Appendix J:
Transportation Supporting Information

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J.1 - VMT Screening

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July 22, 2022

Ms. Cecilia So
First Carbon Solutions
250 Commerce, Suite 250
Irvine, CA 92602

SUBJECT: QUICK N CLEAN CAR WASH VEHICLE MILES TRAVELED (VMT) SCREENING ANALYSIS

Dear Ms. Cecilia So:

The following VMT Screening Analysis has been prepared for the proposed Quick N Clean Car Wash ("Project"), which is located south of Seneca Road and west of US Highway 395 in the City of Adelanto. It is our understanding that the Project is to consist of an automated car wash.

PROJECT OVERVIEW

The proposed Project consists of a 4,552 square foot automated car wash with a single tunnel. Trip generation rates used for this assessment are based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their Trip Generation Manual (10th Edition, 2017). (1) The ITE Trip Generation Manual is a nationally recognized source for estimating site specific trip generation.

As shown in Attachment A, the Project is anticipated to generate a total of 776 trip-ends per day.

BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which require all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020.

It is our understanding that the City of Adelanto utilizes the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool (**Screening Tool**). The Screening Tool allows users to input an assessor's parcel number (APN) to determine if a project's location meets one or more of the screening thresholds for land use projects identified in the Governor's Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA (**Technical Advisory**). (2)

The focus of this memorandum is to evaluate more thoroughly each of the applicable screening thresholds to determine if the proposed Project would be expected to cause a less-than-significant impact to VMT without requiring a more detailed VMT analysis.

PROJECT SCREENING

The Technical Advisory provides details on appropriate "screening thresholds" that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant impact without conducting a more detailed analysis. Screening thresholds are broken into the following four types:

- Transit Priority Area (TPA) Screening
- Low VMT Area Screening
- Project Type Screening

A land use project need only to meet one of the above screening thresholds to result in a less-than-significant impact.

TPA SCREENING

Consistent with guidance identified in the Technical Advisory, projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. However, the presumption may not be appropriate if a project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the Screening Tool results presented in Attachment B, the Project site is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

The TPA screening threshold is not met.

LOW VMT AREA SCREENING

As noted in the Technical Advisory, "residential and office projects that locate in areas with low VMT and that incorporate similar features (density, mix of uses, and transit accessibility) will tend to exhibit similarly low VMT." (2) The Screening Tool uses the sub-regional San Bernardino Transportation Analysis

[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

Model (SBTAM) to measure VMT performance within individual traffic analysis zones (TAZ's) within the region. The Project's physical location based on parcel number is input into the Screening Tool to determine project generated VMT as compared to either a City or County average. The parcel containing the proposed Project was selected and the Screening Tool was run. Based on the Screening Tool results (see Attachment B), the Project is not located within a low VMT generating zone.

The Low VMT Area screening threshold is not met.

PROJECT TYPE SCREENING

The Technical Advisory notes that retail and service development projects typically redistribute shopping/service trips rather than creating new trips. By adding retail opportunities and thereby improving retail/service destination proximity, local-serving retail/service development projects tend to shorten trips and reduce VMT. Thus, lead agencies generally may presume such development creates a less than significant impact. As the proposed car wash is anticipated to service the local community almost exclusively, the Project would meet the intent of the project type screening criteria.

The Project Type screening threshold is met.

CONCLUSION

Based on our review of applicable VMT screening thresholds, the Project meets the project type screening (i.e., local serving retail/service use) and would be presumed to result in a less than significant VMT impact; no additional VMT analysis is required.

If you have any questions, please contact me directly at (949) 336-5978.

Respectfully submitted,

URBAN CROSSROADS, INC.

Aric Evatt, PTP
President

Robert Vu, PE
Transportation Engineer

REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.
2. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.

ATTACHMENT A:
PROJECT TRIP GENERATION

Land Use[1]	ITE Code	Units[2]	AM Peak Hour			PM Peak Hour			Weekday Daily
			In	Out	Total	In	Out	Total	
Automated Car Wash	948	TUN	N/A	N/A	N/A	38.75	38.75	77.50	775.00

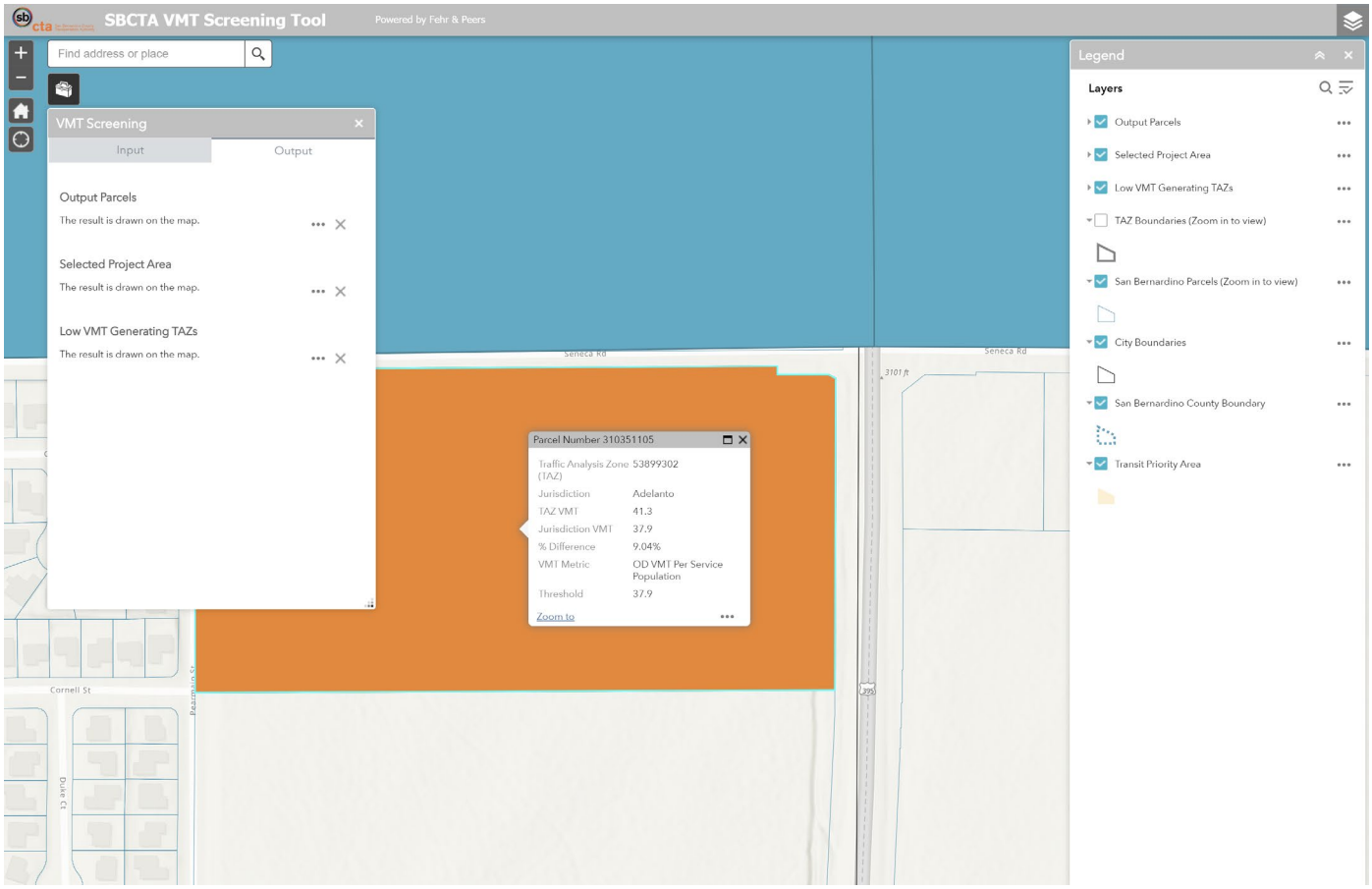
Land Use[1]	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Automated Car Wash[3]	1	TUN	N/A	N/A	N/A	39	39	78	776

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] TUN = Tunnels

[3] AM peak hour and daily trip generation rate not available. Daily rate estimated at 10 times the PM peak hour rate.

ATTACHMENT B:
SBCTA SCREENING ASSESSMENT


SBCTA VMT Screening Tool
Powered by Fehr & Peers
Find address or place
VMT Screening
Input
Output
Output Parcels
The result is drawn on the map.
Selected Project Area
The result is drawn on the map.
Low VMT Generating TAZs
The result is drawn on the map.
Parcel Number 310351105
Traffic Analysis Zone (TAZ) 53899302
Jurisdiction Adelanto
TAZ VMT 41.3
Jurisdiction VMT 37.9
% Difference 9.04%
VMT Metric OD VMT Per Service Population
Threshold 37.9
Zoom to
Legend
Layers
Output Parcels
Selected Project Area
Low VMT Generating TAZs
TAZ Boundaries (Zoom in to view)
San Bernardino Parcels (Zoom in to view)
City Boundaries
San Bernardino County Boundary
Transit Priority Area
Seneca Rd
Cornell St
Duke Ct
3101 ft

J.2 - TA Report and Appendices

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APPENDIX 1.1:

APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

June 30, 2020

Mr. Brian Wolfe
City of Adelanto
11600 Air Expressway
Adelanto, CA 92301

SUBJECT: QUICK N CLEAN CAR WASH TRAFFIC ANALYSIS – SCOPING AGREEMENT

Dear Mr. Brian Wolfe:

Urban Crossroads, Inc. is pleased to submit this scoping letter to City of Adelanto regarding the Traffic Analysis (TA) for the proposed Quick N Clean Car Wash development ("Project"), which is located north of Seneca Road and west of US Highway 395 in the City of Adelanto. It is our understanding that the Project is to consist of a 4,961 square foot automated car wash with a single tunnel. This letter describes the draft proposed Project trip generation, trip distribution, and analysis methodology, which have been used to establish the proposed Project study area and analysis locations.

A preliminary site plan for the proposed Project is shown on Exhibit 1. Exhibit 2 depicts the location of the proposed Project in relation to the existing roadway network. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. As indicated on Exhibit 2, access to the Project site will be provided to US Highway 395 via a proposed right-in/right-out access driveway.

Since the City of Adelanto does not have their own traffic study guidelines, this scoping agreement has been prepared in accordance with the County of San Bernardino Congestion Management Program, 2016 Update and the County of San Bernardino Transportation Impact Study Guidelines, July 2019.

TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Trip generation rates used to estimate Project traffic are shown in Table 1. The trip generation rates used for this analysis are based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their Trip Generation Manual, 10th Edition, 2017. The trip generation rates are based upon data collected by the ITE for Automated Car Wash (ITE Land Use Code 948). As shown in Table 1, the proposed Project is anticipated to generate a total of 776 trip-ends per day with 78 PM peak hour trips based on a single tunnel. Note that the ITE Trip Generation Manual does not identify an AM peak hour trip generation rate for this land use and a daily trip generation rate is also not available. For the

purposes of this analysis, the daily trip generation rate is estimated to be 10 times the PM peak hour trip generation rate.

TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered to identify the route where the Project traffic would distribute. Trip distribution patterns will be based on existing and planned land uses in the area along with the planned circulation system. Exhibit 3 illustrates the trip distribution patterns for the proposed Project.

ANALYSIS SCENARIOS

Consistent with the County's TIA guidelines, intersection analysis will be provided for the following analysis scenarios:

- Existing (2020) Conditions
- Opening Year Cumulative (2022) Without Project Conditions
- Opening Year Cumulative (2022) With Project Conditions

Long-range traffic conditions have not been evaluated as the proposed Project's land use is consistent with the General Plan. All study area intersections will be analyzed using the HCM (6th Edition) methodology.

STUDY AREA

The study area was defined in conformance with the requirements of the County's traffic study guidelines and has been determined based on intersections where the proposed Project is anticipated to contribute 50 or more peak hour trips. Exhibit 2 identifies the proposed study area intersections based on the aforementioned criteria.

LEVEL OF SERVICE (LOS) CRITERIA

Per the County of San Bernardino TIA Guidelines, the following LOS will be utilized for study area intersections located within the County: Require development to achieve a peak hour Level of Service (LOS) C or better at intersections. Therefore, any intersection operating at LOS D, E, or F will be considered deficient for the purposes of this analysis.

THRESHOLDS OF SIGNIFICANCE

To determine whether the addition of project traffic at a signalized study intersection results in a project-related deficiency, the following thresholds will be utilized:

- Any signalized study intersection in the Desert region that is operating at an LOS C or better without project traffic in which the addition of project traffic causes the intersection to degrade to an LOS D, E, or F shall identify improvements to improve operations to LOS C.
- Any signalized study intersection in the Desert region that is operating at LOS D, E, or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.

To determine whether the addition of project traffic at an unsignalized study intersection results in a project-related deficiency, the following thresholds will be utilized:

- The addition of project related traffic causes the intersection to degrade from an LOS D or better to a LOS E or worse in the Valley and Mountain regions or from an LOS C or better to an LOS D or worse in the Desert region.

OR

- The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at an LOS E or F in the Valley and Mountain regions or at an LOS D, E, or F in the Desert region.

AND

- One or both of the following conditions are met:
    - The project adds ten (10) or more trips to any minor street approach.
    - The intersection meets the peak hour traffic signal warrant after the addition of project traffic.

The proposed thresholds will be applied at study area intersections for the purposes of determining project-related deficiencies.

EXISTING COUNT DATA

Based on the proposed land use, the traffic analysis will evaluate the following time frame:

- Afternoon/Evening (4:00 p.m. to 6:00 p.m.)

Since the proposed Project is not anticipated to contribute any trips during the AM peak hour, as shown in Table 1, only the PM peak hour is proposed for analysis as part of this traffic study.

Due to the currently ongoing COVID-19 pandemic traffic counts cannot be conducted at this time. As such, it is proposed that historic traffic counts be utilized in conjunction with the application of a growth factor (of 2% per year, compounded annually). We will work with the lead agency and local count companies to obtain historic count data for the study area intersection.

SPECIAL ISSUES

The following special issues will also be addressed as part of the TIA:

- *Site Access Evaluation:* The turn pocket lengths will be determined through peak hour traffic simulations developed using Synchro and SimTraffic software in an effort to identify the required storage capacity for turn lanes at the Project driveway.
- *Vehicle Miles Traveled:* A VMT analysis will be prepared for this project under separate cover. It is requested that the City provide any methodology/threshold guidelines for VMT (as adopted or to be adopted by the City).

OPEN ITEMS – CUMULATIVE DEVELOPMENT PROJECTS

We request that City staff provide a list of cumulative development projects within the City's jurisdiction for inclusion in the traffic study, and associated mitigation measures where appropriate for recently approved, but not yet constructed development.

If you have any questions, please contact me directly at (949) 861-0177.

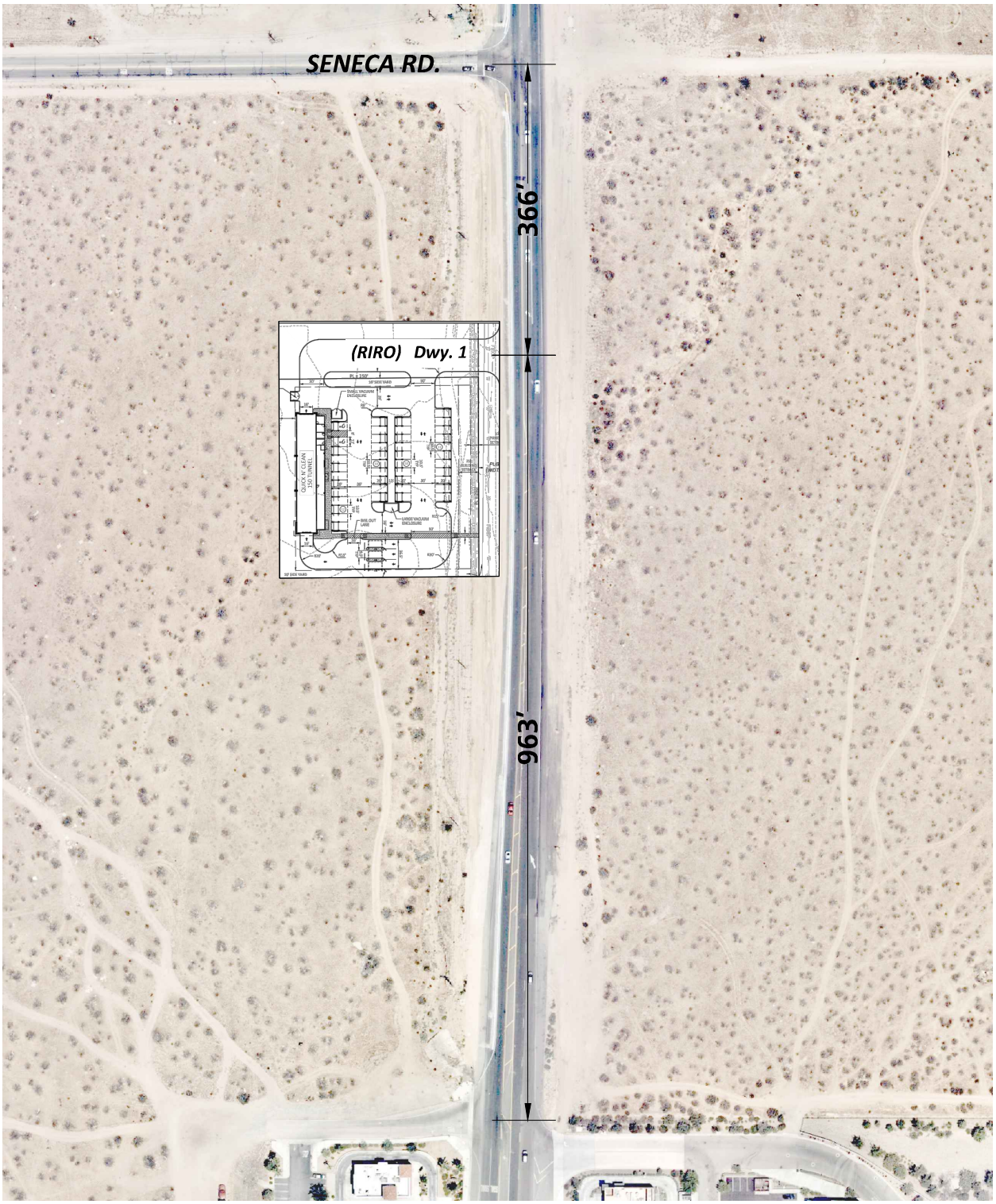
Respectfully submitted,

URBAN CROSSROADS, INC.

Charlene So

Charlene So, PE
Associate Principal

EXHIBIT 1: PRELIMINARY SITE PLAN



LEGEND:

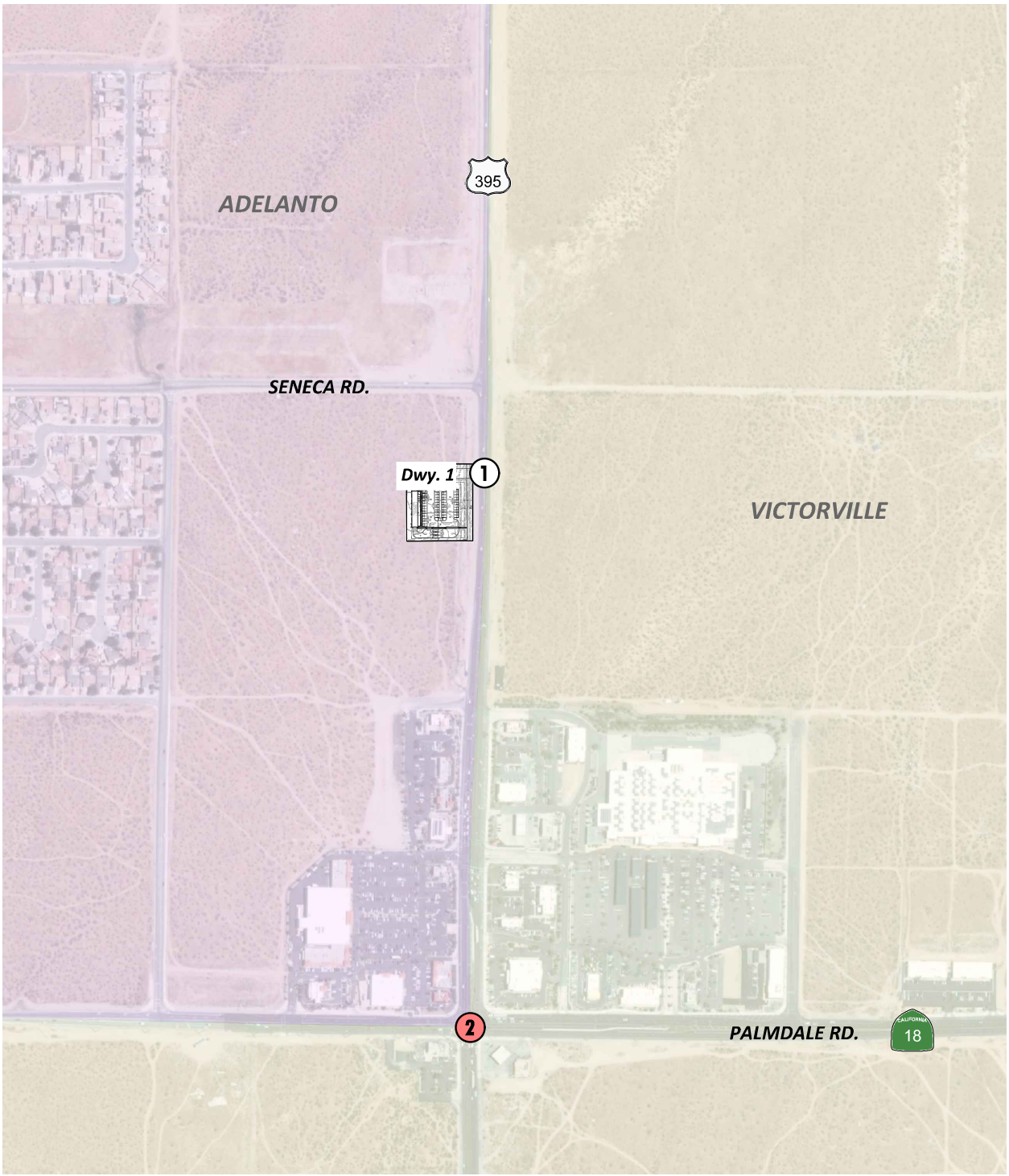
RIRO = RIGHT-IN/RIGHT-OUT ONLY ACCESS

N

13410 - siteplan.dwg

URBAN CROSSROADS

EXHIBIT 2: LOCATION MAP



LEGEND:

0 = CMP INTERSECTION

0 = FUTURE INTERSECTION ANALYSIS LOCATION

N

13410 - locmap.dwg

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EXHIBIT 3: PROJECT TRIP DISTRIBUTION

LEGEND:

10 = PERCENT TO/FROM PROJECT

= OUTBOUND

= INBOUND

N

13410 - trip.dwg

URBAN CROSSROADS

Table 1

Project Trip Generation Summary

Land Use[1]	ITE Code	Units[2]	AM Peak Hour			PM Peak Hour			Weekday Daily
			In	Out	Total	In	Out	Total	
Automated Car Wash	948	TUN	N/A	N/A	N/A	38.75	38.75	77.50	775.00

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[3] AM peak hour and daily trip generation rate not available. Daily rate estimated at 10 times the PM peak hour rate.

APPENDIX 3.1:

EXISTING TRAFFIC COUNTS

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Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Adelanto
N/S: US-395
E/W: Seneca Road
Weather: Clear

File Name : ADL395SEPM
Site Code : 99917016
Start Date : 1/18/2017
Page No : 1

Groups Printed- Total Volume

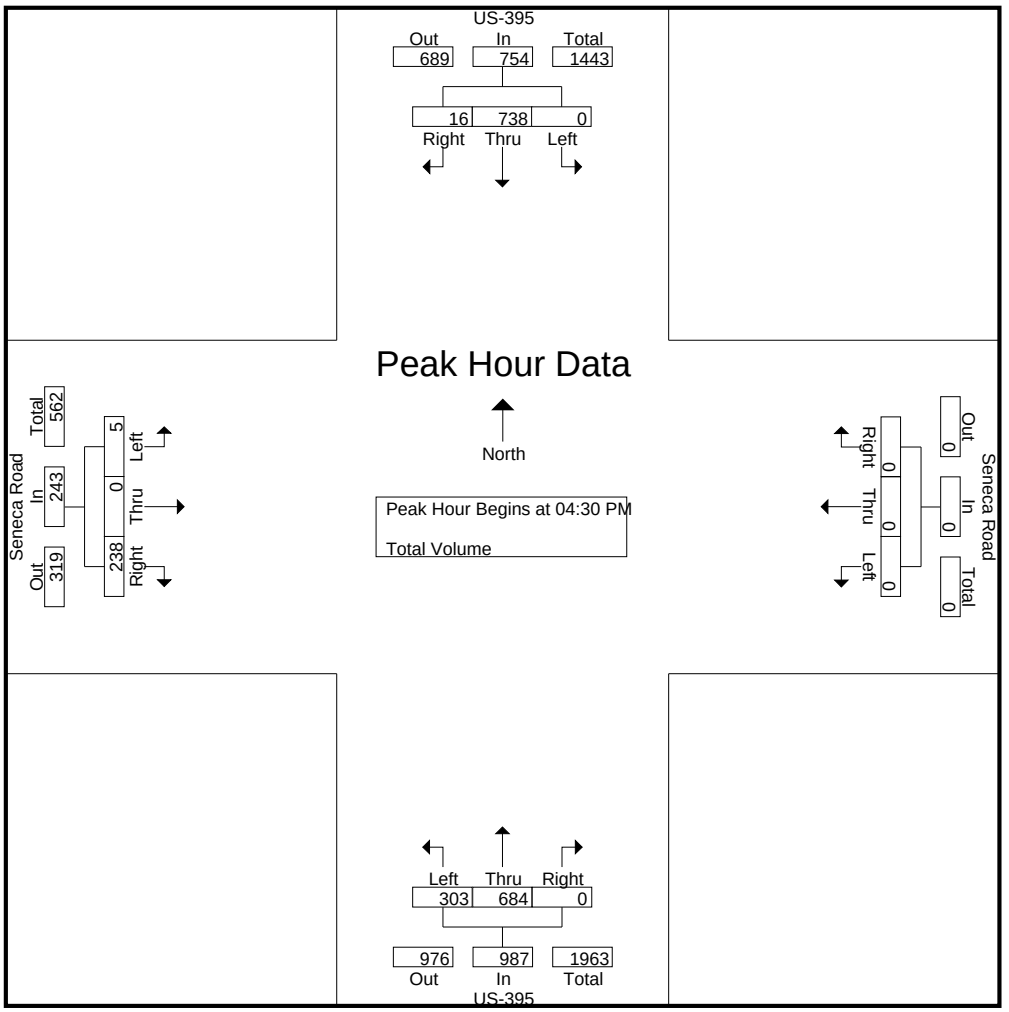
	US-395 Southbound				Seneca Road Westbound				US-395 Northbound				Seneca Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	183	4	187	0	0	0	0	58	163	0	221	2	1	60	63	471
04:15 PM	0	180	5	185	0	0	0	0	66	161	0	227	1	0	49	50	462
04:30 PM	0	180	5	185	0	0	0	0	80	175	0	255	1	0	69	70	510
04:45 PM	0	181	5	186	0	0	0	0	85	153	0	238	1	0	57	58	482
Total	0	724	19	743	0	0	0	0	289	652	0	941	5	1	235	241	1925
05:00 PM	0	167	2	169	0	0	0	0	67	190	0	257	1	0	58	59	485
05:15 PM	0	210	4	214	0	0	0	0	71	166	0	237	2	0	54	56	507
05:30 PM	0	183	0	183	0	0	0	0	71	169	0	240	3	0	60	63	486
05:45 PM	0	164	3	167	0	0	0	0	78	201	0	279	1	0	53	54	500
Total	0	724	9	733	0	0	0	0	287	726	0	1013	7	0	225	232	1978
Grand Total	0	1448	28	1476	0	0	0	0	576	1378	0	1954	12	1	460	473	3903
Apprch %	0	98.1	1.9		0	0	0		29.5	70.5	0		2.5	0.2	97.3		
Total %	0	37.1	0.7	37.8	0	0	0	0	14.8	35.3	0	50.1	0.3	0	11.8	12.1	

	US-395 Southbound				Seneca Road Westbound				US-395 Northbound				Seneca Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	180	**5**	185	0	0	0	0	80	175	0	255	1	0	**69**	**70**	**510**
04:45 PM	0	181	5	186	0	0	0	0	**85**	153	0	238	1	0	57	58	482
05:00 PM	0	167	2	169	0	0	0	0	67	**190**	0	**257**	1	0	58	59	485
05:15 PM	0	**210**	4	**214**	0	0	0	0	71	166	0	237	**2**	0	54	56	507
Total Volume	0	738	16	754	0	0	0	0	303	684	0	987	5	0	238	243	1984
% App. Total	0	97.9	2.1		0	0	0		30.7	69.3	0		2.1	0	97.9		
PHF	.000	.879	.800	.881	.000	.000	.000	.000	.891	.900	.000	.960	.625	.000	.862	.868	.973

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Adelanto
N/S: US-395
E/W: Seneca Road
Weather: Clear

File Name : ADL395SEPM
Site Code : 99917016
Start Date : 1/18/2017
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				05:00 PM				04:30 PM			
+0 mins.	0	180	**5**	185	0	0	0	0	67	190	0	257	1	0	**69**	**70**
+15 mins.	0	181	5	186	0	0	0	0	71	166	0	237	1	0	57	58
+30 mins.	0	167	2	169	0	0	0	0	71	169	0	240	1	0	58	59
+45 mins.	0	**210**	4	**214**	0	0	0	0	**78**	**201**	0	**279**	**2**	0	54	56
Total Volume	0	738	16	754	0	0	0	0	287	726	0	1013	5	0	238	243
% App. Total	0	97.9	2.1		0	0	0		28.3	71.7	0		2.1	0	97.9	
PHF	.000	.879	.800	.881	.000	.000	.000	.000	.920	.903	.000	.908	.625	.000	.862	.868

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Adelanto
N/S: US-395
E/W: Palmdale Road (SR-18)
Weather: Clear

File Name : ADL395-18PM
Site Code : 99917016
Start Date : 1/18/2017
Page No : 1

Groups Printed- Total Volume

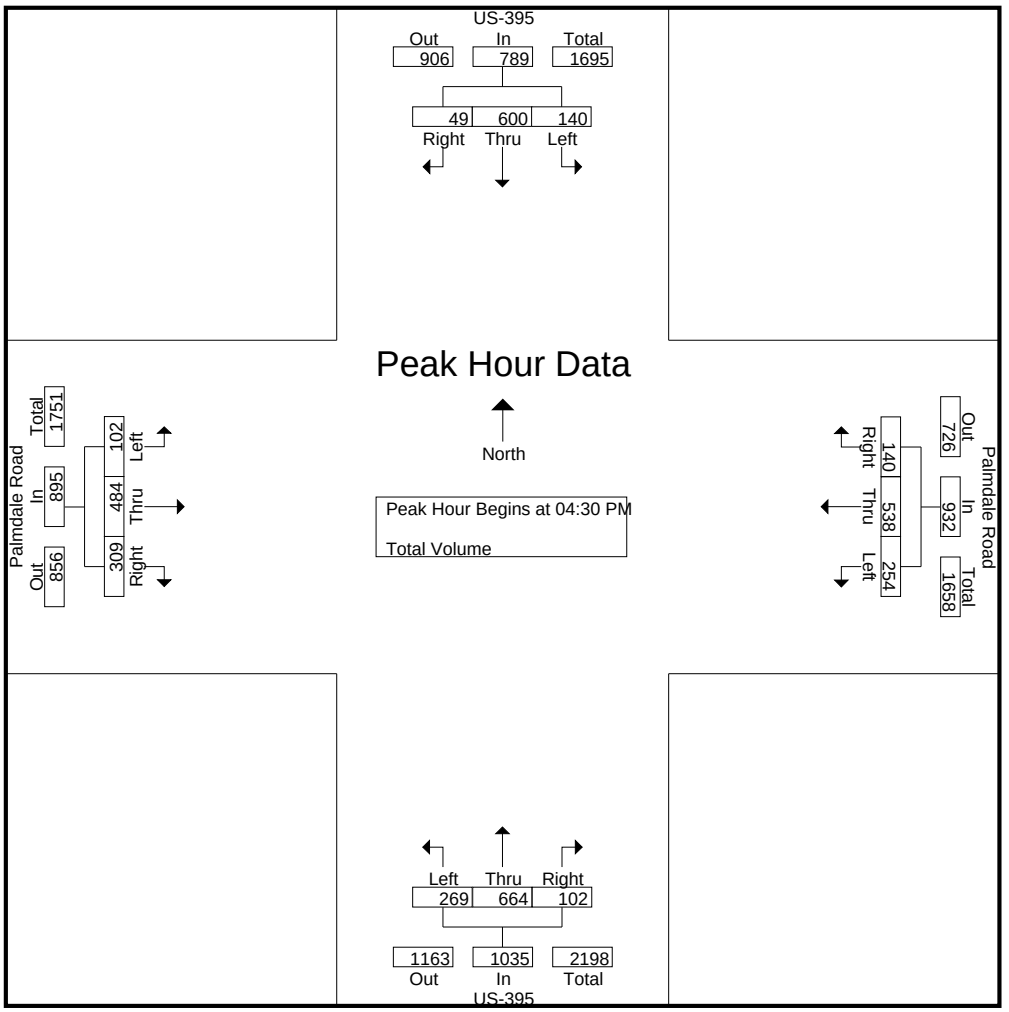
	US-395 Southbound				Palmdale Road Westbound				US-395 Northbound				Palmdale Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	41	149	7	197	60	101	37	198	84	162	21	267	21	120	88	229	891
04:15 PM	37	142	11	190	53	109	29	191	82	154	23	259	21	159	73	253	893
04:30 PM	31	153	8	192	50	110	36	196	65	168	31	264	33	166	89	288	940
04:45 PM	38	145	15	198	69	121	33	223	78	179	22	279	22	133	70	225	925
Total	147	589	41	777	232	441	135	808	309	663	97	1069	97	578	320	995	3649
05:00 PM	35	133	10	178	70	149	33	252	62	158	22	242	23	93	80	196	868
05:15 PM	36	169	16	221	65	158	38	261	64	159	27	250	24	92	70	186	918
05:30 PM	32	158	13	203	57	149	31	237	60	164	23	247	31	120	66	217	904
05:45 PM	33	106	15	154	71	136	35	242	66	163	22	251	18	101	58	177	824
Total	136	566	54	756	263	592	137	992	252	644	94	990	96	406	274	776	3514
Grand Total	283	1155	95	1533	495	1033	272	1800	561	1307	191	2059	193	984	594	1771	7163
Apprch %	18.5	75.3	6.2		27.5	57.4	15.1		27.2	63.5	9.3		10.9	55.6	33.5		
Total %	4	16.1	1.3	21.4	6.9	14.4	3.8	25.1	7.8	18.2	2.7	28.7	2.7	13.7	8.3	24.7	

	US-395 Southbound				Palmdale Road Westbound				US-395 Northbound				Palmdale Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	31	153	8	192	50	110	36	196	65	168	**31**	264	**33**	**166**	**89**	**288**	**940**
04:45 PM	**38**	145	15	198	69	121	33	223	**78**	**179**	22	**279**	22	133	70	225	925
05:00 PM	35	133	10	178	**70**	149	33	252	62	158	22	242	23	93	80	196	868
05:15 PM	36	**169**	**16**	**221**	65	**158**	**38**	**261**	64	159	27	250	24	92	70	186	918
Total Volume	140	600	49	789	254	538	140	932	269	664	102	1035	102	484	309	895	3651
% App. Total	17.7	76	6.2		27.3	57.7	15		26	64.2	9.9		11.4	54.1	34.5		
PHF	.921	.888	.766	.893	.907	.851	.921	.893	.862	.927	.823	.927	.773	.729	.868	.777	.971

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Adelanto
N/S: US-395
E/W: Palmdale Road (SR-18)
Weather: Clear

File Name : ADL395-18PM
Site Code : 99917016
Start Date : 1/18/2017
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				05:00 PM				04:00 PM				04:00 PM			
+0 mins.	**38**	145	15	198	70	149	33	252	**84**	162	21	267	21	120	88	229
+15 mins.	35	133	10	178	65	**158**	**38**	**261**	82	154	23	259	21	159	73	253
+30 mins.	36	**169**	**16**	**221**	57	149	31	237	65	168	**31**	264	**33**	**166**	**89**	**288**
+45 mins.	32	158	13	203	**71**	136	35	242	78	**179**	22	**279**	22	133	70	225
Total Volume	141	605	54	800	263	592	137	992	309	663	97	1069	97	578	320	995
% App. Total	17.6	75.6	6.8		26.5	59.7	13.8		28.9	62	9.1		9.7	58.1	32.2	
PHF	.928	.895	.844	.905	.926	.937	.901	.950	.920	.926	.782	.958	.735	.870	.899	.864

APPENDIX 3.2:

EXISTING (2020) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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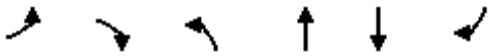
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	5	253	322	726	783
Future Volume (vph)	5	253	322	726	783
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.4	23.4	9.6	24.2	27.2
Total Split (s)	23.4	23.4	23.0	51.6	28.6
Total Split (%)	31.2%	31.2%	30.7%	68.8%	38.1%
Yellow Time (s)	4.2	4.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	Max	Max

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 67.4
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: US 395 & Seneca Rd.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	253	322	726	783	17
Future Volume (veh/h)	5	253	322	726	783	17
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	1673	1772	1772	1772
Adj Flow Rate, veh/h	5	261	332	748	807	18
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	319	301	369	2152	1154	26
Arrive On Green	0.20	0.20	0.23	0.64	0.34	0.34
Sat Flow, veh/h	1594	1502	1594	3455	3455	75
Grp Volume(v), veh/h	5	261	332	748	403	422
Grp Sat Flow(s),veh/h/ln	1594	1502	1594	1683	1683	1758
Q Serve(g_s), s	0.2	11.9	14.4	7.3	14.7	14.7
Cycle Q Clear(g_c), s	0.2	11.9	14.4	7.3	14.7	14.7
Prop In Lane	1.00	1.00	1.00			0.04
Lane Grp Cap(c), veh/h	319	301	369	2152	577	603
V/C Ratio(X)	0.02	0.87	0.90	0.35	0.70	0.70
Avail Cap(c_a), veh/h	408	385	413	2152	577	603
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	27.5	26.5	5.9	20.2	20.2
Incr Delay (d2), s/veh	0.0	15.5	19.5	0.4	6.9	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.3	6.7	1.6	5.8	6.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.8	43.0	46.0	6.4	27.1	26.8
LnGrp LOS	C	D	D	A	C	C
Approach Vol, veh/h	266			1080	825	
Approach Delay, s/veh	42.6			18.5	26.9	
Approach LOS	D			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		51.6		19.4	21.1	30.5
Change Period (Y+Rc), s		6.2		5.2	4.6	6.2
Max Green Setting (Gmax), s		45.4		18.2	18.4	22.4
Max Q Clear Time (g_c+I1), s		9.3		13.9	16.4	16.7
Green Ext Time (p_c), s		4.9		0.3	0.1	2.2

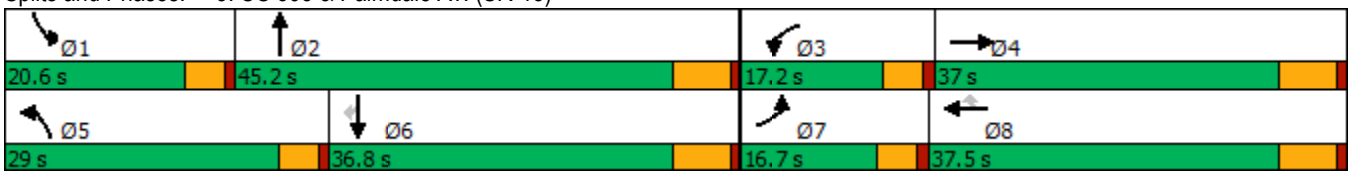
Intersection Summary		
HCM 6th Ctrl Delay		24.7
HCM 6th LOS		C

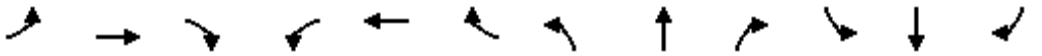
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	108	514	270	571	149	285	705	149	637	52
Future Volume (vph)	108	514	270	571	149	285	705	149	637	52
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases					8					6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	33.2	9.6	16.2	16.2	9.6	37.2	9.6	35.2	35.2
Total Split (s)	16.7	37.0	17.2	37.5	37.5	29.0	45.2	20.6	36.8	36.8
Total Split (%)	13.9%	30.8%	14.3%	31.3%	31.3%	24.2%	37.7%	17.2%	30.7%	30.7%
Yellow Time (s)	3.6	5.2	3.6	5.2	5.2	3.6	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	4.6	6.2	6.2	4.6	6.2	4.6	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max	Max

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119.1
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: US 395 & Palmdale Av. (SR-18)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	514	328	270	571	149	285	705	108	149	637	52
Future Volume (veh/h)	108	514	328	270	571	149	285	705	108	149	637	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	111	530	338	278	589	154	294	727	111	154	657	54
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	509	324	307	944	421	316	1006	153	178	864	385
Arrive On Green	0.08	0.26	0.26	0.11	0.28	0.28	0.20	0.34	0.34	0.11	0.26	0.26
Sat Flow, veh/h	1594	1973	1256	2910	3367	1502	1594	2928	447	1594	3367	1502
Grp Volume(v), veh/h	111	452	416	278	589	154	294	418	420	154	657	54
Grp Sat Flow(s),veh/h/ln	1594	1683	1546	1455	1683	1502	1594	1683	1691	1594	1683	1502
Q Serve(g_s), s	8.2	30.8	30.8	11.3	18.2	9.8	21.6	25.8	25.9	11.3	21.5	3.3
Cycle Q Clear(g_c), s	8.2	30.8	30.8	11.3	18.2	9.8	21.6	25.8	25.9	11.3	21.5	3.3
Prop In Lane	1.00		0.81	1.00		1.00	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	133	435	399	307	944	421	316	578	581	178	864	385
V/C Ratio(X)	0.84	1.04	1.04	0.90	0.62	0.37	0.93	0.72	0.72	0.87	0.76	0.14
Avail Cap(c_a), veh/h	162	435	399	307	944	421	326	578	581	214	864	385
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.9	44.2	44.2	52.7	37.4	34.4	47.0	34.2	34.2	52.1	40.9	34.2
Incr Delay (d2), s/veh	22.3	54.0	56.3	27.7	1.3	0.5	31.1	7.6	7.6	23.1	6.3	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	18.6	17.3	5.1	7.2	3.5	10.8	11.1	11.1	5.5	9.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.2	98.2	100.5	80.4	38.7	34.9	78.1	41.8	41.8	75.2	47.2	34.9
LnGrp LOS	E	F	F	F	D	C	E	D	D	E	D	C
Approach Vol, veh/h		979			1021			1132			865	
Approach Delay, s/veh		96.7			49.5			51.2			51.4	
Approach LOS		F			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.9	47.2	17.2	37.0	28.3	36.8	14.5	39.7
Change Period (Y+Rc), s	4.6	6.2	4.6	6.2	4.6	6.2	4.6	6.2
Max Green Setting (Gmax), s	16.0	39.0	12.6	30.8	24.4	30.6	12.1	31.3
Max Q Clear Time (g_c+I1), s	13.3	27.9	13.3	32.8	23.6	23.5	10.2	20.2
Green Ext Time (p_c), s	0.0	3.4	0.0	0.0	0.0	2.3	0.0	3.0

Intersection Summary	
HCM 6th Ctrl Delay	62.0
HCM 6th LOS	E

APPENDIX 5.1:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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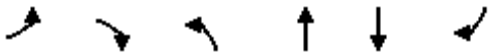
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	6	270	341	936	1002
Future Volume (vph)	6	270	341	936	1002
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.4	23.4	9.6	24.2	27.2
Total Split (s)	23.4	23.4	23.0	51.6	28.6
Total Split (%)	31.2%	31.2%	30.7%	68.8%	38.1%
Yellow Time (s)	4.2	4.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	Max	Max

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 67.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: US 395 & Seneca Rd.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	270	341	936	1002	18
Future Volume (veh/h)	6	270	341	936	1002	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	1673	1772	1772	1772
Adj Flow Rate, veh/h	6	278	352	965	1033	19
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	336	316	387	2124	1096	20
Arrive On Green	0.21	0.21	0.24	0.63	0.32	0.32
Sat Flow, veh/h	1594	1502	1594	3455	3470	62
Grp Volume(v), veh/h	6	278	352	965	514	538
Grp Sat Flow(s),veh/h/ln	1594	1502	1594	1683	1683	1761
Q Serve(g_s), s	0.2	12.9	15.4	10.7	21.4	21.4
Cycle Q Clear(g_c), s	0.2	12.9	15.4	10.7	21.4	21.4
Prop In Lane	1.00	1.00	1.00			0.04
Lane Grp Cap(c), veh/h	336	316	387	2124	545	570
V/C Ratio(X)	0.02	0.88	0.91	0.45	0.94	0.94
Avail Cap(c_a), veh/h	403	380	408	2124	545	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.5	27.5	26.5	6.9	23.7	23.7
Incr Delay (d2), s/veh	0.0	18.0	22.4	0.7	26.7	25.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	11.5	7.4	2.5	11.1	11.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.5	45.5	48.9	7.6	50.4	49.6
LnGrp LOS	C	D	D	A	D	D
Approach Vol, veh/h	284			1317	1052	
Approach Delay, s/veh	45.0			18.6	50.0	
Approach LOS	D			B	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		51.6		20.4	22.1	29.5
Change Period (Y+Rc), s		6.2		5.2	4.6	6.2
Max Green Setting (Gmax), s		45.4		18.2	18.4	22.4
Max Q Clear Time (g_c+I1), s		12.7		14.9	17.4	23.4
Green Ext Time (p_c), s		6.7		0.3	0.1	0.0

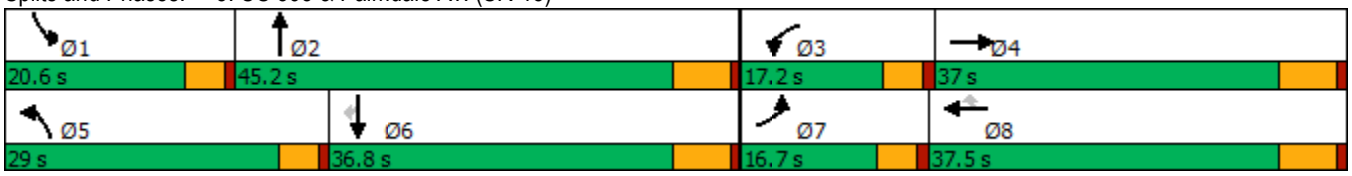
Intersection Summary		
HCM 6th Ctrl Delay		33.9
HCM 6th LOS		C

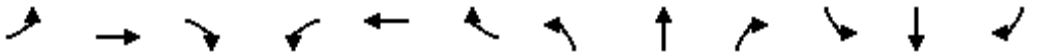
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	201	666	350	738	184	382	803	175	731	159
Future Volume (vph)	201	666	350	738	184	382	803	175	731	159
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases					8					6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	33.2	9.6	16.2	16.2	9.6	37.2	9.6	35.2	35.2
Total Split (s)	16.7	37.0	17.2	37.5	37.5	29.0	45.2	20.6	36.8	36.8
Total Split (%)	13.9%	30.8%	14.3%	31.3%	31.3%	24.2%	37.7%	17.2%	30.7%	30.7%
Yellow Time (s)	3.6	5.2	3.6	5.2	5.2	3.6	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	4.6	6.2	6.2	4.6	6.2	4.6	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max	Max

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: US 395 & Palmdale Av. (SR-18)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	201	666	416	350	738	184	382	803	164	175	731	159
Future Volume (veh/h)	201	666	416	350	738	184	382	803	164	175	731	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	207	687	429	361	761	190	394	828	169	180	754	164
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	511	318	306	878	392	324	921	188	203	858	383
Arrive On Green	0.10	0.26	0.26	0.11	0.26	0.26	0.20	0.33	0.33	0.13	0.26	0.26
Sat Flow, veh/h	1594	1991	1241	2910	3367	1502	1594	2785	568	1594	3367	1502
Grp Volume(v), veh/h	207	580	536	361	761	190	394	501	496	180	754	164
Grp Sat Flow(s),veh/h/ln	1594	1683	1549	1455	1683	1502	1594	1683	1670	1594	1683	1502
Q Serve(g_s), s	12.1	30.8	30.8	12.6	25.9	12.8	24.4	34.0	34.0	13.3	25.8	11.0
Cycle Q Clear(g_c), s	12.1	30.8	30.8	12.6	25.9	12.8	24.4	34.0	34.0	13.3	25.8	11.0
Prop In Lane	1.00		0.80	1.00		1.00	1.00		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	161	432	397	306	878	392	324	557	552	203	858	383
V/C Ratio(X)	1.29	1.34	1.35	1.18	0.87	0.49	1.22	0.90	0.90	0.89	0.88	0.43
Avail Cap(c_a), veh/h	161	432	397	306	878	392	324	557	552	213	858	383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.0	44.6	44.6	53.7	42.4	37.5	47.8	38.2	38.2	51.5	42.9	37.4
Incr Delay (d2), s/veh	168.2	169.5	172.2	110.1	9.1	0.9	122.0	20.0	20.1	30.8	12.3	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	32.4	30.1	9.1	11.3	4.6	20.1	16.1	16.0	6.8	11.6	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	222.2	214.1	216.8	163.8	51.5	38.5	169.8	58.2	58.4	82.3	55.3	40.9
LnGrp LOS	F	F	F	F	D	D	F	E	E	F	E	D
Approach Vol, veh/h		1323			1312			1391			1098	
Approach Delay, s/veh		216.4			80.5			89.9			57.5	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.9	45.9	17.2	37.0	29.0	36.8	16.7	37.5
Change Period (Y+Rc), s	4.6	6.2	4.6	6.2	4.6	6.2	4.6	6.2
Max Green Setting (Gmax), s	16.0	39.0	12.6	30.8	24.4	30.6	12.1	31.3
Max Q Clear Time (g_c+I1), s	15.3	36.0	14.6	32.8	26.4	27.8	14.1	27.9
Green Ext Time (p_c), s	0.0	1.6	0.0	0.0	0.0	1.4	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	113.2
HCM 6th LOS	F

APPENDIX 5.2:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	275	8	20	358	8	6
Future Vol, veh/h	275	8	20	358	8	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	299	9	22	389	9	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	308	0	737	304
Stage 1	-	-	-	-	304	-
Stage 2	-	-	-	-	433	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1253	-	386	736
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	654	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1253	-	378	736
Mov Cap-2 Maneuver	-	-	-	-	378	-
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	640	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	478	-	-	1253	-
HCM Lane V/C Ratio	0.032	-	-	0.017	-
HCM Control Delay (s)	12.8	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	277	4	0	378	0	6
Future Vol, veh/h	277	4	0	378	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	301	4	0	411	0	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	303
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	737
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	737
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

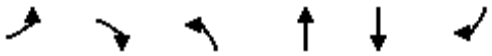
Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	737	-	-	-
HCM Lane V/C Ratio	0.009	-	-	-
HCM Control Delay (s)	9.9	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	14	270	361	936	1010
Future Volume (vph)	14	270	361	936	1010
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.4	23.4	9.6	24.2	27.2
Total Split (s)	23.4	23.4	23.0	51.6	28.6
Total Split (%)	31.2%	31.2%	30.7%	68.8%	38.1%
Yellow Time (s)	4.2	4.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	Max	Max

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 67.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: US 395 & Seneca Rd.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	270	361	936	1010	18
Future Volume (veh/h)	14	270	361	936	1010	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	1673	1772	1772	1772
Adj Flow Rate, veh/h	14	278	372	965	1041	19
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	336	317	406	2124	1056	19
Arrive On Green	0.21	0.21	0.25	0.63	0.31	0.31
Sat Flow, veh/h	1594	1502	1594	3455	3471	62
Grp Volume(v), veh/h	14	278	372	965	518	542
Grp Sat Flow(s),veh/h/ln	1594	1502	1594	1683	1683	1761
Q Serve(g_s), s	0.5	12.9	16.3	10.7	22.0	22.0
Cycle Q Clear(g_c), s	0.5	12.9	16.3	10.7	22.0	22.0
Prop In Lane	1.00	1.00	1.00			0.04
Lane Grp Cap(c), veh/h	336	317	406	2124	526	550
V/C Ratio(X)	0.04	0.88	0.92	0.45	0.99	0.99
Avail Cap(c_a), veh/h	403	380	407	2124	526	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	27.5	26.1	6.9	24.6	24.6
Incr Delay (d2), s/veh	0.1	17.9	24.7	0.7	35.9	35.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	11.5	8.1	2.5	12.5	13.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.7	45.4	50.8	7.6	60.5	59.7
LnGrp LOS	C	D	D	A	E	E
Approach Vol, veh/h	292			1337	1060	
Approach Delay, s/veh	44.3			19.6	60.1	
Approach LOS	D			B	E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		51.6		20.4	22.9	28.7
Change Period (Y+Rc), s		6.2		5.2	4.6	6.2
Max Green Setting (Gmax), s		45.4		18.2	18.4	22.4
Max Q Clear Time (g_c+I1), s		12.7		14.9	18.3	24.0
Green Ext Time (p_c), s		6.7		0.3	0.0	0.0

Intersection Summary		
HCM 6th Ctrl Delay		38.2
HCM 6th LOS		D

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	23	0	1297	1272	8
Future Vol, veh/h	0	23	0	1297	1272	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	25	0	1410	1383	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	696	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	384	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	384	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

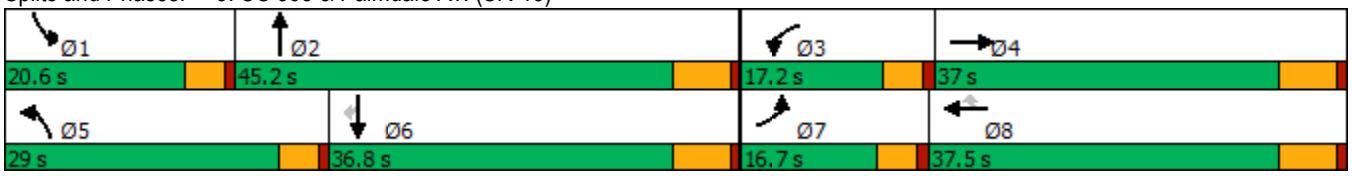
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	384	-	-
HCM Lane V/C Ratio	-	0.065	-	-
HCM Control Delay (s)	-	15	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

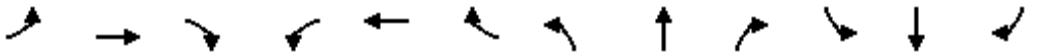
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	201	666	350	738	190	382	817	181	745	163
Future Volume (vph)	201	666	350	738	190	382	817	181	745	163
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases					8					6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	33.2	9.6	16.2	16.2	9.6	37.2	9.6	35.2	35.2
Total Split (s)	16.7	37.0	17.2	37.5	37.5	29.0	45.2	20.6	36.8	36.8
Total Split (%)	13.9%	30.8%	14.3%	31.3%	31.3%	24.2%	37.7%	17.2%	30.7%	30.7%
Yellow Time (s)	3.6	5.2	3.6	5.2	5.2	3.6	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	6.2	4.6	6.2	6.2	4.6	6.2	4.6	6.2	6.2
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max	Max

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: US 395 & Palmdale Av. (SR-18)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	201	666	416	350	738	190	382	817	164	181	745	163
Future Volume (veh/h)	201	666	416	350	738	190	382	817	164	181	745	163
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	207	687	429	361	761	196	394	842	169	187	768	168
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	511	318	306	878	392	324	912	183	210	858	383
Arrive On Green	0.10	0.26	0.26	0.11	0.26	0.26	0.20	0.33	0.33	0.13	0.26	0.26
Sat Flow, veh/h	1594	1991	1241	2910	3367	1502	1594	2794	561	1594	3367	1502
Grp Volume(v), veh/h	207	580	536	361	761	196	394	507	504	187	768	168
Grp Sat Flow(s),veh/h/ln	1594	1683	1549	1455	1683	1502	1594	1683	1671	1594	1683	1502
Q Serve(g_s), s	12.1	30.8	30.8	12.6	25.9	13.3	24.4	34.9	34.9	13.8	26.4	11.3
Cycle Q Clear(g_c), s	12.1	30.8	30.8	12.6	25.9	13.3	24.4	34.9	34.9	13.8	26.4	11.3
Prop In Lane	1.00		0.80	1.00		1.00	1.00		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	161	432	397	306	878	392	324	550	546	210	858	383
V/C Ratio(X)	1.29	1.34	1.35	1.18	0.87	0.50	1.22	0.92	0.92	0.89	0.89	0.44
Avail Cap(c_a), veh/h	161	432	397	306	878	392	324	550	546	213	858	383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.0	44.6	44.6	53.7	42.4	37.7	47.8	39.0	39.0	51.2	43.1	37.5
Incr Delay (d2), s/veh	168.2	169.5	172.2	110.1	9.1	1.0	122.0	23.4	23.6	32.6	13.8	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	32.4	30.1	9.1	11.3	4.8	20.1	17.0	16.9	7.2	12.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	222.2	214.1	216.8	163.8	51.5	38.7	169.8	62.4	62.5	83.8	56.9	41.1
LnGrp LOS	F	F	F	F	D	D	F	E	E	F	E	D
Approach Vol, veh/h		1323			1318			1405			1123	
Approach Delay, s/veh		216.4			80.4			92.6			59.0	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.4	45.4	17.2	37.0	29.0	36.8	16.7	37.5
Change Period (Y+Rc), s	4.6	6.2	4.6	6.2	4.6	6.2	4.6	6.2
Max Green Setting (Gmax), s	16.0	39.0	12.6	30.8	24.4	30.6	12.1	31.3
Max Q Clear Time (g_c+I1), s	15.8	36.9	14.6	32.8	26.4	28.4	14.1	27.9
Green Ext Time (p_c), s	0.0	1.2	0.0	0.0	0.0	1.1	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	113.9
HCM 6th LOS	F

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Quick N Clean Car Wash

TRAFFIC ANALYSIS

CITY OF ADELANTO

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JULY 22, 2022

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APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CCI	Construction Cost Index
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
PHF	Peak Hour Factor
Project	Quick N Clean Car Wash
SBCTA	San Bernardino County Transportation Authority
SR	State Route
TA	Traffic Impact Analysis
v/c	Volume to Capacity
VMT	Vehicle Miles Traveled
Vphgpl	Vehicles per Hour Green per Lane
VVTA	Victor Valley Transit Authority

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1 INTRODUCTION

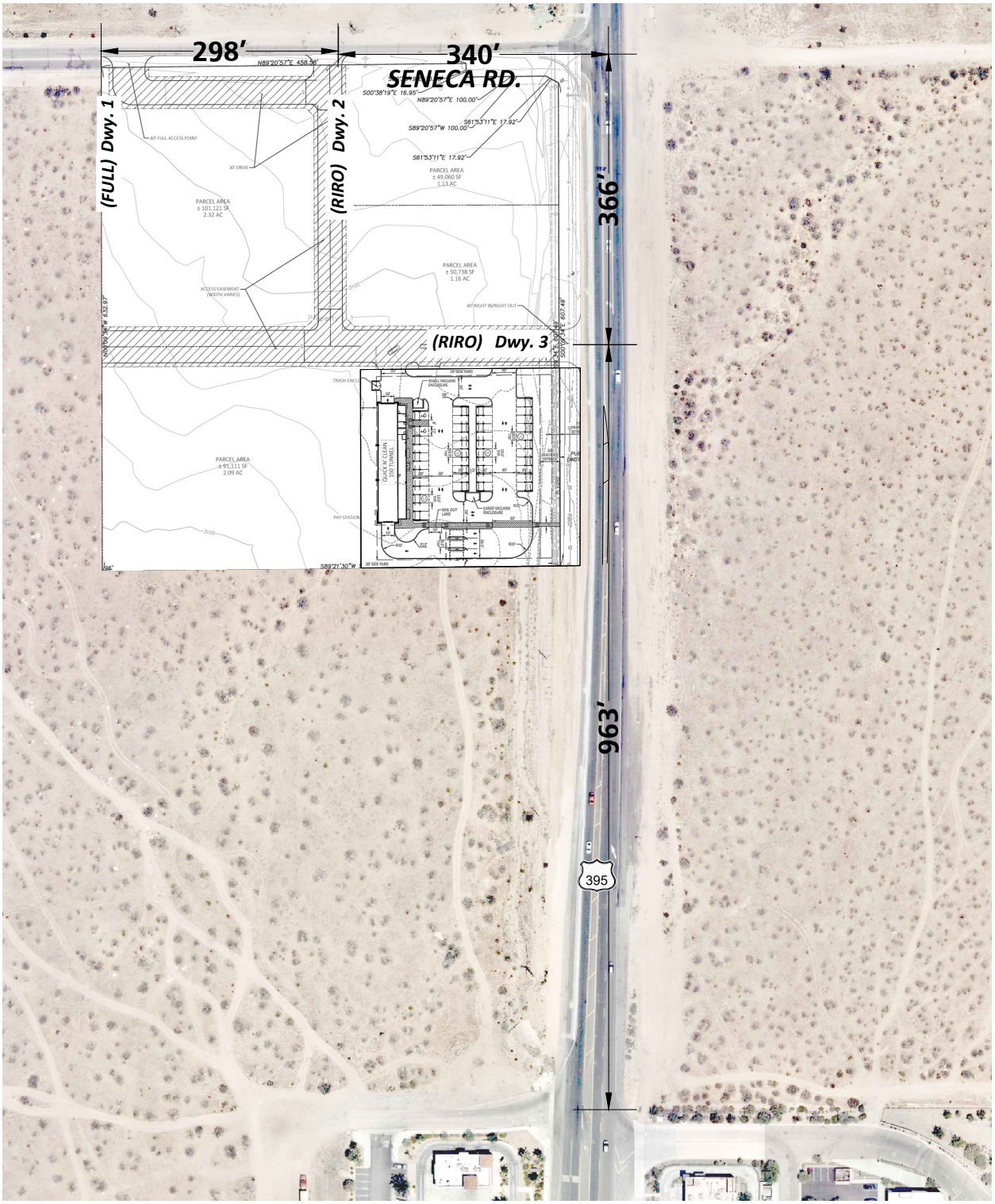
This report presents the results of the traffic analysis (TA) for the proposed Quick N Clean Car Wash development ("Project"), which is located south of Seneca Road and west of US Highway 395 in the City of Adelanto, as shown on Exhibit 1-1.

The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions. The TA will be utilized to support General Plan consistency and will not be utilized in the environmental document per the California Environmental Quality Act (CEQA). As of July 1st, vehicle miles traveled (VMT) is be utilized to discern traffic-related impacts and potential mitigation measures (VMT prepared under separate cover). As directed by City of Adelanto staff, this traffic study has been prepared in accordance with the County of San Bernardino Transportation Impact Study Guidelines, the County of San Bernardino Congestion Management Program, the California Department of Transportation (Caltrans) Guide for the Preparation of Traffic Impact Studies, and consultation with City staff during the scoping process. (1) (2) (3) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA.

1.1 SUMMARY OF FINDINGS

The Project should either construct the ultimate half-section of US Highway 395 along its frontage between the northern and southern boundaries or contribute in-lieu fees for US Highway 395 to be constructed at a future date. In addition, the Project shall construct the Project driveway on US Highway 395 right right-in/right-out access only. The westernmost driveway on Seneca Road is to accommodate full access to the Project and another right-in/right-out driveway is proposed on Seneca Road between the full access driveway and US Highway 395. The intersection of US Highway 395 and Palmdale Avenue (SR-18) currently operates at deficient levels of service (LOS) during the PM peak hour and is anticipated to continue to operate at a deficient LOS under future cumulative traffic conditions. However, the addition of Project traffic is anticipated to increase the delay by less than 5.0 seconds (the City's criteria for determining significance at intersections). As such, there are no project-related deficiencies and no off-site improvements have been recommended. Additional details are provided in Section 1.6 *Recommendations* of this report.

EXHIBIT 1-1: PRELIMINARY SITE PLAN



LEGEND:

RIRO = RIGHT-IN/RIGHT-OUT ONLY ACCESS

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1.2 PROJECT OVERVIEW

Exhibit 1-1 illustrates the preliminary Project site plan. The Project is to consist of a 4,552 square foot automated car wash with a single tunnel. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. For the purpose of this analysis, access to the Project site will be accommodated via a full access driveway way (Driveway 1) on Seneca Road, a right-in/right-out driveway on Seneca Road (Driveway 2), and a right-in/right-out only driveway on US Highway 395 (Driveway 3). Regional access to the Project site is available from US Highway 395, Palmdale Avenue (SR-18), and the I-15 Freeway.

Trips generated by the Project's proposed land uses have been estimated based on the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017) for Automated Car Wash (ITE Land Use Code 948). (4) The proposed Project is anticipated to generate a total of 776 trip-ends per day with 78 PM peak hour trips. Note that the ITE Trip Generation Manual does not identify an AM peak hour trip generation rate for this land use. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2020) Conditions
- Opening Year Cumulative (2022) Without and With Project Conditions

1.3.1 EXISTING (2020) CONDITIONS

Information for Existing (2020) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.3.2 OPENING YEAR CUMULATIVE (2022) CONDITIONS

The Opening Year Cumulative conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth factor from Existing conditions of 4.04% (2.0% per year compounded annually over 2 years, or $1.02^{2\ years}$)is included for Opening Year Cumulative (2022) traffic conditions. The ambient growth is consistent with the growth used by other projects in the area. The list of cumulative projects was compiled from information provided by the City of Adelanto and the City of Victorville.

1.4 STUDY AREA

To ensure that this TA satisfies the City of Adelanto's traffic study requirements, Urban Crossroads, Inc. prepared a traffic study scoping package for review by City staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology and is included in Appendix 1.1.

The following 2 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TA based on consultation with City of Adelanto staff and have generally been selected based on the "50 peak hour trip" criterion. The "50 peak hour trip" criterion is consistent with the methodology employed by the City of Adelanto and County of San Bernardino, and generally represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential study area.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Driveway 1 & Seneca Rd. – Future Intersection	Adelanto	No
2	Driveway 2 & Seneca Rd. – Future Intersection	Adelanto	No
3	US Highway 395 & Seneca Rd.	Caltrans, Adelanto, Victorville	No
4	US Highway 395 & Driveway 3 – Future Intersection	Caltrans, Adelanto, Victorville	No
5	US Highway 395 & Palmdale Av. (SR-18)	Caltrans, Adelanto, Victorville	Yes

The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. Study area intersections that are identified as CMP facilities in the County of San Bernardino per the San Bernardino County Transportation Authority (SBCTA) CMP are indicated on Table 1-1. (2) The intersection of US Highway 395 and Palmdale Avenue (SR-18) is a CMP intersection.

EXHIBIT 1-2: LOCATION MAP

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1.5 ANALYSIS FINDINGS

This section provides a summary of analysis results for existing and Opening Year Cumulative (2022) traffic conditions. A summary of LOS results for all analysis scenarios is presented on Exhibit 1-3.

1.5.1 EXISTING (2020) CONDITIONS

The intersection of US Highway 395 and Palmdale Avenue (SR-18) is currently operating at an unacceptable LOS during the PM peak hour.

1.5.2 OPENING YEAR CUMULATIVE (2022) CONDITIONS

The intersection of US Highway 395 and Palmdale Avenue (SR-18) is anticipated to continue to operate at an unacceptable LOS during the PM peak hour. The addition of Project traffic is anticipated to increase the delay by less than 5.0 seconds (the City's criteria for determining significance at intersections). As such, there are no project-related deficiencies and no off-site improvements have been recommended.

1.6 RECOMMENDATIONS

The following recommendations are based on the improvements needed to accommodate site access and peak hour queues. Exhibit 1-4 shows the site adjacent recommendations.

- US Highway 395 is a north-south oriented roadway located along the Project's eastern boundary. Project to construct US Highway 395 between the northern and southern Project boundaries at its ultimate half-section width (130-foot right-of-way) in compliance with the circulation recommendations found in the City of Adelanto's General Plan. Additional southbound through lanes may not be striped until such time in the future when US Highway 395 is widened to the south to accommodate the receiving lanes. Alternatively, the Project could contribute in-lieu fees for the future widening of US Highway 395.
- Project to install a stop control on the northbound approach of Driveway 1 on Seneca Road and construct the intersection to accommodate full access.
- Project to install a stop control on the northbound approach of Driveway 2 on Seneca Road and construct the intersection to restrict access to right-in/right-out only.
- Project to install a stop control on the eastbound approach of Driveway 3 on US Highway 395 and construct the intersection to restrict access to right-in/right-out only.

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with the identified roadway classifications and respective cross-sections in the City of Adelanto General Plan Circulation Element.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the Project site.

EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2020)	Opening Year Cumulative (2022) Without Project	Opening Year Cumulative (2022) With Project
1	Dwy. 1 & Seneca Rd.	NA	NA	
2	Dwy. 2 & Seneca Rd.	NA	NA	
3	US Highway 395 & Seneca Rd.			
4	US Highway 395 & Dwy. 3	NA	NA	
5	US Highway 395 & Palmdale Rd. (SR-18)			

NOTE: FOR PM PEAK HOUR ONLY

LEGEND:

 ***= LOS A-C***

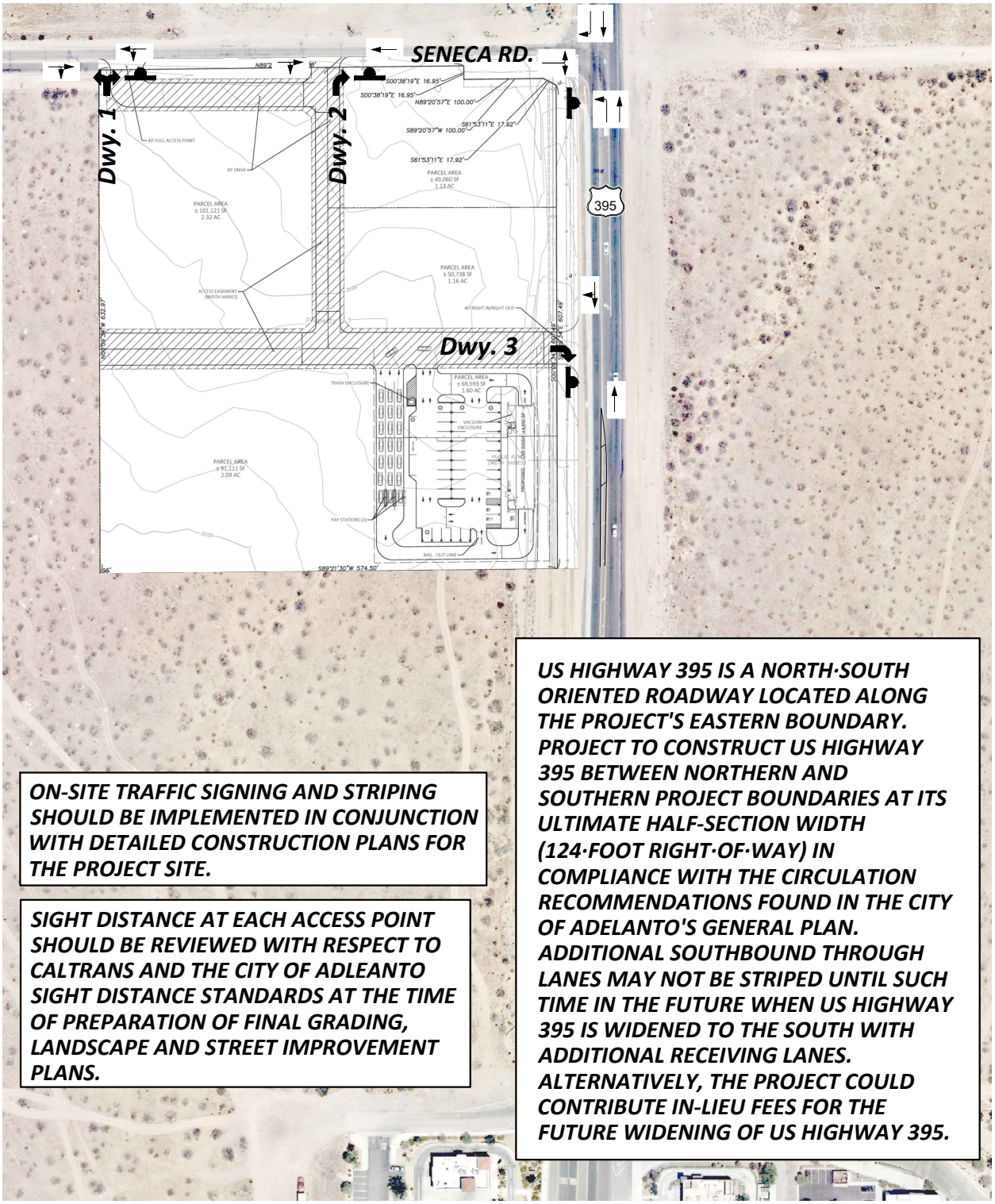
 ***= LOS D***

 ***= LOS E***

 ***= LOS F***

NA ***= NOT AN ANALYSIS LOCATION FOR THIS SCENARIO***

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of Adelanto traffic study guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM), 6th Edition, methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (5) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Adelanto and City of Victorville require signalized intersection operations analysis based on the methodology described in the HCM. (5) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro (Version 10) analysis software package.

Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F	F

Source: HCM (6th Edition)

Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections: (2)

Existing and Opening Year Cumulative Traffic Conditions:

- Exclusive through: 1800 vphgpl
- Exclusive left: 1700 vphgpl
- Exclusive right: 1800 vphgpl
- Exclusive dual left: 1600 vphgpl
- Exclusive triple left: 1500 vphgpl

Horizon Year (2040) Traffic Conditions:

- Exclusive through: 1900 vphgpl
- Exclusive left: 1800 vphgpl
- Exclusive dual left: 1700 vphgpl
- Exclusive right: 1900 vphgpl
- Exclusive dual right: 1800 vphgpl
- Exclusive triple left: 1600 vphgpl or less

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (5) Existing PHFs have been used for all near-term analysis scenarios and 0.95 has been utilized for any new intersections.

Caltrans

Per the Caltrans Guide for the Preparation of Traffic Impact Studies, the traffic modeling and signal timing optimization software package Synchro (Version 10) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include intersections along US Highway 395. (3)

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Adelanto and City of Victorville require the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (5) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM (6th Edition)

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Per the HCM, the highest delay for any individual movement on the minor street is reported for side-street stop-controlled intersections. For all-way stop controlled intersections, LOS is computed for the intersection as a whole and the average intersection delay is reported (similar to signalized intersections).

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

Although the study area includes a future unsignalized study area intersection (Driveway 1 on US Highway 395), this intersection is not a suitable location for the installation of a traffic signal as it is proposed to be restricted to right-in/right-out access only. Traffic signal warrants were also not evaluated at the intersection of Driveway 1 and Seneca Road as the intersection is anticipated to operate at an acceptable LOS without the installation of a signal. As such, traffic signal warrant analyses have not been performed for the unsignalized study area intersections for the purposes of this TA.

2.4 MINIMUM ACCEPTABLE LOS

2.4.1 CITY OF ADELANTO

Per the County of San Bernardino TIA Guidelines, the following LOS will be utilized for study area intersections located within the City of Adelanto: Require development to achieve a peak hour Level of Service (LOS) C or better at intersections. Therefore, any intersection operating at LOS D, E, or F will be considered deficient for the purposes of this analysis.

2.4.3 CITY OF VICTORVILLE

The City of Victorville utilizes a LOS standard of LOS D. However, the study area intersections lie within multiple jurisdictions and have been evaluated based on the most stringent LOS criteria (the County of San Bernardino for the Desert Area).

2.4.3 CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on SHS facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. (3) If an existing State highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways and intersections is LOS D. Consistent with the City of Adelanto LOS threshold of LOS C, LOS C will be used as the target LOS for intersections that also lie within Caltrans' jurisdiction.

2.4.4 SAN BERNARDINO COUNTY CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. However, for the purposes of this analysis, LOS C has been utilized for all study area intersections.

2.5 PROJECT-RELATED LOS DEFICIENCIES

2.5.1 CITY OF ADELANTO

To determine whether the addition of project traffic at a signalized study intersection results in a project-related deficiency, the following thresholds will be utilized:

- Any signalized study intersection in the Desert region that is operating at an LOS C or better without project traffic in which the addition of project traffic causes the intersection to degrade to an LOS D, E, or F shall identify improvements to improve operations to LOS C.
- Any signalized study intersection in the Desert region that is operating at LOS D, E, or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.

To determine whether the addition of project traffic at an unsignalized study intersection results in a project-related deficiency, the following thresholds will be utilized:

- The addition of project related traffic causes the intersection to degrade from an LOS D or better to a LOS E or worse in the Valley and Mountain regions or from an LOS C or better to an LOS D or worse in the Desert region.

OR

- The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at an LOS E or F in the Valley and Mountain regions or at an LOS D, E, or F in the Desert region.

AND

- One or both of the following conditions are met:
    - The project adds ten (10) or more trips to any minor street approach.
    - The intersection meets the peak hour traffic signal warrant after the addition of project traffic.

The proposed thresholds will be applied at study area intersections for the purposes of determining project-related deficiencies.

2.5.2 CITY OF VICTORVILLE

A deficiency will occur if the project causes an intersection to deteriorate from acceptable LOS (LOS D or better) to an unacceptable LOS (LOS E or F). At an intersection already operating at LOS E or F in the baseline (or pre-project) condition, a project-related deficiency will occur if the project adds measurable delay (2% or more) to an intersection already operating at an unacceptable LOS.

2.5.3 CALTRANS FACILITIES

Caltrans does not have defined project-related deficiency criteria. As such, the City of Adelanto criteria has been utilized for Caltrans facilities.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Adelanto General Plan Circulation Network, and a review of existing peak hour intersection operations analysis.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Adelanto staff (Appendix 1.1), the study area includes a total of 2 intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF ADELANTO AND CITY OF VICTORVILLE GENERAL PLAN CIRCULATION ELEMENTS

As noted previously, the Project site is located within the City of Adelanto. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified in the City of Adelanto General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Adelanto General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Adelanto General Plan roadway cross-sections. Study area roadways that are classified as a Super Arterial are identified as having six lanes of travel separated by a 12-foot median. The following study area roadways within the City of Adelanto are classified as a Super Arterial:

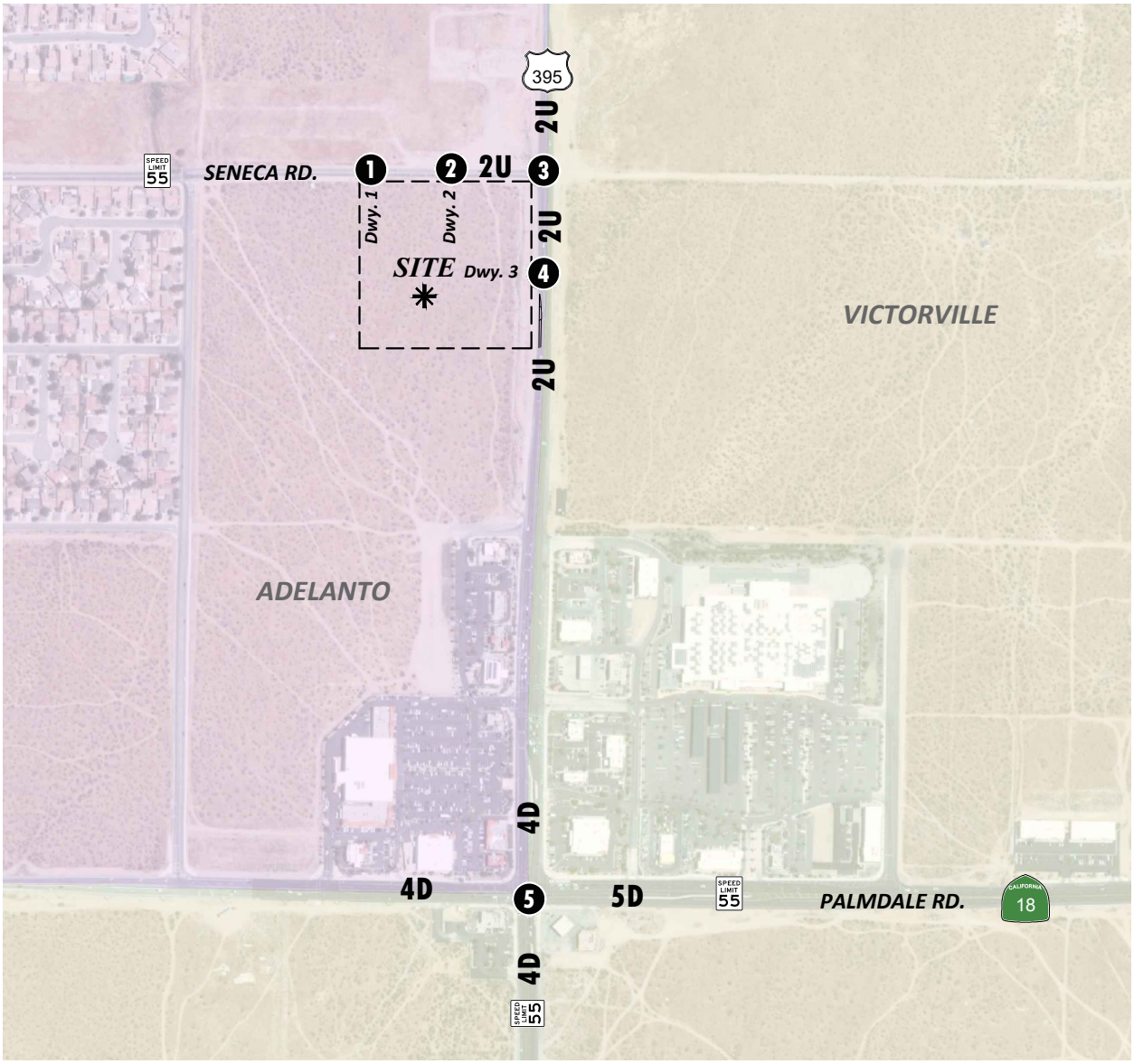
- US Highway 395
- Palmdale Avenue (SR-18)

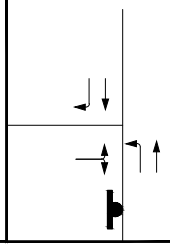
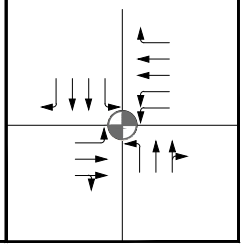
Seneca Road is classified as a 4-lane Major Street. Major Streets include two lanes of travel in each direction, separated by a 12-foot median and includes 8-foot bike lanes in each direction. The 128-foot right-of-way also includes sidewalk and parkway improvements on both sides. Exhibit 3-4 shows the City of Victorville General Plan Circulation Element, and Exhibit 3-5 illustrates the City of Victorville General Plan roadway cross-sections. Consistent with the City of Adelanto, both US Highway 395 and Palmdale Avenue (SR-18) are designated as a Super Arterial (with 124-foot right-of-way).

3.3 TRANSIT SERVICE

The Victor Valley Transit Authority (VVTA) currently serves the City of Adelanto. Transit service is reviewed and updated by VVTA periodically to address ridership, budget, and community demand needs. VVTA Routes 31/33 runs along Palmdale Avenue (SR-18) between Bellflower Street and the Adelanto Marketplace. VVTA Route 54 runs along US Highway 395 from the Adelanto Marketplace to south of Palmdale Avenue (SR-18). Existing transit routes in the vicinity of the study area are illustrated on Exhibit 3-6. There is currently no existing transit route that passes the Project along US Highway 395. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. As such, it is recommended that the applicant work in conjunction with VVTA to potentially provide additional bus service to the site.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



1 Dwy. 1 & Seneca Rd.	2 Dwy. 2 & Seneca Rd.	3 US Highway 395 & Seneca Rd.	4 US Highway 395 & Dwy. 3	5 US Highway 395 & Palmdale Rd. (SR-18)
Future Intersection	Future Intersection		Future Intersection	

LEGEND:

- = TRAFFIC SIGNAL
- = STOP SIGN
- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- SPEED LIMIT 25 = SPEED LIMIT (MPH)

N

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EXHIBIT 3-2: CITY OF ADELANTO GENERAL PLAN CIRCULATION ELEMENT

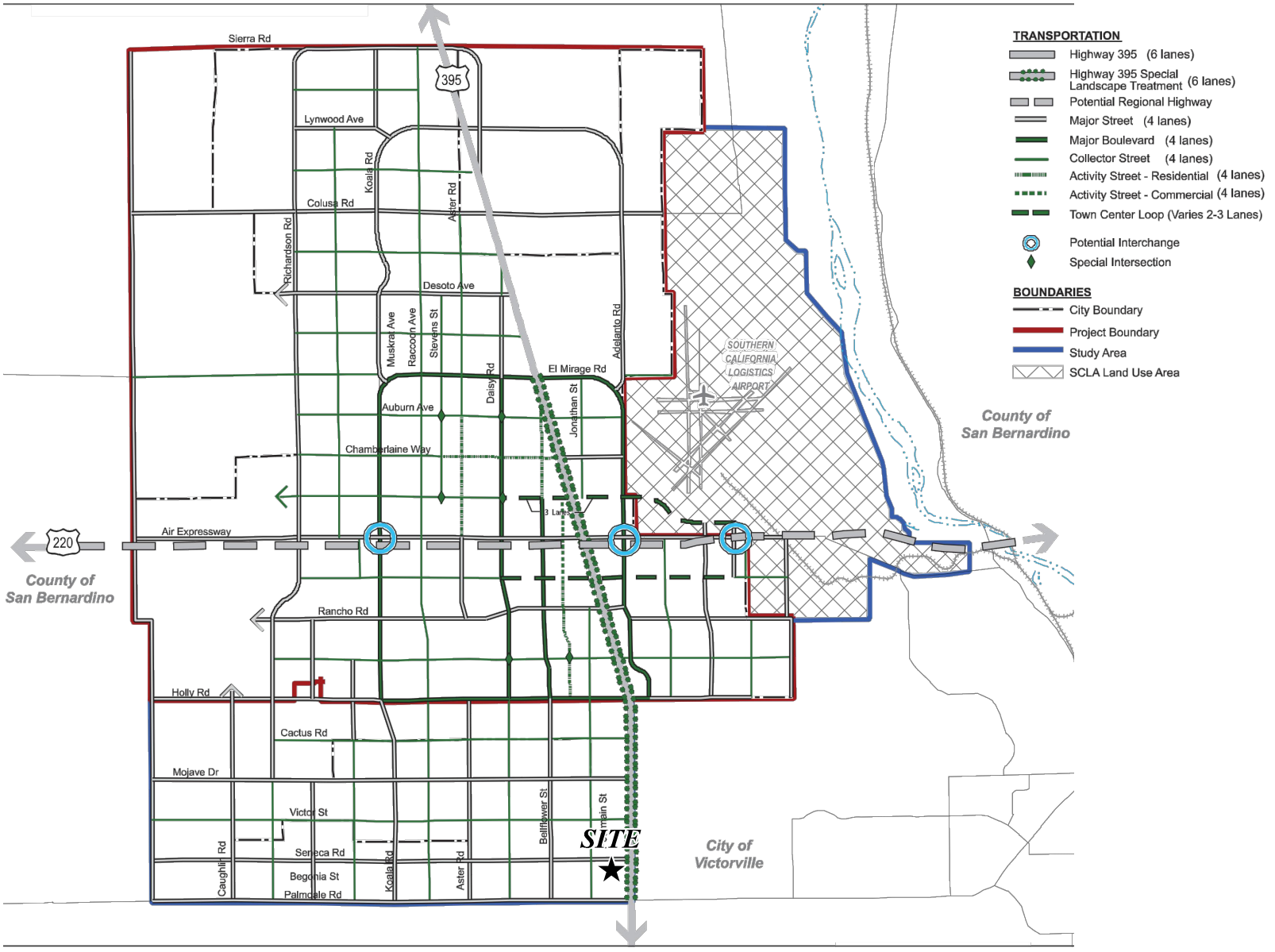


EXHIBIT 3-3 (1OF2): CITY OF ADELANTO GENERAL PLAN ROADWAY CROSS-SECTIONS

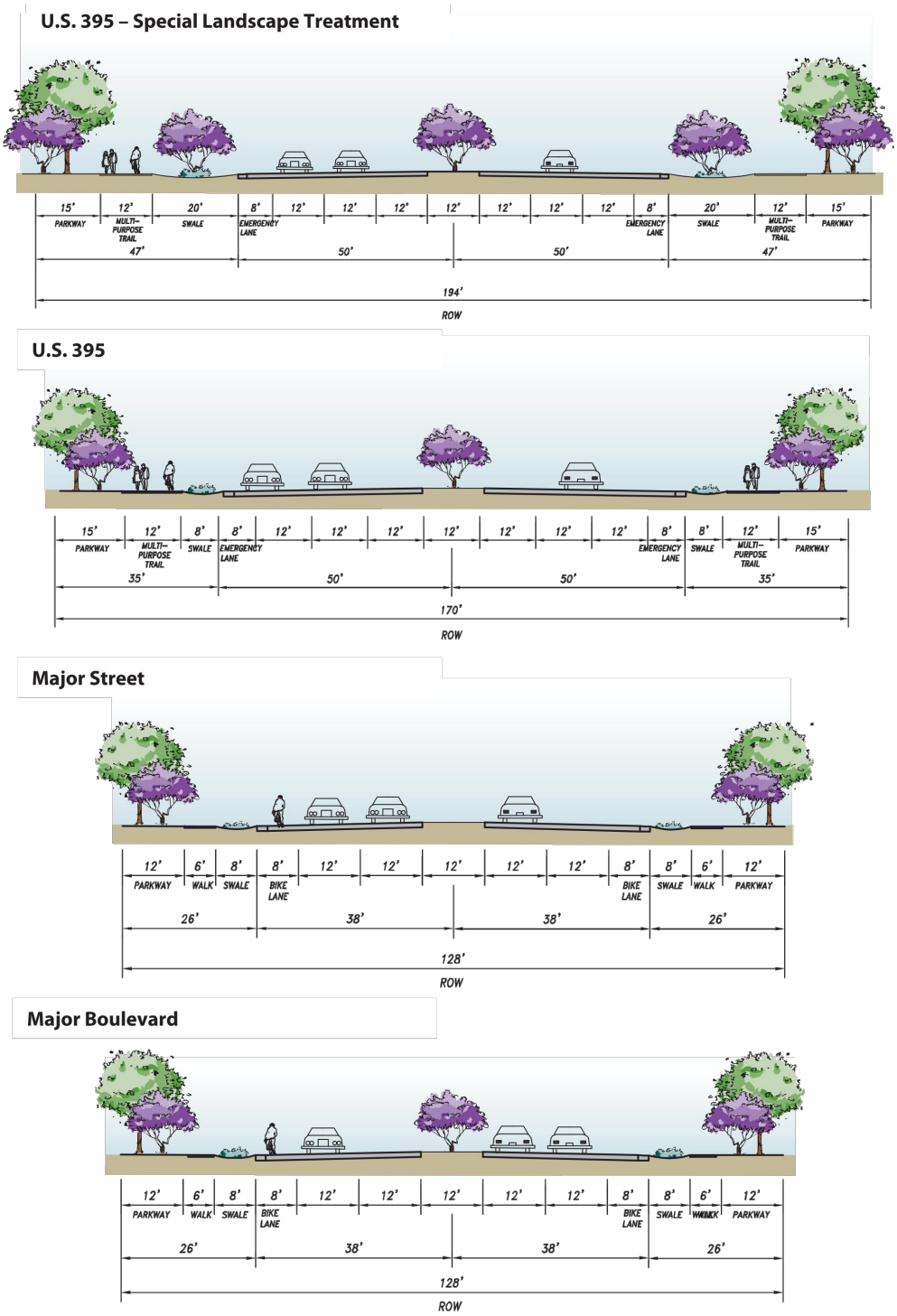


EXHIBIT 3-3 (2OF2): CITY OF ADELANTO GENERAL PLAN ROADWAY CROSS-SECTIONS

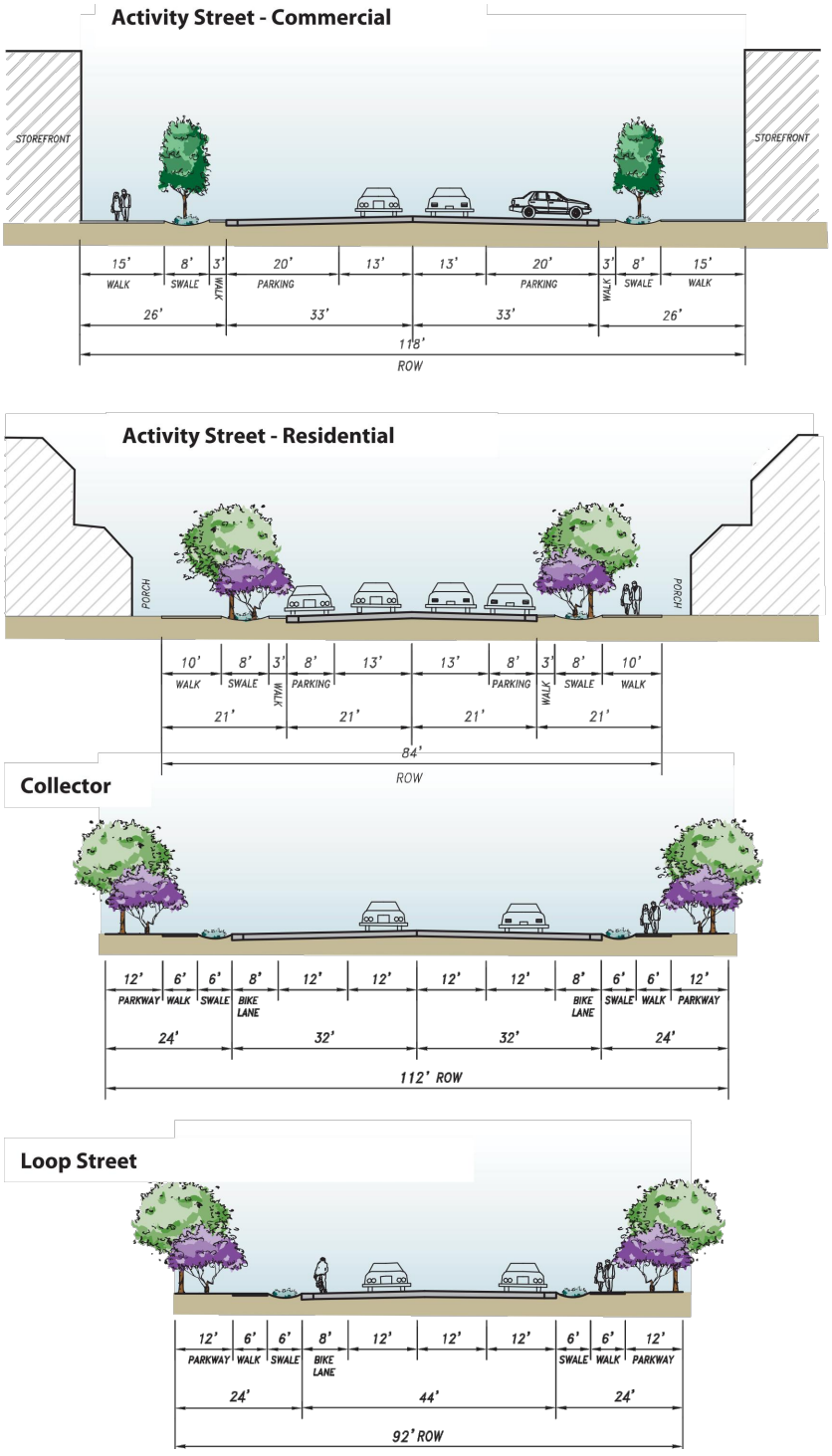
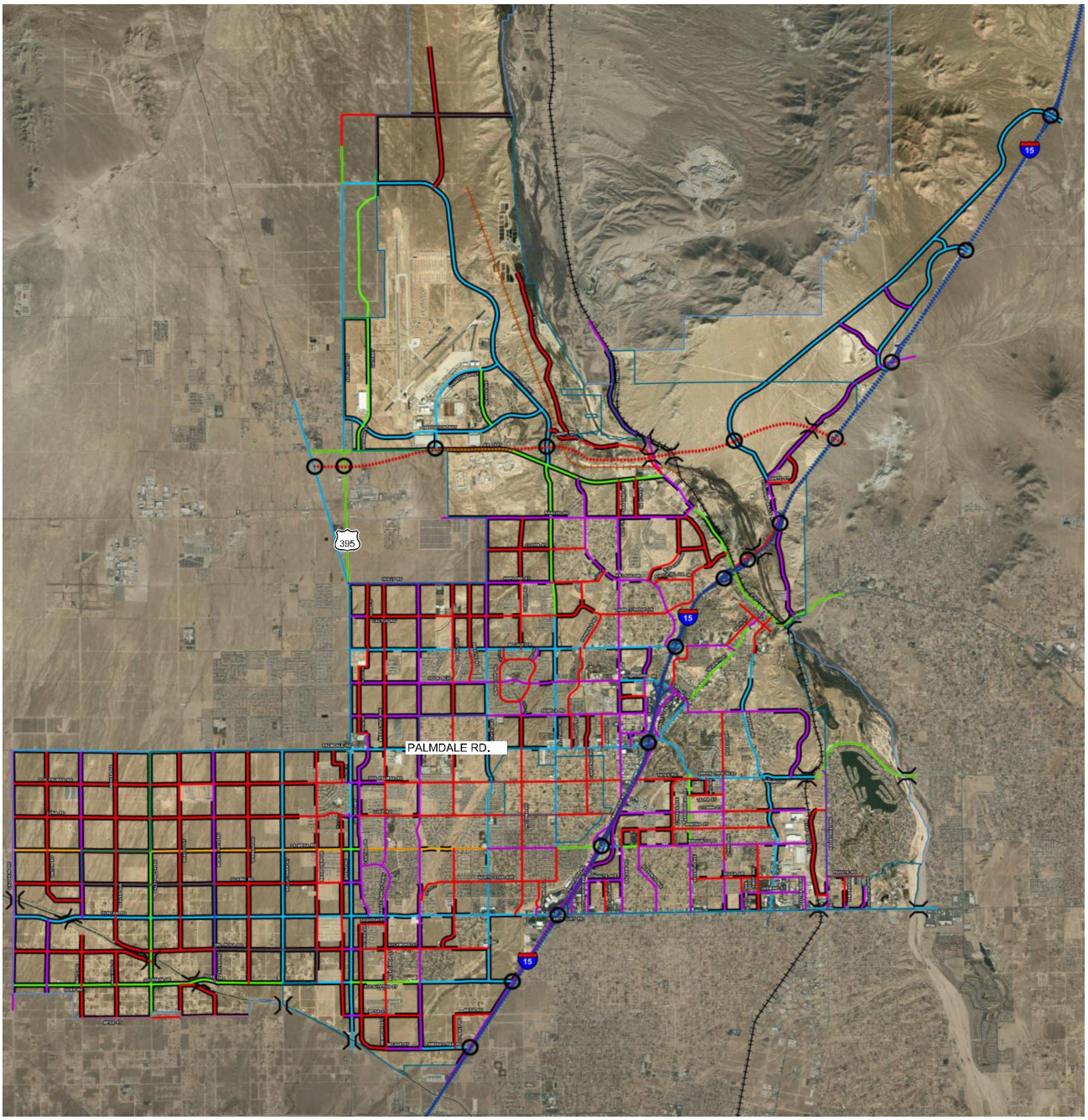


EXHIBIT 3-4: CITY OF VICTORVILLE GENERAL PLAN CIRCULATION ELEMENT



Retrofit Street Sections	Street Sections
Collector	Collector
Arterial	Arterial
Major Arterial	Major Arterial
Residential Arterial	Residential Arterial
Super Arterial	Super Arterial

N

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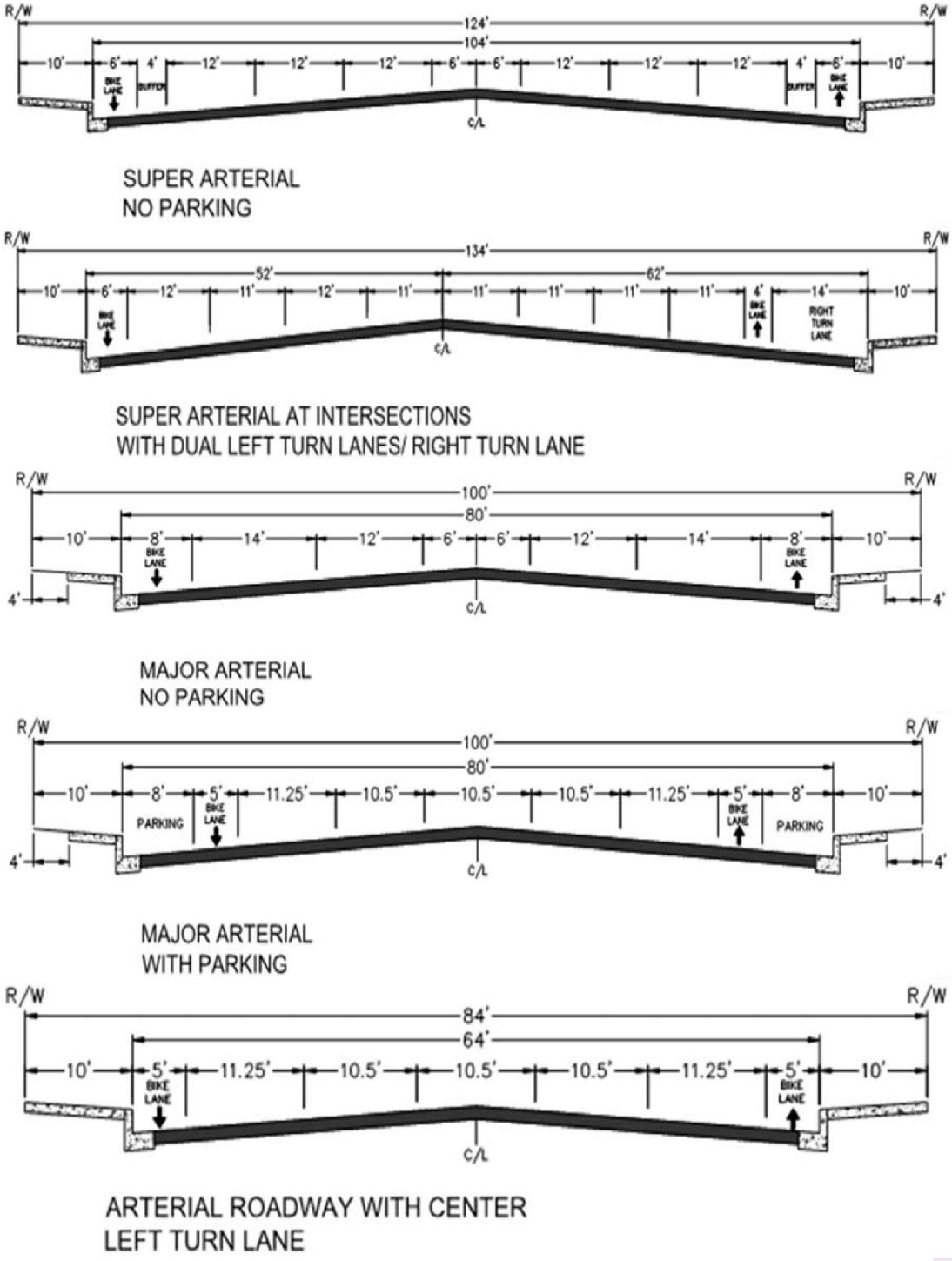
URBAN CROSSROADS

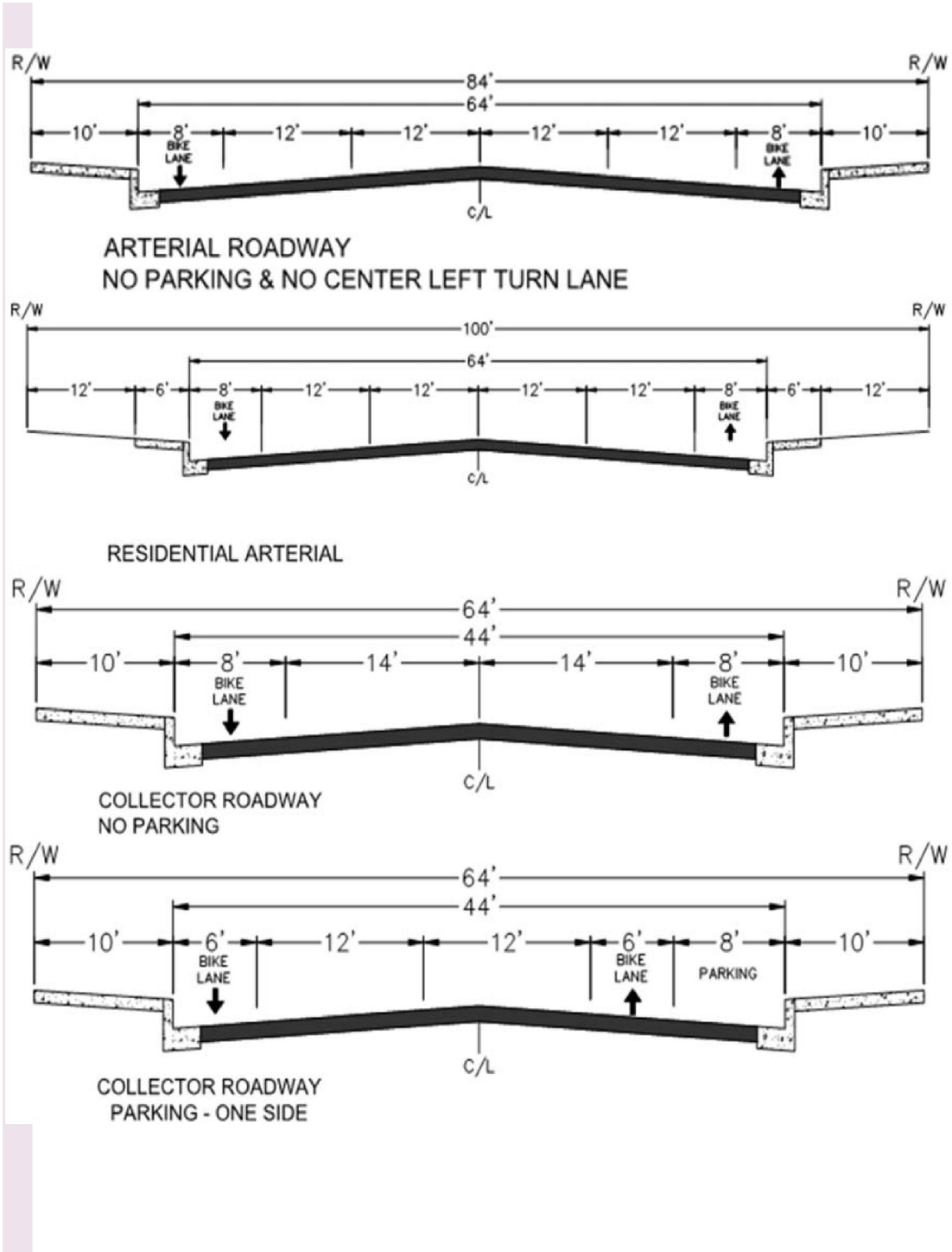
EXHIBIT 3-5 (1OF2): CITY OF VICTORVILLE GENERAL PLAN ROADWAY CROSS-SECTIONS



Retrofit Street Sections

N

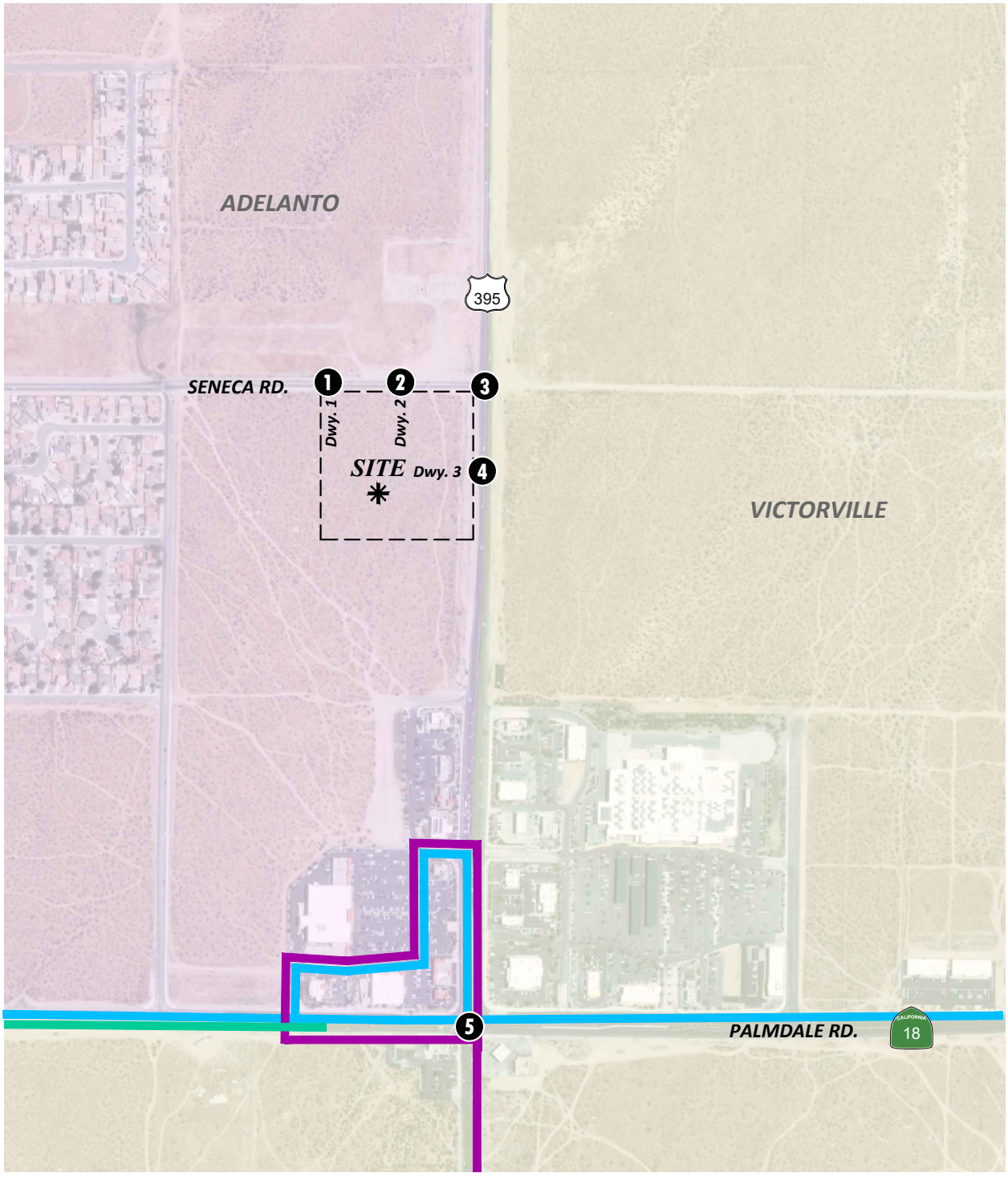
EXHIBIT 3-5 (2OF2): CITY OF VICTORVILLE GENERAL PLAN ROADWAY CROSS-SECTIONS



Retrofit Street Sections

N

EXHIBIT 3-6: EXISTING TRANSIT ROUTES



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3.4 BICYCLE AND PEDESTRIAN FACILITIES

Existing pedestrian facilities within the study area are shown on Exhibit 3-7. Sidewalks and other bicycle and pedestrian facilities are limited to the intersection of US Highway 395 and Palmdale Avenue (SR-18). Sidewalks are also provided along the Adelanto Marketplace and Crossroads at 395 shopping centers on the corners of US Highway 395 and Palmdale Avenue (SR-18). There are no existing sidewalks or curb and gutter improvements in place adjacent to the Project.

3.5 EXISTING (2020) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected on Thursday, January 18, 2017. The following peak hours were selected for analysis:

- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

Since the proposed Project is not anticipated to generate any trips during the AM peak hour, only the PM peak hour has been evaluated as part of this TA. Due to the currently ongoing COVID-19 pandemic, schools and businesses within the study area were closed or operating at less than full capacity at the time this study was prepared. As such, historic (2017) traffic counts were utilized in conjunction with a 6.12% adjustment factor (2% per year compounded annually over 3 years) to reflect 2020 conditions. The 2017 weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

Existing weekday Average Daily Traffic (ADT) volumes are shown on Exhibit 3-8. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 13.05 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.67 percent. As such, the above equation utilizing a factor of 13.05 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.67 percent (i.e., 1/0.0767 = 13.05) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. Existing weekday PM peak hour intersection volumes are also shown on Exhibit 3-8.

EXHIBIT 3-7: EXISTING PEDESTRIAN FACILITIES

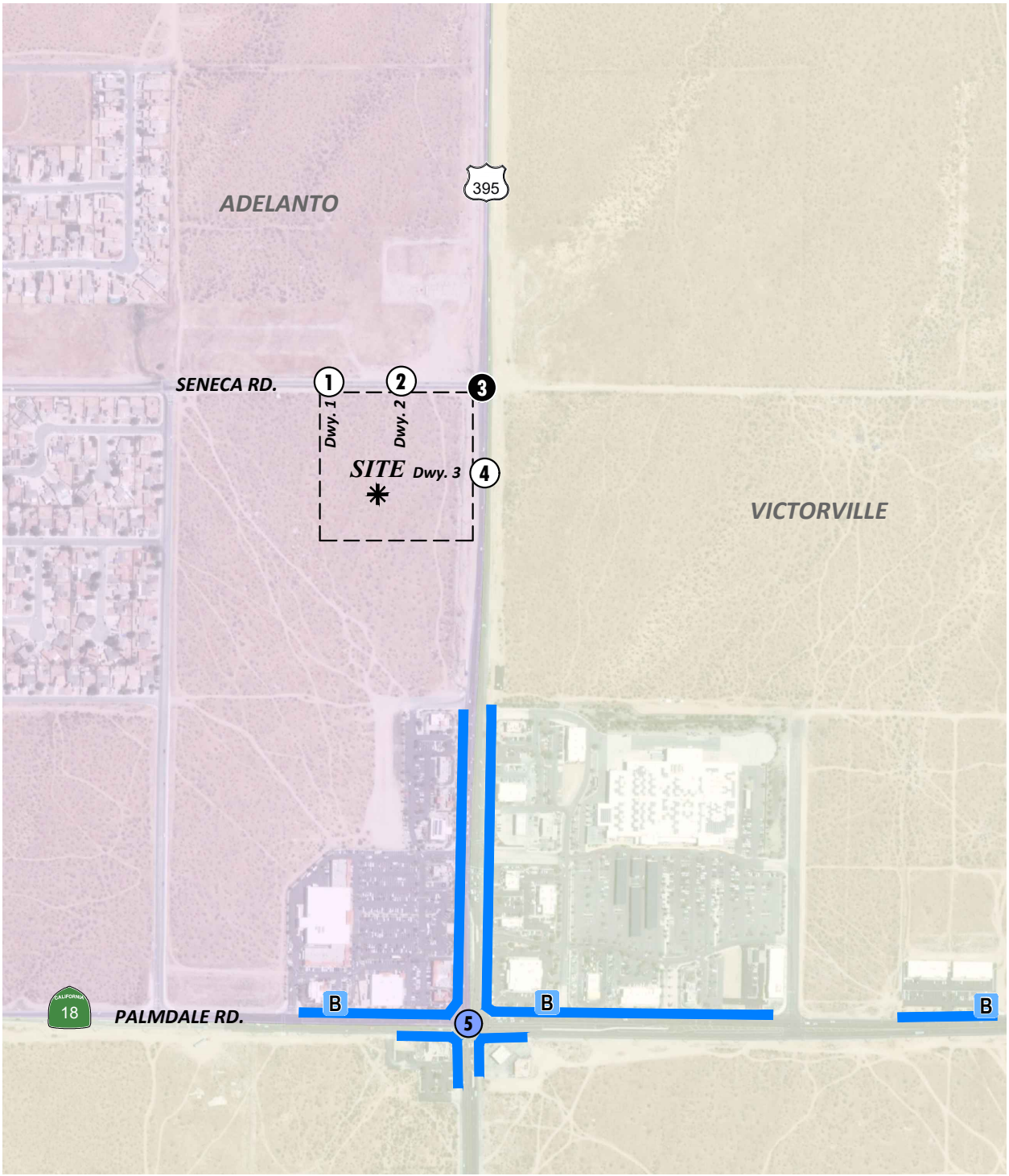
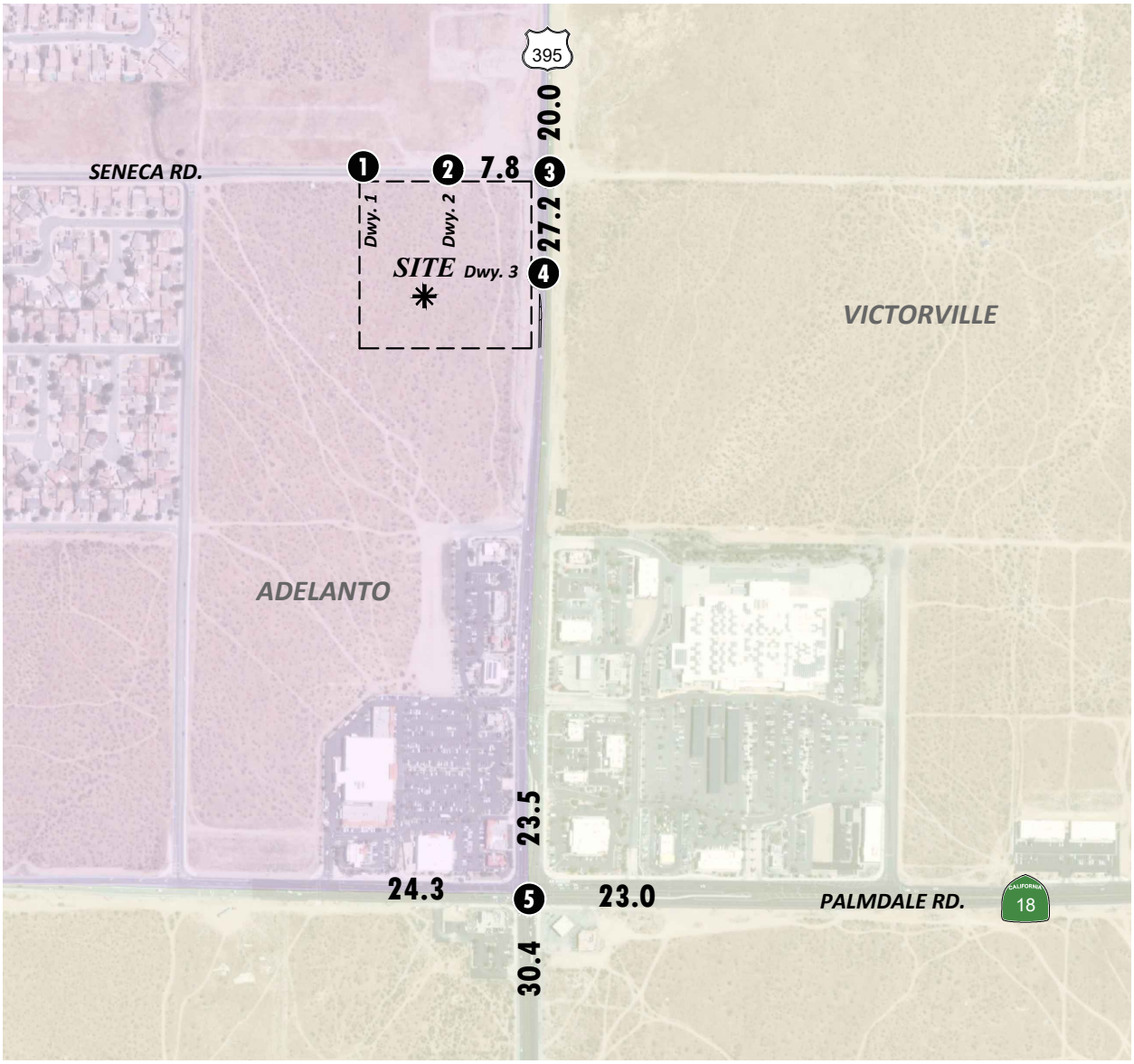
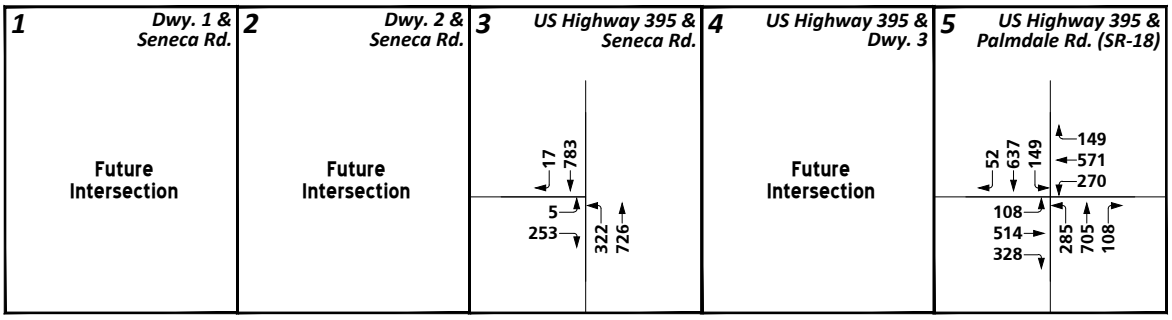


EXHIBIT 3-8: EXISTING (2020) TRAFFIC VOLUMES





LEGEND:

10 *= PM PEAK HOUR INTERSECTION VOLUMES*
10.0 *= VEHICLES PER DAY (1000'S)*

3.6 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1, which indicates that the intersection of US Highway 395 and Palmdale Avenue (SR-18) currently operates at an unacceptable LOS under Existing (2020) traffic conditions. Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing (2020) traffic conditions are shown on Exhibit 3-9. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

Table 3-1

Intersection Analysis for Existing (2020) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)	Level of Service
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	PM	PM
1	Driveway 1 & Seneca Rd.		Future Intersection													
2	Driveway 2 & Seneca Rd.		Future Intersection													
3	US-395 & Seneca Rd.	TS	1	2	0	0	2	0	1	0	1	0	0	0	24.7	C
4	US-395 & Driveway 3		Future Intersection													
5	US-395 & Palmdale Av. (SR-18)	TS	1	2	0	1	2	1	1	2	0	2	2	1	**62.0**	**E**

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

[3] TS = Traffic Signal

EXHIBIT 3-9: EXISTING (2020) PM PEAK HOUR ONLY SUMMARY OF LOS

LEGEND:

- = LOS A-C
- = LOS D
- = LOS E
- = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

N

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project's trip assignment onto the study area roadway network. The Project is to consist of a 4,552 square foot automated car wash with a single tunnel. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. The Project will have access to Seneca Road via Driveways 1 and 2 (Driveway 1 with full access and Driveway 2 with right-in/right-out access only) and US Highway 395 via Driveway 3 (right-in/right-out access only). Regional access to the Project site is available from US Highway 395, Palmdale Avenue (SR-18), and the I-15 Freeway.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Trip generation rates used to estimate Project traffic are shown in Table 4-1. The trip generation rates used for this analysis are based upon information collected and published in the ITE Trip Generation Manual, 10th Edition, 2017. (4) The trip generation rate for the proposed gas station are based upon data collected by ITE for Automated Car Wash (ITE Land Use Code 948). (4) Note that the ITE Trip Generation Manual does not identify an AM peak hour trip generation rate for this land use and a daily trip generation rate is also not available. For the purposes of this analysis, the daily trip generation rate is estimated to be 10 times the PM peak hour trip generation rate. The proposed Project is estimated to generate 776 trip-ends per day with 78 PM peak hour trips (see Table 4-1).

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. The Project trip distribution pattern is graphically depicted on Exhibit 4-1. The Project trip distribution pattern was reviewed by the City of Adelanto as part of the traffic study scoping process (see Appendix 1.1).

4.3 MODAL SPLIT

The potential for Project trips to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

Table 4-1

Project Trip Generation Summary

Land Use[1]	ITE Code	Units[2]	AM Peak Hour			PM Peak Hour			Weekday Daily
			In	Out	Total	In	Out	Total	
Automated Car Wash	948	TUN	N/A	N/A	N/A	38.75	38.75	77.50	775.00

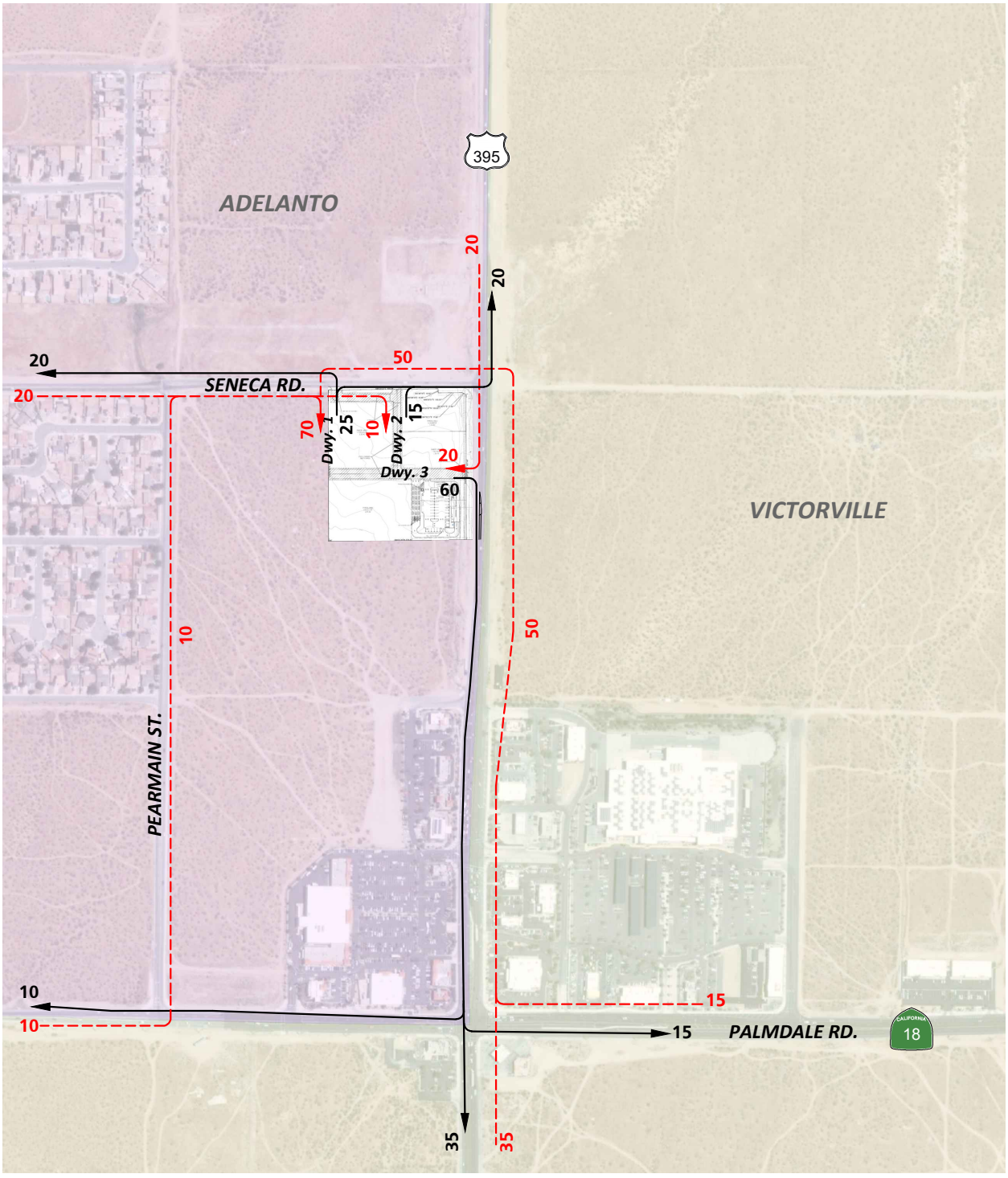
Land Use[1]	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Automated Car Wash[3]	1	TUN	N/A	N/A	N/A	39	39	78	776

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition (2017).

[2] TUN = Tunnels

[3] AM peak hour and daily trip generation rate not available. Daily rate estimated at 10 times the PM peak hour rate.

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

= OUTBOUND

= INBOUND

N

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4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project only ADT and PM peak hour intersection turning movement volumes are shown on Exhibit 4-2.

4.5 BACKGROUND TRAFFIC

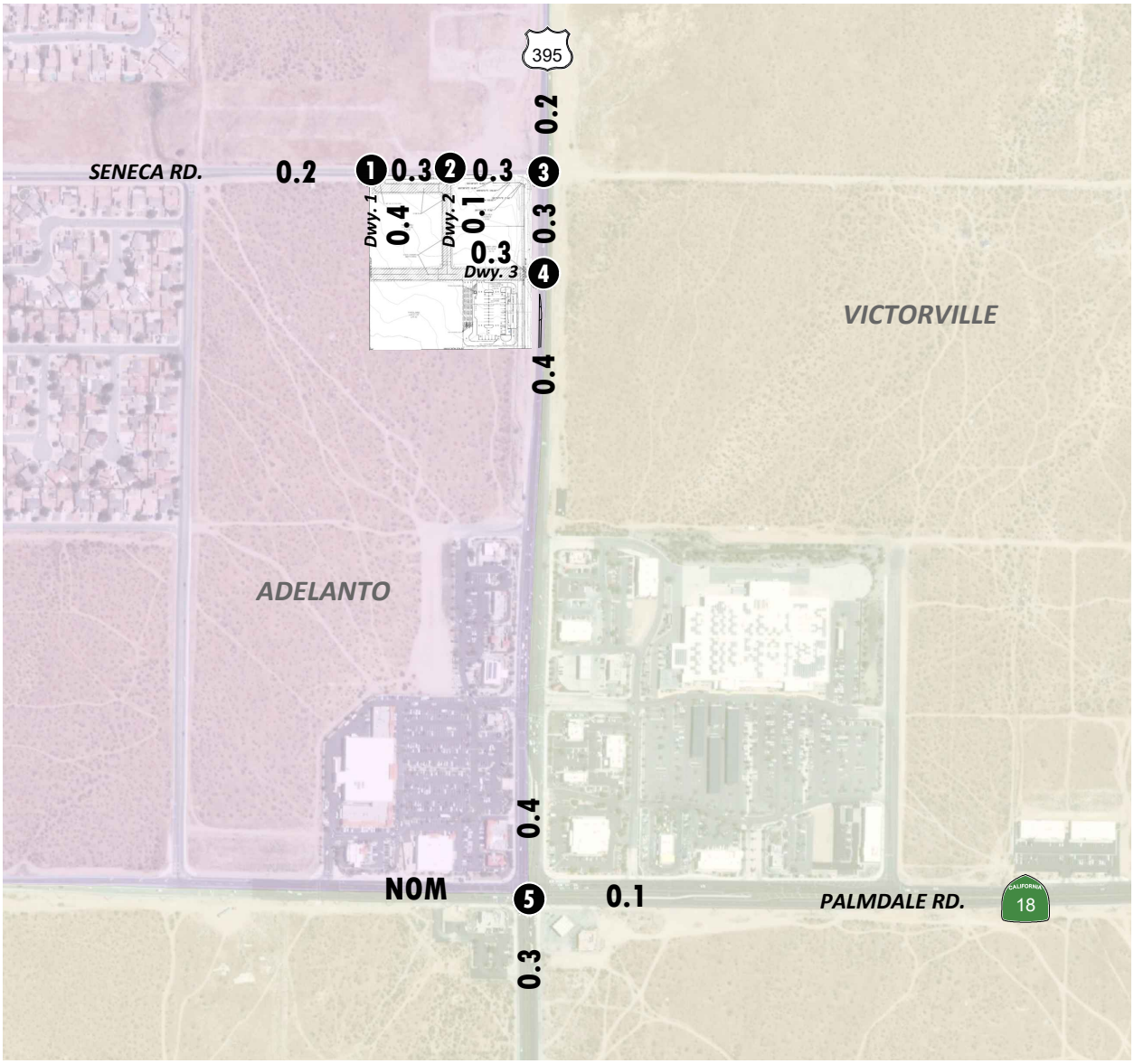
Future year traffic forecasts have been based upon background (ambient) growth of 4.04% (2% per year compounded over 2 years) for 2022 traffic conditions. This ambient growth factor is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and PM peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

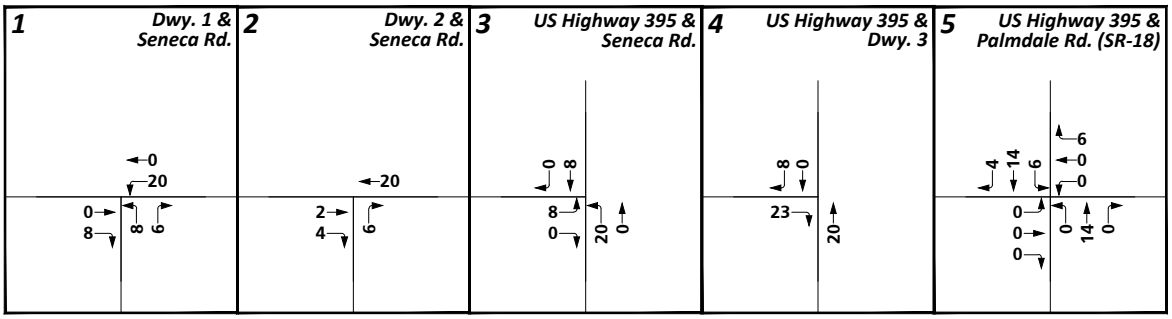
4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with Planning/Engineering staff from the City of Adelanto. Exhibit 4-3 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown in Table 4-2. If applicable, the traffic generated by individual cumulative projects was manually added to the Existing traffic volumes plus ambient growth to ensure that traffic generated by the listed cumulative development projects in Table 4-2 are reflected as part of the background traffic to calculate Opening Year Cumulative (2022) traffic forecasts.

For the purposes of this TA, an absorption percentage has been applied to the residential-related development traffic located in the City of Victorville. It is unlikely that these residential uses as shown on Exhibit 4-3 will be fully constructed and occupied by the year 2022. As such, 15% absorption has been assumed for the residential uses only located within the City of Victorville for the purposes of this TA. However, smaller residential projects located in close proximity to the study area have included 100% of future traffic. Cumulative ADT and PM peak hour intersection turning movement volumes are shown on Exhibit 4-4.

EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES





LEGEND:

10 = PM PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)
NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

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EXHIBIT 4-3: CUMULATIVE DEVELOPMENT LOCATION MAP

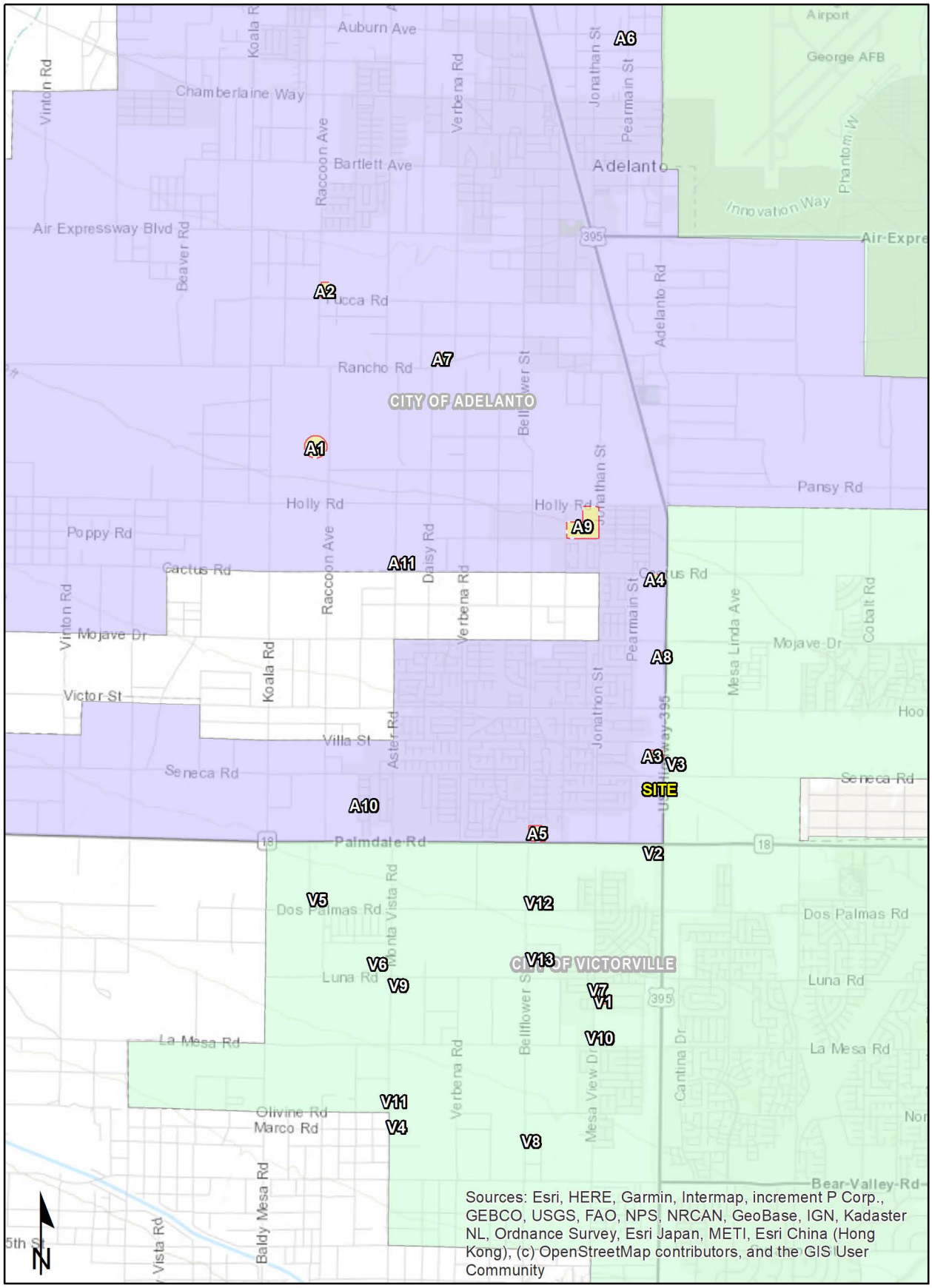
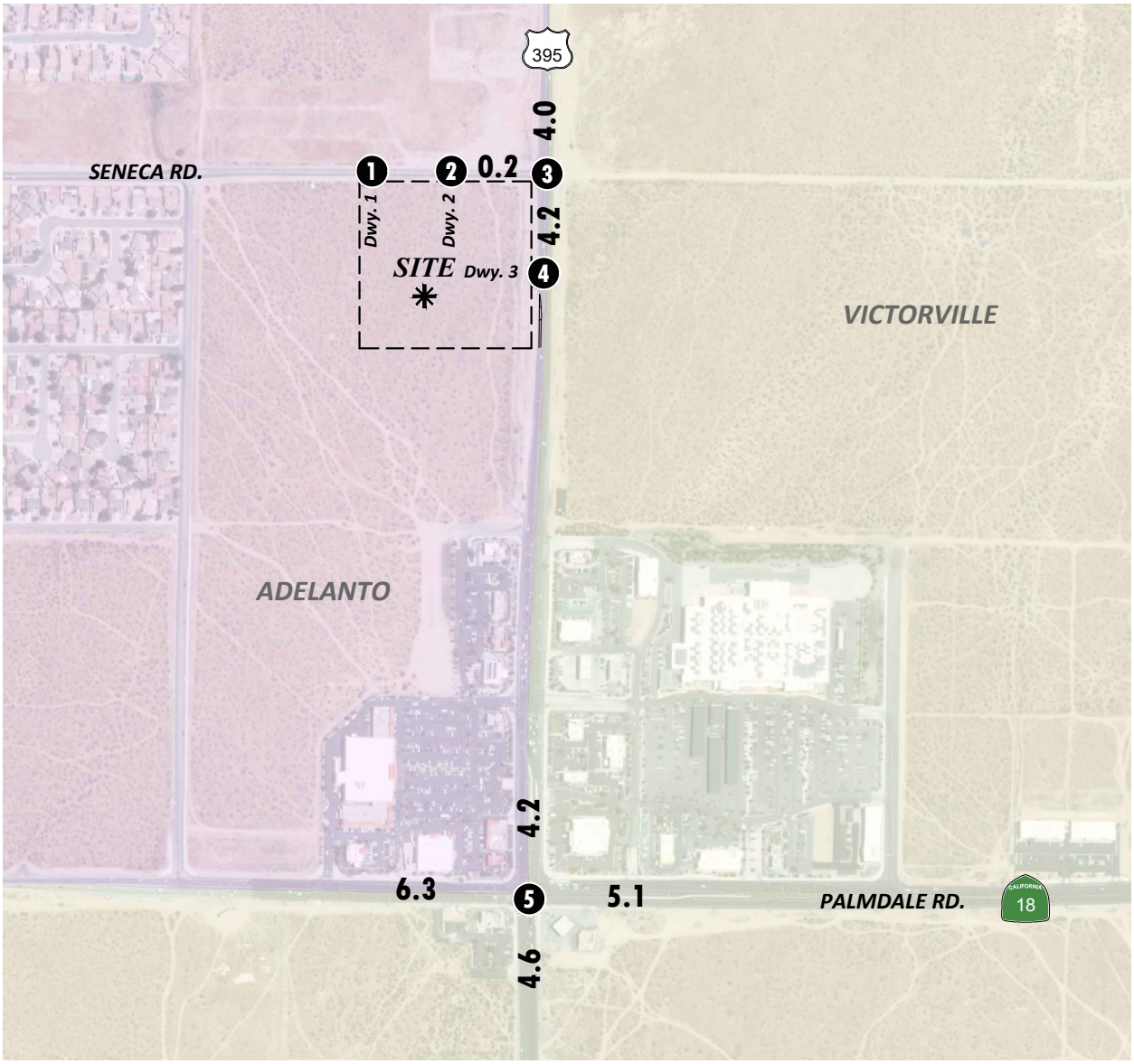


EXHIBIT 4-4: CUMULATIVE ONLY TRAFFIC VOLUMES



1 Dwy. 1 & Seneca Rd.	2 Dwy. 2 & Seneca Rd.	3 US Highway 395 & Seneca Rd.	4 US Highway 395 & Dwy. 3	5 US Highway 395 & Palmdale Rd. (SR-18)
Future Intersection	Future Intersection	0 187 0 7 6 181	Future Intersection	105 69 20 29 144 70 88 132 75 85 70 51

LEGEND:

10 = PM PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

N

Table 4-2

Summary of Cumulative Development Projects

No.	Project Name	Land Use	Quantity[1]	
City of Adelanto				
A1	Copart Adelanto (2-61 Ac)	Used Car Sales Lot	56.97	AC
A2	Adelanto Industrial Center	General Light Industrial	72.000	TSF
A3	CUP 20-01; LDP 20-01 (N of Seneca on US-395)	Hotel	90	RM
		Restaurant	5.293	TSF
A4	St. Mary's Property	Medical Office	17.688	TSF
		Commercial Retail	7.000	TSF
		Restaurant	3.800	TSF
		Fast-food with Drive-Through	3.500	TSF
		Gas Station w/ Market	16	VFP
A5	CUP 19-05; LDP 19-04 (NEC Bellflower/Palmdale)	Circle K Gas Station w/ Market	12	VFP
		Car Wash	3.580	TSF
		Fast-food with Drive-Through	2.500	TSF
A6	CUP 19-14	Cannibis Cultivation	363.295	TSF
A7	Park Family Trust	Cannibis Cultivation	84.000	TSF
A8	7-Eleven	Gas Station w/ Market	16	VFP
A9	NWC Poppy Road & Jonathan Street	Single Family Residential (partial occupancy)	116	DU
A10	West of Aster, between Seneca Road and Highway 18	Single Family Residential	141	DU
		Park	8.3	AC
		Hotel	130	RM
		Shopping Center	29.500	TSF
A11	NEC Aster Road & Cactus Road	Single Family Residential	20	DU
City of Victorville				
V1	Desert Trails Prepatory Academy	Charter Elementary School	460	STU
V2	SWC US-395/Palmdale Road	Fast-food with Drive-Through	8.800	TSF
		Restaurant	4.500	TSF
		Shopping Center	75.000	TSF
		Car Wash	1	Site
		Gas Station w/ Market	16	VFP
V3	NEC US-395/Seneca Road	Single Family Residential	69	DU
V4	NEC Monte Vista Road/Olivine Road	Single Family Residential	195	DU
V5	SEC Monte Vista Road/Olivine Road	Single Family Residential	132	DU
V6	Single Family Residential	Single Family Residential	271	DU
V7	Single Family Residential	Single Family Residential	48	DU
V8	Single Family Residential	Single Family Residential	151	DU
V9	Single Family Residential	Single Family Residential	168	DU
V10	Single Family Residential	Single Family Residential	147	DU
V11	Single Family Residential	Single Family Residential	246	DU
V12	Single Family Residential	Single Family Residential	72	DU
V13	Single Family Residential	Single Family Residential	352	DU

[1] TSF = Thousand Square Feet; DU = Dwelling Unit; AC = Acres; VFP = Vehicle Fueling Positions; RM = Rooms

5 OPENING YEAR CUMULATIVE (2022) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2022) traffic forecasts, and the resulting intersection operations analysis.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

5.2 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 4.04% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) Without Project traffic conditions are shown on Exhibit 5-1.

5.3 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUME FORECASTS

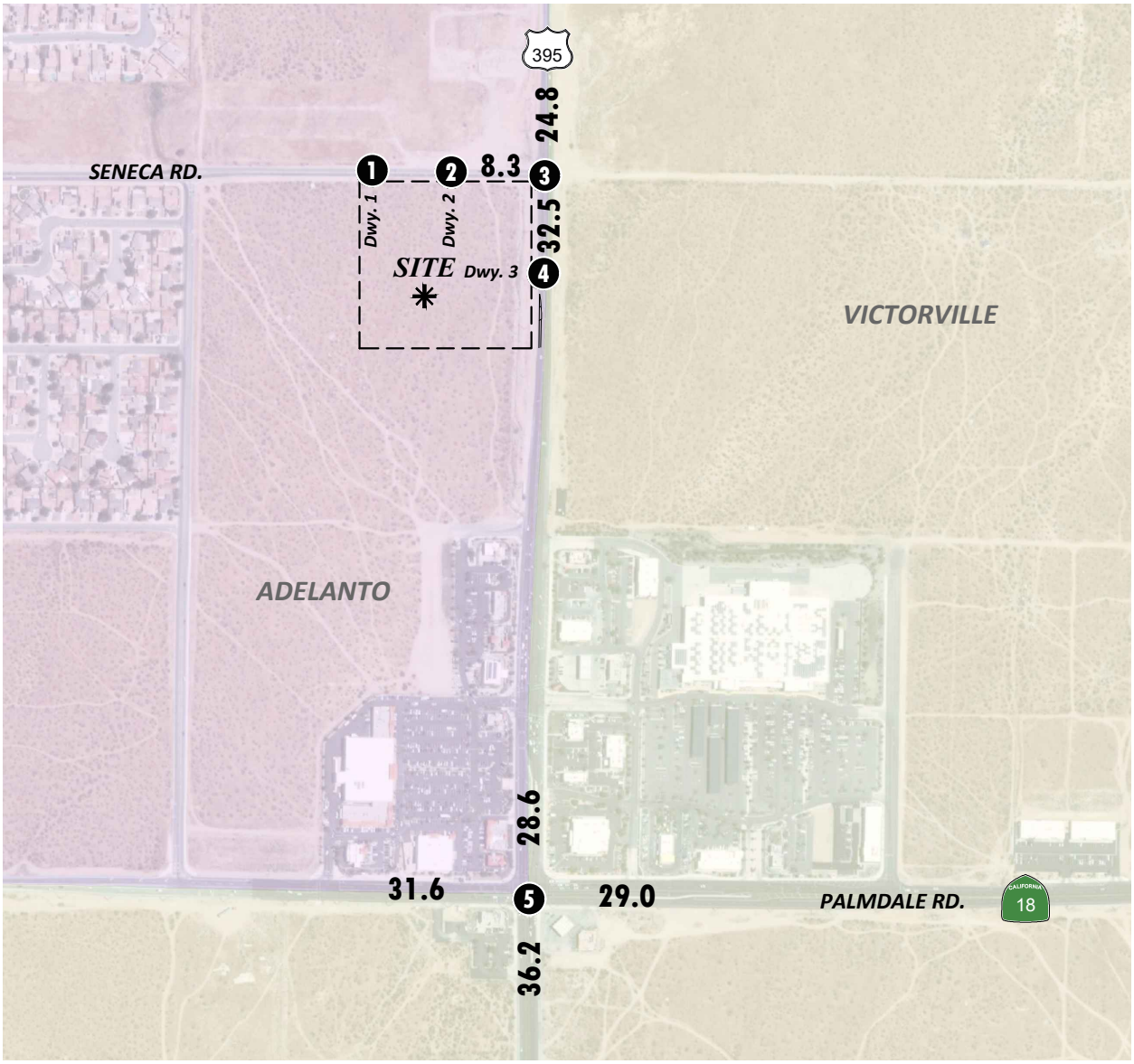
This scenario includes Existing traffic volumes plus an ambient growth factor of 4.04% plus traffic from pending and approved but not yet constructed known development projects in the area in conjunction with Project traffic. The weekday ADT and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) With Project traffic conditions are shown on Exhibit 5-2.

5.4 INTERSECTION OPERATIONS ANALYSIS

5.4.1 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2022) Without Project traffic conditions with the roadway and intersection geometrics consistent with Section 5.1 *Roadway Improvements*. As shown in Table 5-1, the intersection of US Highway 395 and Palmdale Avenue (SR-18) is anticipated to continue to operate at an unacceptable LOS during the PM peak hour under Opening Year Cumulative (2022) Without Project traffic conditions, consistent with Existing (2020) traffic conditions. A summary of the peak hour intersection LOS for Opening Year Cumulative (2022) Without Project traffic conditions is shown on Exhibit 5-3. The intersection operations analysis worksheets for Opening Year Cumulative (2022) Without Project traffic conditions are included in Appendix 5.1.

EXHIBIT 5-1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES



1 Dwy. 1 & Seneca Rd.	2 Dwy. 2 & Seneca Rd.	3 US Highway 395 & Seneca Rd.	4 US Highway 395 & Dwy. 3	5 US Highway 395 & Palmdale Rd. (SR-18)
Future Intersection	Future Intersection	18 1002 6 270 341 936	Future Intersection	159 731 175 184 738 350 201 666 416 382 803 164

LEGEND:

10 *= PM PEAK HOUR INTERSECTION VOLUMES*
10.0 *= VEHICLES PER DAY (1000'S)*

N

EXHIBIT 5-2: OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES

LEGEND:

10 *= PM PEAK HOUR INTERSECTION VOLUMES*
10.0 *= VEHICLES PER DAY (1000'S)*

N

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EXHIBIT 5-3: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT PM PEAK HOUR ONLY SUMMARY OF LOS

LEGEND:

- = LOS A-C
- = LOS D
- = LOS E
- = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

N

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Table 5-1

Intersection Analysis for Opening Year Cumulative (2022) Conditions

#	Intersection	Traffic Control[2]	2022 Without Project		2022 With Project		Change in Delay	Project Related Deficiency?[3]
			Delay[1] (secs.)	Level of Service	Delay[1] (secs.)	Level of Service		
			PM	PM	PM	PM		
1	Driveway 1 & Seneca Rd.	**CSS**	Future Intersection		12.8	B	N/A[4]	N/A[4]
2	Driveway 2 & Seneca Rd.	**CSS**	Future Intersection		9.9	A	N/A[4]	N/A[4]
3	US-395 & Seneca Rd.	TS	33.9	C	38.2	D	N/A[4]	N/A[4]
4	US-395 & Driveway 3	**CSS**	Future Intersection		15.0	C	N/A[4]	N/A[4]
5	US-395 & Palmdale Av. (SR-18)	TS	**113.2**	**F**	**113.9**	**F**	0.7	No

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

[2] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Project-related deficiency identified if the addition of project traffic adds 5.0 seconds or more of delay to an intersection that operates at a deficient LOS under pre-project traffic conditions.

[4] N/A = Not Applicable

5.4.2 OPENING YEAR CUMULATIVE (2022) WITH PROJECT

As shown in Table 5-1, there are no additional study area intersections anticipated to operate at a deficient LOS with the addition of Project traffic. A summary of the peak hour intersection LOS for Opening Year Cumulative (2022) With Project traffic conditions is shown on Exhibit 5-4. The intersection operations analysis worksheets for Opening Year Cumulative (2022) With Project traffic conditions are included in Appendix 5.2.

5.5 RECOMMENDED IMPROVEMENTS

As shown in Table 5-1, the addition of Project traffic is anticipated to increase the pre-project delay by less than 5.0 seconds (the City's criteria for determining significance at intersections). As such, there are no project-related deficiencies and no off-site improvements have been recommended.

EXHIBIT 5-4: OPENING YEAR CUMULATIVE (2022) WITH PROJECT PM PEAK HOUR ONLY SUMMARY OF LOS

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6 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Adelanto are funded through a combination of direct project mitigation, development impact fee programs or fair share contributions, such as the City of Adelanto Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

6.1 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by San Bernardino County Transportation Authority (SBCTA) and concluded that each jurisdiction should include a regional fee component in their local programs to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in September 2017. Revenues collected through these programs are used in tandem with Measure "I" funds to deliver projects identified in the Nexus Study.

While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past, and will continue to fund, new transportation facilities in San Bernardino County, including within the City of Adelanto.

6.2 CITY OF ADELANTO DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The City of Adelanto has created its own local DIF program to impose and collect fees from new residential, commercial and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF includes a Regional Circulation System Fee to comply with Measure "I" and a Local Circulation System Fee to address transportation improvements which are locally significant. The fee schedule was recently updated in June 2016 and is adjusted annually based upon changes in the construction cost index (CCI). Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the

LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds. (6)

The Project Applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect. The Project Applicant's payment of the requisite DIF fees at the rates then in effect pursuant to the DIF Program will mitigate its impacts to DIF-funded facilities. After the City's DIF fees are collected, they are placed in a separate interest-bearing account pursuant to the requirements of Government Code § 66000 *et seq*. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department.

6.3 FAIR SHARE CONTRIBUTION

The conditions of approval may include a combination of fee payments to established programs (e.g., DIF), construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City of Adelanto's discretion). When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements.

7 REFERENCES

1. **County of San Bernardino.** *Transportation Impact Study Guidelines.* County of San Bernardino : s.n., July 9, 2019.

2. **San Bernardino County Transportation Authority (SBCTA), formerly San Bernardino Associated Governments (SANBAG).** *County of San Bernardino Congestion Management Program.* San Bernardino County : s.n., 2016 Update.

3. **California Department of Transportation.** *Guide for the Preparation of Traffic Impact Studies.* December 2002.

4. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.

5. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.

6. **City of Adelanto.** *City of Adelanto Annual Budget.* Adelanto : s.n., Fiscal Year 2018/2019.

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