will be

described in the BLM's Record of Decision and Right-of-Way grant documents for this project. The conditions of certification within this document may also require the submittal of documents and reports to other federal, state, or local agencies. It is the project owner's responsibility to ensure the timely submittal of these documents and reports.

The Energy Commission staff identified significant unmitigable impacts to Biological Resources, Land Use, Soil & Water Resources, and Visual Resources. Impacts to Cultural Resources are being analyzed and will be addressed in a document filed subsequently to this document. Because many of the unmitigable impacts identified by staff could be significantly reduced through implementation of Drainage Alternative #1, the Energy Commission staff recommends that it, rather than the proposed project, be approved by the Energy Commission. The BLM has addressed the reduction of potential impacts identified in the FEIS by coordinating with the U.S. Army Corps of Engineers (USACE) on identifying and analyzing a draft Least Environmentally Damaging Alternative (LEDPA). A final LEDPA will ultimately be identified by USACE and will be required in order for the project to proceed. The Energy Commission staff believe that when the LEDPA is finalized, it will be similar to Drainage Alternative #1 recommended by staff.

## **PROPOSED PROJECT**

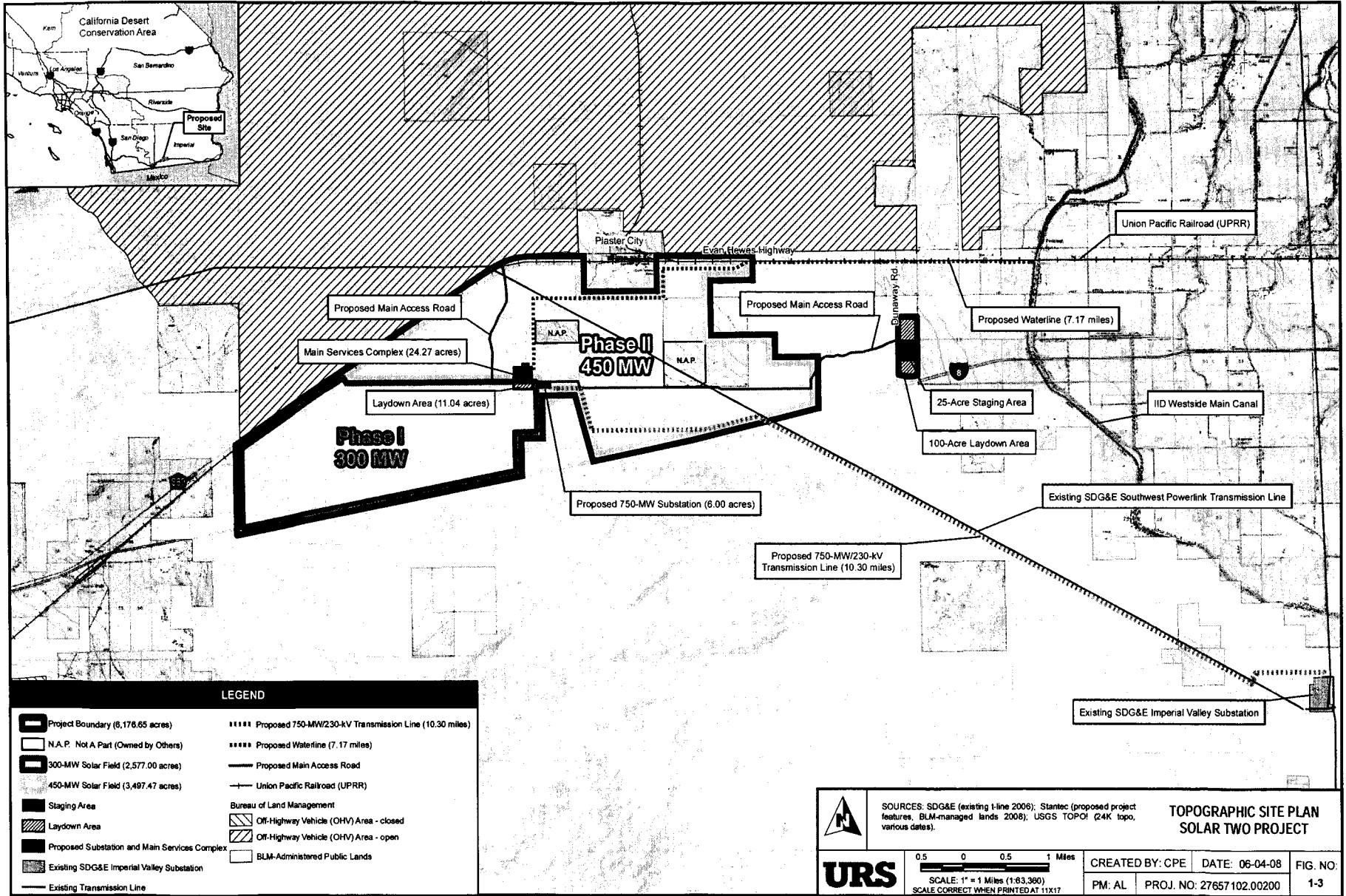
---

### **Project Location and Description**

The applicant intends to develop an electric-generating facility with a nominal capacity of 750 megawatts (MW) using concentrated solar power. The IVS Project would be constructed on an approximately 6,500-acre (just over 10 square miles) site in the Imperial Valley in Imperial County, California. The site is approximately 100 miles east of San Diego, 14 miles west of El Centro, and 4 miles east of Ocotillo Wells. The IVS Project site is predominantly comprised of BLM managed lands with some private parcels within the approximately 6,500 acre site. Key features of the proposed project are described briefly below and in more detail in the following sections:

The electric-generating facility would include the construction of a new 230-kilovolt (kV) substation approximately in the center of the project site, an operation and administration building, a maintenance building, and a substation building.

The IVS Project as proposed would be constructed in two phases: Phase I would consist of up to 12,000 SunCatchers configured in 200 1.5-MW solar groups of 60 SunCatchers per group. The total net nominal generating capacity of Phase 1 is 300 MW. Phase I would require approximately 2,600 acres. The renewable energy from Phase I would be transmitted via the existing 500-kV SDG&E Southwest Powerlink transmission line. The IVS Project would be connected to the grid at the SDG&E Imperial Valley Substation via a 10.3-mi long, 230-kV interconnection transmission line that would be constructed as part of the project in a corridor parallel to the existing Southwest Powerlink transmission line.



Path: G:\projects\1577\2221699\res\section\_1\_topo\_sit\_rim.mxd, 06/04/08



**Table 5.11-6  
Project Construction Trip Generation**

Vehicle Type	Peak Daily Round Trips	Morning Peak Trips			Evening Peak Trips		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Construction worker vehicles <sup>1</sup>	1,462	731	0	731	0	731	731
Truck deliveries <sup>2</sup>	274	41	0	41	0	41	41

Source: SES Solar Two, LLC, 2008.

Notes:

<sup>1</sup>Peak workforce was conservatively analyzed at 731 worker trips conservatively assumed to drive alone during both the morning (0700 to 0900) and evening (1600 to 1800) peak hours.

<sup>2</sup>Trucks deliveries shown in the table were adjusted into PCE vehicles (3 PCE per month). 1,099 truck trips per month = 3,297 PCEs divided by 24 working days = 137 PCE one-way trips or 274 round trips per day on average. It was also assumed that 30 percent of the truck delivery trips arrive during the morning peak hour and leave during the evening peak hour while the remaining deliveries (70 percent) would arrive and leave during off-peak hours.

PCE = passenger car equivalent

### *Project Operations Trip Generation*

During Project operations, the Project study area will experience increases in traffic associated primarily with operation worker commute and operation and maintenance (O&M) trips. Some visitor trips were also assumed for a proposed visitor center that could potentially be built on-site. The traffic analysis evaluated the worst-case Project operations scenario by accounting for both planned (operations and delivery) and future visitor trips within the Project study area.

#### **Operations**

The operational workforce projections provided by the Project design engineer estimated that by Year 7 of Project operations, up to 164 workers will be working on-site on a daily basis. The estimated vehicle requirements for operational workers include 100 cars and 4 van pool vehicles. The operational projections also included 8 daily visitor trips for sales, deliveries, and other services. To evaluate the worst-case scenario, these vehicle trips were assumed to arrive during the morning peak period (0700 to 0900) and depart during the evening peak period (1600 to 1800).

#### **Deliveries**

To sustain and support Project operations, five weekly delivery trips of hydrogen, O&M supplies, waste management, and hazardous waste handling are anticipated at the Project Site. In addition, one weekly tractor trailer trip is anticipated for spare parts, building supplies, and temporary rental equipments. It is estimated that there will be an average of 12 truck round trips or 36 PCE operational delivery round trips on a daily basis accessing the Project Site during operations. Delivery trips will likely arrive and depart throughout the day. The analysis assumed the worst-case scenario: that these trips occur on the same day.

**Project Site Visits**

The Project trip generation data in Table 5.11-7, Project Operations Trip Generation, show the resultant trips that would be generated by operations, deliveries, and Project Site trips.

**Table 5.11-7  
Project Operations Trip Generation**

Vehicle Type	Peak Daily Round Trips <sup>1</sup>	Morning Peak Trips			Evening Peak Trips		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Operations	224	112	0	<b>112</b>	0	112	<b>112</b>
Deliveries <sup>2</sup>	36	9	5	<b>14</b>	0	4	<b>4</b>
Visitor Center	20	5	5	<b>10</b>	5	5	<b>10</b>

Source: SES Solar Two, LLC, 2008; URS Corporation, 2008.

Notes:

<sup>1</sup>Peak workforce was conservatively analyzed at 731 worker trips conservatively assumed to drive alone during both the morning (0700 to 0900) and evening (1600 to 1800) peak hours.

<sup>2</sup>Trucks deliveries shown in the table were adjusted into PCE vehicles (3 PCE per month).

PCE = passenger car equivalent

**Project Trip Distribution**

**Trip Distribution and Assignment**

It is assumed that workers will come from Imperial and adjoining counties. As shown in Table 5.11-8, Workforce Distribution, it is anticipated that the construction and operation workforces will be originating from the following geographical areas:

- Imperial County,
- San Diego County, and
- Riverside County.

**Table 5.11-8  
Workforce Distribution**

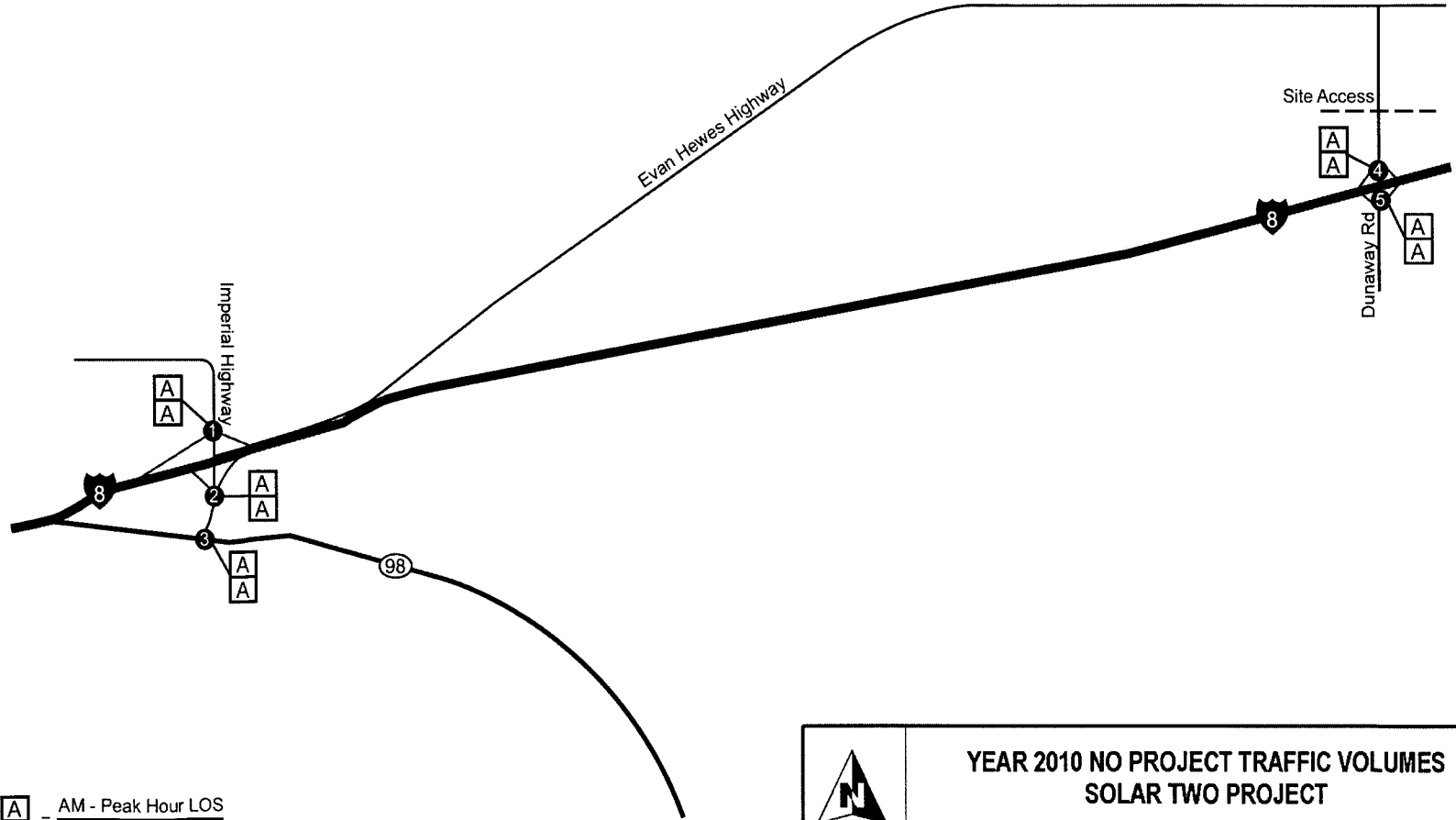
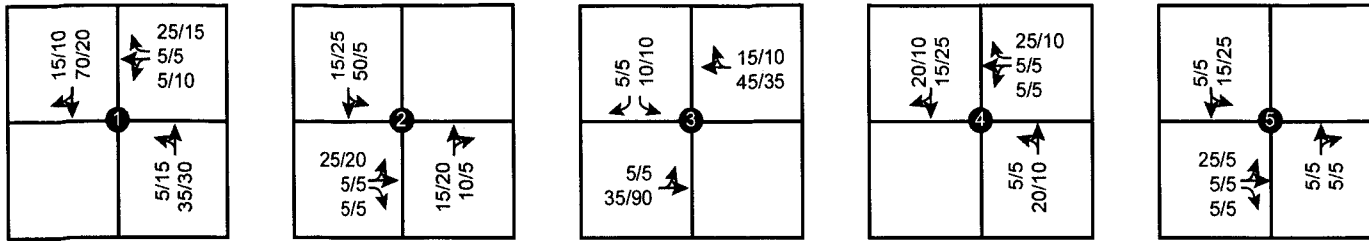
Origin of Workforce Vehicle Travel to Project Site	Construction Workforce	Operation Workforce
I-8 East (Imperial County)	60.0%	65.0%
I-8 East (outside of Imperial County)	5.0%	1.0%
Evan Hewes Highway east (local)	15.0% ✓	23.0%
I-8 West (Imperial County)	5.0%	5.0%
I-8 West (outside of Imperial County)	10.0%	5.0%
Evan Hewes Highway west (Local)	5.0%	1.0%
<b>Totals</b>	<b>100.0%</b>	<b>100.0%</b>

Source: SES Solar Two, LLC, 2008; URS Corporation, 2008.

Notes:

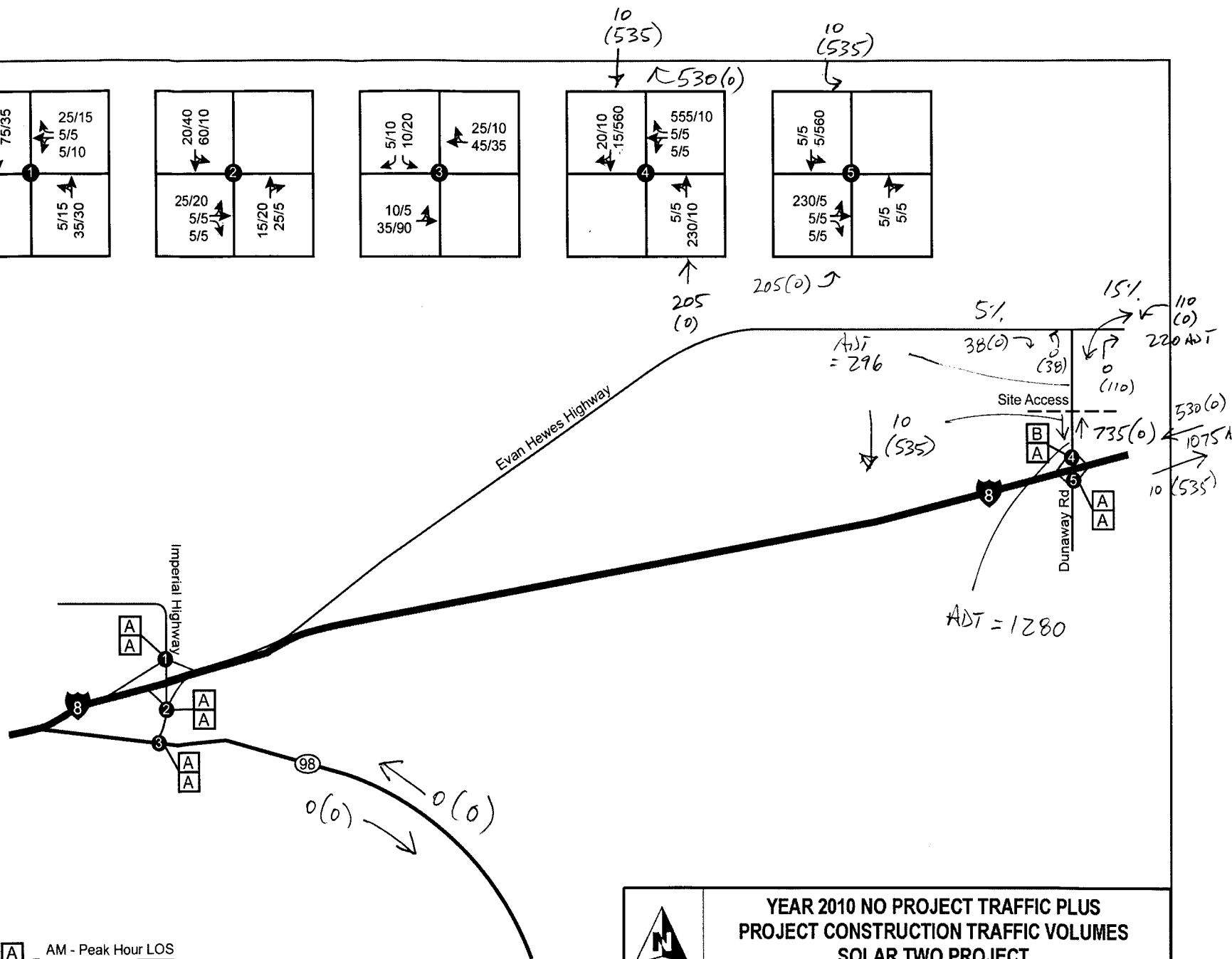
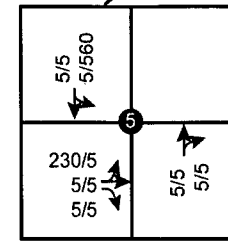
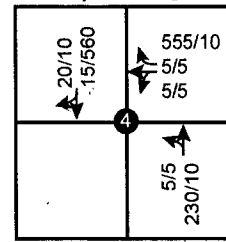
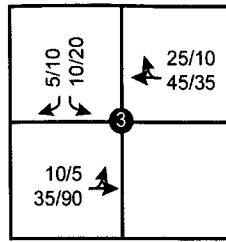
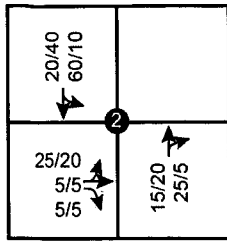
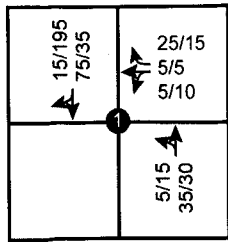
% = percent

I-8 = Interstate 8



A = AM - Peak Hour LOS  
A = PM - Peak Hour LOS  
 ● Numbers rounded to nearest five.

	<b>YEAR 2010 NO PROJECT TRAFFIC VOLUMES SOLAR TWO PROJECT</b>		
		CREATED BY: MT PM: AL	DATE: 05-15-08 PROJ. NO: 27657102.00411



A = AM - Peak Hour LOS  
A = PM - Peak Hour LOS  
 ● Numbers rounded to nearest five.

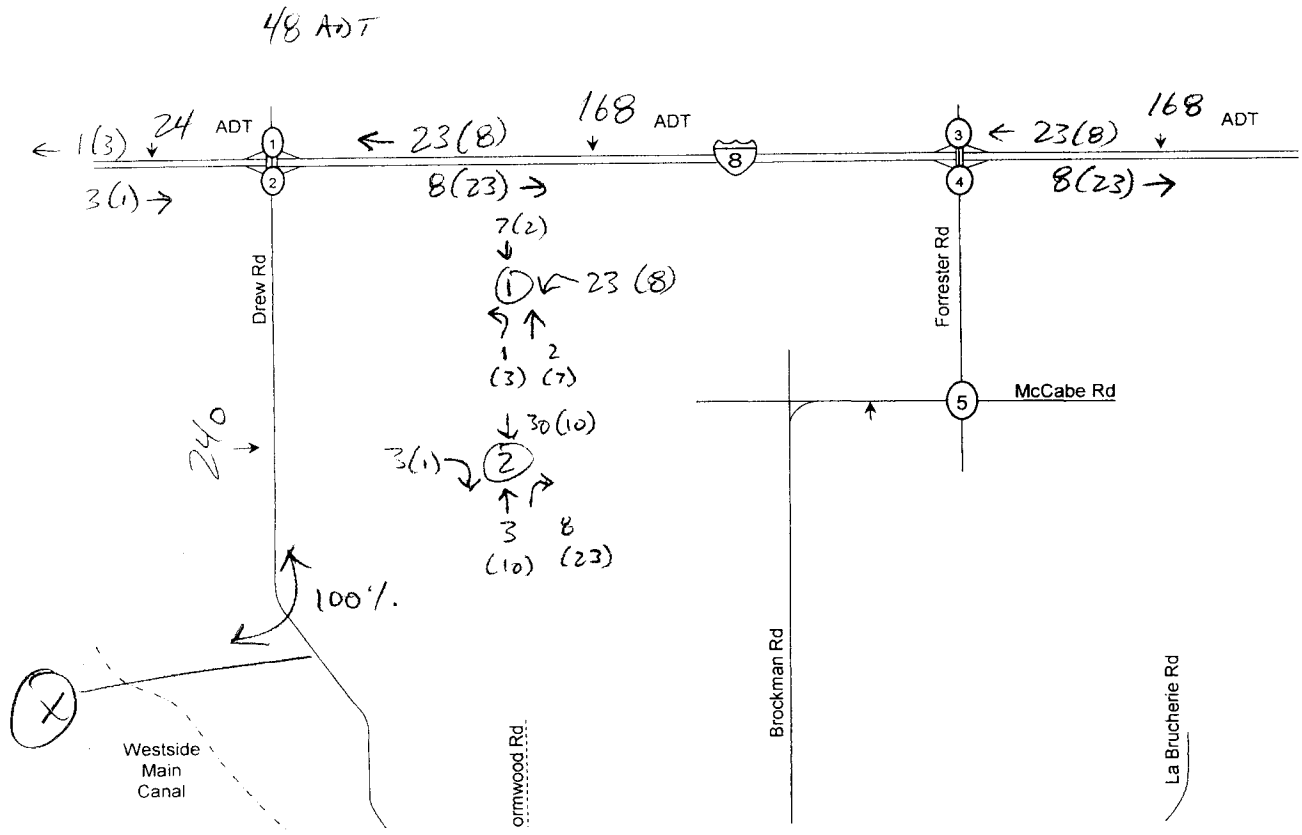
	YEAR 2010 NO PROJECT TRAFFIC PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES SOLAR TWO PROJECT			
		CREATED BY: MT	DATE: 05-15-08	FIG. NO: 5.11-6
PM: AL		PROJ. NO: 27657102.00411		

K:\2008\SES Solar 2\figure 5.11-6.ai

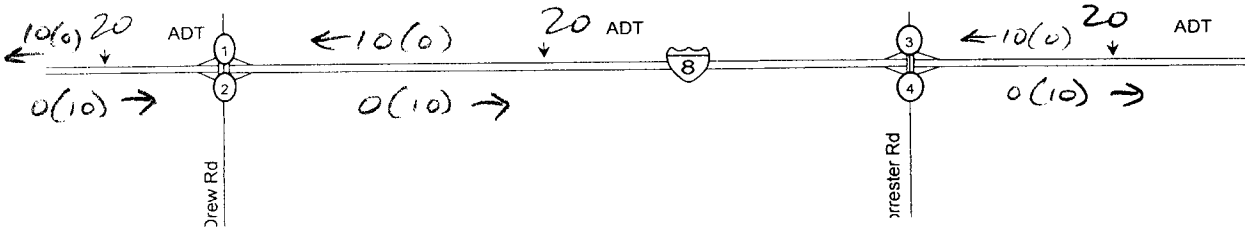
2

# CUMULATIVE PROJECT #3

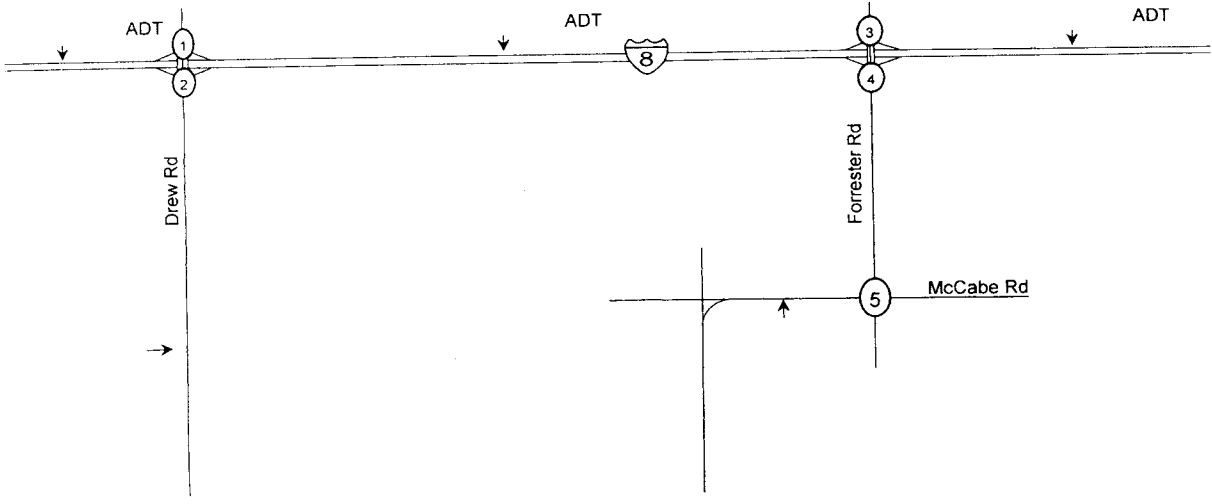
# SUNRISE POWERLINK



Cumulative Project 4 (EIR [D]): SDG&E PV Solar Field approx. 18 miles northwest of the project site; therefore, no cumulative traffic is anticipated to be added to the study intersections and segments south of I-8. However, the cumulative project is anticipated to add regional traffic to I-8 as shown below.

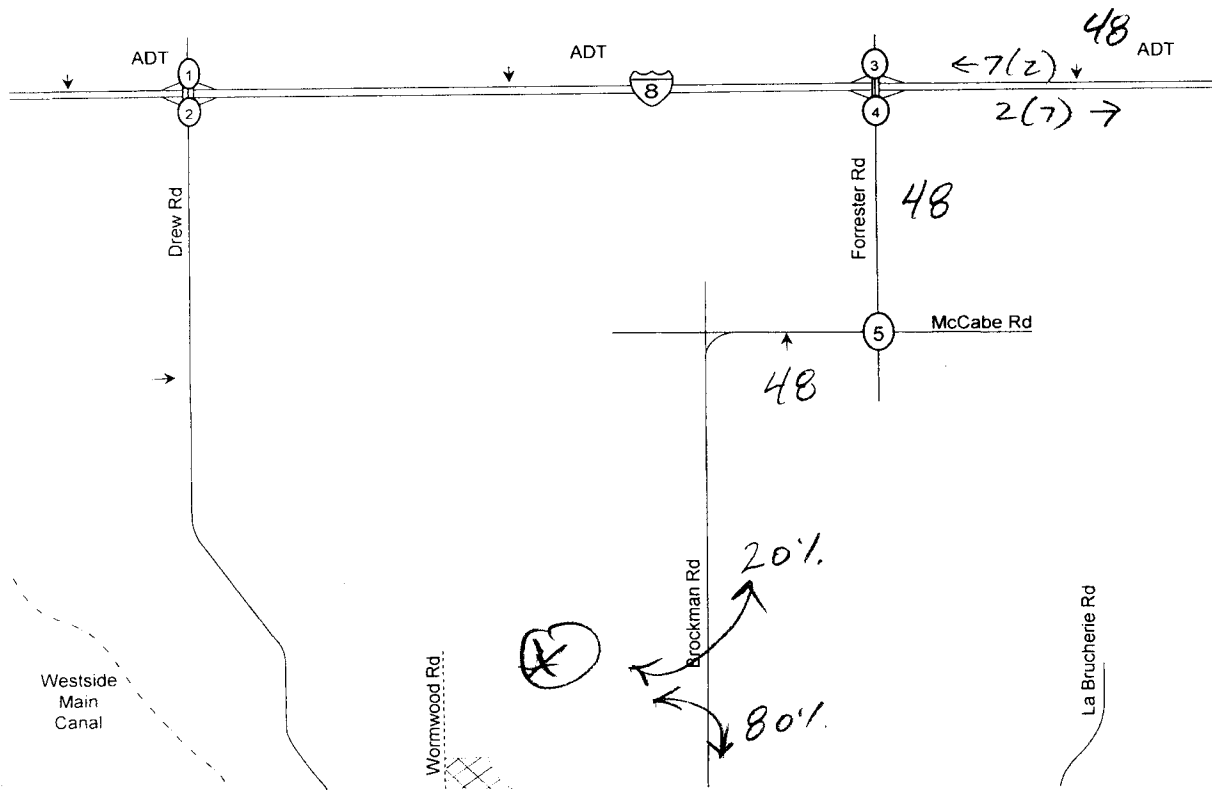


CUMULATIVE PROJECT #5 (EIR[E]): SDG&E GEOTECHNICAL INVESTIGATION. LIMITED CONSTRUCTION TRAFFIC IS ANTICIPATED TO LAST NO LONGER THAN ONE WEEK IN SEPT 2011; THEREFORE, NO CUMULATIVE TRAFFIC ADDED TO STUDY ROADWAYS.



CUMULATIVE PROJECT #6  
#2 TRANSMISSION LINE

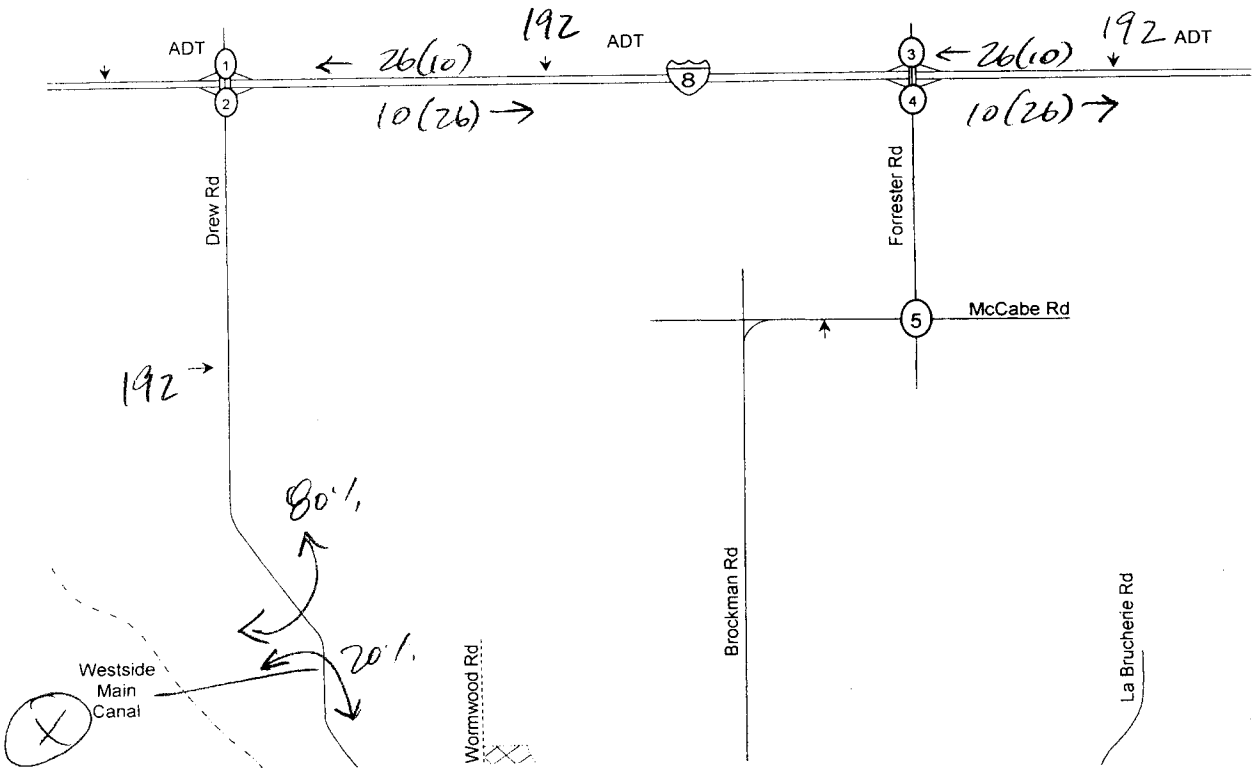
NORTH GILA TO IMPERIAL VALLEY



<p>Drew Rd</p> <p>I-8 WB Ramp</p> <p>1</p>	<p>Drew Rd</p> <p>I-8 EB Ramp</p> <p>2</p>	<p>Forrester Rd</p> <p>I-8 WB Ramp</p> <p>3</p> <p>7(2)</p>
<p>I-8 EB Ramp</p> <p>Forrester Rd</p> <p>4</p> <p>2(7)</p>	<p>Forrester Rd</p> <p>McCabe Rd</p> <p>5</p> <p>2(7)</p>	<p>Brockman Rd</p> <p>Kubler Rd</p> <p>6</p> <p>26(10)</p>
<p>Drew Rd</p> <p>SR-98</p> <p>7</p>	<p>Pulliam Rd</p> <p>SR-98</p> <p>8</p>	<p>Brockman Rd</p> <p>SR-98</p> <p>9</p> <p>26(10)</p>
<p>Rockwood Rd</p> <p>SR-98</p> <p>10</p> <p>26(10)</p>	<p>Ferrell Rd</p> <p>SR-98</p> <p>11</p> <p>26(10)</p>	<p>Clark Rd</p> <p>SR-98</p> <p>12</p> <p>26(10)</p>

CUMULATIVE PROJECT #7  
TO IID TRANSMISSION DISTRICT.

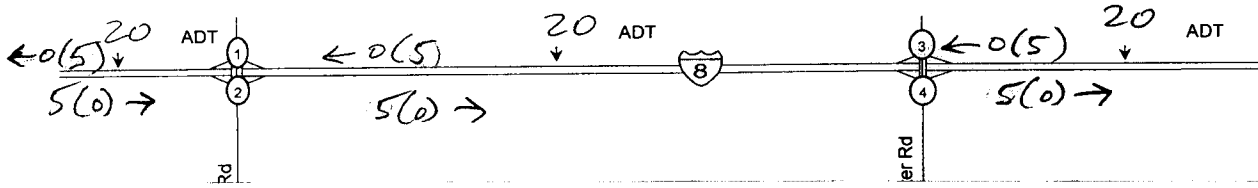
DIXIELAND CONNECTION



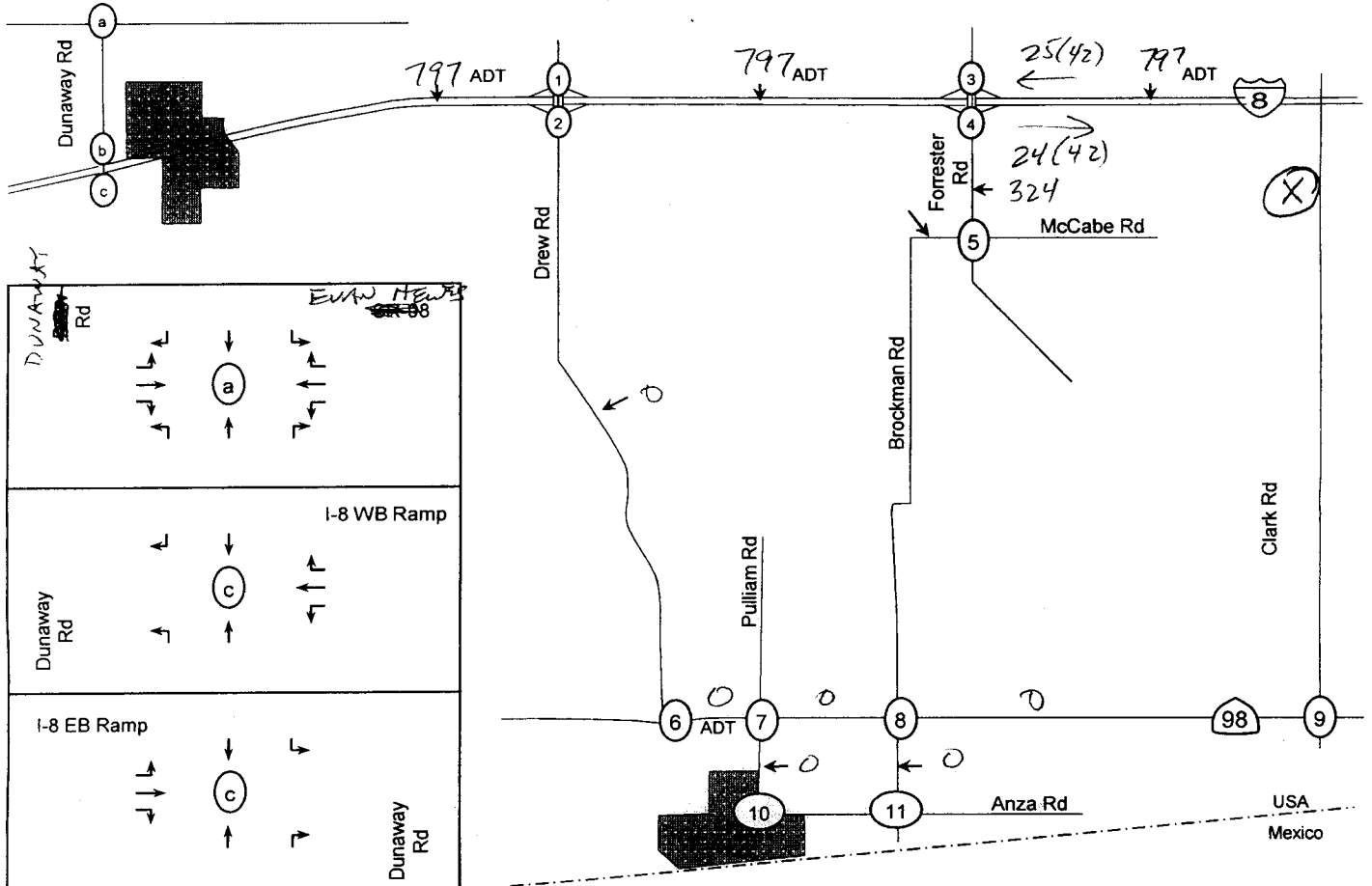
<p>Drew Rd</p> <p>I-8 WB Ramp</p> <p>1</p> <p>26(10)</p>	<p>Drew Rd</p> <p>I-8 EB Ramp</p> <p>2</p> <p>26(10)</p> <p>10(26)</p>	<p>Forrester Rd</p> <p>I-8 WB Ramp</p> <p>3</p>
<p>I-8 EB Ramp</p> <p>4</p> <p>Forrester Rd</p>	<p>Forrester Rd</p> <p>McCabe Rd</p> <p>5</p>	<p>Brockman Rd</p> <p>Kubler Rd</p> <p>6</p>
<p>Drew Rd</p> <p>SR-98</p> <p>7</p> <p>7(2)</p>	<p>Pulliam Rd</p> <p>SR-98</p> <p>8</p> <p>2(7)</p> <p>7(2)</p>	<p>Brockman Rd</p> <p>SR-98</p> <p>9</p> <p>2(7)</p> <p>7(2)</p>
<p>Rockwood Rd</p> <p>SR-98</p> <p>10</p> <p>7(2)</p>	<p>Ferrell Rd</p> <p>SR-98</p> <p>11</p> <p>2(7)</p> <p>7(2)</p>	<p>Clark Rd</p> <p>SR-98</p> <p>12</p> <p>2(7)</p> <p>7(2)</p>



Cumulative Project 8: Solar Reserve Imperial Valley approx. 30 miles east of the project site; therefore, no cumulative traffic is anticipated to be added to the study intersections and segments south of I-8. However, the cumulative project is anticipated to add regional traffic to I-8 and SR-98 as shown below.



#9  
 CUMULATIVE: LINDA VISTA



DUNAWAY Rd	EVAN HENRY SR-98	
Dunaway Rd	I-8 WB Ramp	
I-8 EB Ramp	Dunaway Rd	
Drew Rd	I-8 WB Ramp	
I-8 EB Ramp	Forrester Rd	

I-8 EB Ramp	Drew Rd	
Forrester Rd	McCabe Rd	

Forrester Rd	I-8 WB Ramp	
Drew Rd	SR-98	

## 8.0 CUMULATIVE PROJECTS

There are other planned projects in the areas adjacent to the project site that will add traffic to the roadways surrounding the project site. Based a review of potential projects in the City of El Centro, City of Calexico, and the County of Imperial, it was determined that thirty-four (34) near-term development projects should be included in the traffic study. The following is a brief description of these cumulative projects. *Figure 8-1* shows the total cumulative projects traffic volumes & *Figure 8-2* depicts the existing + project + cumulative projects traffic volumes. *Appendix E* contains more detailed information on the cumulative projects. There are several longer -term projects in the City of Calexico which are not included in the near-tem cumulative scenario but are included in the 2030 cumulative scenario.

### 8.1 Description of Projects

**Linda Vista Mixed Use** proposes to develop 182 single-family dwelling units along with a 6-acre commercial lot. The project site is currently undeveloped agricultural land. Based on the trip generation calculations, the total project is calculated to generate 7,175 ADT with 109 inbound / 143 outbound trips during the AM peak hour and 349 inbound / 327 outbound trips during the PM peak hour. The traffic study for this project was prepared by LLG (August 2004).

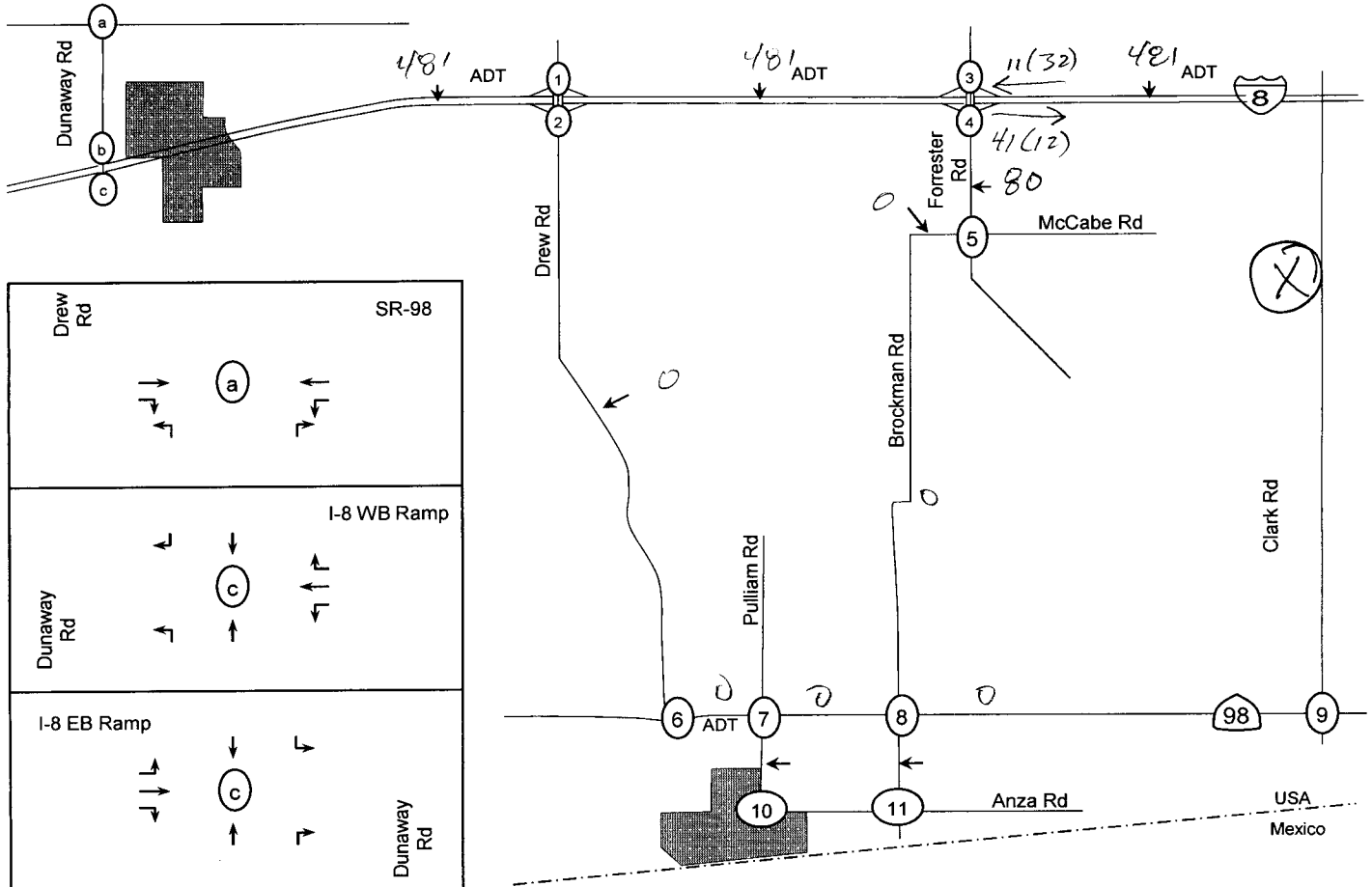
**Desert Village Mixed Use** proposes to develop 95 single-family residential homes along with 260 apartment units and 7.3 acres of commercial space. The project site is currently undeveloped agricultural land. Based on the trip generation calculations, the total project is calculated to generate 8,740 ADT with 129 inbound / 202 outbound trips during the AM peak hour and 431 inbound / 387 outbound trips during the PM peak hour. The traffic study for this project was prepared by LLG (February 2005).

**Countryside Estates** proposes to develop a 152-unit residential subdivision on 39.80 acres. The project site is currently undeveloped agricultural land. Based on the trip generation calculations, the total project is calculated to generate 1,530 ADT with 29 inbound / 87 outbound trips during the AM peak hour and 98 inbound / 58 outbound trips during the PM peak hour. The traffic study for this project was prepared by LLG (November 2004).

**Venezia Planned Community** proposes to develop approximately 250 single-family residential dwelling units and 135,100 square feet of commercial space. The project is located southeast of SR 98, east of Bowker Road and south of the All American Canal. The project is calculated to generate 12,140 ADT with 279 inbound / 279 outbound trips during the AM peak hour and 640 inbound / 576 outbound trips during the PM peak hour. The traffic study for this project was prepared by LLG (March 2005).

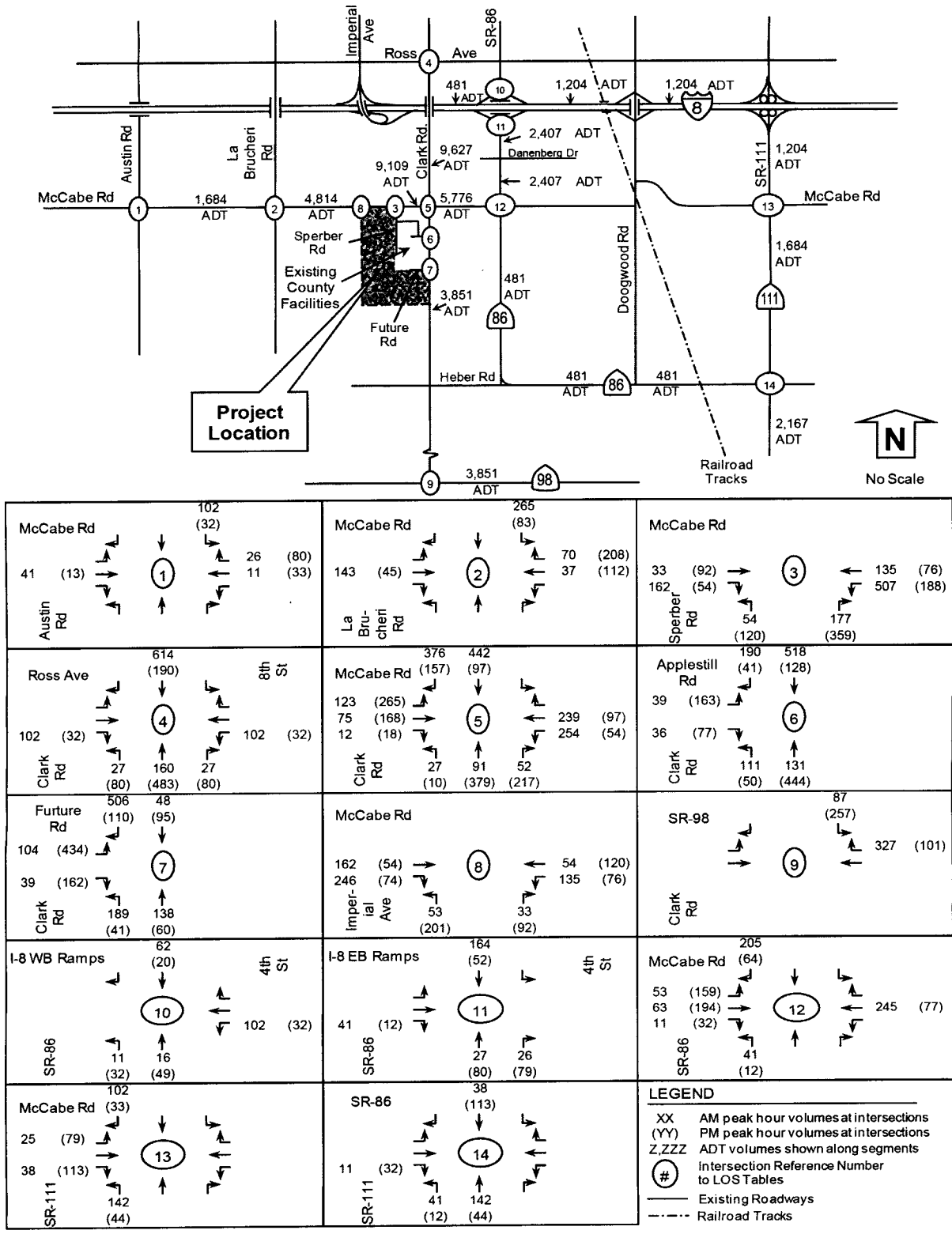
**The McCabe Ranch** proposes to develop 428 single-family residential dwelling units located south of Interstate 8 and west of Dogwood Road. The project is calculated to generate 3,550 ADT with 76 inbound / 206 outbound trips during the AM peak hour and 243 inbound / 142 outbound trips during the PM peak hour. The traffic study for this project was prepared by LLG (July 2002).

# CUMULATIVE: COUNTY CENTER II

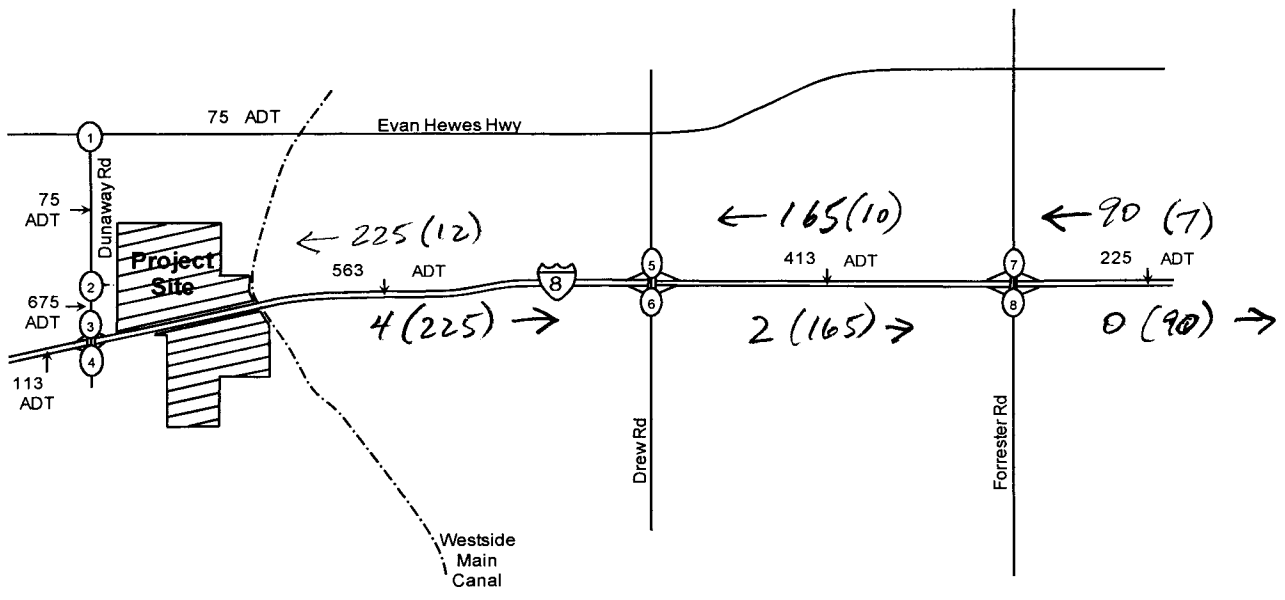


<p>Drew Rd SR-98</p>		
<p>Dunaway Rd I-8 WB Ramp</p>		
<p>I-8 EB Ramp Dunaway Rd</p>		
<p>I-8 WB Ramp</p>	<p>I-8 EB Ramp</p>	<p>I-8 WB Ramp</p>
<p>Drew Rd</p>	<p>Forrester Rd McCabe Rd</p>	<p>Drew Rd SR-98</p>
<p>I-8 EB Ramp</p>	<p>Brockman Rd SR-98</p>	<p>Clark Rd SR-98</p>
<p>Pulliam Rd SR-98</p>	<p>Brockman Rd SR-98</p>	<p>Legend</p> <ul style="list-style-type: none"> <li>XX AM peak hour volumes at intersections</li> <li>(YY) PM peak hour volumes at intersections</li> <li>Z,ZZZ ADT volumes shown along segments</li> <li># Intersection Reference Number to LOS Tables</li> <li>Existing Roadways</li> </ul>
<p>Pulliam Rd Anza Rd</p>	<p>Brockman Rd Anza Rd</p>	

**Figure 15: Project Assignment (All Phases)**



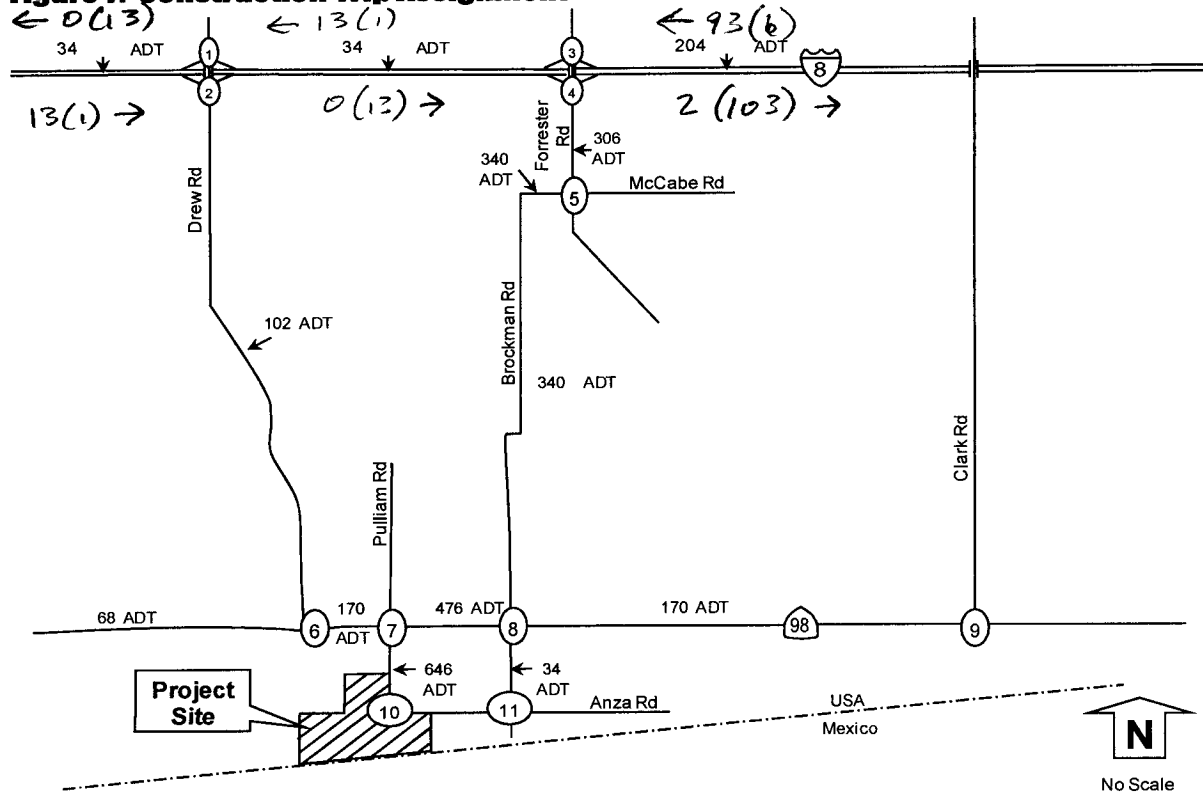
**Figure 7: Construction Trip Assignment**



<p><b>Evan Hewes Hwy</b></p>		<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li>XX AM peak hour volumes at intersections</li> <li>(YY) PM peak hour volumes at intersections</li> <li>Z,ZZZ ADT volumes shown along segments</li> <li># Intersection Reference Number to LOS Tables</li> <li>— Existing Roadways</li> <li>- - - Project Access</li> <li>- - - Canal</li> </ul>			
<p><b>Dunaway Rd</b></p>					
<p><b>Dunaway Rd</b></p>		<p><b>Drew Rd</b></p>		<p><b>Forrester Rd</b></p>	
<p><b>I-8 EB Ramp</b></p>		<p><b>I-8 EB Ramp</b></p>		<p><b>I-8 EB Ramp</b></p>	



**Figure 7: Construction Trip Assignment I**



		<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li>XX AM peak hour volumes at intersections</li> <li>(YY) PM peak hour volumes at intersections</li> <li>Z,ZZZ ADT volumes shown along segments</li> <li>Ⓝ In Intersection Reference Number to LOS Tables</li> <li>— Existing Roadways</li> </ul>

## 2.0 PROJECT DESCRIPTION

The proposed Mount Signal Solar Farm I project would construct a 200 megawatt photovoltaic plant on a currently undeveloped parcel in Imperial County. The Project is comprised of eight parcels totaling 1,375 acres situated about 2.5 miles west of Calexico in Imperial County, California. The eight parcels are all located generally south of SR-98 and north of Mandrapa Road. The current use is irrigated agriculture.

Construction is anticipated to begin in March 2014, and is expected to take about 12-15 months. Construction traffic will consist of both truck traffic and employee traffic, and will comprise the majority of traffic associated with development and operation of the project.

Primary access to the site is will be provided as paved, public road access via SR-98, County Highway S30, and Ferrell Road. For the purposes of this analysis, all traffic was assumed to use a single access point at the SR 98/Ferrell Road intersection. This provides the most conservative analysis since it assumes the highest concentration of traffic at one location.

Post-construction Operations and Maintenance will be comprised of 3 on-site staff members during normal business hours, plus one security guard on-site during each of three daily shifts: 1<sup>st</sup> watch, 2<sup>nd</sup> watch and 3<sup>rd</sup> watch. Operations and maintenance traffic will be a small percentage of the short-term traffic associated with the project's construction phase.

**TABLE 7-1  
PROJECT TRIP GENERATION**

Trip Type	Daily Total (ADT) <sup>a</sup>	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
<b>Construction</b>							
Vehicles	462	150	0	150	0	150	150
Trucks	30	6	0	6	0	6	6
<b>Total (w/PCE)<sup>b</sup></b>	<b>522</b>	<b>162</b>	<b>0</b>	<b>162</b>	<b>0</b>	<b>162</b>	<b>162</b>
<b>Operations and Maintenance (O&amp;M)</b>							
Vehicles	40	8	2	10	2	8	10
Trucks	0	0	0	0	0	0	0
<b>Total (w/PCE)</b>	<b>40</b>	<b>8</b>	<b>2</b>	<b>10</b>	<b>2</b>	<b>8</b>	<b>10</b>

**General Notes:**

1. Source: 8minuteenergy Renewables, LLC, and Fehr & Peers, 2010.

**Footnotes:**

- a. ADT = Average Daily Traffic (24-hour total bi-directional traffic on a roadway segment)
- b. PCE = Passenger Car Equivalent, used to reflect the additional impacts of heavy vehicles in the technical analyses.

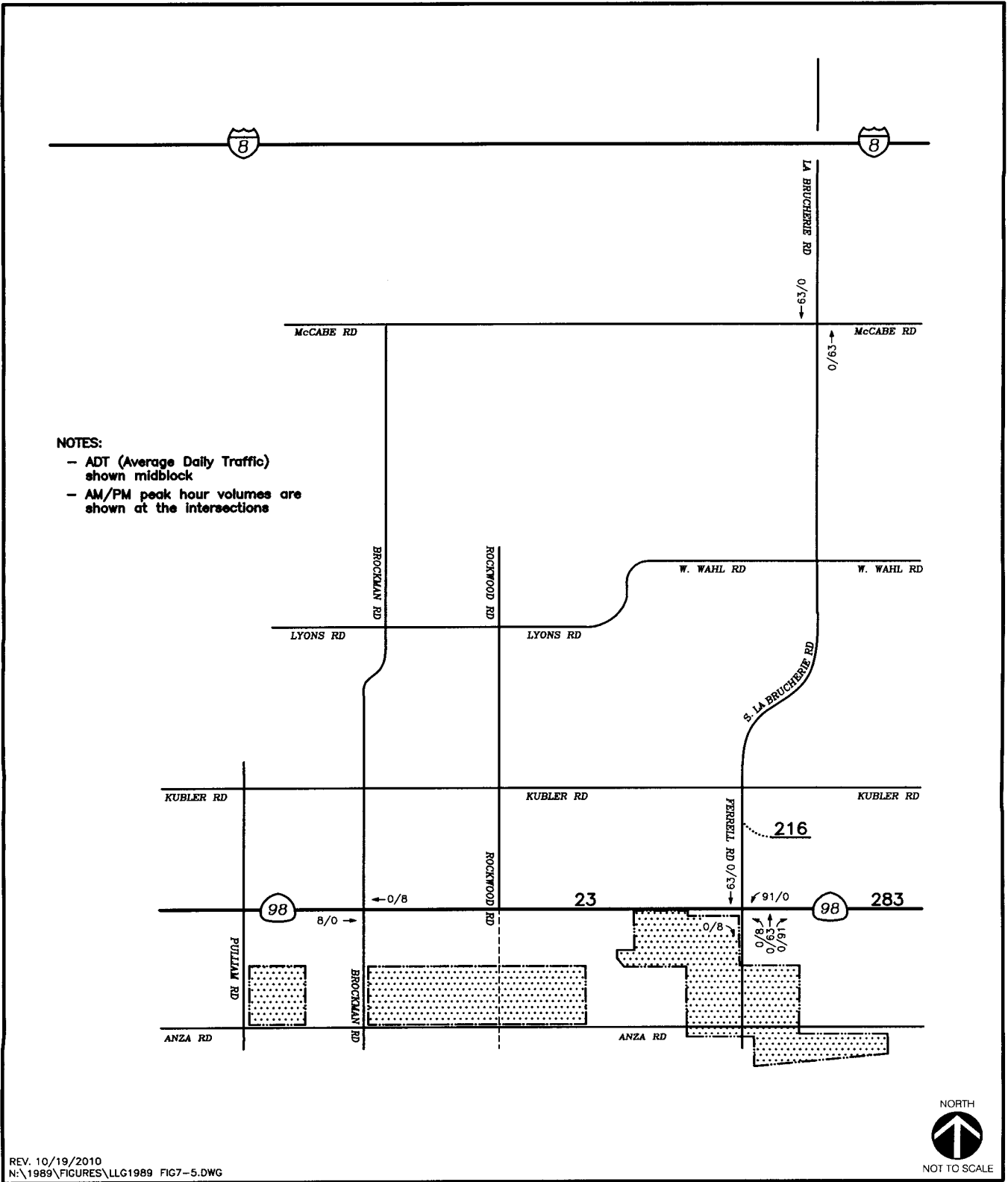
*Table 7-1* shows that the construction traffic is substantially greater than the O&M traffic, which validates the assertion that analysis of the construction impacts would represent the worst-case potential traffic impacts of the project. The total construction traffic analyzed in this report is 522 ADT, with 162 inbound/0 outbound trips during the AM peak hour, and 0 inbound/162 outbound trips during the PM peak hour.

**7.1 Trip Distribution**

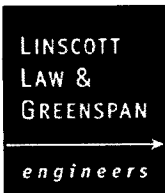
Regional trip distribution for construction truck traffic was estimated based on information from the applicant that material deliveries will be from the Los Angeles area. *Figure 7-1* shows the distribution of truck traffic, which is primarily oriented along La Brucherie Road and SR 98 in the study area.

It is anticipated that the majority of construction workers will be from the local population centers of Calipatria, El Centro, and Calexico. *Figure 7-2* shows the distribution of construction employee passenger car traffic north, west and east of the site. The majority of employee traffic (95%) is anticipated to be to/from north and east of the site, from the local labor pool utilizing I-8 and SR 98 as their primary routes to work.



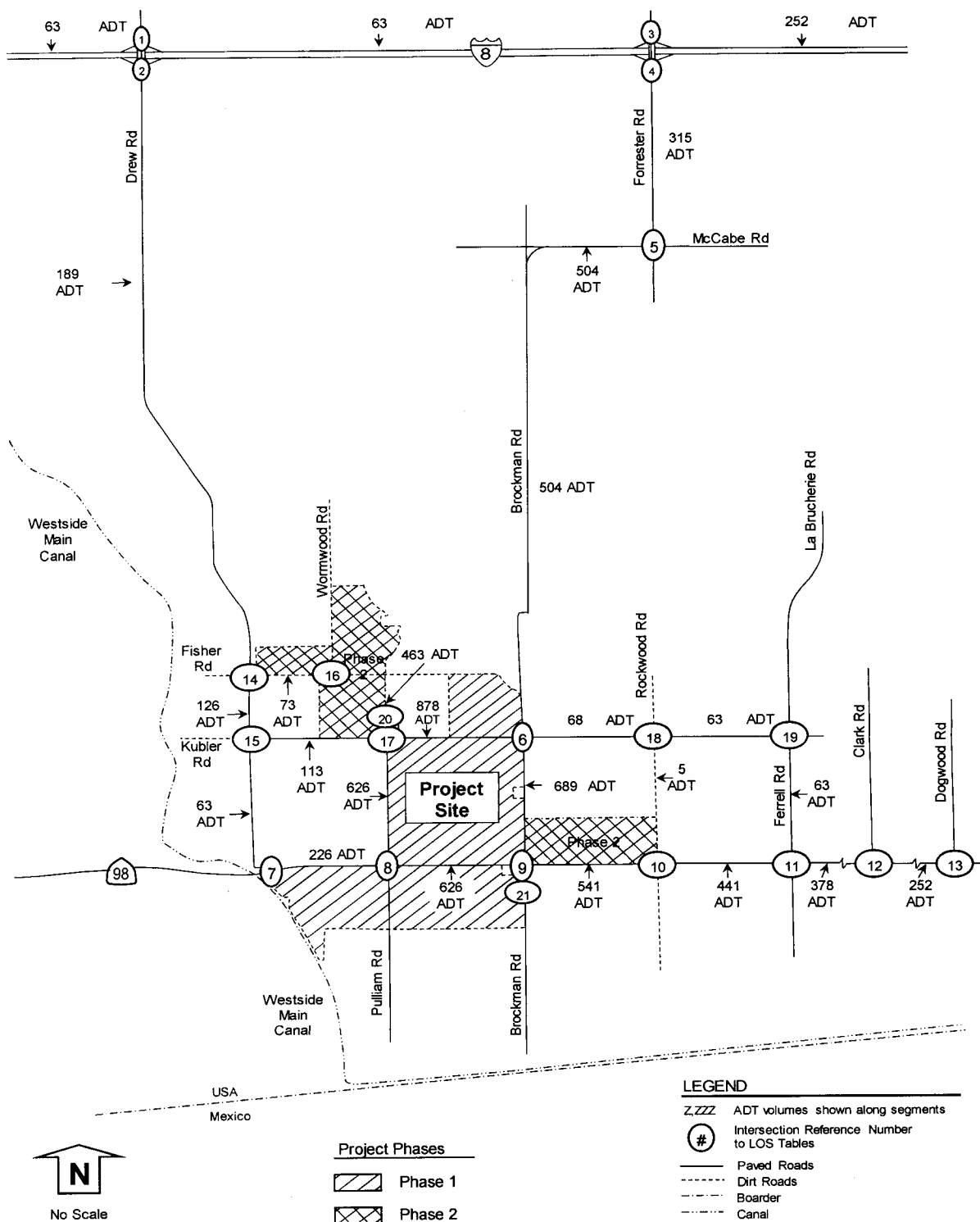


REV. 10/19/2010  
 N:\1989\FIGURES\LLG1989 FIG7-5.DWG

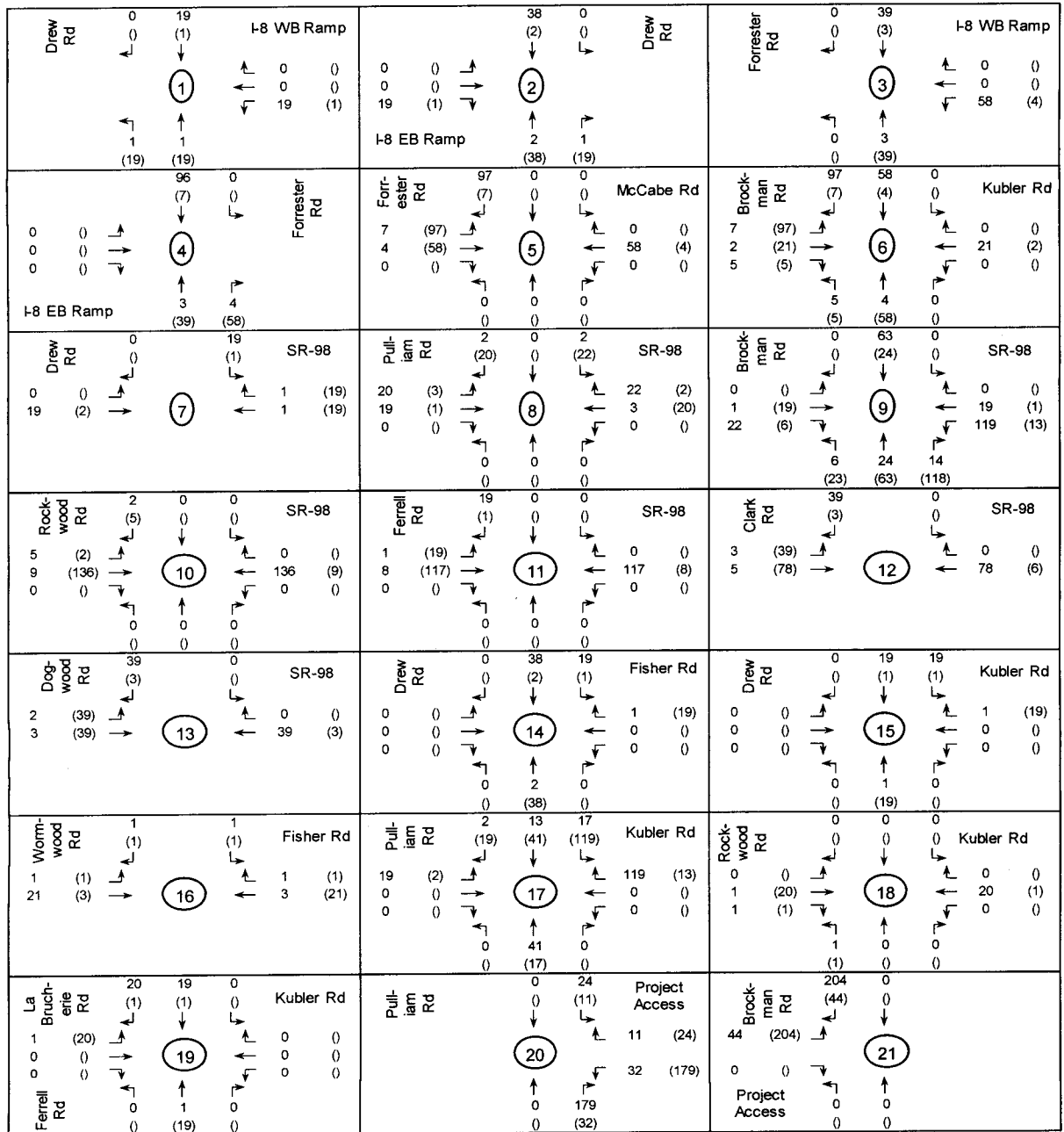


**Figure 7-5**  
**Construction Project Traffic Volumes**  
**Total Trips**  
**AM/PM Peak Hours & ADT**

**Figure 10a: Project (Construction and Shuttle) Trip Assignment**



**Figure 10b: Project (Construction and Shuttle) Trip Assignment**

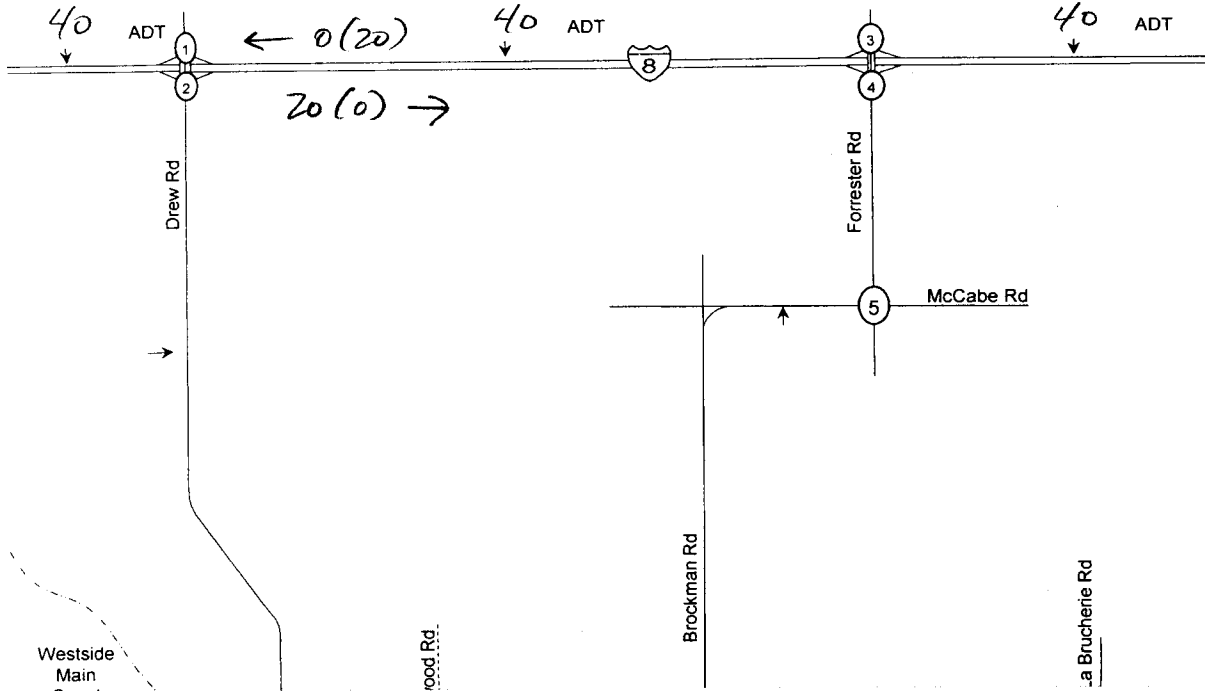


**LEGEND**

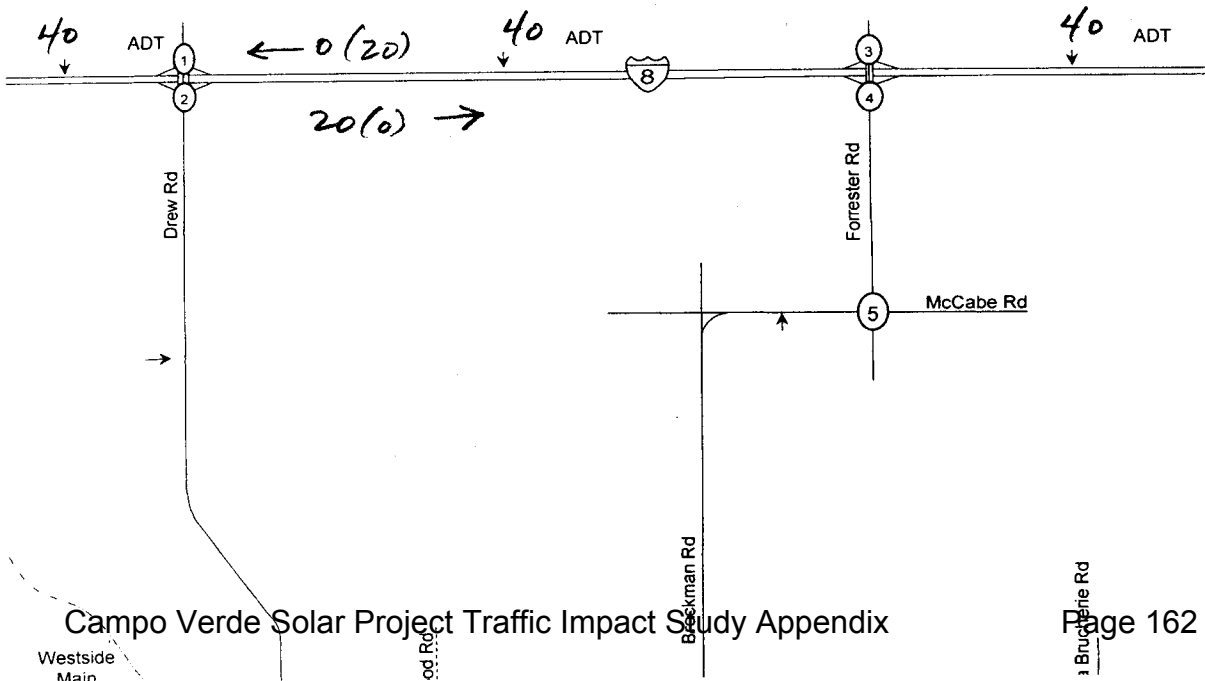
- XX AM peak hour volumes at intersections
- YY PM peak hour volumes at intersections
- An empty PM ( ) represents a 0 volume
- # Intersection Reference Number to LOS Tables



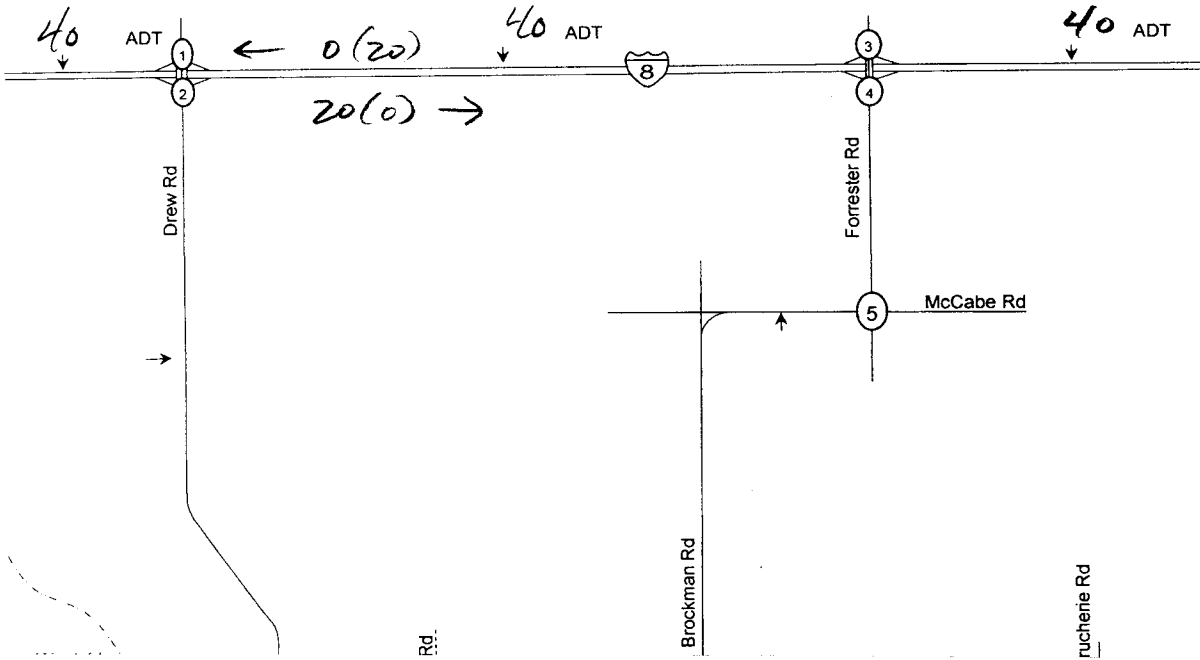
Cumulative Project 15 ): Mayflower Solar Farm approx. 27 miles north and slightly east of the project site; therefore, no cumulative traffic is anticipated to be added to the study intersections and segments south of I-8. However, the cumulative project is anticipated to add regional traffic to I-8 as shown below.



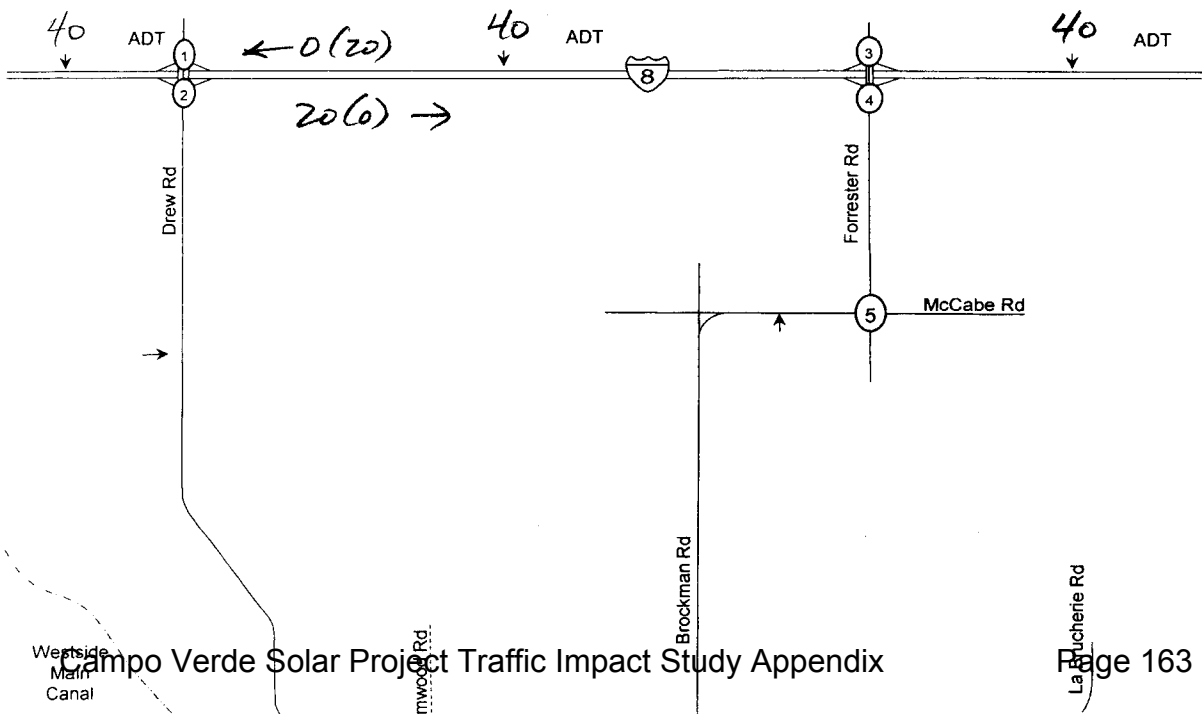
Cumulative Project 16 ): Arkansas Solar Farm approx. 32 miles north and slightly east of the project site; therefore, no cumulative traffic is anticipated to be added to the study intersections and segment south of I-8. However, the cumulative project is anticipated to add regional traffic to I-8 as shown below.



Cumulative Project 17 (EIR [9]): Sonora Solar Farm approx. 33 miles north and slightly east of the project site; therefore, no cumulative traffic is anticipated to be added to the study intersections and segments south of I-8. However, the cumulative project is anticipated to add regional traffic to I-8 as shown below.

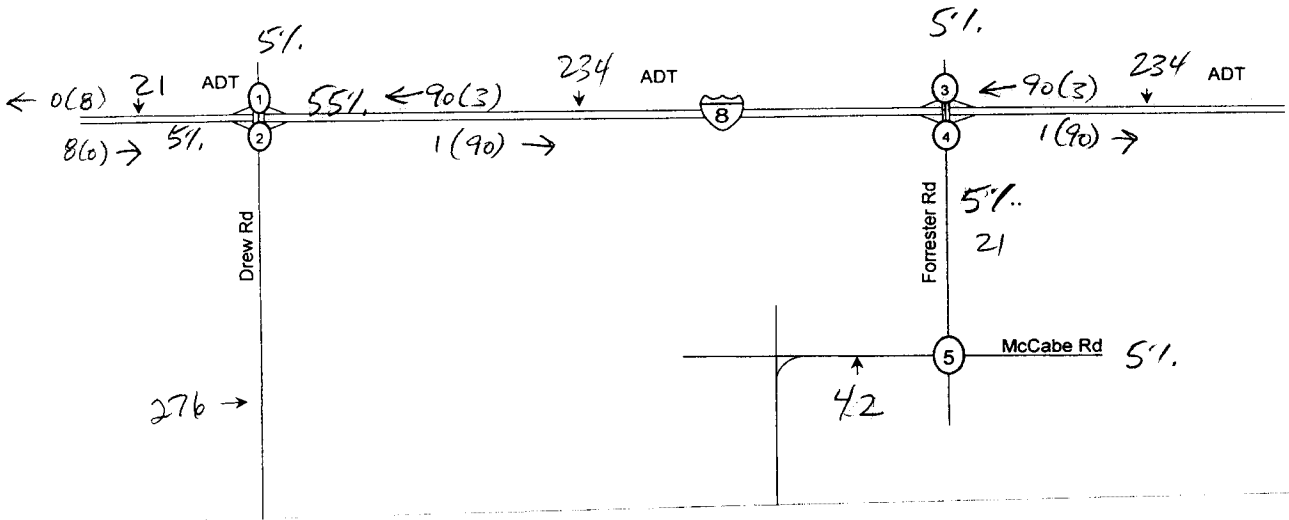


Cumulative Project 18 (EIR [10]): Alhambra Solar Farm approx. 28 miles north and slightly east of the project site; therefore, no cumulative traffic is anticipated to be added to the study intersections and segments south of I-8. However, the cumulative project is anticipated to add regional traffic to I-8 as shown below.



# CUMULATIVE PROJECT #19

# ACORN GREENWORKS

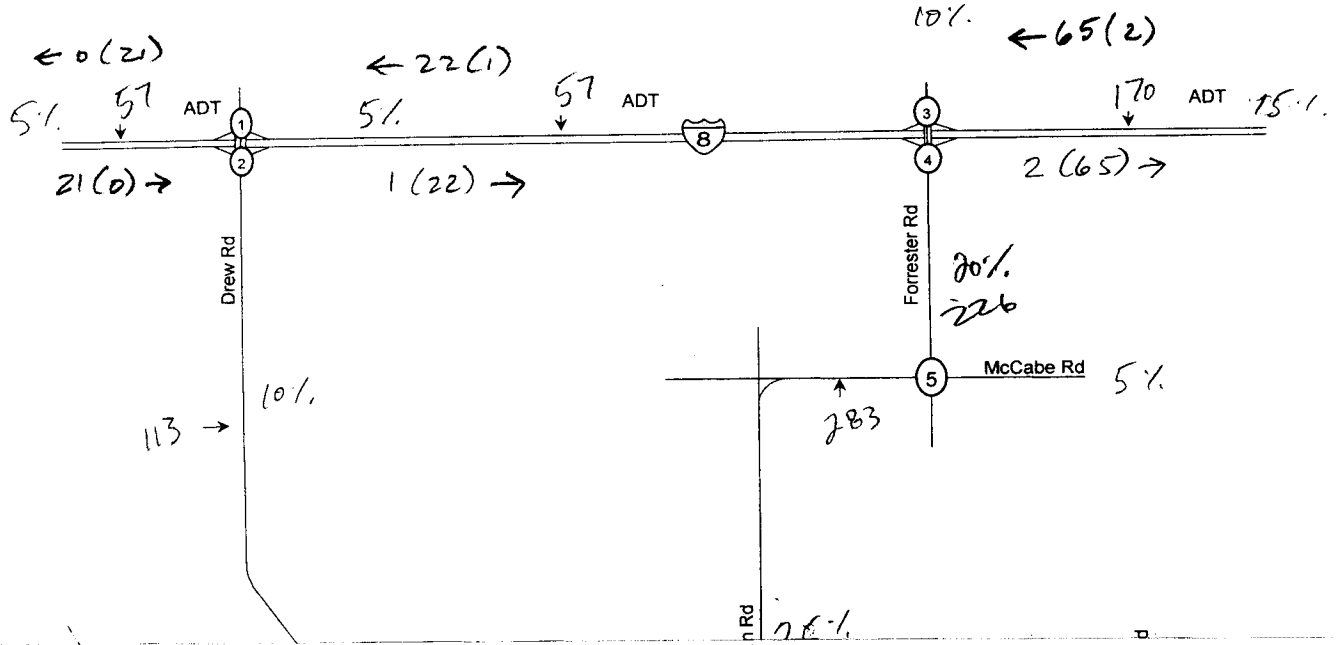


# CUMULATIVE PROJECT #19

# ACORN GREENWORKS

<p>Drew Rd</p> <p>I-8 WB Ramp</p> <p>90(3)</p> <p>1</p> <p>8(0)</p> <p>21</p> <p>0(8)</p>	<p>Drew Rd</p> <p>I-8 EB Ramp</p> <p>98(3)</p> <p>2</p> <p>8(0)</p> <p>0</p> <p>16</p> <p>90</p>	<p>Forrester Rd</p> <p>I-8 WB Ramp</p> <p>3</p> <p>Forrester Rd</p>
<p>I-8 EB Ramp</p> <p>4</p> <p>Forrester Rd</p>	<p>Forrester Rd</p> <p>McCabe Rd</p> <p>5</p>	<p>Brockman Rd</p> <p>Kubler Rd</p> <p>6</p>
<p>Drew Rd</p> <p>SR-98</p> <p>9(0)</p> <p>7</p> <p>16(1)</p> <p>16</p>	<p>Pulliam Rd</p> <p>SR-98</p> <p>8</p> <p>16(1)</p>	<p>Brockman Rd</p> <p>SR-98</p> <p>9</p> <p>16(1)</p>
<p>Rockwood Rd</p> <p>SR-98</p> <p>16(0)</p> <p>10</p> <p>16(1)</p>	<p>Ferrell Rd</p> <p>SR-98</p> <p>16(0)</p> <p>11</p> <p>16(1)</p>	<p>Clark Rd</p> <p>SR-98</p> <p>16(0)</p> <p>12</p> <p>16(1)</p>

# CUMULATIVE PROJECTS 20-23 (EIR [12-15]): CALEXICO I-A, I-B, II-A, & II-B (SOLAR FARMS)



# CUMULATIVE PROJECTS 20-23 (EIR [12-15]): CALEXICO I-A, I-B, II-A, & II-B (SOLAR FARMS)

<p>Drew Rd</p> <p>I-8 WB Ramp</p> <p>1</p> <p>21(0)</p> <p>I-8 EB Ramp</p> <p>22(1)</p> <p>22(1)</p> <p>10%</p>	<p>Drew Rd</p> <p>22(1)</p> <p>Drew Rd</p> <p>2</p> <p>21(0)</p> <p>I-8 EB Ramp</p> <p>22(1)</p> <p>22(1)</p>	<p>Forrester Rd</p> <p>I-8 WB Ramp</p> <p>3</p> <p>43(1)</p> <p>43(1)</p> <p>70%</p> <p>226</p>
<p>I-8 EB Ramp</p> <p>4</p> <p>Forrester Rd</p> <p>44</p> <p>43</p>	<p>Forrester Rd</p> <p>McCabe Rd</p> <p>5</p> <p>1(87)</p> <p>0(22)</p> <p>22(0)</p>	<p>Brockman Rd</p> <p>Kubler Rd</p> <p>6</p> <p>109</p> <p>109</p>
<p>Drew Rd</p> <p>SR-98</p> <p>7</p> <p>22(1)</p> <p>43(1)</p> <p>1(43)</p> <p>0(22)</p>	<p>Pulliam Rd</p> <p>SR-98</p> <p>8</p> <p>65(2)</p> <p>1(65)</p>	<p>Brockman Rd</p> <p>SR-98</p> <p>9</p> <p>65(2)</p> <p>109</p> <p>109</p>

## Solar Farm Average Traffic Generation Rates

Several cumulative projects did not have technical studies and therefore did not have reported cumulative project traffic generation. Therefore, an average traffic generation rate from other existing solar farm projects was calculated based on the number of megawatts (MW). The following tables lists the traffic generation associated with each cumulative project and the associated MW.

Project	MegaWatts ADT ADT/MW			AM				PM			
				IN		OUT		IN		OUT	
				IN/MW	OUT/MW	IN/MW	OUT/MW	IN/MW	OUT/MW		
Mount Signal Solar Farm I	200	522	2.61	162	0.81	0	0.00	0	0.00	162	0.81
Imperial Solar South	200	680	3.40	265	1.33	6	0.03	15	0.08	265	1.33
Imperial Solar West	250	750	3.00	300	1.20	6	0.02	15	0.06	300	1.20
Imperial Valley Solar (SES Solar II)	750	1736	2.31	772	1.03	0	0.00	0	0.00	772	1.03
<b>Average Rates</b>			<b>2.83</b>		<b>1.09</b>		<b>0.01</b>		<b>0.03</b>		<b>1.09</b>

The above rates were used to calculate the traffic associated with the following cumulative projects.

<u>PROPOSED CUMULATIVE PROJECTS</u>		ADT	IN	OUT	IN	OUT
4) SDG&E Photovoltaic Solar Field [D]	14	40	15	0	0	15
8) Solar Reserve Imperial Valley [H]	100	283	109	1	3	109
14) USS Mount Signal [5]	250	708	273	3	8	273
15) Mayflower Solar Farm Project [7]	50	142	55	1	2	55
16) Arkansas [8]	50	142	55	1	2	55
17) Sonora [9]	50	142	55	1	2	55
18) Alhambra [10]	50	142	55	1	2	55
19) Acron Greenworks [11]	150	425	164	2	5	164
20) Calexico I-A [12]	100	283	109	1	3	109
21) Calexico I-B [13]	100	283	109	1	3	109
22) Calexico II-A [14]	100	283	109	1	3	109
23) Calexico II-B [15]	100	283	109	1	3	109

Notes: [ ] indicates reference in EIR



## Power Line Construction and Delivery Traffic Estimation

The following traffic generation is based on detailed estimates of the required construction workers, deliveries by truck, and equipment identified for the Centinela project (detailes attached). These estimates are used for the cumulative projects that do not have traffic generation information provided.

Estimated Power Line Construction and Deliveries	ADT	AM		PM	
		IN	OUT	IN	OUT
Power Line Construction Workers <sup>1</sup>	42	21	0	0	21
Power Line Deliveries and Construction Truck Trips (with PCE) <sup>2</sup>	198	12	12	12	12
<b>Total Traffic During Peak Construction Period</b>	<b>240</b>	<b>33</b>	<b>12</b>	<b>12</b>	<b>33</b>

Notes: 1) Total workers estimated at 54, which includes construction and truck drivers, thus construction only (21) has truck drivers removed (33).

2) Passenger Car Equivalent (PCE) factor of 3 applied to daily trucks (33 in and 33 out) associated with power line construction, thus ADT = 66 x 3 = 198. The daily estimate of 33 trucks is based on the identified equipment list included on the following pages. Truck deliveries vary throughout the day, thus 33 truck divided by 8 hours to equal 4 trucks (in and out) during a peak hour, which equals 12 PCE.

**TABLE C-3. EQUIPMENT LIST FOR GEN-TIE LINE CONSTRUCTION (Month 6)**

<b>Equipment Description</b>	<b>Quantity</b>	<b>Horsepower</b>	<b>Fuel Type</b>	<b>Equivalent Full-Load Operating Time (hr/day)</b>	<b>Vehicle Weight (pounds)</b>	<b>Vehicle Miles (VMT) per Day on Unpaved Surface</b>	<b>Estimated Workforce for this Activity</b>
<b><i>Steel (Hauling, Shake-Out, Assembly and Erection)</i></b>							
Crane, Hydraulic, 150/300 Ton	1	250	Diesel	1.8	135,000 lbs	5	35
Crane, Hydraulic, Rough Terrain, 35 Ton	1	125	Diesel	1.8	65,500 lbs	5	
Truck, Flatbed w/Boom, 5 Ton	2	235	Diesel	1.0	51,800 lbs	10	
Truck, Crew Cab, Flatbed, 1 Ton	7	180	Gas	1.1	12,000 lbs	10	
Truck, Semi, Tractor	1	310	Diesel	6.0	20,000 lbs	10	
Trailer, Flatbed, 40'	3	N/A	N/A		10,000 lbs	10	
Water Truck	1	175	Diesel	4.5	N/A	N/A	
Motor, Auxillary Power	2	5	Gas	1.0	150 lbs	0	
Compressor, Air	3	75	Gas	2.0	1,500 lbs	15	

**TABLE C-3. EQUIPMENT LIST FOR GEN-TIE LINE CONSTRUCTION (Month 6)**

Equipment Description	Quantity	Horsepower	Fuel Type	Equivalent Full-Load Operating Time (hr/day)	Vehicle Weight (pounds)	Vehicle Miles (VMT) per Day on Unpaved Surface	Estimated Workforce for this Activity
<b><i>Conductor / Shield Wire / OPGW (Stringing, Sagging, Deadending and Clipping)</i></b>							
Truck, Flatbed, w/ Bucket, 5 Ton	3	235	Diesel	3.0	51,800 lbs	15	15
Tension Machine, Conductor	1	135	Diesel	1.5	42,000 lbs	1	
Tension Machine, Static	1	135	Diesel	0.2	32,000 lbs	1	
Truck, Sock Line, Puller, 3 Drum	1	310	Diesel	2.3	55,000 lbs	1	
Truck, Wire Puller, 1 Drum	1	310	Diesel	2.3	72,000 lbs	1	
Truck, Semi, Tractor	2	310	Diesel	6.0	20,000 lbs	10	
Water Truck	1	175	Diesel	4.5	N/A	N/A	
Crawler, Track Type, Sagging (D8 type)	1	305	Diesel	0.8	84,850 lbs	1	
Truck, Crew Cab, Flatbed, 1 Ton	5	180	Gas	1.4	12,000 lbs	10	
Back Hoe, w/ Bucket	1	85	Diesel	3.0	15,770 lbs	1	
Truck, Mechanics, 1 - 2 Ton	1	260	Diesel	3.0	18,000 lbs	15	
Crane, Hydraulic, Rough Terrain, 35 Ton	2	125	Diesel	1.0	65,500 lbs	10	
Helicopter	1	600	Jet Fuel	4.0	N/A	N/A	
Motor, Auxillary Power	2	5	Gas	2.3	N/A	N/A	

**TABLE C-3. EQUIPMENT LIST FOR GEN-TIE LINE CONSTRUCTION (Month 6)**

<b>Equipment Description</b>	<b>Quantity</b>	<b>Horsepower</b>	<b>Fuel Type</b>	<b>Equivalent Full-Load Operating Time (hr/day)</b>	<b>Vehicle Weight (pounds)</b>	<b>Vehicle Miles (VMT) per Day on Unpaved Surface</b>	<b>Estimated Workforce for this Activity</b>
<b><i>Cleanup &amp; Restoration</i></b>							
Truck, Flatbed, w/ Bucket, 5 Ton	1	235	Diesel	2.0	51,800 lbs	5	4
Excavator, Bucket Type	1	165	Diesel	4.5	41,000 lbs	5	
Truck, Semi, Tractor	1	310	Diesel	4.5	20,000 lbs	10	
Digger, Transmission Type, Truck Mount	1	190	Diesel	2.0	34,500 lbs	5	
Truck, Dump, 10 Ton	1	235	Diesel	3.0	30,000 lbs	10	
Motor Grader	1	110	Diesel	8.0	32,460 lbs	20	
Truck, Flatbed, 1 Ton	1	210	Diesel	2.1	12,000 lbs	10	
Truck, Pick-Up	1	210	Diesel	2.1	5,300 lbs	10	
Motor, Auxillary Power	1	5	Gas	0.5	N/A	N/A	

## **Appendix P**

### **Year 2013 + Project + Cumulative Intersection LOS Calculations**

AM Year 2013 + Project + Cumulative

1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	5	63	45	97	251	3	75	12	22	6	24	11
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)	5	68	49	105	273	3	82	13	24	7	26	12
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	40	83	242	140	118	45						
Volume Left (vph)	5	0	105	0	82	7						
Volume Right (vph)	0	49	0	3	24	12						
Hadj (s)	0.10	-0.38	0.25	0.02	0.05	-0.10						
Departure Headway (s)	5.4	5.0	5.3	5.1	5.2	5.1						
Degree Utilization, x	0.06	0.11	0.36	0.20	0.17	0.06						
Capacity (veh/h)	633	689	655	686	649	636						
Control Delay (s)	7.6	7.4	10.1	8.1	9.2	8.5						
Approach Delay (s)	7.5		9.3		9.2	8.5						
Approach LOS	A		A		A	A						
<b>Intersection Summary</b>												
Delay			8.9									
HCM Level of Service			A									
Intersection Capacity Utilization			32.6%		ICU Level of Service		A					
Analysis Period (min)			15									

AM Year 2013 + Project + Cumulative

2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔				↔
Volume (veh/h)	0	0	0	403	0	59	44	30	0	0	105	47
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	438	0	64	48	33	0	0	114	51
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	300	268	140	268	293	33	165			33		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	300	268	140	268	293	33	165			33		
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	34	100	94	97			100		
cM capacity (veh/h)	596	616	908	667	597	1041	1413			1579		
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	502	80	165									
Volume Left	438	48	0									
Volume Right	64	0	51									
cSH	743	1413	1700									
Volume to Capacity	0.68	0.03	0.10									
Queue Length 95th (ft)	133	3	0									
Control Delay (s)	19.3	4.6	0.0									
Lane LOS	C	A										
Approach Delay (s)	19.3	4.6	0.0									
Approach LOS	C											
<b>Intersection Summary</b>												
Average Delay			13.5									
Intersection Capacity Utilization			44.7%		ICU Level of Service		A					
Analysis Period (min)			15									

AM Year 2013 + Project + Cumulative  
3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	7	0	163	0	0	0	0	71	66	39	468	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)	8	0	177	0	0	0	0	77	72	42	509	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	707	742	509	795	707	113	509						149
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	707	742	509	795	707	113	509						149
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	69	100	100	100	100						97
cM capacity (veh/h)	342	333	564	205	350	940	1056						1433
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	185	149	551										
Volume Left	8	0	42										
Volume Right	177	72	0										
cSH	589	1700	1433										
Volume to Capacity	0.31	0.09	0.03										
Queue Length 95th (ft)	33	0	2										
Control Delay (s)	14.3	0.0	0.9										
Lane LOS	B		A										
Approach Delay (s)	14.3	0.0	0.9										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay			3.5										
Intersection Capacity Utilization			47.9%	ICU Level of Service									A
Analysis Period (min)			15										

AM Year 2013 + Project + Cumulative  
4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕						↕			↕		
Volume (veh/h)	15	0	6	0	0	1	52	94	0	0	350	278	
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	0	7	0	0	1	57	102	0	0	380	302	
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	748	747	532	753	898	102	683						102
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	748	747	532	753	898	102	683						102
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 %	95	100	99	100	100	100	94						100
cM capacity (veh/h)	313	320	548	307	262	953	910						1490
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	23	1	159	683									
Volume Left	16	0	57	0									
Volume Right	7	1	0	302									
cSH	356	953	910	1490									
Volume to Capacity	0.06	0.00	0.06	0.00									
Queue Length 95th (ft)	5	0	5	0									
Control Delay (s)	15.8	8.8	3.7	0.0									
Lane LOS	C	A	A										
Approach Delay (s)	15.8	8.8	3.7	0.0									
Approach LOS	C	A											
<b>Intersection Summary</b>													
Average Delay			1.1										
Intersection Capacity Utilization			61.1%	ICU Level of Service									B
Analysis Period (min)			15										

AM Year 2013 + Project + Cumulative  
5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	10	105	56	78	103	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)	11	114	61	85	112	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	146				239	103
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	146				239	103
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				85	100
cM capacity (veh/h)	1436				743	952
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	125	146	114			
Volume Left	11	0	112			
Volume Right	0	85	2			
cSH	1436	1700	747			
Volume to Capacity	0.01	0.09	0.15			
Queue Length 95th (ft)	1	0	13			
Control Delay (s)	0.7	0.0	10.7			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	10.7			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay		3.4				
Intersection Capacity Utilization		26.3%		ICU Level of Service	A	
Analysis Period (min)		15				

LOS Engineering, Inc.

Synchro 7 - Report

AM Year 2013 + Project + Cumulative  
6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕					↕	↕	↕
Volume (vph)	14	58	8	23	250	8	14	128	16	16	282	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0				4.0		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00				1.00		1.00	
Frt	1.00	0.98		1.00	1.00				0.99		0.98	
Flt Protected	0.95	1.00		0.95	1.00				1.00		1.00	
Satd. Flow (prot)	1770	1828		1770	1854				1830		1814	
Flt Permitted	0.95	1.00		0.95	1.00				1.00		1.00	
Satd. Flow (perm)	1770	1828		1770	1854				1830		1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	63	9	25	272	9	15	139	17	17	307	70
RTOR Reduction (vph)	0	7	0	0	2	0	0	5	0	0	9	0
Lane Group Flow (vph)	15	65	0	25	279	0	0	166	0	0	385	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	6.1	6.1		14.2	14.2			8.9			17.5	
Effective Green, g (s)	6.1	6.1		14.2	14.2			8.9			17.5	
Actuated g/C Ratio	0.10	0.10		0.23	0.23			0.14			0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	172	178		401	420			260			506	
v/s Ratio Prot	0.01	c0.04		0.01	c0.15			c0.09			c0.21	
v/s Ratio Perm												
v/c Ratio	0.09	0.36		0.06	0.67			0.64			0.76	
Uniform Delay, d1	25.8	26.5		19.0	22.1			25.4			20.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	1.3		0.1	4.0			5.1			6.7	
Delay (s)	26.0	27.8		19.1	26.0			30.4			27.4	
Level of Service	C	C		B	C			C			C	
Approach Delay (s)		27.4			25.5			30.4			27.4	
Approach LOS		C			C			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay		27.3			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		62.7			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		42.8%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

LOS Engineering, Inc.

Synchro 7 - Report



AM Year 2013 + Project + Cumulative

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔			↔	
Volume (veh/h)	0	0	0	204	0	211	34	108	0	0	273	160
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	222	0	229	37	117	0	0	297	174
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)	656											
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	690	575	384	575	662	117	471			117		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	538	402	175	402	505	117	278			117		
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	52	100	75	97			100		
cM capacity (veh/h)	281	437	732	459	382	935	1082			1471		
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	451	154	471									
Volume Left	222	37	0									
Volume Right	229	0	174									
cSH	933	1082	1700									
Volume to Capacity	0.48	0.03	0.28									
Queue Length 95th (ft)	67	3	0									
Control Delay (s)	15.0	2.3	0.0									
Lane LOS	B	A										
Approach Delay (s)	15.0	2.3	0.0									
Approach LOS	B											
<b>Intersection Summary</b>												
Average Delay	6.6											
Intersection Capacity Utilization	53.0%			ICU Level of Service			A					
Analysis Period (min)	15											

AM Year 2013 + Project + Cumulative

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔					↔			↔	↔
Volume (veh/h)	50	0	4	0	0	0	0	90	14	96	380	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)	54	0	4	0	0	0	0	98	15	104	413	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)	1040											
pX, platoon unblocked												
vC, conflicting volume	727	735	413	729	727	105	413			113		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	727	735	413	729	727	105	413			113		
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 %	83	100	99	100	100	100	100			93		
cM capacity (veh/h)	321	322	639	318	326	949	1146			1476		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	59	113	517									
Volume Left	54	0	104									
Volume Right	4	15	0									
cSH	347	1700	1476									
Volume to Capacity	0.17	0.07	0.07									
Queue Length 95th (ft)	15	0	6									
Control Delay (s)	17.9	0.0	2.1									
Lane LOS	C		A									
Approach Delay (s)	17.9	0.0	2.1									
Approach LOS	C											
<b>Intersection Summary</b>												
Average Delay	3.1											
Intersection Capacity Utilization	42.0%			ICU Level of Service			A					
Analysis Period (min)	15											

AM Year 2013 + Project + Cumulative

9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	5	18	5	20	194	21	6	5	5	23	21	20
Sign Control		Free			Free			Stop			Stop	
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)	5	20	5	22	211	23	7	5	5	25	23	22
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	234			25			332	310	22	307	302	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			25			332	310	22	307	302	222
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	99	99	96	96	97
cM capacity (veh/h)	1334			1589			579	594	1055	629	600	817
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	30	255	17	70								
Volume Left	5	22	7	25								
Volume Right	5	23	5	22								
cSH	1334	1589	680	666								
Volume to Capacity	0.00	0.01	0.03	0.10								
Queue Length 95th (ft)	0	1	2	9								
Control Delay (s)	1.4	0.7	10.4	11.0								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.4	0.7	10.4	11.0								
Approach LOS			B	B								
<b>Intersection Summary</b>												
Average Delay	3.2											
Intersection Capacity Utilization	25.6%			ICU Level of Service			A					
Analysis Period (min)	15											

AM Year 2013 + Project + Cumulative

10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	61	7	3	426	1	3
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)	66	8	3	463	1	3
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		540	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			74		540	70
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		100	100
cM capacity (veh/h)			1526		502	993
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	74	466	4			
Volume Left	0	3	1			
Volume Right	8	0	3			
cSH	1700	1526	798			
Volume to Capacity	0.04	0.00	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.1	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.1	9.5			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay	0.1					
Intersection Capacity Utilization	34.8%			ICU Level of Service		
Analysis Period (min)	15			A		

AM Year 2013 + Project + Cumulative

11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	63	1	14	292	1	5
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)	68	1	15	317	1	5
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			70		417	69
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			70		417	69
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1531		587	994
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	70	333	7			
Volume Left	0	15	1			
Volume Right	1	0	5			
cSH	1700	1531	891			
Volume to Capacity	0.04	0.01	0.01			
Queue Length 95th (ft)	0	1	1			
Control Delay (s)	0.0	0.4	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.1			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization		32.8%		ICU Level of Service		A
Analysis Period (min)			15			

PM Year 2013 + Project + Cumulative

1: Evan Hewes & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	8	283	99	19	36	20	51	25	73	15	11	13
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)	9	308	108	21	39	22	55	27	79	16	12	14
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>						
Volume Total (vph)	163	261	40	41	162	42						
Volume Left (vph)	9	0	21	0	55	16						
Volume Right (vph)	0	108	0	22	79	14						
Hadj (s)	0.06	-0.25	0.29	-0.33	-0.19	-0.09						
Departure Headway (s)	5.2	4.9	5.8	5.1	4.9	5.2						
Degree Utilization, x	0.23	0.35	0.06	0.06	0.22	0.06						
Capacity (veh/h)	675	716	588	658	691	634						
Control Delay (s)	8.6	9.3	8.0	7.3	9.2	8.5						
Approach Delay (s)	9.0		7.6		9.2	8.5						
Approach LOS	A		A		A	A						
<b>Intersection Summary</b>												
Delay	8.9											
HCM Level of Service	A											
Intersection Capacity Utilization	34.0%		ICU Level of Service				A					
Analysis Period (min)	15											

PM Year 2013 + Project + Cumulative

2: I-8 WB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔				↔
Volume (veh/h)	0	0	0	55	0	39	163	100	0	0	95	7
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	60	0	42	177	109	0	0	103	8
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	591	570	107	570	574	109	111				109	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	591	570	107	570	574	109	111				109	
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	85	100	96	88				100	
cM capacity (veh/h)	363	380	947	393	378	945	1479				1482	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	102	286	111									
Volume Left	60	177	0									
Volume Right	42	0	8									
cSH	671	1479	1700									
Volume to Capacity	0.15	0.12	0.07									
Queue Length 95th (ft)	13	10	0									
Control Delay (s)	13.0	5.2	0.0									
Lane LOS	B	A										
Approach Delay (s)	13.0	5.2	0.0									
Approach LOS	B											
<b>Intersection Summary</b>												
Average Delay	5.6											
Intersection Capacity Utilization	31.0%		ICU Level of Service				A					
Analysis Period (min)	15											

PM Year 2013 + Project + Cumulative

3: I-8 EB Ramp & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	37	0	43	0	0	0	0	226	409	62	81	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)	40	0	47	0	0	0	0	246	445	67	88	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	691	913	88	714	691	468	88						690
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	691	913	88	714	691	468	88						690
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 %	88	100	95	100	100	100	100						93
cM capacity (veh/h)	339	253	970	311	340	595	1508						904
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	87	690	155										
Volume Left	40	0	67										
Volume Right	47	445	0										
cSH	732	1700	904										
Volume to Capacity	0.12	0.41	0.07										
Queue Length 95th (ft)	10	0	6										
Control Delay (s)	12.7	0.0	4.4										
Lane LOS	B		A										
Approach Delay (s)	12.7	0.0	4.4										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay			1.9										
Intersection Capacity Utilization			58.0%	ICU Level of Service									B
Analysis Period (min)			15										

PM Year 2013 + Project + Cumulative

4: Diehl Rd & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Volume (veh/h)	274	0	51	0	0	0	1	346	0	0	97	13	
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)	298	0	55	0	0	0	1	376	0	0	105	14	
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	491	491	112	546	498	376	120						376
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	491	491	112	546	498	376	120						376
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 %	39	100	94	100	100	100	100						100
cM capacity (veh/h)	488	478	940	422	474	670	1468						1182
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>									
Volume Total	353	0	377	120									
Volume Left	298	0	1	0									
Volume Right	55	0	0	14									
cSH	528	1700	1468	1182									
Volume to Capacity	0.67	0.00	0.00	0.00									
Queue Length 95th (ft)	124	0	0	0									
Control Delay (s)	24.6	0.0	0.0	0.0									
Lane LOS	C	A	A										
Approach Delay (s)	24.6	0.0	0.0	0.0									
Approach LOS	C	A											
<b>Intersection Summary</b>													
Average Delay			10.2										
Intersection Capacity Utilization			44.0%	ICU Level of Service									A
Analysis Period (min)			15										

PM Year 2013 + Project + Cumulative  
5: SR-98 & Drew Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	2	100	132	107	81	10
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	109	143	116	88	11
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	260				315	202
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	260				315	202
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				87	99
cM capacity (veh/h)	1305				677	839
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	111	260	99			
Volume Left	2	0	88			
Volume Right	0	116	11			
cSH	1305	1700	692			
Volume to Capacity	0.00	0.15	0.14			
Queue Length 95th (ft)	0	0	12			
Control Delay (s)	0.2	0.0	11.1			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	11.1			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay	2.4					
Intersection Capacity Utilization	25.2%		ICU Level of Service	A		
Analysis Period (min)	15					

LOS Engineering, Inc.

Synchro 7 - Report

PM Year 2013 + Project + Cumulative  
6: Evan Hewes & Forrester Road

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↕		↕	↕			↕	↕		↕	↕
Volume (vph)	78	323	16	25	104	14	8	335	29	21	174	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1770	1850		1770	1830			1841			1835	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1770	1850		1770	1830			1841			1835	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	351	17	27	113	15	9	364	32	23	189	17
RTOR Reduction (vph)	0	2	0	0	5	0	0	4	0	0	3	0
Lane Group Flow (vph)	85	366	0	27	123	0	0	401	0	0	226	0
Turn Type	Split			Split			Split			Split		
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases												
Actuated Green, G (s)	18.9	18.9		8.9	8.9			21.1			14.0	
Effective Green, g (s)	18.9	18.9		8.9	8.9			21.1			14.0	
Actuated g/C Ratio	0.24	0.24		0.11	0.11			0.27			0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	424	443		200	206			492			326	
v/s Ratio Prot	0.05	c0.20		0.02	c0.07			c0.22			c0.12	
v/s Ratio Perm												
v/c Ratio	0.20	0.83		0.14	0.60			0.82			0.69	
Uniform Delay, d1	24.0	28.5		31.5	33.3			27.1			30.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	12.0		0.3	4.6			10.1			6.2	
Delay (s)	24.2	40.5		31.8	37.9			37.1			36.7	
Level of Service	C	D		C	D			D			D	
Approach Delay (s)	37.4			36.8				37.1			36.7	
Approach LOS	D			D				D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay	37.1		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	78.9		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	48.7%		ICU Level of Service		A							
Analysis Period (min)	15											
c Critical Lane Group												

LOS Engineering, Inc.

Synchro 7 - Report

PM Year 2013 + Project + Cumulative

7: I-8 WB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔			↔		
Volume (veh/h)	0	0	0	20	0	169	1	323	0	0	307	66	
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	22	0	184	1	351	0	0	334	72	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)						2							
Median type						None							
Median storage (veh)													
Upstream signal (ft)												656	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91							0.91	
vC, conflicting volume	815	723	370	723	759	351	405						351
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	748	647	259	647	686	351	298						351
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	94	100	73	100						100
cM capacity (veh/h)	220	355	710	350	337	692	1150						1208
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	205	352	405										
Volume Left	22	1	0										
Volume Right	184	0	72										
cSH	774	1150	1700										
Volume to Capacity	0.27	0.00	0.24										
Queue Length 95th (ft)	27	0	0										
Control Delay (s)	12.5	0.0	0.0										
Lane LOS	B	A											
Approach Delay (s)	12.5	0.0	0.0										
Approach LOS	B												
<b>Intersection Summary</b>													
Average Delay			2.7										
Intersection Capacity Utilization			34.2%	ICU Level of Service									A
Analysis Period (min)			15										

PM Year 2013 + Project + Cumulative

8: I-8 EB Ramp & Forrester Road

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔	↔					↔			↔		
Volume (veh/h)	181	1	33	0	0	0	0	187	198	245	80	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)	197	1	36	0	0	0	0	203	215	266	87	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)						2							
Median type						None							
Median storage (veh)													
Upstream signal (ft)												1040	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99			0.99					
vC, conflicting volume	930	1038	87	949	930	311	87						418
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	923	1032	67	941	923	311	67						418
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 %	3	99	96	100	100	100	100						77
cM capacity (veh/h)	203	176	982	189	204	729	1513						1141
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>										
Volume Total	234	418	353										
Volume Left	197	0	266										
Volume Right	36	215	0										
cSH	233	1700	1141										
Volume to Capacity	1.00	0.25	0.23										
Queue Length 95th (ft)	235	0	23										
Control Delay (s)	104.7	0.0	7.4										
Lane LOS	F		A										
Approach Delay (s)	104.7	0.0	7.4										
Approach LOS	F												
<b>Intersection Summary</b>													
Average Delay			26.9										
Intersection Capacity Utilization			59.8%	ICU Level of Service									B
Analysis Period (min)			15										

PM Year 2013 + Project + Cumulative

9: Diehl Rd & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	20	189	21	5	12	5	21	20	20	7	6	5
Sign Control		Free			Free			Stop			Stop	
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)	22	205	23	5	13	5	23	22	22	8	7	5
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	18			228			296	290	217	320	298	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	18			228			296	290	217	320	298	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	96	97	99	99	99
cM capacity (veh/h)	1598			1340			639	610	823	592	603	1064
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	250	24	66	20								
Volume Left	22	5	23	8								
Volume Right	23	5	22	5								
cSH	1598	1340	678	680								
Volume to Capacity	0.01	0.00	0.10	0.03								
Queue Length 95th (ft)	1	0	8	2								
Control Delay (s)	0.7	1.8	10.9	10.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	1.8	10.9	10.5								
Approach LOS			B	B								
<b>Intersection Summary</b>												
Average Delay	3.2											
Intersection Capacity Utilization	24.5%			ICU Level of Service			A					
Analysis Period (min)	15											

PM Year 2013 + Project + Cumulative

10: Evan Hewes & Westside Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	↔
Volume (veh/h)	328	0	0	26	7	5
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)	357	0	0	28	8	5
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				357	385	357
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				357	385	357
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	99
cM capacity (veh/h)				1202	618	688
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	357	28	13			
Volume Left	0	0	8			
Volume Right	0	0	5			
cSH	1700	1202	645			
Volume to Capacity	0.21	0.00	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	10.7			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.7			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay	0.4					
Intersection Capacity Utilization	27.3%			ICU Level of Service		
Analysis Period (min)	15			A		



PM Year 2013 + Project + Cumulative

11: Evan Hewes & Derrick Rd

HCM Unsignalized Intersection Capacity Analysis

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	356	0	4	55	0	14
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)	387	0	4	60	0	15
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			387		455	387
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			387		455	387
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		100	98
cM capacity (veh/h)			1172		561	661
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	387	64	15			
Volume Left	0	4	0			
Volume Right	0	0	15			
cSH	1700	1172	661			
Volume to Capacity	0.23	0.00	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.6	10.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	10.6			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			0.4			
Intersection Capacity Utilization		28.7%		ICU Level of Service		A
Analysis Period (min)			15			

## **Appendix Q**

### **ITE Turn Lane Warrants**

---

# TRAFFIC ENGINEERING HANDBOOK

Fifth Edition

James L. Pline  
*Editor*



Institute of Transportation Engineers

---

Library of Congress Cataloging-in-Publication Data

Traffic engineering handbook / James L. Pline, editor. — 5th ed.

p. cm.

Includes bibliographical references and index.

ISBN 0-935403-32-9

1. Traffic engineering—Handbooks, manuals, etc. I. Pline, James L.  
II. Institute of Transportation Engineers.

HE333.T68 1999

388.3' 12-dc21

99-41568

CIP

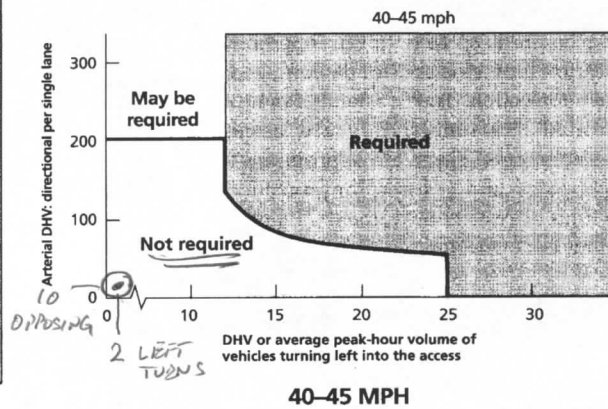
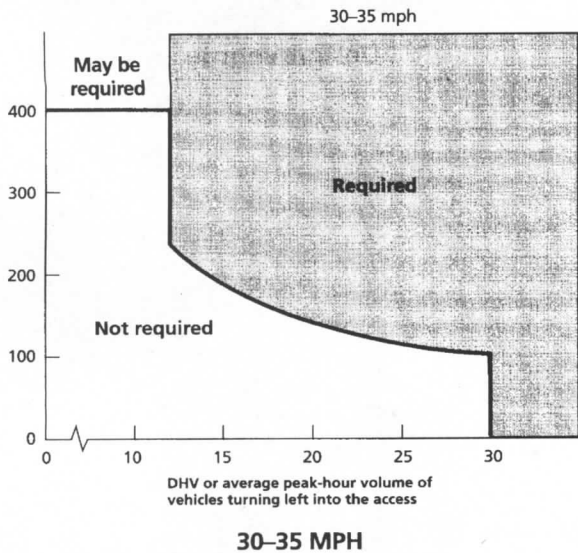


Figure 11-22(a) Left-Turn Lane Warrants

Source: Access Management Guidelines for Activity Centers, NCHRP Report 348.

### Corner Radius Design

Corner radius design should be based on the selected design vehicle. Care should be taken to select an appropriate vehicle. Over-designing an intersection using a very large semitrailer, which may never or rarely ever use the intersection, can be costly and may create problems in executing a desired channelization plan; and it may even create a more difficult environment for pedestrians. Under-designing an intersection creates potential safety and operational problems. Table 11-17 shows guidelines for selection of an appropriate design vehicle.

Design of the corner radius itself can take a variety of forms. Simple circular radius designs are common for low-speed, residential, collector, and downtown streets. Higher-speed designs and radii for very large semitrailers are most efficiently accomplished using multicentered curves. These best replicate the turning paths of design vehicles.

### Turning Roadway Widths

Widths of turning roadways are based on the turning paths of design vehicles. AASHTO policy gives designers a choice of three cases for which turning roadway width can be designed, as shown in Figure 11-23. Designers should take care to not over-design the turning roadway for too great a width. This can create a design that is difficult to drain, difficult for pedestrians to cross, and that may reduce or eliminate an island desired for traffic control devices or other uses.

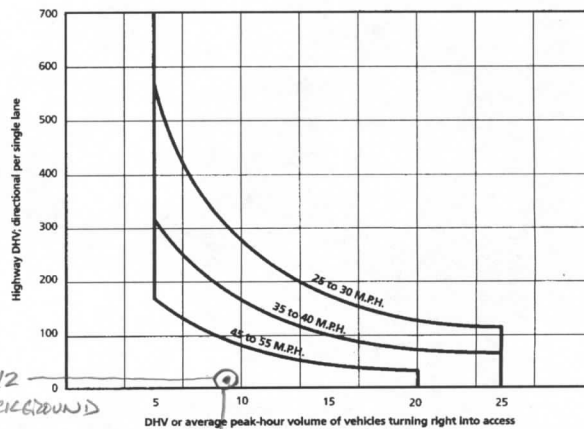


Figure 11-22(b) Right-Turn Lane Warrants

Source: State Highway Access Code, Colorado Department of Transportation, 1985.

















DURING OPERATIONS (AFTER CONSTRUCTION)  
 8 RIGHT TURNS INTO SITE ALONG SIDE 12 SB THROUGH VEHICLES. ∴ RIGHT-TURN LANE NOT REQUIRED.

## **Appendix R**

### **Existing + Cumulative + Project Mitigation LOS and Fair Share Calculations**

















AM Year 2013 + Project + Cumulative  
8: I-8 EB Ramp & Forrester Road

With Mitigation  
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	0	4	0	0	0	0	90	14	96	380	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0					4.0			4.0	
Lane Util. Factor		1.00	1.00					1.00			1.00	
Flt		1.00	0.85					0.98			1.00	
Flt Protected		0.95	1.00					1.00			0.99	
Satd. Flow (prot)		1770	1583					1829			1844	
Flt Permitted		0.95	1.00					1.00			0.99	
Satd. Flow (perm)		1770	1583					1829			1844	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	0	4	0	0	0	0	98	15	104	413	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	54	0	0	0	0	0	103	0	0	517	0
Turn Type	Perm		Perm							Split		
Protected Phases		4						2		6	6	
Permitted Phases	4		4									
Actuated Green, G (s)		2.6	2.6					7.7			16.7	
Effective Green, g (s)		2.6	2.6					7.7			16.7	
Actuated g/C Ratio		0.07	0.07					0.20			0.43	
Clearance Time (s)		4.0	4.0					4.0			4.0	
Vehicle Extension (s)		3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)		118	106					361			790	
v/s Ratio Prot								c0.06			c0.28	
v/s Ratio Perm		0.03	0.00									
v/c Ratio		0.46	0.00					0.28			0.65	
Uniform Delay, d1		17.5	17.0					13.3			8.9	
Progression Factor		1.00	1.00					1.00			1.00	
Incremental Delay, d2		2.8	0.0					0.4			2.0	
Delay (s)		20.3	17.0					13.7			10.8	
Level of Service		C	B					B			B	
Approach Delay (s)		20.1			0.0			13.7			10.8	
Approach LOS		C			A			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			12.1								HCM Level of Service	B
HCM Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			39.0								Sum of lost time (s)	12.0
Intersection Capacity Utilization			42.0%								ICU Level of Service	A
Analysis Period (min)			15									
c Critical Lane Group												

PM Year 2013 + Project + Cumulative  
8: I-8 EB Ramp & Forrester Road

With Mitigation  
HCM Signalized Intersection Capacity Analysis

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	181	1	33	0	0	0	0	187	198	245	80	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0					4.0			4.0		
Lane Util. Factor		1.00	1.00					1.00			1.00		
Flt		1.00	0.85					0.93			1.00		
Flt Protected		0.95	1.00					1.00			0.96		
Satd. Flow (prot)		1774	1583					1733			1795		
Flt Permitted		0.95	1.00					1.00			0.96		
Satd. Flow (perm)		1774	1583					1733			1795		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	197	1	36	0	0	0	0	203	215	266	87	0	
RTOR Reduction (vph)	0	0	30	0	0	0	0	62	0	0	0	0	
Lane Group Flow (vph)	0	198	6	0	0	0	0	356	0	0	353	0	
Turn Type	Perm		Perm							Split			
Protected Phases		4						2		6	6		
Permitted Phases	4		4										
Actuated Green, G (s)		8.8	8.8					14.4			14.4		
Effective Green, g (s)		8.8	8.8					14.4			14.4		
Actuated g/C Ratio		0.18	0.18					0.29			0.29		
Clearance Time (s)		4.0	4.0					4.0			4.0		
Vehicle Extension (s)		3.0	3.0					3.0			3.0		
Lane Grp Cap (vph)		315	281					503			521		
v/s Ratio Prot								c0.21			c0.20		
v/s Ratio Perm		0.11	0.00										
v/c Ratio		0.63	0.02					0.71			0.68		
Uniform Delay, d1		18.9	16.8					15.7			15.5		
Progression Factor		1.00	1.00					1.00			1.00		
Incremental Delay, d2		3.9	0.0					4.5			3.5		
Delay (s)		22.8	16.9					20.3			19.0		
Level of Service		C	B					C			B		
Approach Delay (s)		21.9			0.0			20.3			19.0		
Approach LOS		C			A			C			B		
<b>Intersection Summary</b>													
HCM Average Control Delay			20.2									HCM Level of Service	C
HCM Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			49.6									Sum of lost time (s)	12.0
Intersection Capacity Utilization			59.8%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													



**Fair Share Calculations**

<b>8) Forrester/I-8 EB Ramp</b>			
Cumulative AM =	409	Fairshare Calculation	
<u>Project Construction Traffic AM =</u>	7	Project / (Cumulative + Project) =	1.7%
Cumulative PM =	(470)	Fairshare Calculation	
<u>Project Construction Traffic PM =</u>	(56)	Project / (Cumulative + Project) =	10.6%
<b>Average of AM and PM peak (based on Construction Traffic) =</b>			<b>6.2%</b>
Cumulative AM =	409	Fairshare Calculation	
<u>Project Operaion Traffic AM =</u>	2	Project / (Cumulative + Project) =	0.5%
Cumulative PM =	(470)	Fairshare Calculation	
<u>Project Operaion Traffic PM =</u>	(2)	Project / (Cumulative + Project) =	0.4%
<b>Average of AM and PM peak (based on Operations Traffic) =</b>			<b>0.5%</b>