APPENDIX A - AIR QUALITY

Northeast Grover Beach

San Luis Obispo, Summary Report

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	51.45	1000sqft	1.18	51,450.00	0
Parking Lot	56.40		0.00	56,400.00	0
Hotel	60.00	Room	0.35	42,202.00	0
Single Family Housing	7.00	Dwelling Unit	0.96	12,600.00	20

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.2	**Precipitation Freq (Days)**	44
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments

Only CalEEMod defaults were used.

Project Characteristics - This is based on a provided construction schedule by the applicant, assuming one year of permitting

Land Use - SF based on provided site plan and calculated Calculated out seperate driveway and infrastructure

Construction Phase - Based on provided construction schedule as revised to accomodate proposed permitting from outside agencies.

Demolition -

Grading - Based on provided phasing and grading plan

Woodstoves -

Energy Use -

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation - Reduced to industry standards with the exception of residential, which went to a zero VOC paint

Energy Mitigation -

Water Mitigation -

Trips and VMT - Based on grading plan and assumption.

Vehicle Trips - Traffic engineer traffic study assumed ITE 10th edition category 311, and 75% occupancy of hotel. Please refer to traffic study appendix.

2.0 Peak Daily Emissions

Peak Daily Construction Emissions

Peak Daily Construction Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
Year	Phase	lb/day											
2020	Demolition	2.1993 W	21.3484 W	15.1935 S	0.0262 S	1.5525 W	1.1556 W	2.1993 W	21.3484 W	15.1935 S	0.0262 S	1.4001 W	1.1325 W
2020	Site Preparation	1.6911 W	19.9520 W	11.5518 S	0.0252 S	0.9362 S	0.7449 S	1.6911 W	19.9520 W	11.5518 S	0.0252 S	0.8877 S	0.7397 S
2020	Grading	1.9819 W	21.7862 W	10.3769 S	0.0225 S	7.1671 W	4.2615 W	1.9819 W	21.7862 W	10.3769 S	0.0225 S	3.4848 W	2.2413 W
2021	Grading	1.8830 W	20.6191 W	10.1650 S	0.0225 S	7.0921 W	4.1927 W	1.8830 W	20.6191 W	10.1650 S	0.0225 S	3.4099 W	2.1726 W
2021	Building Construction	2.4242 W	18.6141 W	17.3655 W	0.0359 S	1.5969 W	1.0000 W	2.4242 W	18.6141 W	17.3655 W	0.0359 S	1.5969 W	1.0000 W
2022	Building Construction	2.2109 W	17.0497 W	16.9254 W	0.0357 S	1.4809 W	0.8891 W	2.2109 W	17.0497 W	16.9254 W	0.0357 S	1.4809 W	0.8891 W
2022	Paving	1.3145 W	9.3810 W	12.1407 S	0.0192 S	0.6370 S	0.4901 S	1.3145 W	9.3810 W	12.1407 S	0.0192 S	0.6370 S	0.4901 S
2023	Architectural Coating	141.9668 W	1.3410 W	2.1630 S	4.0500e-003 S	0.2001 S	0.1056 S	141.9668 W	1.3410 W	2.1630 S	4.0500e-003 S	0.2001 S	0.1056 S
	Peak Daily Total	141.9668 W	21.7862 W	17.3655 W	0.0359 S	7.1671 W	4.2615 W	141.9668 W	21.7862 W	17.3655 W	0.0359 S	3.4848 W	2.2413 W
	Air District Threshold												
	Exceed Significance?												

Peak Daily Operational Emissions

Peak Daily Operational Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
	Operational Activity	lb/day											
On-Site	Area	1.6182 S	6.8100e-003 S	0.5948 S	3.0000e-005 S	3.2600e-003 S	3.2600e-003 S	1.2570 S	6.8100e-003 S	0.5948 S	3.0000e-005 S	3.2600e-003 S	3.2600e-003 S
On-Site	Energy	0.0629 S	0.5681 S	0.4509 S	3.4300e-003 S	0.0435 S	0.0435 S	0.0573 S	0.5172 S	0.4105 S	3.1300e-003 S	0.0396 S	0.0396 S
Off-Site	Mobile	0.4455 S	1.5375 W	4.3731 W	0.0127 S	1.1851 W	0.3242 W	0.4455 S	1.5375 W	4.3731 W	0.0127 S	1.1851 W	0.3242 W
	Peak Daily Total	2.1267 S	2.1124 W	5.4187 W	0.0161 S	1.2319 W	0.3709 W	1.7598 S	2.0615 W	5.3784 W	0.0158 S	1.2280 W	0.3671 W
	Air District Threshold												
	Exceed Significance?												

3.0 Annual GHG Emissions

Annual GHG

Annual GHG

		Unmitigated				Mitigated			
		CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
GHG Activity	Year	MT/yr							
Construction	2020	198.8940	0.0591	0.0000	200.3718	198.8937	0.0591	0.0000	200.3716
Construction	2021	317.2536	0.0635	0.0000	318.8402	317.2533	0.0635	0.0000	318.8399
Construction	2022	381.5423	0.0567	0.0000	382.9591	381.5420	0.0567	0.0000	382.9588
Construction	2023	1.7459	9.0718e-005	0.0000	1.7482	1.7459	9.0718e-005	0.0000	1.7482
Operational	2023	462.4925	0.5735	4.9532e-003	478.3061	422.6803	0.5591	4.1912e-003	437.9063
	Total								
	Significance Threshold								
	Exceed Significance?								

Northeast Grover Beach

San Luis Obispo County, Annual

1.0 Project Characteristics

1.1 Land Usage

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CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Northeast Grover Beach - San Luis Obispo County, Annual

Project Characteristics - This is based on a provided construction schedule by the applicant, assuming one year of permitting

Land Use - SF based on provided site plan and calculated Calculated out seperate driveway and infrastructure

Construction Phase - Based on provided construction schedule as revised to accomodate proposed permitting from outside agencies.

Demolition -

Grading - Based on provided phasing and grading plan

Woodstoves -

Energy Use -

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation - Reduced to industry standards with the exception of residential, which went to a zero VOC paint

Energy Mitigation -

Water Mitigation -

Trips and VMT - Based on grading plan and assumption.

Vehicle Trips - Traffic engineer traffic study assumed ITE 10th edition category 311, and 75% occupancy of hotel. Please refer to traffic study appendix.

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	50
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	150	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	50
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	220.00	380.00
tblConstructionPhase	NumDays	6.00	221.00

tblConstructionPhase	NumDays	3.00	60.00
tblConstructionPhase	PhaseEndDate	2/3/2023	12/9/2022
tblConstructionPhase	PhaseEndDate	6/25/2021	6/4/2021
tblConstructionPhase	PhaseEndDate	2/17/2023	6/17/2022
tblConstructionPhase	PhaseStartDate	8/21/2020	7/31/2020
tblConstructionPhase	PhaseStartDate	2/4/2023	6/6/2022
tblGrading	AcresOfGrading	110.50	3.00
tblGrading	AcresOfGrading	90.00	4.50
tblLandUse	BuildingSpaceSquareFeet	87,120.00	42,202.00
tblLandUse	LandUseSquareFeet	87,120.00	42,202.00
tblLandUse	LotAcreage	2.00	0.35
tblLandUse	LotAcreage	2.27	0.96
tblProjectCharacteristics	OperationalYear	2018	2023
tblSequestration	NumberOfNewTrees	0.00	105.00
tblTripsAndVMT	HaulingTripNumber	0.00	281.00
tblVehicleTrips	ST_TR	8.19	3.91
tblVehicleTrips	SU_TR	5.95	2.84
tblVehicleTrips	WD_TR	8.17	3.89

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1813	2.0105	1.0684	2.2500e-003	0.6831	0.0895	0.7725	0.3695	0.0825	0.4520	0.0000	198.8940	198.8940	0.0591	0.0000	200.3718
2021	0.2656	2.4029	1.7327	3.6500e-003	0.7250	0.1068	0.8319	0.3815	0.1004	0.4820	0.0000	317.2536	317.2536	0.0635	0.0000	318.8402
2022	0.2734	2.1387	2.1287	4.4300e-003	0.0925	0.0897	0.1822	0.0249	0.0859	0.1108	0.0000	381.5423	381.5423	0.0567	0.0000	382.9592
2023	0.7098	6.7000e-003	0.0108	2.0000e-005	6.3000e-004	3.6000e-004	9.8000e-004	1.7000e-004	3.6000e-004	5.2000e-004	0.0000	1.7459	1.7459	9.0000e-005	0.0000	1.7482
Maximum	**0.7098**	**2.4029**	**2.1287**	**4.4300e-003**	**0.7250**	**0.1068**	**0.8319**	**0.3815**	**0.1004**	**0.4820**	**0.0000**	**381.5423**	**381.5423**	**0.0635**	**0.0000**	**382.9592**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1813	2.0105	1.0684	2.2500e-003	0.2732	0.0895	0.3627	0.1459	0.0825	0.2284	0.0000	198.8938	198.8938	0.0591	0.0000	200.3716
2021	0.2656	2.4029	1.7327	3.6500e-003	0.3181	0.1068	0.4250	0.1583	0.1004	0.2587	0.0000	317.2533	317.2533	0.0635	0.0000	318.8399
2022	0.2734	2.1387	2.1286	4.4300e-003	0.0925	0.0897	0.1822	0.0249	0.0859	0.1108	0.0000	381.5420	381.5420	0.0567	0.0000	382.9589
2023	0.7098	6.7000e-003	0.0108	2.0000e-005	6.3000e-004	3.6000e-004	9.8000e-004	1.7000e-004	3.6000e-004	5.2000e-004	0.0000	1.7459	1.7459	9.0000e-005	0.0000	1.7482
Maximum	**0.7098**	**2.4029**	**2.1286**	**4.4300e-003**	**0.3181**	**0.1068**	**0.4250**	**0.1583**	**0.1004**	**0.2587**	**0.0000**	**381.5420**	**381.5420**	**0.0635**	**0.0000**	**382.9589**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.41**	**0.00**	**45.69**	**57.57**	**0.00**	**42.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**5-1-2020**	**7-31-2020**	0.7383	0.7383
2	**8-1-2020**	**10-31-2020**	0.9352	0.9352
3	**11-1-2020**	**1-31-2021**	0.7669	0.7669
4	**2-1-2021**	**4-30-2021**	0.7151	0.7151
5	**5-1-2021**	**7-31-2021**	0.5509	0.5509
6	**8-1-2021**	**10-31-2021**	0.6901	0.6901
7	**11-1-2021**	**1-31-2022**	0.6716	0.6716
8	**2-1-2022**	**4-30-2022**	0.6117	0.6117

9	**5-1-2022**	**7-31-2022**	0.6770	0.6770
10	**8-1-2022**	**10-31-2022**	0.6318	0.6318
11	**11-1-2022**	**1-31-2023**	0.2683	0.2683
12	**2-1-2023**	**4-30-2023**	0.7165	0.7165
		Highest	0.9352	0.9352

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2950	1.1200e-003	0.0981	1.0000e-005		5.4000e-004	5.4000e-004		5.4000e-004	5.4000e-004	0.0000	0.1612	0.1612	1.6000e-004	0.0000	0.1653
Energy	0.0115	0.1037	0.0823	6.3000e-004		7.9400e-003	7.9400e-003		7.9400e-003	7.9400e-003	0.0000	254.4257	254.4257	8.5400e-003	3.4000e-003	255.6527
Mobile	0.0729	0.2679	0.7436	2.1300e-003	0.1989	1.9900e-003	0.2009	0.0532	1.8600e-003	0.0551	0.0000	195.3666	195.3666	7.7200e-003	0.0000	195.5596
Waste						0.0000	0.0000		0.0000	0.0000	8.3328	0.0000	8.3328	0.4925	0.0000	20.6441
Water						0.0000	0.0000		0.0000	0.0000	0.6276	3.5787	4.2063	0.0646	1.5600e-003	6.2852
Total	**0.3794**	**0.3727**	**0.9240**	**2.7700e-003**	**0.1989**	**0.0105**	**0.2094**	**0.0532**	**0.0103**	**0.0636**	**8.9603**	**453.5321**	**462.4925**	**0.5735**	**4.9600e-003**	**478.3069**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2291	1.1200e-003	0.0981	1.0000e-005		5.4000e-004	5.4000e-004		5.4000e-004	5.4000e-004	0.0000	0.1612	0.1612	1.6000e-004	0.0000	0.1653
Energy	0.0105	0.0944	0.0749	5.7000e-004		7.2200e-003	7.2200e-003		7.2200e-003	7.2200e-003	0.0000	215.3901	215.3901	7.0400e-003	2.9400e-003	216.4436
Mobile	0.0729	0.2679	0.7436	2.1300e-003	0.1989	1.9900e-003	0.2009	0.0532	1.8600e-003	0.0551	0.0000	195.3666	195.3666	7.7200e-003	0.0000	195.5596
Waste						0.0000	0.0000		0.0000	0.0000	8.3328	0.0000	8.3328	0.4925	0.0000	20.6441
Water						0.0000	0.0000		0.0000	0.0000	0.5020	2.9276	3.4296	0.0517	1.2400e-003	5.0931
Total	**0.3124**	**0.3634**	**0.9166**	**2.7100e-003**	**0.1989**	**9.7500e-003**	**0.2087**	**0.0532**	**9.6200e-003**	**0.0629**	**8.8348**	**413.8455**	**422.6803**	**0.5591**	**4.1800e-003**	**437.9056**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**17.65**	**2.49**	**0.80**	**2.17**	**0.00**	**6.88**	**0.34**	**0.00**	**6.96**	**1.13**	**1.40**	**8.75**	**8.61**	**2.51**	**15.73**	**8.45**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	74.3400
Vegetation Land Change	-8.2752
Total	**66.0648**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2020	5/28/2020	5	20	Removal of existing family home
2	Site Preparation	Site Preparation	5/29/2020	8/20/2020	5	60	Grubbing, clearing, removing trees and bridge
3	Grading	Grading	7/31/2020	6/4/2021	5	221	Installation of backbone infrstrcuture, site benching, grading, etc
4	Building Construction	Building Construction	6/26/2021	12/9/2022	5	380	Construction of Hotel B
5	Paving	Paving	6/6/2022	6/17/2022	5	10	Pavement of infrastrucutre and parking lot
6	Architectural Coating	Architectural Coating	2/18/2023	3/3/2023	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 1.18

Residential Indoor: 25,515; Residential Outdoor: 8,505; Non-Residential Indoor: 63,303; Non-Residential Outdoor: 21,101; Striped Parking Area: 6,471 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	22.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	281.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	66.00	25.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	13.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2020

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.5000e-003	0.0000	2.5000e-003	3.8000e-004	0.0000	3.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2095	0.1466	2.4000e-004		0.0115	0.0115		0.0108	0.0108	0.0000	21.0677	21.0677	5.4200e-003	0.0000	21.2031
Total	**0.0213**	**0.2095**	**0.1466**	**2.4000e-004**	**2.5000e-003**	**0.0115**	**0.0140**	**3.8000e-004**	**0.0108**	**0.0111**	**0.0000**	**21.0677**	**21.0677**	**5.4200e-003**	**0.0000**	**21.2031**

3.2 Demolition - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	3.5400e-003	7.7000e-004	1.0000e-005	1.9000e-004	2.0000e-005	2.0000e-004	5.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.8462	0.8462	5.0000e-005	0.0000	0.8474
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	5.2000e-004	4.4700e-003	1.0000e-005	1.2500e-003	1.0000e-005	1.2600e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	1.0470	1.0470	3.0000e-005	0.0000	1.0479
Total	**6.7000e-004**	**4.0600e-003**	**5.2400e-003**	**2.0000e-005**	**1.4400e-003**	**3.0000e-005**	**1.4600e-003**	**3.8000e-004**	**2.0000e-005**	**4.1000e-004**	**0.0000**	**1.8932**	**1.8932**	**8.0000e-005**	**0.0000**	**1.8953**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.7000e-004	0.0000	9.7000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2095	0.1466	2.4000e-004		0.0115	0.0115		0.0108	0.0108	0.0000	21.0676	21.0676	5.4200e-003	0.0000	21.2030
Total	**0.0213**	**0.2095**	**0.1466**	**2.4000e-004**	**9.7000e-004**	**0.0115**	**0.0125**	**1.5000e-004**	**0.0108**	**0.0109**	**0.0000**	**21.0676**	**21.0676**	**5.4200e-003**	**0.0000**	**21.2030**

3.2 Demolition - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	3.5400e-003	7.7000e-004	1.0000e-005	1.9000e-004	2.0000e-005	2.0000e-004	5.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.8462	0.8462	5.0000e-005	0.0000	0.8474
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	5.2000e-004	4.4700e-003	1.0000e-005	1.2500e-003	1.0000e-005	1.2600e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	1.0470	1.0470	3.0000e-005	0.0000	1.0479
Total	**6.7000e-004**	**4.0600e-003**	**5.2400e-003**	**2.0000e-005**	**1.4400e-003**	**3.0000e-005**	**1.4600e-003**	**3.8000e-004**	**2.0000e-005**	**4.1000e-004**	**0.0000**	**1.8932**	**1.8932**	**8.0000e-005**	**0.0000**	**1.8953**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0496	0.5976	0.3380	7.3000e-004		0.0233	0.0233		0.0215	0.0215	0.0000	64.5799	64.5799	0.0209	0.0000	65.1021
Total	**0.0496**	**0.5976**	**0.3380**	**7.3000e-004**	**2.3900e-003**	**0.0233**	**0.0257**	**2.6000e-004**	**0.0215**	**0.0217**	**0.0000**	**64.5799**	**64.5799**	**0.0209**	**0.0000**	**65.1021**

3.3 Site Preparation - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	9.5000e-004	8.2600e-003	2.0000e-005	2.3100e-003	2.0000e-005	2.3300e-003	6.1000e-004	1.0000e-005	6.3000e-004	0.0000	1.9330	1.9330	6.0000e-005	0.0000	1.9346
Total	**1.0500e-003**	**9.5000e-004**	**8.2600e-003**	**2.0000e-005**	**2.3100e-003**	**2.0000e-005**	**2.3300e-003**	**6.1000e-004**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**1.9330**	**1.9330**	**6.0000e-005**	**0.0000**	**1.9346**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.3000e-004	0.0000	9.3000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0496	0.5976	0.3380	7.3000e-004		0.0233	0.0233		0.0215	0.0215	0.0000	64.5799	64.5799	0.0209	0.0000	65.1020
Total	**0.0496**	**0.5976**	**0.3380**	**7.3000e-004**	**9.3000e-004**	**0.0233**	**0.0242**	**1.0000e-004**	**0.0215**	**0.0216**	**0.0000**	**64.5799**	**64.5799**	**0.0209**	**0.0000**	**65.1020**

3.3 Site Preparation - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	9.5000e-004	8.2600e-003	2.0000e-005	2.3100e-003	2.0000e-005	2.3300e-003	6.1000e-004	1.0000e-005	6.3000e-004	0.0000	1.9330	1.9330	6.0000e-005	0.0000	1.9346
Total	**1.0500e-003**	**9.5000e-004**	**8.2600e-003**	**2.0000e-005**	**2.3100e-003**	**2.0000e-005**	**2.3300e-003**	**6.1000e-004**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**1.9330**	**1.9330**	**6.0000e-005**	**0.0000**	**1.9346**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6670	0.0000	0.6670	0.3660	0.0000	0.3660	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1057	1.1738	0.5465	1.1300e-003		0.0545	0.0545		0.0501	0.0501	0.0000	99.6110	99.6110	0.0322	0.0000	100.4164
Total	**0.1057**	**1.1738**	**0.5465**	**1.1300e-003**	**0.6670**	**0.0545**	**0.7215**	**0.3660**	**0.0501**	**0.4161**	**0.0000**	**99.6110**	**99.6110**	**0.0322**	**0.0000**	**100.4164**

3.4 Grading - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1000e-004	0.0225	4.8900e-003	6.0000e-005	2.1000e-003	1.0000e-004	2.2000e-003	5.5000e-004	9.0000e-005	6.4000e-004	0.0000	5.3795	5.3795	3.0000e-004	0.0000	5.3871
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4100e-003	2.1900e-003	0.0189	5.0000e-005	5.2900e-003	3.0000e-005	5.3300e-003	1.4100e-003	3.0000e-005	1.4400e-003	0.0000	4.4297	4.4297	1.5000e-004	0.0000	4.4334
Total	**3.0200e-003**	**0.0247**	**0.0238**	**1.1000e-004**	**7.3900e-003**	**1.3000e-004**	**7.5300e-003**	**1.9600e-003**	**1.2000e-004**	**2.0800e-003**	**0.0000**	**9.8092**	**9.8092**	**4.5000e-004**	**0.0000**	**9.8205**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2601	0.0000	0.2601	0.1427	0.0000	0.1427	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1057	1.1738	0.5465	1.1300e-003		0.0545	0.0545		0.0501	0.0501	0.0000	99.6109	99.6109	0.0322	0.0000	100.4163
Total	**0.1057**	**1.1738**	**0.5465**	**1.1300e-003**	**0.2601**	**0.0545**	**0.3146**	**0.1427**	**0.0501**	**0.1928**	**0.0000**	**99.6109**	**99.6109**	**0.0322**	**0.0000**	**100.4163**

3.4 Grading - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1000e-004	0.0225	4.8900e-003	6.0000e-005	2.1000e-003	1.0000e-004	2.2000e-003	5.5000e-004	9.0000e-005	6.4000e-004	0.0000	5.3795	5.3795	3.0000e-004	0.0000	5.3871
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4100e-003	2.1900e-003	0.0189	5.0000e-005	5.2900e-003	3.0000e-005	5.3300e-003	1.4100e-003	3.0000e-005	1.4400e-003	0.0000	4.4297	4.4297	1.5000e-004	0.0000	4.4334
Total	**3.0200e-003**	**0.0247**	**0.0238**	**1.1000e-004**	**7.3900e-003**	**1.3000e-004**	**7.5300e-003**	**1.9600e-003**	**1.2000e-004**	**2.0800e-003**	**0.0000**	**9.8092**	**9.8092**	**4.5000e-004**	**0.0000**	**9.8205**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6670	0.0000	0.6670	0.3660	0.0000	0.3660	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1014	1.1219	0.5417	1.1400e-003		0.0508	0.0508		0.0468	0.0468	0.0000	100.4766	100.4766	0.0325	0.0000	101.2890
Total	**0.1014**	**1.1219**	**0.5417**	**1.1400e-003**	**0.6670**	**0.0508**	**0.7179**	**0.3660**	**0.0468**	**0.4127**	**0.0000**	**100.4766**	**100.4766**	**0.0325**	**0.0000**	**101.2890**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.7000e-004	0.0208	4.6900e-003	5.0000e-005	2.1000e-003	9.0000e-005	2.1900e-003	5.5000e-004	8.0000e-005	6.3000e-004	0.0000	5.3674	5.3674	3.1000e-004	0.0000	5.3752
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2600e-003	1.9700e-003	0.0173	5.0000e-005	5.3400e-003	3.0000e-005	5.3800e-003	1.4200e-003	3.0000e-005	1.4500e-003	0.0000	4.3177	4.3177	1.3000e-004	0.0000	4.3209
Total	**2.8300e-003**	**0.0227**	**0.0220**	**1.0000e-004**	**7.4400e-003**	**1.2000e-004**	**7.5700e-003**	**1.9700e-003**	**1.1000e-004**	**2.0800e-003**	**0.0000**	**9.6851**	**9.6851**	**4.4000e-004**	**0.0000**	**9.6962**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2601	0.0000	0.2601	0.1427	0.0000	0.1427	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1014	1.1219	0.5417	1.1400e-003		0.0508	0.0508		0.0468	0.0468	0.0000	100.4764	100.4764	0.0325	0.0000	101.2888
Total	**0.1014**	**1.1219**	**0.5417**	**1.1400e-003**	**0.2601**	**0.0508**	**0.3110**	**0.1427**	**0.0468**	**0.1895**	**0.0000**	**100.4764**	**100.4764**	**0.0325**	**0.0000**	**101.2888**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.7000e-004	0.0208	4.6900e-003	5.0000e-005	2.1000e-003	9.0000e-005	2.1900e-003	5.5000e-004	8.0000e-005	6.3000e-004	0.0000	5.3674	5.3674	3.1000e-004	0.0000	5.3752
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2600e-003	1.9700e-003	0.0173	5.0000e-005	5.3400e-003	3.0000e-005	5.3800e-003	1.4200e-003	3.0000e-005	1.4500e-003	0.0000	4.3177	4.3177	1.3000e-004	0.0000	4.3209
Total	**2.8300e-003**	**0.0227**	**0.0220**	**1.0000e-004**	**7.4400e-003**	**1.2000e-004**	**7.5700e-003**	**1.9700e-003**	**1.1000e-004**	**2.0800e-003**	**0.0000**	**9.6851**	**9.6851**	**4.4000e-004**	**0.0000**	**9.6962**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1380	1.0819	0.9830	1.6900e-003		0.0552	0.0552		0.0529	0.0529	0.0000	140.1629	140.1629	0.0276	0.0000	140.8523
Total	**0.1380**	**1.0819**	**0.9830**	**1.6900e-003**		**0.0552**	**0.0552**		**0.0529**	**0.0529**	**0.0000**	**140.1629**	**140.1629**	**0.0276**	**0.0000**	**140.8523**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.1400e-003	0.1606	0.0471	3.3000e-004	7.6700e-003	4.6000e-004	8.1300e-003	2.2200e-003	4.4000e-004	2.6500e-003	0.0000	32.2710	32.2710	1.9000e-003	0.0000	32.3185
Worker	0.0182	0.0158	0.1389	3.8000e-004	0.0429	2.7000e-004	0.0432	0.0114	2.5000e-004	0.0117	0.0000	34.6581	34.6581	1.0500e-003	0.0000	34.6843
Total	**0.0233**	**0.1765**	**0.1860**	**7.1000e-004**	**0.0506**	**7.3000e-004**	**0.0513**	**0.0136**	**6.9000e-004**	**0.0143**	**0.0000**	**66.9290**	**66.9290**	**2.9500e-003**	**0.0000**	**67.0028**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1380	1.0819	0.9830	1.6900e-003		0.0552	0.0552		0.0529	0.0529	0.0000	140.1627	140.1627	0.0276	0.0000	140.8521
Total	**0.1380**	**1.0819**	**0.9830**	**1.6900e-003**		**0.0552**	**0.0552**		**0.0529**	**0.0529**	**0.0000**	**140.1627**	**140.1627**	**0.0276**	**0.0000**	**140.8521**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.1400e-003	0.1606	0.0471	3.3000e-004	7.6700e-003	4.6000e-004	8.1300e-003	2.2200e-003	4.4000e-004	2.6500e-003	0.0000	32.2710	32.2710	1.9000e-003	0.0000	32.3185
Worker	0.0182	0.0158	0.1389	3.8000e-004	0.0429	2.7000e-004	0.0432	0.0114	2.5000e-004	0.0117	0.0000	34.6581	34.6581	1.0500e-003	0.0000	34.6843
Total	**0.0233**	**0.1765**	**0.1860**	**7.1000e-004**	**0.0506**	**7.3000e-004**	**0.0513**	**0.0136**	**6.9000e-004**	**0.0143**	**0.0000**	**66.9290**	**66.9290**	**2.9500e-003**	**0.0000**	**67.0028**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2273	1.7890	1.7583	3.0700e-003		0.0860	0.0860		0.0825	0.0825	0.0000	254.4081	254.4081	0.0491	0.0000	255.6352
Total	**0.2273**	**1.7890**	**1.7583**	**3.0700e-003**		**0.0860**	**0.0860**		**0.0825**	**0.0825**	**0.0000**	**254.4081**	**254.4081**	**0.0491**	**0.0000**	**255.6352**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.6300e-003	0.2770	0.0789	6.0000e-004	0.0139	7.3000e-004	0.0147	4.0200e-003	7.0000e-004	4.7200e-003	0.0000	58.1669	58.1669	3.4100e-003	0.0000	58.2521
Worker	0.0309	0.0258	0.2309	6.7000e-004	0.0778	4.8000e-004	0.0783	0.0207	4.4000e-004	0.0211	0.0000	60.6497	60.6497	1.7100e-003	0.0000	60.6924
Total	**0.0396**	**0.3028**	**0.3097**	**1.2700e-003**	**0.0918**	**1.2100e-003**	**0.0930**	**0.0247**	**1.1400e-003**	**0.0259**	**0.0000**	**118.8166**	**118.8166**	**5.1200e-003**	**0.0000**	**118.9445**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2273	1.7890	1.7583	3.0700e-003		0.0860	0.0860		0.0825	0.0825	0.0000	254.4078	254.4078	0.0491	0.0000	255.6349
Total	**0.2273**	**1.7890**	**1.7583**	**3.0700e-003**		**0.0860**	**0.0860**		**0.0825**	**0.0825**	**0.0000**	**254.4078**	**254.4078**	**0.0491**	**0.0000**	**255.6349**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.6300e-003	0.2770	0.0789	6.0000e-004	0.0139	7.3000e-004	0.0147	4.0200e-003	7.0000e-004	4.7200e-003	0.0000	58.1669	58.1669	3.4100e-003	0.0000	58.2521
Worker	0.0309	0.0258	0.2309	6.7000e-004	0.0778	4.8000e-004	0.0783	0.0207	4.4000e-004	0.0211	0.0000	60.6497	60.6497	1.7100e-003	0.0000	60.6924
Total	**0.0396**	**0.3028**	**0.3097**	**1.2700e-003**	**0.0918**	**1.2100e-003**	**0.0930**	**0.0247**	**1.1400e-003**	**0.0259**	**0.0000**	**118.8166**	**118.8166**	**5.1200e-003**	**0.0000**	**118.9445**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	1.5500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2600e-003**	**0.0467**	**0.0585**	**9.0000e-005**		**2.4400e-003**	**2.4400e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.7550**	**7.7550**	**2.4600e-003**	**0.0000**	**7.8165**

3.6 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.4000e-004	2.1400e-003	1.0000e-005	7.2000e-004	0.0000	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5626	0.5626	2.0000e-005	0.0000	0.5630
Total	**2.9000e-004**	**2.4000e-004**	**2.1400e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5626**	**0.5626**	**2.0000e-005**	**0.0000**	**0.5630**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	1.5500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2600e-003**	**0.0467**	**0.0585**	**9.0000e-005**		**2.4400e-003**	**2.4400e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.7550**	**7.7550**	**2.4600e-003**	**0.0000**	**7.8165**

3.6 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.4000e-004	2.1400e-003	1.0000e-005	7.2000e-004	0.0000	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5626	0.5626	2.0000e-005	0.0000	0.5630
Total	**2.9000e-004**	**2.4000e-004**	**2.1400e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5626**	**0.5626**	**2.0000e-005**	**0.0000**	**0.5630**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7086					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.6000e-004	6.5100e-003	9.0600e-003	1.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2785
Total	**0.7096**	**6.5100e-003**	**9.0600e-003**	**1.0000e-005**		**3.5000e-004**	**3.5000e-004**		**3.5000e-004**	**3.5000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2785**

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.9000e-004	1.7000e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.4693	0.4693	1.0000e-005	0.0000	0.4696
Total	**2.3000e-004**	**1.9000e-004**	**1.7000e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.4693**	**0.4693**	**1.0000e-005**	**0.0000**	**0.4696**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7086					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.6000e-004	6.5100e-003	9.0600e-003	1.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2785
Total	**0.7096**	**6.5100e-003**	**9.0600e-003**	**1.0000e-005**		**3.5000e-004**	**3.5000e-004**		**3.5000e-004**	**3.5000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2785**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.9000e-004	1.7000e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.4693	0.4693	1.0000e-005	0.0000	0.4696
Total	**2.3000e-004**	**1.9000e-004**	**1.7000e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.4693**	**0.4693**	**1.0000e-005**	**0.0000**	**0.4696**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0729	0.2679	0.7436	2.1300e-003	0.1989	1.9900e-003	0.2009	0.0532	1.8600e-003	0.0551	0.0000	195.3666	195.3666	7.7200e-003	0.0000	195.5596
Unmitigated	0.0729	0.2679	0.7436	2.1300e-003	0.1989	1.9900e-003	0.2009	0.0532	1.8600e-003	0.0551	0.0000	195.3666	195.3666	7.7200e-003	0.0000	195.5596

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Hotel	233.40	234.60	170.40	361,848	361,848
Parking Lot	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	66.64	69.37	60.34	168,073	168,073
Total	300.04	303.97	230.74	529,921	529,921

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Hotel	13.00	5.00	5.00	19.40	61.60	19.00	58	38	4
Parking Lot	13.00	5.00	5.00	0.00	0.00	0.00	0	0	0
Parking Lot	13.00	5.00	5.00	0.00	0.00	0.00	0	0	0
Single Family Housing	13.00	5.00	5.00	35.80	21.00	43.20	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.582546	0.028575	0.198242	0.117308	0.024121	0.006096	0.012865	0.019735	0.002341	0.001188	0.004913	0.000770	0.001299
Parking Lot	0.582546	0.028575	0.198242	0.117308	0.024121	0.006096	0.012865	0.019735	0.002341	0.001188	0.004913	0.000770	0.001299
Hotel	0.582546	0.028575	0.198242	0.117308	0.024121	0.006096	0.012865	0.019735	0.002341	0.001188	0.004913	0.000770	0.001299
Single Family Housing	0.582546	0.028575	0.198242	0.117308	0.024121	0.006096	0.012865	0.019735	0.002341	0.001188	0.004913	0.000770	0.001299

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	111.9003	111.9003	5.0600e-003	1.0500e-003	112.3388
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	140.7566	140.7566	6.3600e-003	1.3200e-003	141.3081
NaturalGas Mitigated	0.0105	0.0944	0.0749	5.7000e-004		7.2200e-003	7.2200e-003		7.2200e-003	7.2200e-003	0.0000	103.4898	103.4898	1.9800e-003	1.9000e-003	104.1048
NaturalGas Unmitigated	0.0115	0.1037	0.0823	6.3000e-004		7.9400e-003	7.9400e-003		7.9400e-003	7.9400e-003	0.0000	113.6691	113.6691	2.1800e-003	2.0800e-003	114.3446

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hotel	1.87841e+006	0.0101	0.0921	0.0774	5.5000e-004		7.0000e-003	7.0000e-003		7.0000e-003	7.0000e-003	0.0000	100.2392	100.2392	1.9200e-003	1.8400e-003	100.8348
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	251668	1.3600e-003	0.0116	4.9300e-003	7.0000e-005		9.4000e-004	9.4000e-004		9.4000e-004	9.4000e-004	0.0000	13.4300	13.4300	2.6000e-004	2.5000e-004	13.5098
Total		**0.0115**	**0.1037**	**0.0823**	**6.2000e-004**		**7.9400e-003**	**7.9400e-003**		**7.9400e-003**	**7.9400e-003**	**0.0000**	**113.6691**	**113.6691**	**2.1800e-003**	**2.0900e-003**	**114.3446**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hotel	1.71062e+006	9.2200e-003	0.0839	0.0704	5.0000e-004		6.3700e-003	6.3700e-003		6.3700e-003	6.3700e-003	0.0000	91.2850	91.2850	1.7500e-003	1.6700e-003	91.8274
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	228710	1.2300e-003	0.0105	4.4800e-003	7.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	12.2048	12.2048	2.3000e-004	2.2000e-004	12.2774
Total		**0.0105**	**0.0944**	**0.0749**	**5.7000e-004**		**7.2200e-003**	**7.2200e-003**		**7.2200e-003**	**7.2200e-003**	**0.0000**	**103.4898**	**103.4898**	**1.9800e-003**	**1.8900e-003**	**104.1048**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hotel	328332	95.5154	4.3200e-003	8.9000e-004	95.8897
Parking Lot	45276	13.1713	6.0000e-004	1.2000e-004	13.2229
Parking Lot	49632	14.4385	6.5000e-004	1.4000e-004	14.4951
Single Family Housing	60607.2	17.6313	8.0000e-004	1.6000e-004	17.7004
Total		**140.7566**	**6.3700e-003**	**1.3100e-003**	**141.3081**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hotel	271865	79.0887	3.5800e-003	7.4000e-004	79.3986
Parking Lot	27165.6	7.9028	3.6000e-004	7.0000e-005	7.9338
Parking Lot	29779.2	8.6631	3.9000e-004	8.0000e-005	8.6971
Single Family Housing	55844.2	16.2457	7.3000e-004	1.5000e-004	16.3094
Total		**111.9003**	**5.0600e-003**	**1.0400e-003**	**112.3388**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2291	1.1200e-003	0.0981	1.0000e-005		5.4000e-004	5.4000e-004		5.4000e-004	5.4000e-004	0.0000	0.1612	0.1612	1.6000e-004	0.0000	0.1653
Unmitigated	0.2950	1.1200e-003	0.0981	1.0000e-005		5.4000e-004	5.4000e-004		5.4000e-004	5.4000e-004	0.0000	0.1612	0.1612	1.6000e-004	0.0000	0.1653

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0709					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2210					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.1300e-003	1.1200e-003	0.0981	1.0000e-005		5.4000e-004	5.4000e-004		5.4000e-004	5.4000e-004	0.0000	0.1612	0.1612	1.6000e-004	0.0000	0.1653
Total	**0.2950**	**1.1200e-003**	**0.0981**	**1.0000e-005**		**5.4000e-004**	**5.4000e-004**		**5.4000e-004**	**5.4000e-004**	**0.0000**	**0.1612**	**0.1612**	**1.6000e-004**	**0.0000**	**0.1653**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	4.9300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2210					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.1300e-003	1.1200e-003	0.0981	1.0000e-005		5.4000e-004	5.4000e-004		5.4000e-004	5.4000e-004	0.0000	0.1612	0.1612	1.6000e-004	0.0000	0.1653
Total	**0.2291**	**1.1200e-003**	**0.0981**	**1.0000e-005**		**5.4000e-004**	**5.4000e-004**		**5.4000e-004**	**5.4000e-004**	**0.0000**	**0.1612**	**0.1612**	**1.6000e-004**	**0.0000**	**0.1653**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	3.4296	0.0517	1.2400e-003	5.0931
Unmitigated	4.2063	0.0646	1.5600e-003	6.2852

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hotel	1.52201 / 0.169112	3.0509	0.0497	1.2000e-003	4.6498
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0.456078 / 0.287528	1.1554	0.0149	3.6000e-004	1.6354
Total		**4.2062**	**0.0646**	**1.5600e-003**	**6.2852**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hotel	1.2176 / 0.158796	2.4646	0.0398	9.6000e-004	3.7438
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0.364863 / 0.269988	0.9650	0.0119	2.9000e-004	1.3492
Total		**3.4296**	**0.0517**	**1.2500e-003**	**5.0930**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	8.3328	0.4925	0.0000	20.6441
Unmitigated	8.3328	0.4925	0.0000	20.6441

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hotel	32.85	6.6683	0.3941	0.0000	16.5203
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	8.2	1.6645	0.0984	0.0000	4.1238
Total		**8.3328**	**0.4925**	**0.0000**	**20.6441**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hotel	32.85	6.6683	0.3941	0.0000	16.5203
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	8.2	1.6645	0.0984	0.0000	4.1238
Total		**8.3328**	**0.4925**	**0.0000**	**20.6441**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	66.0648	0.0000	0.0000	66.0648

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Grassland	5.57 / 3.65	-8.2752	0.0000	0.0000	-8.2752
Wetlands	1.73 / 1.73	0.0000	0.0000	0.0000	0.0000
Total		**-8.2752**	**0.0000**	**0.0000**	**-8.2752**

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	105	74.3400	0.0000	0.0000	74.3400
Total		**74.3400**	**0.0000**	**0.0000**	**74.3400**

Northeast Grover Beach Phase 2

San Luis Obispo, Summary Report

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	24.70	1000sqft	0.57	24,700.00	0
Hotel	91.00	Room	0.79	50,995.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.2	**Precipitation Freq (Days)**	44
Climate Zone	4			**Operational Year**	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments

Only CalEEMod defaults were used.

Northeast Grover Beach Phase 2
San Luis Obispo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	24.70	1000sqft	0.57	24,700.00	0
Hotel	91.00	Room	0.79	50,995.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.2	**Precipitation Freq (Days)**	44
Climate Zone	4			**Operational Year**	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - This is based on a provided construction schedule by the applicant, assuming one year of permitting

Land Use - SF based on provided site plan and calculated. Major Site improvements including driveway, infratructure, and other paving elements completed as a part of Phase 1.

Construction Phase - Based on project schedule and grading completed as a part of Phase 1.

Demolition -

Grading - Grading will be limited to the Hotel A pad and cut slopes only.

Energy Use - Change

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation - Based on industry standards

Energy Mitigation -

Water Mitigation -

Mobile Commute Mitigation -

Vehicle Trips - Based on provided traffic engineer study assuming only 75 occupancy at any given time. Please refer to enclosed traffic study.

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	50
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	150	100
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	200.00	360.00
tblConstructionPhase	NumDays	4.00	179.00
tblConstructionPhase	NumDays	2.00	10.00
tblFleetMix	HHD	0.02	0.02
tblFleetMix	HHD	0.02	0.02

tblFleetMix	LDA	0.54	0.60
tblFleetMix	LDA	0.54	0.60
tblFleetMix	LDT1	0.04	0.03
tblFleetMix	LDT1	0.04	0.03
tblFleetMix	LDT2	0.20	0.20
tblFleetMix	LDT2	0.20	0.20
tblFleetMix	LHD1	0.04	0.02
tblFleetMix	LHD1	0.04	0.02
tblFleetMix	LHD2	8.4270e-003	4.9490e-003
tblFleetMix	LHD2	8.4270e-003	4.9490e-003
tblFleetMix	MCY	5.8600e-003	4.4590e-003
tblFleetMix	MCY	5.8600e-003	4.4590e-003
tblFleetMix	MDV	0.14	0.11
tblFleetMix	MDV	0.14	0.11
tblFleetMix	MH	2.0180e-003	9.3900e-004
tblFleetMix	MH	2.0180e-003	9.3900e-004
tblFleetMix	MHD	0.01	0.01
tblFleetMix	MHD	0.01	0.01
tblFleetMix	OBUS	2.4270e-003	2.2700e-003
tblFleetMix	OBUS	2.4270e-003	2.2700e-003
tblFleetMix	SBUS	8.3900e-004	7.3000e-004
tblFleetMix	SBUS	8.3900e-004	7.3000e-004
tblFleetMix	UBUS	1.3580e-003	1.1000e-003
tblFleetMix	UBUS	1.3580e-003	1.1000e-003
tblGrading	AcresOfGrading	67.13	1.30
tblGrading	AcresOfGrading	5.00	1.30
tblLandUse	BuildingSpaceSquareFeet	132,132.00	50,995.00

Northeast Grover Beach Phase 2 - San Luis Obispo County, Annual

tblLandUse	LandUseSquareFeet	132,132.00	50,995.00
tblLandUse	LotAcreage	3.03	0.79
tblSequestration	NumberOfNewTrees	0.00	45.00
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tblVehicleEF	HHD	1,752.25	1,572.58
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tblVehicleEF	HHD	8.7260e-003	8.8530e-003
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Northeast Grover Beach Phase 2 - San Luis Obispo County, Annual

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tblVehicleEF	LDA	0.02	7.2380e-003
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tblVehicleEF	LDA	0.15	0.05
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tblVehicleEF	LDA	0.08	0.04
tblVehicleEF	LDA	0.16	0.08
tblVehicleEF	LDA	0.06	0.03
tblVehicleEF	LDA	0.03	0.01
tblVehicleEF	LDA	0.04	0.03
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tblVehicleEF	LDA	0.54	0.60
tblVehicleEF	LDA	0.09	0.04
tblVehicleEF	LDA	0.18	0.06
tblVehicleEF	LDA	1.8280e-003	1.4400e-003
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tblVehicleEF	LDA	1.6910e-003	1.3260e-003

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tblVehicleEF	LDA	0.17	0.08
tblVehicleEF	LDA	0.03	0.01
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tblVehicleEF	LDA	0.21	0.06
tblVehicleEF	LDT1	0.02	6.0170e-003
tblVehicleEF	LDT1	0.03	8.4800e-003
tblVehicleEF	LDT1	2.05	0.72
tblVehicleEF	LDT1	4.91	1.87
tblVehicleEF	LDT1	335.56	242.73
tblVehicleEF	LDT1	78.67	59.14
tblVehicleEF	LDT1	0.04	0.03
tblVehicleEF	LDT1	0.23	0.08
tblVehicleEF	LDT1	0.29	0.11
tblVehicleEF	LDT1	2.8940e-003	1.8160e-003
tblVehicleEF	LDT1	3.8670e-003	2.6240e-003
tblVehicleEF	LDT1	2.6820e-003	1.6730e-003

tblVehicleEF	LDT1	3.5700e-003	2.4130e-003
tblVehicleEF	LDT1	0.10	0.05
tblVehicleEF	LDT1	0.29	0.16
tblVehicleEF	LDT1	0.08	0.04
tblVehicleEF	LDT1	0.06	0.02
tblVehicleEF	LDT1	0.18	0.12
tblVehicleEF	LDT1	0.36	0.11
tblVehicleEF	LDT1	3.3840e-003	2.4350e-003
tblVehicleEF	LDT1	8.7400e-004	6.2300e-004
tblVehicleEF	LDT1	0.10	0.05
tblVehicleEF	LDT1	0.29	0.16
tblVehicleEF	LDT1	0.08	0.04
tblVehicleEF	LDT1	0.09	0.02
tblVehicleEF	LDT1	0.18	0.12
tblVehicleEF	LDT1	0.40	0.13
tblVehicleEF	LDT1	0.02	6.3490e-003
tblVehicleEF	LDT1	0.02	7.3420e-003
tblVehicleEF	LDT1	2.15	0.77
tblVehicleEF	LDT1	4.06	1.55
tblVehicleEF	LDT1	348.99	252.68
tblVehicleEF	LDT1	78.67	59.14
tblVehicleEF	LDT1	0.04	0.03
tblVehicleEF	LDT1	0.20	0.07
tblVehicleEF	LDT1	0.26	0.10
tblVehicleEF	LDT1	2.8940e-003	1.8160e-003
tblVehicleEF	LDT1	3.8670e-003	2.6240e-003
tblVehicleEF	LDT1	2.6820e-003	1.6730e-003

tblVehicleEF	LDT1	3.5700e-003	2.4130e-003
tblVehicleEF	LDT1	0.18	0.10
tblVehicleEF	LDT1	0.30	0.16
tblVehicleEF	LDT1	0.13	0.07
tblVehicleEF	LDT1	0.06	0.02
tblVehicleEF	LDT1	0.17	0.10
tblVehicleEF	LDT1	0.31	0.10
tblVehicleEF	LDT1	3.5190e-003	2.5350e-003
tblVehicleEF	LDT1	8.5900e-004	6.1800e-004
tblVehicleEF	LDT1	0.18	0.10
tblVehicleEF	LDT1	0.30	0.16
tblVehicleEF	LDT1	0.13	0.07
tblVehicleEF	LDT1	0.09	0.02
tblVehicleEF	LDT1	0.17	0.10
tblVehicleEF	LDT1	0.34	0.11
tblVehicleEF	LDT1	0.02	5.9280e-003
tblVehicleEF	LDT1	0.03	8.9910e-003
tblVehicleEF	LDT1	2.05	0.71
tblVehicleEF	LDT1	5.32	2.02
tblVehicleEF	LDT1	332.88	240.75
tblVehicleEF	LDT1	78.67	59.14
tblVehicleEF	LDT1	0.04	0.03
tblVehicleEF	LDT1	0.23	0.08
tblVehicleEF	LDT1	0.30	0.11
tblVehicleEF	LDT1	2.8940e-003	1.8160e-003
tblVehicleEF	LDT1	3.8670e-003	2.6240e-003
tblVehicleEF	LDT1	2.6820e-003	1.6730e-003

tblVehicleEF	LDT1	3.5700e-003	2.4130e-003
tblVehicleEF	LDT1	0.08	0.04
tblVehicleEF	LDT1	0.33	0.17
tblVehicleEF	LDT1	0.06	0.03
tblVehicleEF	LDT1	0.06	0.01
tblVehicleEF	LDT1	0.22	0.14
tblVehicleEF	LDT1	0.39	0.12
tblVehicleEF	LDT1	3.3570e-003	2.4150e-003
tblVehicleEF	LDT1	8.8100e-004	6.2600e-004
tblVehicleEF	LDT1	0.08	0.04
tblVehicleEF	LDT1	0.33	0.17
tblVehicleEF	LDT1	0.06	0.03
tblVehicleEF	LDT1	0.09	0.02
tblVehicleEF	LDT1	0.22	0.14
tblVehicleEF	LDT1	0.42	0.13
tblVehicleEF	LDT2	0.01	5.7030e-003
tblVehicleEF	LDT2	0.02	8.0630e-003
tblVehicleEF	LDT2	1.50	0.71
tblVehicleEF	LDT2	4.23	1.74
tblVehicleEF	LDT2	390.62	294.75
tblVehicleEF	LDT2	91.49	71.46
tblVehicleEF	LDT2	0.20	0.20
tblVehicleEF	LDT2	0.23	0.09
tblVehicleEF	LDT2	0.42	0.15
tblVehicleEF	LDT2	1.9170e-003	1.5960e-003
tblVehicleEF	LDT2	2.8550e-003	2.4020e-003
tblVehicleEF	LDT2	1.7640e-003	1.4680e-003

tblVehicleEF	LDT2	2.6280e-003	2.2080e-003
tblVehicleEF	LDT2	0.08	0.05
tblVehicleEF	LDT2	0.23	0.14
tblVehicleEF	LDT2	0.06	0.04
tblVehicleEF	LDT2	0.04	0.01
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.32	0.11
tblVehicleEF	LDT2	3.9240e-003	2.9530e-003
tblVehicleEF	LDT2	9.9000e-004	7.4400e-004
tblVehicleEF	LDT2	0.08	0.05
tblVehicleEF	LDT2	0.23	0.14
tblVehicleEF	LDT2	0.06	0.04
tblVehicleEF	LDT2	0.06	0.02
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.35	0.12
tblVehicleEF	LDT2	0.02	6.0400e-003
tblVehicleEF	LDT2	0.02	7.0150e-003
tblVehicleEF	LDT2	1.60	0.76
tblVehicleEF	LDT2	3.52	1.45
tblVehicleEF	LDT2	406.52	306.77
tblVehicleEF	LDT2	91.49	71.46
tblVehicleEF	LDT2	0.20	0.20
tblVehicleEF	LDT2	0.21	0.08
tblVehicleEF	LDT2	0.38	0.13
tblVehicleEF	LDT2	1.9170e-003	1.5960e-003
tblVehicleEF	LDT2	2.8550e-003	2.4020e-003
tblVehicleEF	LDT2	1.7640e-003	1.4680e-003

tblVehicleEF	LDT2	2.6280e-003	2.2080e-003
tblVehicleEF	LDT2	0.13	0.08
tblVehicleEF	LDT2	0.24	0.14
tblVehicleEF	LDT2	0.10	0.07
tblVehicleEF	LDT2	0.04	0.01
tblVehicleEF	LDT2	0.13	0.09
tblVehicleEF	LDT2	0.28	0.09
tblVehicleEF	LDT2	4.0840e-003	3.0740e-003
tblVehicleEF	LDT2	9.7800e-004	7.3900e-004
tblVehicleEF	LDT2	0.13	0.08
tblVehicleEF	LDT2	0.24	0.14
tblVehicleEF	LDT2	0.10	0.07
tblVehicleEF	LDT2	0.06	0.02
tblVehicleEF	LDT2	0.13	0.09
tblVehicleEF	LDT2	0.30	0.10
tblVehicleEF	LDT2	0.01	5.6110e-003
tblVehicleEF	LDT2	0.03	8.5320e-003
tblVehicleEF	LDT2	1.48	0.70
tblVehicleEF	LDT2	4.58	1.87
tblVehicleEF	LDT2	387.45	292.35
tblVehicleEF	LDT2	91.49	71.46
tblVehicleEF	LDT2	0.20	0.20
tblVehicleEF	LDT2	0.23	0.09
tblVehicleEF	LDT2	0.44	0.15
tblVehicleEF	LDT2	1.9170e-003	1.5960e-003
tblVehicleEF	LDT2	2.8550e-003	2.4020e-003
tblVehicleEF	LDT2	1.7640e-003	1.4680e-003

tblVehicleEF	LDT2	2.6280e-003	2.2080e-003
tblVehicleEF	LDT2	0.06	0.04
tblVehicleEF	LDT2	0.25	0.15
tblVehicleEF	LDT2	0.04	0.03
tblVehicleEF	LDT2	0.04	0.01
tblVehicleEF	LDT2	0.17	0.12
tblVehicleEF	LDT2	0.34	0.12
tblVehicleEF	LDT2	3.8920e-003	2.9290e-003
tblVehicleEF	LDT2	9.9600e-004	7.4600e-004
tblVehicleEF	LDT2	0.06	0.04
tblVehicleEF	LDT2	0.25	0.15
tblVehicleEF	LDT2	0.04	0.03
tblVehicleEF	LDT2	0.06	0.02
tblVehicleEF	LDT2	0.17	0.12
tblVehicleEF	LDT2	0.37	0.13
tblVehicleEF	LHD1	5.0480e-003	4.2750e-003
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.13
tblVehicleEF	LHD1	1.79	1.15
tblVehicleEF	LHD1	3.06	2.12
tblVehicleEF	LHD1	9.57	9.42
tblVehicleEF	LHD1	700.66	673.35
tblVehicleEF	LHD1	27.24	26.17
tblVehicleEF	LHD1	0.04	0.02
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	3.11	2.03

tblVehicleEF	LHD1	0.95	0.84
tblVehicleEF	LHD1	1.1550e-003	1.0710e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	1.1480e-003	8.0800e-004
tblVehicleEF	LHD1	1.1050e-003	1.0250e-003
tblVehicleEF	LHD1	2.5780e-003	2.5950e-003
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	1.0570e-003	7.4300e-004
tblVehicleEF	LHD1	2.3790e-003	2.2650e-003
tblVehicleEF	LHD1	0.10	0.11
tblVehicleEF	LHD1	0.02	0.01
tblVehicleEF	LHD1	1.2200e-003	1.3140e-003
tblVehicleEF	LHD1	0.20	0.15
tblVehicleEF	LHD1	0.35	0.44
tblVehicleEF	LHD1	0.31	0.22
tblVehicleEF	LHD1	9.5000e-005	9.3000e-005
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tblVehicleEF	LHD1	3.3000e-004	3.0200e-004
tblVehicleEF	LHD1	2.3790e-003	2.2650e-003
tblVehicleEF	LHD1	0.10	0.11
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.2200e-003	1.3140e-003
tblVehicleEF	LHD1	0.24	0.18
tblVehicleEF	LHD1	0.35	0.44
tblVehicleEF	LHD1	0.33	0.24
tblVehicleEF	LHD1	5.0480e-003	4.2750e-003

tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.13
tblVehicleEF	LHD1	1.82	1.16
tblVehicleEF	LHD1	2.86	1.99
tblVehicleEF	LHD1	9.57	9.42
tblVehicleEF	LHD1	700.66	673.35
tblVehicleEF	LHD1	27.24	26.17
tblVehicleEF	LHD1	0.04	0.02
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	3.00	1.96
tblVehicleEF	LHD1	0.89	0.79
tblVehicleEF	LHD1	1.1550e-003	1.0710e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	1.1480e-003	8.0800e-004
tblVehicleEF	LHD1	1.1050e-003	1.0250e-003
tblVehicleEF	LHD1	2.5780e-003	2.5950e-003
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	1.0570e-003	7.4300e-004
tblVehicleEF	LHD1	4.2260e-003	3.9100e-003
tblVehicleEF	LHD1	0.10	0.11
tblVehicleEF	LHD1	0.02	0.01
tblVehicleEF	LHD1	2.0740e-003	2.1560e-003
tblVehicleEF	LHD1	0.20	0.15
tblVehicleEF	LHD1	0.33	0.42
tblVehicleEF	LHD1	0.29	0.21

tblVehicleEF	LHD1	9.5000e-005	9.3000e-005
tblVehicleEF	LHD1	6.8660e-003	6.5850e-003
tblVehicleEF	LHD1	3.2600e-004	2.9900e-004
tblVehicleEF	LHD1	4.2260e-003	3.9100e-003
tblVehicleEF	LHD1	0.10	0.11
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.0740e-003	2.1560e-003
tblVehicleEF	LHD1	0.25	0.18
tblVehicleEF	LHD1	0.33	0.42
tblVehicleEF	LHD1	0.32	0.22
tblVehicleEF	LHD1	5.0480e-003	4.2750e-003
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.13
tblVehicleEF	LHD1	1.78	1.14
tblVehicleEF	LHD1	3.16	2.19
tblVehicleEF	LHD1	9.57	9.42
tblVehicleEF	LHD1	700.66	673.35
tblVehicleEF	LHD1	27.24	26.17
tblVehicleEF	LHD1	0.04	0.02
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	3.08	2.01
tblVehicleEF	LHD1	0.98	0.87
tblVehicleEF	LHD1	1.1550e-003	1.0710e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	1.1480e-003	8.0800e-004

tblVehicleEF	LHD1	1.1050e-003	1.0250e-003
tblVehicleEF	LHD1	2.5780e-003	2.5950e-003
tblVehicleEF	LHD1	0.03	0.02
tblVehicleEF	LHD1	1.0570e-003	7.4300e-004
tblVehicleEF	LHD1	1.7420e-003	1.6790e-003
tblVehicleEF	LHD1	0.12	0.12
tblVehicleEF	LHD1	0.02	0.01
tblVehicleEF	LHD1	9.5800e-004	1.0380e-003
tblVehicleEF	LHD1	0.20	0.15
tblVehicleEF	LHD1	0.38	0.48
tblVehicleEF	LHD1	0.31	0.22
tblVehicleEF	LHD1	9.5000e-005	9.3000e-005
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tblVehicleEF	LHD1	3.3200e-004	3.0300e-004
tblVehicleEF	LHD1	1.7420e-003	1.6790e-003
tblVehicleEF	LHD1	0.12	0.12
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	9.5800e-004	1.0380e-003
tblVehicleEF	LHD1	0.24	0.18
tblVehicleEF	LHD1	0.38	0.48
tblVehicleEF	LHD1	0.34	0.24
tblVehicleEF	LHD2	3.1970e-003	2.5220e-003
tblVehicleEF	LHD2	0.01	7.1410e-003
tblVehicleEF	LHD2	9.9930e-003	4.6490e-003
tblVehicleEF	LHD2	0.11	0.11
tblVehicleEF	LHD2	1.02	0.63
tblVehicleEF	LHD2	1.29	0.84

tblVehicleEF	LHD2	15.42	14.69
tblVehicleEF	LHD2	729.14	689.33
tblVehicleEF	LHD2	18.83	18.92
tblVehicleEF	LHD2	8.4270e-003	4.9490e-003
tblVehicleEF	LHD2	0.15	0.11
tblVehicleEF	LHD2	2.72	1.00
tblVehicleEF	LHD2	0.49	0.32
tblVehicleEF	LHD2	1.5540e-003	1.3300e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.03	0.02
tblVehicleEF	LHD2	4.6300e-004	3.2100e-004
tblVehicleEF	LHD2	1.4860e-003	1.2720e-003
tblVehicleEF	LHD2	2.7560e-003	2.7400e-003
tblVehicleEF	LHD2	0.03	0.02
tblVehicleEF	LHD2	4.2600e-004	2.9500e-004
tblVehicleEF	LHD2	8.8400e-004	5.6700e-004
tblVehicleEF	LHD2	0.04	0.02
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.8300e-004	3.6900e-004
tblVehicleEF	LHD2	0.17	0.12
tblVehicleEF	LHD2	0.11	0.06
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.5000e-004	1.4300e-004
tblVehicleEF	LHD2	7.0670e-003	6.6850e-003
tblVehicleEF	LHD2	2.1300e-004	2.0400e-004
tblVehicleEF	LHD2	8.8400e-004	5.6700e-004
tblVehicleEF	LHD2	0.04	0.02

tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	4.8300e-004	3.6900e-004
tblVehicleEF	LHD2	0.20	0.13
tblVehicleEF	LHD2	0.11	0.06
tblVehicleEF	LHD2	0.15	0.07
tblVehicleEF	LHD2	3.1970e-003	2.5220e-003
tblVehicleEF	LHD2	0.01	7.1940e-003
tblVehicleEF	LHD2	9.5060e-003	4.4580e-003
tblVehicleEF	LHD2	0.11	0.11
tblVehicleEF	LHD2	1.03	0.64
tblVehicleEF	LHD2	1.21	0.79
tblVehicleEF	LHD2	15.42	14.69
tblVehicleEF	LHD2	729.14	689.33
tblVehicleEF	LHD2	18.83	18.92
tblVehicleEF	LHD2	8.4270e-003	4.9490e-003
tblVehicleEF	LHD2	0.15	0.11
tblVehicleEF	LHD2	2.63	0.97
tblVehicleEF	LHD2	0.46	0.31
tblVehicleEF	LHD2	1.5540e-003	1.3300e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.03	0.02
tblVehicleEF	LHD2	4.6300e-004	3.2100e-004
tblVehicleEF	LHD2	1.4860e-003	1.2720e-003
tblVehicleEF	LHD2	2.7560e-003	2.7400e-003
tblVehicleEF	LHD2	0.03	0.02
tblVehicleEF	LHD2	4.2600e-004	2.9500e-004
tblVehicleEF	LHD2	1.5580e-003	9.7300e-004

tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	8.1600e-004	6.0600e-004
tblVehicleEF	LHD2	0.17	0.12
tblVehicleEF	LHD2	0.10	0.06
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.5000e-004	1.4300e-004
tblVehicleEF	LHD2	7.0670e-003	6.6850e-003
tblVehicleEF	LHD2	2.1100e-004	2.0300e-004
tblVehicleEF	LHD2	1.5580e-003	9.7300e-004
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	8.1600e-004	6.0600e-004
tblVehicleEF	LHD2	0.20	0.14
tblVehicleEF	LHD2	0.10	0.06
tblVehicleEF	LHD2	0.14	0.07
tblVehicleEF	LHD2	3.1970e-003	2.5220e-003
tblVehicleEF	LHD2	0.01	7.1120e-003
tblVehicleEF	LHD2	0.01	4.7530e-003
tblVehicleEF	LHD2	0.11	0.11
tblVehicleEF	LHD2	1.02	0.63
tblVehicleEF	LHD2	1.33	0.87
tblVehicleEF	LHD2	15.42	14.69
tblVehicleEF	LHD2	729.14	689.33
tblVehicleEF	LHD2	18.83	18.92
tblVehicleEF	LHD2	8.4270e-003	4.9490e-003
tblVehicleEF	LHD2	0.15	0.11

tblVehicleEF	LHD2	2.70	0.99
tblVehicleEF	LHD2	0.50	0.33
tblVehicleEF	LHD2	1.5540e-003	1.3300e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.03	0.02
tblVehicleEF	LHD2	4.6300e-004	3.2100e-004
tblVehicleEF	LHD2	1.4860e-003	1.2720e-003
tblVehicleEF	LHD2	2.7560e-003	2.7400e-003
tblVehicleEF	LHD2	0.03	0.02
tblVehicleEF	LHD2	4.2600e-004	2.9500e-004
tblVehicleEF	LHD2	6.5100e-004	4.1900e-004
tblVehicleEF	LHD2	0.05	0.03
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	3.8000e-004	2.9200e-004
tblVehicleEF	LHD2	0.17	0.12
tblVehicleEF	LHD2	0.12	0.07
tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	LHD2	1.5000e-004	1.4300e-004
tblVehicleEF	LHD2	7.0670e-003	6.6850e-003
tblVehicleEF	LHD2	2.1300e-004	2.0500e-004
tblVehicleEF	LHD2	6.5100e-004	4.1900e-004
tblVehicleEF	LHD2	0.05	0.03
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	3.8000e-004	2.9200e-004
tblVehicleEF	LHD2	0.20	0.13
tblVehicleEF	LHD2	0.12	0.07
tblVehicleEF	LHD2	0.15	0.07

tblVehicleEF	MCY	0.39	0.43
tblVehicleEF	MCY	0.18	0.17
tblVehicleEF	MCY	23.95	19.52
tblVehicleEF	MCY	10.07	10.28
tblVehicleEF	MCY	160.04	165.82
tblVehicleEF	MCY	50.28	47.00
tblVehicleEF	MCY	5.8600e-003	4.4590e-003
tblVehicleEF	MCY	1.23	1.18
tblVehicleEF	MCY	0.32	0.32
tblVehicleEF	MCY	2.0270e-003	2.0200e-003
tblVehicleEF	MCY	5.9880e-003	3.7440e-003
tblVehicleEF	MCY	1.9140e-003	1.8900e-003
tblVehicleEF	MCY	5.6910e-003	3.5290e-003
tblVehicleEF	MCY	0.95	0.95
tblVehicleEF	MCY	1.03	0.88
tblVehicleEF	MCY	0.53	0.51
tblVehicleEF	MCY	2.47	2.19
tblVehicleEF	MCY	1.23	0.92
tblVehicleEF	MCY	2.47	2.30
tblVehicleEF	MCY	2.0600e-003	2.0410e-003
tblVehicleEF	MCY	7.4100e-004	7.0600e-004
tblVehicleEF	MCY	0.95	0.95
tblVehicleEF	MCY	1.03	0.88
tblVehicleEF	MCY	0.53	0.51
tblVehicleEF	MCY	2.94	2.70
tblVehicleEF	MCY	1.23	0.92
tblVehicleEF	MCY	2.68	2.50

tblVehicleEF	MCY	0.37	0.41
tblVehicleEF	MCY	0.15	0.14
tblVehicleEF	MCY	22.30	18.37
tblVehicleEF	MCY	9.05	9.13
tblVehicleEF	MCY	160.04	165.82
tblVehicleEF	MCY	50.28	47.00
tblVehicleEF	MCY	5.8600e-003	4.4590e-003
tblVehicleEF	MCY	1.11	1.07
tblVehicleEF	MCY	0.30	0.30
tblVehicleEF	MCY	2.0270e-003	2.0200e-003
tblVehicleEF	MCY	5.9880e-003	3.7440e-003
tblVehicleEF	MCY	1.9140e-003	1.8900e-003
tblVehicleEF	MCY	5.6910e-003	3.5290e-003
tblVehicleEF	MCY	1.83	1.79
tblVehicleEF	MCY	1.09	0.97
tblVehicleEF	MCY	1.05	0.98
tblVehicleEF	MCY	2.34	2.11
tblVehicleEF	MCY	1.14	0.85
tblVehicleEF	MCY	2.09	1.97
tblVehicleEF	MCY	2.0290e-003	2.0200e-003
tblVehicleEF	MCY	7.1300e-004	6.7700e-004
tblVehicleEF	MCY	1.83	1.79
tblVehicleEF	MCY	1.09	0.97
tblVehicleEF	MCY	1.05	0.98
tblVehicleEF	MCY	2.79	2.60
tblVehicleEF	MCY	1.14	0.85
tblVehicleEF	MCY	2.27	2.15

tblVehicleEF	MCY	0.40	0.44
tblVehicleEF	MCY	0.19	0.18
tblVehicleEF	MCY	25.08	20.31
tblVehicleEF	MCY	10.63	10.88
tblVehicleEF	MCY	160.04	165.82
tblVehicleEF	MCY	50.28	47.00
tblVehicleEF	MCY	5.8600e-003	4.4590e-003
tblVehicleEF	MCY	1.24	1.19
tblVehicleEF	MCY	0.34	0.33
tblVehicleEF	MCY	2.0270e-003	2.0200e-003
tblVehicleEF	MCY	5.9880e-003	3.7440e-003
tblVehicleEF	MCY	1.9140e-003	1.8900e-003
tblVehicleEF	MCY	5.6910e-003	3.5290e-003
tblVehicleEF	MCY	0.71	0.71
tblVehicleEF	MCY	1.32	1.11
tblVehicleEF	MCY	0.38	0.36
tblVehicleEF	MCY	2.55	2.24
tblVehicleEF	MCY	1.40	1.06
tblVehicleEF	MCY	2.66	2.47
tblVehicleEF	MCY	2.0800e-003	2.0550e-003
tblVehicleEF	MCY	7.5600e-004	7.2100e-004
tblVehicleEF	MCY	0.71	0.71
tblVehicleEF	MCY	1.32	1.11
tblVehicleEF	MCY	0.38	0.36
tblVehicleEF	MCY	3.03	2.76
tblVehicleEF	MCY	1.40	1.06
tblVehicleEF	MCY	2.89	2.69

tblVehicleEF	MDV	0.02	9.0130e-003
tblVehicleEF	MDV	0.03	0.02
tblVehicleEF	MDV	2.10	0.94
tblVehicleEF	MDV	5.67	2.79
tblVehicleEF	MDV	513.88	398.67
tblVehicleEF	MDV	118.36	95.84
tblVehicleEF	MDV	0.14	0.11
tblVehicleEF	MDV	0.33	0.14
tblVehicleEF	MDV	0.60	0.28
tblVehicleEF	MDV	1.9340e-003	1.6300e-003
tblVehicleEF	MDV	2.9750e-003	2.4270e-003
tblVehicleEF	MDV	1.7880e-003	1.5020e-003
tblVehicleEF	MDV	2.7430e-003	2.2320e-003
tblVehicleEF	MDV	0.07	0.07
tblVehicleEF	MDV	0.23	0.20
tblVehicleEF	MDV	0.06	0.06
tblVehicleEF	MDV	0.06	0.02
tblVehicleEF	MDV	0.14	0.13
tblVehicleEF	MDV	0.47	0.21
tblVehicleEF	MDV	5.1620e-003	3.9910e-003
tblVehicleEF	MDV	1.2860e-003	1.0070e-003
tblVehicleEF	MDV	0.07	0.07
tblVehicleEF	MDV	0.23	0.20
tblVehicleEF	MDV	0.06	0.06
tblVehicleEF	MDV	0.09	0.03
tblVehicleEF	MDV	0.14	0.13
tblVehicleEF	MDV	0.52	0.23

tblVehicleEF	MDV	0.02	9.5390e-003
tblVehicleEF	MDV	0.03	0.01
tblVehicleEF	MDV	2.21	1.02
tblVehicleEF	MDV	4.74	2.33
tblVehicleEF	MDV	534.42	414.55
tblVehicleEF	MDV	118.36	95.84
tblVehicleEF	MDV	0.14	0.11
tblVehicleEF	MDV	0.29	0.13
tblVehicleEF	MDV	0.55	0.25
tblVehicleEF	MDV	1.9340e-003	1.6300e-003
tblVehicleEF	MDV	2.9750e-003	2.4270e-003
tblVehicleEF	MDV	1.7880e-003	1.5020e-003
tblVehicleEF	MDV	2.7430e-003	2.2320e-003
tblVehicleEF	MDV	0.13	0.12
tblVehicleEF	MDV	0.24	0.20
tblVehicleEF	MDV	0.11	0.11
tblVehicleEF	MDV	0.06	0.02
tblVehicleEF	MDV	0.13	0.12
tblVehicleEF	MDV	0.41	0.18
tblVehicleEF	MDV	5.3690e-003	4.1510e-003
tblVehicleEF	MDV	1.2690e-003	9.9900e-004
tblVehicleEF	MDV	0.13	0.12
tblVehicleEF	MDV	0.24	0.20
tblVehicleEF	MDV	0.11	0.11
tblVehicleEF	MDV	0.09	0.03
tblVehicleEF	MDV	0.13	0.12
tblVehicleEF	MDV	0.45	0.20

tblVehicleEF	MDV	0.02	8.8730e-003
tblVehicleEF	MDV	0.04	0.02
tblVehicleEF	MDV	2.09	0.93
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tblVehicleEF	MDV	0.14	0.11
tblVehicleEF	MDV	0.33	0.14
tblVehicleEF	MDV	0.63	0.29
tblVehicleEF	MDV	1.9340e-003	1.6300e-003
tblVehicleEF	MDV	2.9750e-003	2.4270e-003
tblVehicleEF	MDV	1.7880e-003	1.5020e-003
tblVehicleEF	MDV	2.7430e-003	2.2320e-003
tblVehicleEF	MDV	0.06	0.05
tblVehicleEF	MDV	0.25	0.21
tblVehicleEF	MDV	0.05	0.05
tblVehicleEF	MDV	0.06	0.02
tblVehicleEF	MDV	0.17	0.16
tblVehicleEF	MDV	0.50	0.22
tblVehicleEF	MDV	5.1210e-003	3.9600e-003
tblVehicleEF	MDV	1.2940e-003	1.0110e-003
tblVehicleEF	MDV	0.06	0.05
tblVehicleEF	MDV	0.25	0.21
tblVehicleEF	MDV	0.05	0.05
tblVehicleEF	MDV	0.09	0.03
tblVehicleEF	MDV	0.17	0.16
tblVehicleEF	MDV	0.55	0.24

tblVehicleEF	MH	0.07	0.03
tblVehicleEF	MH	0.04	0.02
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tblVehicleEF	MH	9.22	5.48
tblVehicleEF	MH	1,249.92	1,219.96
tblVehicleEF	MH	64.46	56.71
tblVehicleEF	MH	2.0180e-003	9.3900e-004
tblVehicleEF	MH	2.39	1.69
tblVehicleEF	MH	1.09	0.84
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.05	0.04
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tblVehicleEF	MH	3.2380e-003	3.2490e-003
tblVehicleEF	MH	0.05	0.04
tblVehicleEF	MH	2.0300e-003	9.0300e-004
tblVehicleEF	MH	1.22	0.85
tblVehicleEF	MH	0.11	0.08
tblVehicleEF	MH	0.46	0.36
tblVehicleEF	MH	0.25	0.10
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	0.58	0.32
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	8.0700e-004	6.6300e-004
tblVehicleEF	MH	1.22	0.85
tblVehicleEF	MH	0.11	0.08
tblVehicleEF	MH	0.46	0.36
tblVehicleEF	MH	0.33	0.14

tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	0.64	0.35
tblVehicleEF	MH	0.07	0.03
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	6.17	2.11
tblVehicleEF	MH	8.53	5.07
tblVehicleEF	MH	1,249.92	1,219.96
tblVehicleEF	MH	64.46	56.71
tblVehicleEF	MH	2.0180e-003	9.3900e-004
tblVehicleEF	MH	2.26	1.61
tblVehicleEF	MH	1.02	0.79
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.05	0.04
tblVehicleEF	MH	2.1790e-003	9.8200e-004
tblVehicleEF	MH	3.2380e-003	3.2490e-003
tblVehicleEF	MH	0.05	0.04
tblVehicleEF	MH	2.0300e-003	9.0300e-004
tblVehicleEF	MH	2.15	1.47
tblVehicleEF	MH	0.10	0.08
tblVehicleEF	MH	0.77	0.57
tblVehicleEF	MH	0.25	0.11
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	0.55	0.30
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.9500e-004	6.5600e-004
tblVehicleEF	MH	2.15	1.47
tblVehicleEF	MH	0.10	0.08

tblVehicleEF	MH	0.77	0.57
tblVehicleEF	MH	0.34	0.15
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	0.60	0.33
tblVehicleEF	MH	0.07	0.03
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	6.15	2.01
tblVehicleEF	MH	9.55	5.66
tblVehicleEF	MH	1,249.92	1,219.96
tblVehicleEF	MH	64.46	56.71
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tblVehicleEF	MH	1.13	0.87
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.05	0.04
tblVehicleEF	MH	2.1790e-003	9.8200e-004
tblVehicleEF	MH	3.2380e-003	3.2490e-003
tblVehicleEF	MH	0.05	0.04
tblVehicleEF	MH	2.0300e-003	9.0300e-004
tblVehicleEF	MH	0.91	0.65
tblVehicleEF	MH	0.14	0.10
tblVehicleEF	MH	0.38	0.29
tblVehicleEF	MH	0.25	0.10
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	0.60	0.33
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	8.1300e-004	6.6600e-004

tblVehicleEF	MH	0.91	0.65
tblVehicleEF	MH	0.14	0.10
tblVehicleEF	MH	0.38	0.29
tblVehicleEF	MH	0.33	0.14
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	0.66	0.36
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	0.02	3.6860e-003
tblVehicleEF	MHD	0.10	0.04
tblVehicleEF	MHD	0.60	0.35
tblVehicleEF	MHD	1.36	0.31
tblVehicleEF	MHD	11.96	4.82
tblVehicleEF	MHD	142.58	147.08
tblVehicleEF	MHD	1,226.01	1,183.25
tblVehicleEF	MHD	65.44	54.37
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.39	0.48
tblVehicleEF	MHD	4.34	1.37
tblVehicleEF	MHD	10.90	11.30
tblVehicleEF	MHD	8.2220e-003	1.9500e-004
tblVehicleEF	MHD	0.12	4.7870e-003
tblVehicleEF	MHD	1.7990e-003	7.8400e-004
tblVehicleEF	MHD	7.8670e-003	1.8600e-004
tblVehicleEF	MHD	0.12	4.5750e-003
tblVehicleEF	MHD	1.6660e-003	7.2100e-004
tblVehicleEF	MHD	1.8210e-003	7.3500e-004
tblVehicleEF	MHD	0.08	0.04

tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	9.4500e-004	4.5700e-004
tblVehicleEF	MHD	0.30	0.05
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.73	0.29
tblVehicleEF	MHD	1.3730e-003	1.4150e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	8.6500e-004	6.2800e-004
tblVehicleEF	MHD	1.8210e-003	7.3500e-004
tblVehicleEF	MHD	0.08	0.04
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	9.4500e-004	4.5700e-004
tblVehicleEF	MHD	0.35	0.06
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.79	0.32
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.02	3.7320e-003
tblVehicleEF	MHD	0.09	0.04
tblVehicleEF	MHD	0.41	0.23
tblVehicleEF	MHD	1.37	0.32
tblVehicleEF	MHD	11.15	4.49
tblVehicleEF	MHD	151.37	156.09
tblVehicleEF	MHD	1,226.01	1,183.25
tblVehicleEF	MHD	65.44	54.37
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.43	0.50
tblVehicleEF	MHD	4.18	1.32

tblVehicleEF	MHD	10.81	11.26
tblVehicleEF	MHD	6.9320e-003	1.6400e-004
tblVehicleEF	MHD	0.12	4.7870e-003
tblVehicleEF	MHD	1.7990e-003	7.8400e-004
tblVehicleEF	MHD	6.6320e-003	1.5700e-004
tblVehicleEF	MHD	0.12	4.5750e-003
tblVehicleEF	MHD	1.6660e-003	7.2100e-004
tblVehicleEF	MHD	3.3460e-003	1.2860e-003
tblVehicleEF	MHD	0.09	0.04
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	1.6820e-003	7.6700e-004
tblVehicleEF	MHD	0.30	0.05
tblVehicleEF	MHD	0.04	0.02
tblVehicleEF	MHD	0.69	0.28
tblVehicleEF	MHD	1.4560e-003	1.4990e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	8.5100e-004	6.2200e-004
tblVehicleEF	MHD	3.3460e-003	1.2860e-003
tblVehicleEF	MHD	0.09	0.04
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	1.6820e-003	7.6700e-004
tblVehicleEF	MHD	0.35	0.06
tblVehicleEF	MHD	0.04	0.02
tblVehicleEF	MHD	0.75	0.30
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	0.02	3.6600e-003
tblVehicleEF	MHD	0.10	0.04

tblVehicleEF	MHD	0.77	0.44
tblVehicleEF	MHD	1.35	0.31
tblVehicleEF	MHD	12.41	4.99
tblVehicleEF	MHD	131.22	135.30
tblVehicleEF	MHD	1,226.01	1,183.25
tblVehicleEF	MHD	65.44	54.37
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.32	0.46
tblVehicleEF	MHD	4.30	1.35
tblVehicleEF	MHD	10.95	11.33
tblVehicleEF	MHD	0.01	2.3700e-004
tblVehicleEF	MHD	0.12	4.7870e-003
tblVehicleEF	MHD	1.7990e-003	7.8400e-004
tblVehicleEF	MHD	9.5720e-003	2.2700e-004
tblVehicleEF	MHD	0.12	4.5750e-003
tblVehicleEF	MHD	1.6660e-003	7.2100e-004
tblVehicleEF	MHD	1.3020e-003	5.4000e-004
tblVehicleEF	MHD	0.10	0.04
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	7.3400e-004	3.6000e-004
tblVehicleEF	MHD	0.30	0.05
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.75	0.30
tblVehicleEF	MHD	1.2660e-003	1.3030e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	8.7300e-004	6.3100e-004
tblVehicleEF	MHD	1.3020e-003	5.4000e-004

tblVehicleEF	MHD	0.10	0.04
tblVehicleEF	MHD	0.07	0.03
tblVehicleEF	MHD	7.3400e-004	3.6000e-004
tblVehicleEF	MHD	0.35	0.06
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.82	0.33
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.02	6.4040e-003
tblVehicleEF	OBUS	0.05	0.03
tblVehicleEF	OBUS	0.28	0.24
tblVehicleEF	OBUS	1.36	0.48
tblVehicleEF	OBUS	8.89	5.54
tblVehicleEF	OBUS	95.08	123.54
tblVehicleEF	OBUS	1,343.57	1,295.11
tblVehicleEF	OBUS	70.88	64.42
tblVehicleEF	OBUS	2.4270e-003	2.2700e-003
tblVehicleEF	OBUS	0.62	0.28
tblVehicleEF	OBUS	2.82	1.15
tblVehicleEF	OBUS	3.21	3.52
tblVehicleEF	OBUS	3.6900e-004	2.5000e-005
tblVehicleEF	OBUS	0.01	3.1890e-003
tblVehicleEF	OBUS	9.1600e-004	8.2000e-004
tblVehicleEF	OBUS	3.5300e-004	2.4000e-005
tblVehicleEF	OBUS	0.01	3.0350e-003
tblVehicleEF	OBUS	8.4900e-004	7.5400e-004
tblVehicleEF	OBUS	1.5570e-003	1.4440e-003
tblVehicleEF	OBUS	0.02	0.02

tblVehicleEF	OBUS	0.04	0.03
tblVehicleEF	OBUS	7.5500e-004	7.6300e-004
tblVehicleEF	OBUS	0.12	0.05
tblVehicleEF	OBUS	0.05	0.05
tblVehicleEF	OBUS	0.56	0.34
tblVehicleEF	OBUS	9.1900e-004	1.1900e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.6600e-004	7.4100e-004
tblVehicleEF	OBUS	1.5570e-003	1.4440e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.04
tblVehicleEF	OBUS	7.5500e-004	7.6300e-004
tblVehicleEF	OBUS	0.15	0.06
tblVehicleEF	OBUS	0.05	0.05
tblVehicleEF	OBUS	0.61	0.38
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.02	6.5340e-003
tblVehicleEF	OBUS	0.04	0.03
tblVehicleEF	OBUS	0.26	0.23
tblVehicleEF	OBUS	1.39	0.49
tblVehicleEF	OBUS	8.26	5.14
tblVehicleEF	OBUS	99.72	129.94
tblVehicleEF	OBUS	1,343.57	1,295.11
tblVehicleEF	OBUS	70.88	64.42
tblVehicleEF	OBUS	2.4270e-003	2.2700e-003
tblVehicleEF	OBUS	0.64	0.28
tblVehicleEF	OBUS	2.71	1.11

tblVehicleEF	OBUS	3.12	3.47
tblVehicleEF	OBUS	3.1100e-004	2.1000e-005
tblVehicleEF	OBUS	0.01	3.1890e-003
tblVehicleEF	OBUS	9.1600e-004	8.2000e-004
tblVehicleEF	OBUS	2.9800e-004	2.0000e-005
tblVehicleEF	OBUS	0.01	3.0350e-003
tblVehicleEF	OBUS	8.4900e-004	7.5400e-004
tblVehicleEF	OBUS	2.7250e-003	2.4690e-003
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.04	0.03
tblVehicleEF	OBUS	1.2570e-003	1.2250e-003
tblVehicleEF	OBUS	0.12	0.05
tblVehicleEF	OBUS	0.05	0.05
tblVehicleEF	OBUS	0.53	0.33
tblVehicleEF	OBUS	9.6400e-004	1.2510e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.5500e-004	7.3400e-004
tblVehicleEF	OBUS	2.7250e-003	2.4690e-003
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.05	0.04
tblVehicleEF	OBUS	1.2570e-003	1.2250e-003
tblVehicleEF	OBUS	0.15	0.06
tblVehicleEF	OBUS	0.05	0.05
tblVehicleEF	OBUS	0.58	0.36
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.02	6.3350e-003
tblVehicleEF	OBUS	0.05	0.03

tblVehicleEF	OBUS	0.30	0.25
tblVehicleEF	OBUS	1.35	0.47
tblVehicleEF	OBUS	9.18	5.72
tblVehicleEF	OBUS	88.68	114.70
tblVehicleEF	OBUS	1,343.57	1,295.11
tblVehicleEF	OBUS	70.88	64.42
tblVehicleEF	OBUS	2.4270e-003	2.2700e-003
tblVehicleEF	OBUS	0.59	0.26
tblVehicleEF	OBUS	2.80	1.14
tblVehicleEF	OBUS	3.25	3.56
tblVehicleEF	OBUS	4.4900e-004	3.0000e-005
tblVehicleEF	OBUS	0.01	3.1890e-003
tblVehicleEF	OBUS	9.1600e-004	8.2000e-004
tblVehicleEF	OBUS	4.3000e-004	2.9000e-005
tblVehicleEF	OBUS	0.01	3.0350e-003
tblVehicleEF	OBUS	8.4900e-004	7.5400e-004
tblVehicleEF	OBUS	1.1750e-003	1.0850e-003
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.04	0.03
tblVehicleEF	OBUS	6.0300e-004	6.1300e-004
tblVehicleEF	OBUS	0.12	0.05
tblVehicleEF	OBUS	0.06	0.05
tblVehicleEF	OBUS	0.57	0.35
tblVehicleEF	OBUS	8.5800e-004	1.1060e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.7100e-004	7.4400e-004
tblVehicleEF	OBUS	1.1750e-003	1.0850e-003

tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.05	0.04
tblVehicleEF	OBUS	6.0300e-004	6.1300e-004
tblVehicleEF	OBUS	0.15	0.06
tblVehicleEF	OBUS	0.06	0.05
tblVehicleEF	OBUS	0.63	0.39
tblVehicleEF	SBUS	0.83	0.81
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.19	0.10
tblVehicleEF	SBUS	7.35	6.64
tblVehicleEF	SBUS	3.18	1.25
tblVehicleEF	SBUS	21.72	10.72
tblVehicleEF	SBUS	1,180.91	1,166.81
tblVehicleEF	SBUS	1,103.99	1,100.94
tblVehicleEF	SBUS	50.56	45.88
tblVehicleEF	SBUS	8.3900e-004	7.3000e-004
tblVehicleEF	SBUS	12.02	7.54
tblVehicleEF	SBUS	6.23	3.16
tblVehicleEF	SBUS	14.11	13.84
tblVehicleEF	SBUS	0.02	5.3950e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	1.4660e-003	8.5500e-004
tblVehicleEF	SBUS	0.02	5.1620e-003
tblVehicleEF	SBUS	2.6810e-003	2.7190e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	1.3480e-003	7.8600e-004

tblVehicleEF	SBUS	8.4070e-003	2.9560e-003
tblVehicleEF	SBUS	0.09	0.04
tblVehicleEF	SBUS	0.88	0.78
tblVehicleEF	SBUS	3.1540e-003	1.6470e-003
tblVehicleEF	SBUS	0.22	0.12
tblVehicleEF	SBUS	0.06	0.02
tblVehicleEF	SBUS	1.02	0.51
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	8.7900e-004	6.4300e-004
tblVehicleEF	SBUS	8.4070e-003	2.9560e-003
tblVehicleEF	SBUS	0.09	0.04
tblVehicleEF	SBUS	1.26	1.13
tblVehicleEF	SBUS	3.1540e-003	1.6470e-003
tblVehicleEF	SBUS	0.29	0.15
tblVehicleEF	SBUS	0.06	0.02
tblVehicleEF	SBUS	1.12	0.55
tblVehicleEF	SBUS	0.83	0.81
tblVehicleEF	SBUS	0.06	0.02
tblVehicleEF	SBUS	0.17	0.09
tblVehicleEF	SBUS	7.20	6.54
tblVehicleEF	SBUS	3.26	1.28
tblVehicleEF	SBUS	17.53	8.65
tblVehicleEF	SBUS	1,236.25	1,222.69
tblVehicleEF	SBUS	1,103.99	1,100.94
tblVehicleEF	SBUS	50.56	45.88
tblVehicleEF	SBUS	8.3900e-004	7.3000e-004

tblVehicleEF	SBUS	12.40	7.78
tblVehicleEF	SBUS	5.99	3.04
tblVehicleEF	SBUS	14.02	13.79
tblVehicleEF	SBUS	0.01	4.5480e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	1.4660e-003	8.5500e-004
tblVehicleEF	SBUS	0.01	4.3510e-003
tblVehicleEF	SBUS	2.6810e-003	2.7190e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	1.3480e-003	7.8600e-004
tblVehicleEF	SBUS	0.01	4.9930e-003
tblVehicleEF	SBUS	0.09	0.04
tblVehicleEF	SBUS	0.87	0.78
tblVehicleEF	SBUS	5.3280e-003	2.6290e-003
tblVehicleEF	SBUS	0.22	0.12
tblVehicleEF	SBUS	0.05	0.01
tblVehicleEF	SBUS	0.91	0.45
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	8.1000e-004	6.0800e-004
tblVehicleEF	SBUS	0.01	4.9930e-003
tblVehicleEF	SBUS	0.09	0.04
tblVehicleEF	SBUS	1.26	1.13
tblVehicleEF	SBUS	5.3280e-003	2.6290e-003
tblVehicleEF	SBUS	0.29	0.15
tblVehicleEF	SBUS	0.05	0.01

tblVehicleEF	SBUS	0.99	0.49
tblVehicleEF	SBUS	0.83	0.81
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.20	0.11
tblVehicleEF	SBUS	7.56	6.78
tblVehicleEF	SBUS	3.14	1.23
tblVehicleEF	SBUS	23.35	11.52
tblVehicleEF	SBUS	1,104.48	1,089.65
tblVehicleEF	SBUS	1,103.99	1,100.94
tblVehicleEF	SBUS	50.56	45.88
tblVehicleEF	SBUS	8.3900e-004	7.3000e-004
tblVehicleEF	SBUS	11.49	7.21
tblVehicleEF	SBUS	6.19	3.13
tblVehicleEF	SBUS	14.15	13.86
tblVehicleEF	SBUS	0.02	6.5650e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	1.4660e-003	8.5500e-004
tblVehicleEF	SBUS	0.02	6.2810e-003
tblVehicleEF	SBUS	2.6810e-003	2.7190e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	1.3480e-003	7.8600e-004
tblVehicleEF	SBUS	6.4570e-003	2.2400e-003
tblVehicleEF	SBUS	0.11	0.04
tblVehicleEF	SBUS	0.88	0.79
tblVehicleEF	SBUS	2.5060e-003	1.3190e-003
tblVehicleEF	SBUS	0.22	0.12

tblVehicleEF	SBUS	0.07	0.02
tblVehicleEF	SBUS	1.07	0.53
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	9.0600e-004	6.5600e-004
tblVehicleEF	SBUS	6.4570e-003	2.2400e-003
tblVehicleEF	SBUS	0.11	0.04
tblVehicleEF	SBUS	1.27	1.13
tblVehicleEF	SBUS	2.5060e-003	1.3190e-003
tblVehicleEF	SBUS	0.29	0.15
tblVehicleEF	SBUS	0.07	0.02
tblVehicleEF	SBUS	1.17	0.58
tblVehicleEF	UBUS	0.11	0.03
tblVehicleEF	UBUS	0.05	0.06
tblVehicleEF	UBUS	4.92	2.39
tblVehicleEF	UBUS	9.83	8.70
tblVehicleEF	UBUS	2,132.88	1,977.64
tblVehicleEF	UBUS	112.84	135.47
tblVehicleEF	UBUS	1.3580e-003	1.1000e-003
tblVehicleEF	UBUS	10.43	4.59
tblVehicleEF	UBUS	14.50	12.75
tblVehicleEF	UBUS	0.58	0.52
tblVehicleEF	UBUS	0.21	0.08
tblVehicleEF	UBUS	8.8100e-004	1.2530e-003
tblVehicleEF	UBUS	0.25	0.22
tblVehicleEF	UBUS	0.20	0.08
tblVehicleEF	UBUS	8.1100e-004	1.1520e-003

tblVehicleEF	UBUS	2.8790e-003	2.9250e-003
tblVehicleEF	UBUS	0.06	0.05
tblVehicleEF	UBUS	1.6910e-003	2.1600e-003
tblVehicleEF	UBUS	0.69	0.23
tblVehicleEF	UBUS	0.01	0.01
tblVehicleEF	UBUS	0.74	0.77
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	1.3050e-003	1.5140e-003
tblVehicleEF	UBUS	2.8790e-003	2.9250e-003
tblVehicleEF	UBUS	0.06	0.05
tblVehicleEF	UBUS	1.6910e-003	2.1600e-003
tblVehicleEF	UBUS	0.85	0.27
tblVehicleEF	UBUS	0.01	0.01
tblVehicleEF	UBUS	0.81	0.84
tblVehicleEF	UBUS	0.11	0.03
tblVehicleEF	UBUS	0.05	0.05
tblVehicleEF	UBUS	4.97	2.40
tblVehicleEF	UBUS	8.16	7.36
tblVehicleEF	UBUS	2,132.88	1,977.64
tblVehicleEF	UBUS	112.84	135.47
tblVehicleEF	UBUS	1.3580e-003	1.1000e-003
tblVehicleEF	UBUS	10.08	4.43
tblVehicleEF	UBUS	14.43	12.68
tblVehicleEF	UBUS	0.58	0.52
tblVehicleEF	UBUS	0.21	0.08
tblVehicleEF	UBUS	8.8100e-004	1.2530e-003
tblVehicleEF	UBUS	0.25	0.22

tblVehicleEF	UBUS	0.20	0.08
tblVehicleEF	UBUS	8.1100e-004	1.1520e-003
tblVehicleEF	UBUS	5.0420e-003	5.0230e-003
tblVehicleEF	UBUS	0.06	0.05
tblVehicleEF	UBUS	2.7260e-003	3.3830e-003
tblVehicleEF	UBUS	0.69	0.23
tblVehicleEF	UBUS	0.01	0.01
tblVehicleEF	UBUS	0.66	0.70
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	1.2760e-003	1.4910e-003
tblVehicleEF	UBUS	5.0420e-003	5.0230e-003
tblVehicleEF	UBUS	0.06	0.05
tblVehicleEF	UBUS	2.7260e-003	3.3830e-003
tblVehicleEF	UBUS	0.86	0.28
tblVehicleEF	UBUS	0.01	0.01
tblVehicleEF	UBUS	0.72	0.76
tblVehicleEF	UBUS	0.11	0.03
tblVehicleEF	UBUS	0.06	0.06
tblVehicleEF	UBUS	4.90	2.38
tblVehicleEF	UBUS	10.63	9.35
tblVehicleEF	UBUS	2,132.88	1,977.64
tblVehicleEF	UBUS	112.84	135.47
tblVehicleEF	UBUS	1.3580e-003	1.1000e-003
tblVehicleEF	UBUS	10.34	4.55
tblVehicleEF	UBUS	14.53	12.79
tblVehicleEF	UBUS	0.58	0.52
tblVehicleEF	UBUS	0.21	0.08

tblVehicleEF	UBUS	8.8100e-004	1.2530e-003
tblVehicleEF	UBUS	0.25	0.22
tblVehicleEF	UBUS	0.20	0.08
tblVehicleEF	UBUS	8.1100e-004	1.1520e-003
tblVehicleEF	UBUS	2.3210e-003	2.2910e-003
tblVehicleEF	UBUS	0.07	0.06
tblVehicleEF	UBUS	1.3360e-003	1.7100e-003
tblVehicleEF	UBUS	0.68	0.23
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.78	0.80
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	1.3190e-003	1.5260e-003
tblVehicleEF	UBUS	2.3210e-003	2.2910e-003
tblVehicleEF	UBUS	0.07	0.06
tblVehicleEF	UBUS	1.3360e-003	1.7100e-003
tblVehicleEF	UBUS	0.84	0.27
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.85	0.88
tblVehicleTrips	ST_TR	8.19	2.93
tblVehicleTrips	SU_TR	5.95	2.13
tblVehicleTrips	WD_TR	8.17	2.92

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.1419	1.3597	1.0108	2.3000e-003	0.4492	0.0555	0.5047	0.2414	0.0516	0.2931	0.0000	199.8642	199.8642	0.0514	0.0000	201.1502
2025	0.1893	1.4804	1.7475	3.4800e-003	0.0473	0.0516	0.0989	0.0127	0.0498	0.0625	0.0000	293.7906	293.7906	0.0409	0.0000	294.8132
2026	0.6377	0.3212	0.3949	7.7000e-004	0.0102	0.0116	0.0217	2.7300e-003	0.0111	0.0139	0.0000	64.9505	64.9505	9.9300e-003	0.0000	65.1987
Maximum	**0.6377**	**1.4804**	**1.7475**	**3.4800e-003**	**0.4492**	**0.0555**	**0.5047**	**0.2414**	**0.0516**	**0.2931**	**0.0000**	**293.7906**	**293.7906**	**0.0514**	**0.0000**	**294.8132**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.1419	1.3597	1.0108	2.3000e-003	0.1857	0.0555	0.2412	0.0970	0.0516	0.1486	0.0000	199.8640	199.8640	0.0514	0.0000	201.1500
2025	0.1893	1.4804	1.7475	3.4800e-003	0.0473	0.0516	0.0989	0.0127	0.0498	0.0625	0.0000	293.7903	293.7903	0.0409	0.0000	294.8129
2026	0.6377	0.3212	0.3949	7.7000e-004	0.0102	0.0116	0.0217	2.7300e-003	0.0111	0.0139	0.0000	64.9504	64.9504	9.9300e-003	0.0000	65.1987
Maximum	**0.6377**	**1.4804**	**1.7475**	**3.4800e-003**	**0.1857**	**0.0555**	**0.2412**	**0.0970**	**0.0516**	**0.1486**	**0.0000**	**293.7903**	**293.7903**	**0.0514**	**0.0000**	**294.8129**

Northeast Grover Beach Phase 2 - San Luis Obispo County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	52.00	0.00	42.14	56.23	0.00	39.11	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-8-2024	4-7-2024	0.4029	0.4029
2	4-8-2024	7-7-2024	0.3474	0.3474
3	7-8-2024	10-7-2024	0.3512	0.3512
4	10-8-2024	1-7-2025	0.4267	0.4267
5	1-8-2025	4-7-2025	0.4114	0.4114
6	4-8-2025	7-7-2025	0.4154	0.4154
7	7-8-2025	10-7-2025	0.4200	0.4200
8	10-8-2025	1-7-2026	0.4205	0.4205
9	1-8-2026	4-7-2026	0.8392	0.8392
10	4-8-2026	7-7-2026	0.0861	0.0861
		Highest	0.8392	0.8392

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2606	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7900e-003	3.7900e-003	1.0000e-005	0.0000	4.0500e-003
Energy	0.0122	0.1113	0.0935	6.7000e-004		8.4600e-003	8.4600e-003		8.4600e-003	8.4600e-003	0.0000	242.8643	242.8643	7.8300e-003	3.3600e-003	244.0611
Mobile	0.0477	0.1760	0.4506	1.4600e-003	0.1544	1.2700e-003	0.1557	0.0413	1.1900e-003	0.0425	0.0000	134.2716	134.2716	4.9600e-003	0.0000	134.3957
Waste						0.0000	0.0000		0.0000	0.0000	10.1130	0.0000	10.1130	0.5977	0.0000	25.0546
Water						0.0000	0.0000		0.0000	0.0000	0.7323	3.8948	4.6272	0.0754	1.8100e-003	7.0522
Total	**0.3205**	**0.2873**	**0.5460**	**2.1300e-003**	**0.1544**	**9.7400e-003**	**0.1641**	**0.0413**	**9.6600e-003**	**0.0509**	**10.8454**	**381.0345**	**391.8798**	**0.6859**	**5.1700e-003**	**410.5675**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2042	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7900e-003	3.7900e-003	1.0000e-005	0.0000	4.0500e-003
Energy	0.0112	0.1013	0.0851	6.1000e-004		7.7000e-003	7.7000e-003		7.7000e-003	7.7000e-003	0.0000	209.6659	209.6659	6.6100e-003	2.9500e-003	210.7107
Mobile	0.0477	0.1760	0.4506	1.4600e-003	0.1544	1.2700e-003	0.1557	0.0413	1.1900e-003	0.0425	0.0000	134.2716	134.2716	4.9600e-003	0.0000	134.3957
Waste						0.0000	0.0000		0.0000	0.0000	10.1130	0.0000	10.1130	0.5977	0.0000	25.0546
Water						0.0000	0.0000		0.0000	0.0000	0.5859	3.1522	3.7380	0.0603	1.4500e-003	5.6782
Total	**0.2631**	**0.2774**	**0.5377**	**2.0700e-003**	**0.1544**	**8.9800e-003**	**0.1634**	**0.0413**	**8.9000e-003**	**0.0502**	**10.6989**	**347.0934**	**357.7923**	**0.6696**	**4.4000e-003**	**375.8432**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**17.91**	**3.46**	**1.53**	**2.82**	**0.00**	**7.80**	**0.46**	**0.00**	**7.87**	**1.49**	**1.35**	**8.91**	**8.70**	**2.38**	**14.89**	**8.46**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	31.8600
Vegetation Land Change	-5.8185
Total	**26.0415**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/8/2024	2/2/2024	5	20	No demo as completed in Phase 1
2	Site Preparation	Site Preparation	2/3/2024	2/16/2024	5	10	Mobilization minimal as site is already graded
3	Grading	Grading	2/17/2024	10/24/2024	5	179	Grading will be Hotel A Pad, and needed cut slopes
4	Building Construction	Building Construction	10/25/2024	3/12/2026	5	360	Construction of Hotel A
5	Architectural Coating	Architectural Coating	3/27/2026	4/9/2026	5	10	
6	Paving	Paving	3/13/2026	3/26/2026	5	10	Pavement of infrastrucutre and parking lot

Acres of Grading (Site Preparation Phase): 1.3

Acres of Grading (Grading Phase): 1.3

Acres of Paving: 0.57

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 76,493; Non-Residential Outdoor: 25,498; Striped Parking Area: 1,482 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	32.00	12.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0144	0.1389	0.1349	2.4000e-004		6.3100e-003	6.3100e-003		5.8900e-003	5.8900e-003	0.0000	21.0916	21.0916	5.3400e-003	0.0000	21.2250
Total	**0.0144**	**0.1389**	**0.1349**	**2.4000e-004**	**0.0000**	**6.3100e-003**	**6.3100e-003**	**0.0000**	**5.8900e-003**	**5.8900e-003**	**0.0000**	**21.0916**	**21.0916**	**5.3400e-003**	**0.0000**	**21.2250**

3.2 Demolition - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.4000e-004	3.1300e-003	1.0000e-005	1.2500e-003	1.0000e-005	1.2600e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	0.9021	0.9021	2.0000e-005	0.0000	0.9027
Total	**4.4000e-004**	**3.4000e-004**	**3.1300e-003**	**1.0000e-005**	**1.2500e-003**	**1.0000e-005**	**1.2600e-003**	**3.3000e-004**	**1.0000e-005**	**3.4000e-004**	**0.0000**	**0.9021**	**0.9021**	**2.0000e-005**	**0.0000**	**0.9027**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0144	0.1389	0.1349	2.4000e-004		6.3100e-003	6.3100e-003		5.8900e-003	5.8900e-003	0.0000	21.0915	21.0915	5.3400e-003	0.0000	21.2250
Total	**0.0144**	**0.1389**	**0.1349**	**2.4000e-004**	**0.0000**	**6.3100e-003**	**6.3100e-003**	**0.0000**	**5.8900e-003**	**5.8900e-003**	**0.0000**	**21.0915**	**21.0915**	**5.3400e-003**	**0.0000**	**21.2250**

3.2 Demolition - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.4000e-004	3.1300e-003	1.0000e-005	1.2500e-003	1.0000e-005	1.2600e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	0.9021	0.9021	2.0000e-005	0.0000	0.9027
Total	**4.4000e-004**	**3.4000e-004**	**3.1300e-003**	**1.0000e-005**	**1.2500e-003**	**1.0000e-005**	**1.2600e-003**	**3.3000e-004**	**1.0000e-005**	**3.4000e-004**	**0.0000**	**0.9021**	**0.9021**	**2.0000e-005**	**0.0000**	**0.9027**

3.3 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0270	0.0000	0.0270	0.0146	0.0000	0.0146	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5300e-003	0.0592	0.0332	9.0000e-005		2.4100e-003	2.4100e-003		2.2200e-003	2.2200e-003	0.0000	7.5563	7.5563	2.4400e-003	0.0000	7.6174
Total	**5.5300e-003**	**0.0592**	**0.0332**	**9.0000e-005**	**0.0270**	**2.4100e-003**	**0.0295**	**0.0146**	**2.2200e-003**	**0.0168**	**0.0000**	**7.5563**	**7.5563**	**2.4400e-003**	**0.0000**	**7.6174**

3.3 Site Preparation - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	9.6000e-004	0.0000	3.9000e-004	0.0000	3.9000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2776	0.2776	1.0000e-005	0.0000	0.2778
Total	**1.4000e-004**	**1.0000e-004**	**9.6000e-004**	**0.0000**	**3.9000e-004**	**0.0000**	**3.9000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.2776**	**0.2776**	**1.0000e-005**	**0.0000**	**0.2778**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0105	0.0000	0.0105	5.6800e-003	0.0000	5.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5300e-003	0.0592	0.0332	9.0000e-005		2.4100e-003	2.4100e-003		2.2200e-003	2.2200e-003	0.0000	7.5563	7.5563	2.4400e-003	0.0000	7.6174
Total	**5.5300e-003**	**0.0592**	**0.0332**	**9.0000e-005**	**0.0105**	**2.4100e-003**	**0.0130**	**5.6800e-003**	**2.2200e-003**	**7.9000e-003**	**0.0000**	**7.5563**	**7.5563**	**2.4400e-003**	**0.0000**	**7.6174**

3.3 Site Preparation - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	9.6000e-004	0.0000	3.9000e-004	0.0000	3.9000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2776	0.2776	1.0000e-005	0.0000	0.2778
Total	**1.4000e-004**	**1.0000e-004**	**9.6000e-004**	**0.0000**	**3.9000e-004**	**0.0000**	**3.9000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.2776**	**0.2776**	**1.0000e-005**	**0.0000**	**0.2778**

3.4 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4049	0.0000	0.4049	0.2223	0.0000	0.2223	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0817	0.8708	0.4964	1.2600e-003		0.0358	0.0358		0.0329	0.0329	0.0000	110.8011	110.8011	0.0358	0.0000	111.6970
Total	**0.0817**	**0.8708**	**0.4964**	**1.2600e-003**	**0.4049**	**0.0358**	**0.4407**	**0.2223**	**0.0329**	**0.2552**	**0.0000**	**110.8011**	**110.8011**	**0.0358**	**0.0000**	**111.6970**

3.4 Grading - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4300e-003	1.8600e-003	0.0172	5.0000e-005	6.8900e-003	4.0000e-005	6.9300e-003	1.8300e-003	4.0000e-005	1.8700e-003	0.0000	4.9687	4.9687	1.2000e-004	0.0000	4.9717
Total	**2.4300e-003**	**1.8600e-003**	**0.0172**	**5.0000e-005**	**6.8900e-003**	**4.0000e-005**	**6.9300e-003**	**1.8300e-003**	**4.0000e-005**	**1.8700e-003**	**0.0000**	**4.9687**	**4.9687**	**1.2000e-004**	**0.0000**	**4.9717**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1579	0.0000	0.1579	0.0867	0.0000	0.0867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0817	0.8708	0.4964	1.2600e-003		0.0358	0.0358		0.0329	0.0329	0.0000	110.8009	110.8009	0.0358	0.0000	111.6968
Total	**0.0817**	**0.8708**	**0.4964**	**1.2600e-003**	**0.1579**	**0.0358**	**0.1937**	**0.0867**	**0.0329**	**0.1196**	**0.0000**	**110.8009**	**110.8009**	**0.0358**	**0.0000**	**111.6968**

3.4 Grading - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4300e-003	1.8600e-003	0.0172	5.0000e-005	6.8900e-003	4.0000e-005	6.9300e-003	1.8300e-003	4.0000e-005	1.8700e-003	0.0000	4.9687	4.9687	1.2000e-004	0.0000	4.9717
Total	**2.4300e-003**	**1.8600e-003**	**0.0172**	**5.0000e-005**	**6.8900e-003**	**4.0000e-005**	**6.9300e-003**	**1.8300e-003**	**4.0000e-005**	**1.8700e-003**	**0.0000**	**4.9687**	**4.9687**	**1.2000e-004**	**0.0000**	**4.9717**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0341	0.2655	0.3004	5.3000e-004		0.0108	0.0108		0.0104	0.0104	0.0000	43.5867	43.5867	7.2600e-003	0.0000	43.7682
Total	**0.0341**	**0.2655**	**0.3004**	**5.3000e-004**		**0.0108**	**0.0108**		**0.0104**	**0.0104**	**0.0000**	**43.5867**	**43.5867**	**7.2600e-003**	**0.0000**	**43.7682**

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9000e-004	0.0210	6.1200e-003	6.0000e-005	1.3100e-003	3.0000e-005	1.3400e-003	3.8000e-004	3.0000e-005	4.1000e-004	0.0000	5.3507	5.3507	2.9000e-004	0.0000	5.3578
Worker	2.6000e-003	1.9900e-003	0.0185	6.0000e-005	7.3900e-003	4.0000e-005	7.4400e-003	1.9600e-003	4.0000e-005	2.0000e-003	0.0000	5.3295	5.3295	1.3000e-004	0.0000	5.3328
Total	**3.1900e-003**	**0.0230**	**0.0246**	**1.2000e-004**	**8.7000e-003**	**7.0000e-005**	**8.7800e-003**	**2.3400e-003**	**7.0000e-005**	**2.4100e-003**	**0.0000**	**10.6802**	**10.6802**	**4.2000e-004**	**0.0000**	**10.6906**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0341	0.2655	0.3004	5.3000e-004		0.0108	0.0108		0.0104	0.0104	0.0000	43.5867	43.5867	7.2600e-003	0.0000	43.7681
Total	**0.0341**	**0.2655**	**0.3004**	**5.3000e-004**		**0.0108**	**0.0108**		**0.0104**	**0.0104**	**0.0000**	**43.5867**	**43.5867**	**7.2600e-003**	**0.0000**	**43.7681**

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9000e-004	0.0210	6.1200e-003	6.0000e-005	1.3100e-003	3.0000e-005	1.3400e-003	3.8000e-004	3.0000e-005	4.1000e-004	0.0000	5.3507	5.3507	2.9000e-004	0.0000	5.3578
Worker	2.6000e-003	1.9900e-003	0.0185	6.0000e-005	7.3900e-003	4.0000e-005	7.4400e-003	1.9600e-003	4.0000e-005	2.0000e-003	0.0000	5.3295	5.3295	1.3000e-004	0.0000	5.3328
Total	**3.1900e-003**	**0.0230**	**0.0246**	**1.2000e-004**	**8.7000e-003**	**7.0000e-005**	**8.7800e-003**	**2.3400e-003**	**7.0000e-005**	**2.4100e-003**	**0.0000**	**10.6802**	**10.6802**	**4.2000e-004**	**0.0000**	**10.6906**

3.5 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1729	1.3589	1.6233	2.8800e-003		0.0512	0.0512		0.0494	0.0494	0.0000	237.0300	237.0300	0.0387	0.0000	237.9975
Total	**0.1729**	**1.3589**	**1.6233**	**2.8800e-003**		**0.0512**	**0.0512**		**0.0494**	**0.0494**	**0.0000**	**237.0300**	**237.0300**	**0.0387**	**0.0000**	**237.9975**

3.5 Building Construction - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0500e-003	0.1117	0.0316	3.0000e-004	7.1200e-003	1.5000e-004	7.2700e-003	2.0600e-003	1.4000e-004	2.2000e-003	0.0000	28.9427	28.9427	1.5700e-003	0.0000	28.9819
Worker	0.0134	9.8000e-003	0.0925	3.1000e-004	0.0402	2.3000e-004	0.0404	0.0107	2.1000e-004	0.0109	0.0000	27.8178	27.8178	6.4000e-004	0.0000	27.8337
Total	**0.0164**	**0.1215**	**0.1242**	**6.1000e-004**	**0.0473**	**3.8000e-004**	**0.0477**	**0.0127**	**3.5000e-004**	**0.0131**	**0.0000**	**56.7606**	**56.7606**	**2.2100e-003**	**0.0000**	**56.8156**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1729	1.3589	1.6233	2.8800e-003		0.0512	0.0512		0.0494	0.0494	0.0000	237.0298	237.0298	0.0387	0.0000	237.9973
Total	**0.1729**	**1.3589**	**1.6233**	**2.8800e-003**		**0.0512**	**0.0512**		**0.0494**	**0.0494**	**0.0000**	**237.0298**	**237.0298**	**0.0387**	**0.0000**	**237.9973**

3.5 Building Construction - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0500e-003	0.1117	0.0316	3.0000e-004	7.1200e-003	1.5000e-004	7.2700e-003	2.0600e-003	1.4000e-004	2.2000e-003	0.0000	28.9427	28.9427	1.5700e-003	0.0000	28.9819
Worker	0.0134	9.8000e-003	0.0925	3.1000e-004	0.0402	2.3000e-004	0.0404	0.0107	2.1000e-004	0.0109	0.0000	27.8178	27.8178	6.4000e-004	0.0000	27.8337
Total	**0.0164**	**0.1215**	**0.1242**	**6.1000e-004**	**0.0473**	**3.8000e-004**	**0.0477**	**0.0127**	**3.5000e-004**	**0.0131**	**0.0000**	**56.7606**	**56.7606**	**2.2100e-003**	**0.0000**	**56.8156**

3.5 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0338	0.2655	0.3172	5.6000e-004		0.0100	0.0100		9.6500e-003	9.6500e-003	0.0000	46.3162	46.3162	7.5600e-003	0.0000	46.5053
Total	**0.0338**	**0.2655**	**0.3172**	**5.6000e-004**		**0.0100**	**0.0100**		**9.6500e-003**	**9.6500e-003**	**0.0000**	**46.3162**	**46.3162**	**7.5600e-003**	**0.0000**	**46.5053**

3.5 Building Construction - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.7000e-004	0.0214	5.9100e-003	6.0000e-005	1.3900e-003	3.0000e-005	1.4200e-003	4.0000e-004	3.0000e-005	4.3000e-004	0.0000	5.6278	5.6278	3.1000e-004	0.0000	5.6354
Worker	2.4900e-003	1.7400e-003	0.0168	6.0000e-005	7.8600e-003	4.0000e-005	7.9000e-003	2.0900e-003	4.0000e-005	2.1300e-003	0.0000	5.2338	5.2338	1.1000e-004	0.0000	5.2366
Total	**3.0600e-003**	**0.0232**	**0.0227**	**1.2000e-004**	**9.2500e-003**	**7.0000e-005**	**9.3200e-003**	**2.4900e-003**	**7.0000e-005**	**2.5600e-003**	**0.0000**	**10.8615**	**10.8615**	**4.2000e-004**	**0.0000**	**10.8720**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0338	0.2655	0.3172	5.6000e-004		0.0100	0.0100		9.6500e-003	9.6500e-003	0.0000	46.3162	46.3162	7.5600e-003	0.0000	46.5052
Total	**0.0338**	**0.2655**	**0.3172**	**5.6000e-004**		**0.0100**	**0.0100**		**9.6500e-003**	**9.6500e-003**	**0.0000**	**46.3162**	**46.3162**	**7.5600e-003**	**0.0000**	**46.5052**

3.5 Building Construction - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.7000e-004	0.0214	5.9100e-003	6.0000e-005	1.3900e-003	3.0000e-005	1.4200e-003	4.0000e-004	3.0000e-005	4.3000e-004	0.0000	5.6278	5.6278	3.1000e-004	0.0000	5.6354
Worker	2.4900e-003	1.7400e-003	0.0168	6.0000e-005	7.8600e-003	4.0000e-005	7.9000e-003	2.0900e-003	4.0000e-005	2.1300e-003	0.0000	5.2338	5.2338	1.1000e-004	0.0000	5.2366
Total	**3.0600e-003**	**0.0232**	**0.0227**	**1.2000e-004**	**9.2500e-003**	**7.0000e-005**	**9.3200e-003**	**2.4900e-003**	**7.0000e-005**	**2.5600e-003**	**0.0000**	**10.8615**	**10.8615**	**4.2000e-004**	**0.0000**	**10.8720**

3.6 Architectural Coating - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5961					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5000e-004	5.7300e-003	9.0500e-003	1.0000e-005		2.6000e-004	2.6000e-004		2.6000e-004	2.6000e-004	0.0000	1.2766	1.2766	7.0000e-005	0.0000	1.2784
Total	**0.5969**	**5.7300e-003**	**9.0500e-003**	**1.0000e-005**		**2.6000e-004**	**2.6000e-004**		**2.6000e-004**	**2.6000e-004**	**0.0000**	**1.2766**	**1.2766**	**7.0000e-005**	**0.0000**	**1.2784**

3.6 Architectural Coating - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	6.2000e-004	0.0000	2.9000e-004	0.0000	2.9000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.1924	0.1924	0.0000	0.0000	0.1925
Total	**9.0000e-005**	**6.0000e-005**	**6.2000e-004**	**0.0000**	**2.9000e-004**	**0.0000**	**2.9000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.1924**	**0.1924**	**0.0000**	**0.0000**	**0.1925**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5961					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5000e-004	5.7300e-003	9.0500e-003	1.0000e-005		2.6000e-004	2.6000e-004		2.6000e-004	2.6000e-004	0.0000	1.2766	1.2766	7.0000e-005	0.0000	1.2784
Total	**0.5969**	**5.7300e-003**	**9.0500e-003**	**1.0000e-005**		**2.6000e-004**	**2.6000e-004**		**2.6000e-004**	**2.6000e-004**	**0.0000**	**1.2766**	**1.2766**	**7.0000e-005**	**0.0000**	**1.2784**

3.6 Architectural Coating - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	6.2000e-004	0.0000	2.9000e-004	0.0000	2.9000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.1924	0.1924	0.0000	0.0000	0.1925
Total	**9.0000e-005**	**6.0000e-005**	**6.2000e-004**	**0.0000**	**2.9000e-004**	**0.0000**	**2.9000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.1924**	**0.1924**	**0.0000**	**0.0000**	**0.1925**

3.7 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8700e-003	0.0266	0.0440	7.0000e-005		1.2300e-003	1.2300e-003		1.1400e-003	1.1400e-003	0.0000	5.8868	5.8868	1.8700e-003	0.0000	5.9334
Paving	7.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.6200e-003**	**0.0266**	**0.0440**	**7.0000e-005**		**1.2300e-003**	**1.2300e-003**		**1.1400e-003**	**1.1400e-003**	**0.0000**	**5.8868**	**5.8868**	**1.8700e-003**	**0.0000**	**5.9334**

3.7 Paving - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.4000e-004	1.3400e-003	0.0000	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.4169	0.4169	1.0000e-005	0.0000	0.4171
Total	**2.0000e-004**	**1.4000e-004**	**1.3400e-003**	**0.0000**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.4169**	**0.4169**	**1.0000e-005**	**0.0000**	**0.4171**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8700e-003	0.0266	0.0440	7.0000e-005		1.2300e-003	1.2300e-003		1.1400e-003	1.1400e-003	0.0000	5.8868	5.8868	1.8700e-003	0.0000	5.9334
Paving	7.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.6200e-003**	**0.0266**	**0.0440**	**7.0000e-005**		**1.2300e-003**	**1.2300e-003**		**1.1400e-003**	**1.1400e-003**	**0.0000**	**5.8868**	**5.8868**	**1.8700e-003**	**0.0000**	**5.9334**

3.7 Paving - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.4000e-004	1.3400e-003	0.0000	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.4169	0.4169	1.0000e-005	0.0000	0.4171
Total	**2.0000e-004**	**1.4000e-004**	**1.3400e-003**	**0.0000**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.4169**	**0.4169**	**1.0000e-005**	**0.0000**	**0.4171**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0477	0.1760	0.4506	1.4600e-003	0.1544	1.2700e-003	0.1557	0.0413	1.1900e-003	0.0425	0.0000	134.2716	134.2716	4.9600e-003	0.0000	134.3957
Unmitigated	0.0477	0.1760	0.4506	1.4600e-003	0.1544	1.2700e-003	0.1557	0.0413	1.1900e-003	0.0425	0.0000	134.2716	134.2716	4.9600e-003	0.0000	134.3957

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Hotel	265.72	266.63	193.83	411,812	411,812
Parking Lot	0.00	0.00	0.00		
Total	265.72	266.63	193.83	411,812	411,812

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Hotel	13.00	5.00	5.00	19.40	61.60	19.00	58	38	4
Parking Lot	13.00	5.00	5.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.602606	0.026011	0.198672	0.108173	0.017753	0.004949	0.012577	0.019761	0.002270	0.001100	0.004459	0.000730	0.000939
Hotel	0.602606	0.026011	0.198672	0.108173	0.017753	0.004949	0.012577	0.019761	0.002270	0.001100	0.004459	0.000730	0.000939

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	99.3612	99.3612	4.4900e-003	9.3000e-004	99.7505
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	121.7398	121.7398	5.5000e-003	1.1400e-003	122.2168
NaturalGas Mitigated	0.0112	0.1013	0.0851	6.1000e-004		7.7000e-003	7.7000e-003		7.7000e-003	7.7000e-003	0.0000	110.3047	110.3047	2.1100e-003	2.0200e-003	110.9602
NaturalGas Unmitigated	0.0122	0.1113	0.0935	6.7000e-004		8.4600e-003	8.4600e-003		8.4600e-003	8.4600e-003	0.0000	121.1245	121.1245	2.3200e-003	2.2200e-003	121.8443

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hotel	2.26979e+006	0.0122	0.1113	0.0935	6.7000e-004		8.4600e-003	8.4600e-003		8.4600e-003	8.4600e-003	0.0000	121.1245	121.1245	2.3200e-003	2.2200e-003	121.8443
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0122**	**0.1113**	**0.0935**	**6.7000e-004**		**8.4600e-003**	**8.4600e-003**		**8.4600e-003**	**8.4600e-003**	**0.0000**	**121.1245**	**121.1245**	**2.3200e-003**	**2.2200e-003**	**121.8443**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hotel	2.06703e+006	0.0112	0.1013	0.0851	6.1000e-004		7.7000e-003	7.7000e-003		7.7000e-003	7.7000e-003	0.0000	110.3047	110.3047	2.1100e-003	2.0200e-003	110.9602
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0112**	**0.1013**	**0.0851**	**6.1000e-004**		**7.7000e-003**	**7.7000e-003**		**7.7000e-003**	**7.7000e-003**	**0.0000**	**110.3047**	**110.3047**	**2.1100e-003**	**2.0200e-003**	**110.9602**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hotel	396741	115.4165	5.2200e-003	1.0800e-003	115.8688
Parking Lot	21736	6.3233	2.9000e-004	6.0000e-005	6.3480
Total		**121.7398**	**5.5100e-003**	**1.1400e-003**	**122.2168**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hotel	328510	95.5673	4.3200e-003	8.9000e-004	95.9417
Parking Lot	13041.6	3.7940	1.7000e-004	4.0000e-005	3.8088
Total		**99.3612**	**4.4900e-003**	**9.3000e-004**	**99.7506**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2042	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7900e-003	3.7900e-003	1.0000e-005	0.0000	4.0500e-003
Unmitigated	0.2606	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7900e-003	3.7900e-003	1.0000e-005	0.0000	4.0500e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0596					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2008					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.9000e-004	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7900e-003	3.7900e-003	1.0000e-005	0.0000	4.0500e-003
Total	**0.2606**	**2.0000e-005**	**1.9800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.7900e-003**	**3.7900e-003**	**1.0000e-005**	**0.0000**	**4.0500e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.3000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2008					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.9000e-004	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7900e-003	3.7900e-003	1.0000e-005	0.0000	4.0500e-003
Total	**0.2043**	**2.0000e-005**	**1.9800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.7900e-003**	**3.7900e-003**	**1.0000e-005**	**0.0000**	**4.0500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	3.7380	0.0603	1.4500e-003	5.6782
Unmitigated	4.6272	0.0754	1.8100e-003	7.0522

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hotel	2.30838 / 0.256486	4.6272	0.0754	1.8100e-003	7.0522
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**4.6272**	**0.0754**	**1.8100e-003**	**7.0522**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hotel	1.8467 / 0.240841	3.7380	0.0603	1.4500e-003	5.6782
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**3.7380**	**0.0603**	**1.4500e-003**	**5.6782**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.1130	0.5977	0.0000	25.0546
Unmitigated	10.1130	0.5977	0.0000	25.0546

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hotel	49.82	10.1130	0.5977	0.0000	25.0546
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**10.1130**	**0.5977**	**0.0000**	**25.0546**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hotel	49.82	10.1130	0.5977	0.0000	25.0546
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**10.1130**	**0.5977**	**0.0000**	**25.0546**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	26.0415	0.0000	0.0000	26.0415

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Grassland	1.35 / 0	-5.8185	0.0000	0.0000	-5.8185
Wetlands	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**-5.8185**	**0.0000**	**0.0000**	**-5.8185**

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	45	31.8600	0.0000	0.0000	31.8600
Total		**31.8600**	**0.0000**	**0.0000**	**31.8600**

Project Characteristics - This is based on a provided construction schedule by the applicant, assuming one year of permitting

Land Use - SF based on provided site plan and calculated. Major Site improvements including driveway, infratructure, and other paving elements completed as a part of Phase 1.

Construction Phase - Based on project schedule and grading completed as a part of Phase 1.

Demolition -

Grading - Grading will be limited to the Hotel A pad and cut slopes only.

Energy Use - Change

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation - Based on industry standards

Energy Mitigation -

Water Mitigation -

Mobile Commute Mitigation -

Vehicle Trips - Based on provided traffic engineer study assuming only 75 occupancy at any given time. Please refer to enclosed traffic study.

2.0 Peak Daily Emissions

Peak Daily Construction Emissions

Peak Daily Construction Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
Year	Phase	lb/day											
2024	Demolition	1.4892 W	13.9210 W	13.8128 S	0.0252 S	0.7604 S	0.6242 S	1.4892 W	13.9210 W	13.8128 S	0.0252 S	0.7604 S	0.6242 S
2024	Site Preparation	1.1371 W	11.8618 W	6.8316 S	0.0178 S	5.9690 S	3.3764 S	1.1371 W	11.8618 W	6.8316 S	0.0178 S	2.6706 S	1.6005 S
2024	Grading	0.9436 W	9.7509 W	5.7467 S	0.0147 S	5.0039 S	2.8730 S	0.9436 W	9.7509 W	5.7467 S	0.0147 S	2.2441 S	1.3581 S
2024	Building Construction	1.5671 W	12.0124 W	13.5562 S	0.0270 S	0.8258 W	0.5376 W	1.5671 W	12.0124 W	13.5562 S	0.0270 S	0.8258 W	0.5376 W
2025	Building Construction	1.4643 W	11.3351 W	13.4046 S	0.0268 S	0.7675 W	0.4812 W	1.4643 W	11.3351 W	13.4046 S	0.0268 S	0.7675 W	0.4812 W
2026	Building Construction	1.4578 W	11.3120 W	13.3419 S	0.0267 S	0.7674 W	0.4811 W	1.4578 W	11.3120 W	13.3419 S	0.0267 S	0.7674 W	0.4811 W
2026	Architectural Coating	119.4039 W	1.1586 W	1.9376 S	3.4100e-003 S	0.1112 S	0.0675 S	119.4039 W	1.1586 W	1.9376 S	3.4100e-003 S	0.1112 S	0.0675 S
2026	Paving	0.7672 W	5.3542 W	9.0735 S	0.0145 S	0.3757 S	0.2624 S	0.7672 W	5.3542 W	9.0735 S	0.0145 S	0.3757 S	0.2624 S
	Peak Daily Total	119.4039 W	13.9210 W	13.8128 S	0.0270 S	5.9690 S	3.3764 S	119.4039 W	13.9210 W	13.8128 S	0.0270 S	2.6706 S	1.6005 S
	Air District Threshold												
	Exceed Significance?												

Peak Daily Operational Emissions

Peak Daily Operational Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
	Operational Activity	lb/day											
On-Site	Area	1.4278 S	1.1000e-004 S	0.0120 S	0.0000 S	4.0000e-005 S	4.0000e-005 S	1.1193 S	1.1000e-004 S	0.0120 S	0.0000 S	4.0000e-005 S	4.0000e-005 S
On-Site	Energy	0.0671 S	0.6097 S	0.5121 S	3.6600e-003 S	0.0463 S	0.0463 S	0.0611 S	0.5552 S	0.4664 S	3.3300e-003 S	0.0422 S	0.0422 S
Off-Site	Mobile	0.2941 S	1.0062 W	2.6458 W	8.6500e-003 S	0.9157 W	0.2493 W	0.2941 S	1.0062 W	2.6458 W	8.6500e-003 S	0.9157 W	0.2493 W
	Peak Daily Total	1.7890 S	1.6160 W	3.1699 W	0.0123 S	0.9621 W	0.2956 W	1.4744 S	1.5616 W	3.1242 W	0.0120 S	0.9580 W	0.2915 W
	Air District Threshold												
	Exceed Significance?												

3.0 Annual GHG Emissions

Annual GHG

Annual GHG

		Unmitigated				Mitigated			
		CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
GHG Activity	Year	MT/yr							
Construction	2024	199.8642	0.0514	0.0000	201.1503	199.8640	0.0514	0.0000	201.1501
Construction	2025	293.7906	0.0409	0.0000	294.8132	293.7903	0.0409	0.0000	294.8130
Construction	2026	64.9505	9.9337e-003	0.0000	65.1988	64.9504	9.9337e-003	0.0000	65.1988
Operational	2018	391.8798	0.6859	5.1710e-003	410.5673	357.7923	0.6696	4.3998e-003	375.8424
	Total								
	Significance Threshold								
	Exceed Significance?								

Northeast Grover Beach Phase 3

San Luis Obispo, Summary Report

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
High Turnover (Sit Down Restaurant)	4.00	1000sqft	0.15	4,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.2	**Precipitation Freq (Days)**	44
Climate Zone	4			**Operational Year**	2029
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments

Only CalEEMod defaults were used.

Project Characteristics - This is based on a provided construction schedule that has been modified to assume the stand alone restruant will be constructed last. All improvements will be completed as a part of Phase 1 and Phase 2.

Land Use - SF based on provided site plan and calculated. Site improvements completed as a part of Phase 1 development. See Phase 1 anaysis.

Construction Phase - Assumes minimial grading, paving, and site prep as the lot has already previously been graded and ready for construction as a part of Phase 1.

Demolition -

Grading - No grading will occurr in the phase as it will be completed in Phase 1

Vehicle Trips - Revised based on the Traffic Study that assumes reduction of 40% of traffic through use with hotel. Trips are primary and not pass through.

Woodstoves -

Energy Use -

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation - Based on industry standards

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

2.0 Peak Daily Emissions

Peak Daily Construction Emissions

<u>Peak Daily Construction Emissions</u>

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
Year	Phase	lb/day											
2027	Demolition	0.6070 W	5.1206 W	7.5628 S	0.0127 S	0.3096 S	0.2275 S	0.6070 W	5.1206 W	7.5628 S	0.0127 S	0.3096 S	0.2275 S
2027	Site Preparation	0.4595 W	4.8017 W	3.9232 S	0.0101 S	0.7453 S	0.2227 S	0.4595 W	4.8017 W	3.9232 S	0.0101 S	0.4536 S	0.1912 S
2027	Grading	0.6070 W	5.1206 W	7.5628 S	0.0127 S	1.0624 S	0.6413 S	0.6070 W	5.1206 W	7.5628 S	0.0127 S	0.6483 S	0.4137 S
2027	Building Construction	0.5594 W	5.5540 S	7.0858 W	0.0118 S	0.2659 S	0.2287 S	0.5594 W	5.5540 S	7.0858 W	0.0118 S	0.2659 S	0.2287 S
2027	Paving	0.6226 W	4.9563 W	7.3835 S	0.0126 S	0.3975 S	0.2526 S	0.6226 W	4.9563 W	7.3835 S	0.0126 S	0.3975 S	0.2526 S
2027	Architectural Coating	18.7109 S	1.1455 S	1.8091 S	2.9700e-003 S	0.0515 S	0.0515 S	18.7109 S	1.1455 S	1.8091 S	2.9700e-003 S	0.0515 S	0.0515 S
	Peak Daily Total	18.7109 S	5.5540 S	7.5628 S	0.0127 S	1.0624 S	0.6413 S	18.7109 S	5.5540 S	7.5628 S	0.0127 S	0.6483 S	0.4137 S
	Air District Threshold												
	Exceed Significance?												

Peak Daily Operational Emissions

Peak Daily Operational Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
	Operational Activity	lb/day											
On-Site	Area	0.1110 S	0.0000 S	4.1000e-004 S	0.0000 S	0.0000 S	0.0000 S	0.0895 S	0.0000 S	4.1000e-004 S	0.0000 S	0.0000 S	0.0000 S
On-Site	Energy	0.0246 S	0.2237 S	0.1879 S	1.3400e-003 S	0.0170 S	0.0170 S	0.0239 S	0.2172 S	0.1824 S	1.3000e-003 S	0.0165 S	0.0165 S
Off-Site	Mobile	0.3981 S	1.4663 W	3.9310 W	0.0147 S	1.6719 W	0.4534 W	0.3981 S	1.4663 W	3.9310 W	0.0147 S	1.6719 W	0.4534 W
	Peak Daily Total	0.5338 S	1.6900 W	4.1193 W	0.0160 S	1.6889 W	0.4704 W	0.5115 S	1.6834 W	4.1138 W	0.0160 S	1.6884 W	0.4699 W
	Air District Threshold												
	Exceed Significance?												

3.0 Annual GHG Emissions

Annual GHG

Annual GHG

		Unmitigated				Mitigated			
		CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
GHG Activity	Year	MT/yr							
Construction	2027	62.0190	0.0183	0.0000	62.4757	62.0189	0.0183	0.0000	62.4757
Operational	2029	293.5958	0.6200	2.1319e-003	309.7308	286.2376	0.4691	1.8869e-003	298.5282
	Total								
	Significance Threshold								
	Exceed Significance?								

Northeast Grover Beach Phase 3

San Luis Obispo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
High Turnover (Sit Down Restaurant)	4.00	1000sqft	0.15	4,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.2	**Precipitation Freq (Days)**	44
Climate Zone	4			**Operational Year**	2029
Utility Company	Pacific Gas & Electric Company				
CO_2 Intensity (lb/MWhr)	641.35	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - This is based on a provided construction schedule that has been modified to assume the stand alone restruant will be constructed last. All improvements will be completed as a part of Phase 1 and Phase 2.

Land Use - SF based on provided site plan and calculated. Site improvements completed as a part of Phase 1 development. See Phase 1 anaysis.

Construction Phase - Assumes minimial grading, paving, and site prep as the lot has already previously been graded and ready for construction as a part of Phase 1.

Demolition -

Grading - No grading will occurr in the phase as it will be completed in Phase 1

Vehicle Trips - Revised based on the Traffic Study that assumes reduction of 40% of traffic through use with hotel. Trips are primary and not pass through.

Woodstoves -

Energy Use -

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Area Mitigation - Based on industry standards

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	50
tblAreaMitigation	UseLowVOCPaintParkingValue	150	100
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblLandUse	LotAcreage	0.09	0.15
tblProjectCharacteristics	OperationalYear	2018	2029
tblSequestration	NumberOfNewTrees	0.00	5.00
tblVehicleTrips	DV_TP	20.00	0.00
tblVehicleTrips	PB_TP	43.00	0.00
tblVehicleTrips	PR_TP	37.00	100.00
tblVehicleTrips	ST_TR	158.37	95.02
tblVehicleTrips	SU_TR	131.84	79.10
tblVehicleTrips	WD_TR	127.15	76.29

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2027	0.0801	0.3261	0.4245	7.1000e-004	3.2400e-003	0.0141	0.0173	1.0400e-003	0.0130	0.0141	0.0000	62.0190	62.0190	0.0183	0.0000	62.4758
Maximum	**0.0801**	**0.3261**	**0.4245**	**7.1000e-004**	**3.2400e-003**	**0.0141**	**0.0173**	**1.0400e-003**	**0.0130**	**0.0141**	**0.0000**	**62.0190**	**62.0190**	**0.0183**	**0.0000**	**62.4758**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2027	0.0801	0.3261	0.4245	7.1000e-004	2.6800e-003	0.0141	0.0168	8.0000e-004	0.0130	0.0138	0.0000	62.0189	62.0189	0.0183	0.0000	62.4758
Maximum	**0.0801**	**0.3261**	**0.4245**	**7.1000e-004**	**2.6800e-003**	**0.0141**	**0.0168**	**8.0000e-004**	**0.0130**	**0.0138**	**0.0000**	**62.0189**	**62.0189**	**0.0183**	**0.0000**	**62.4758**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**17.28**	**0.00**	**3.23**	**23.08**	**0.00**	**1.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Northeast Grover Beach Phase 3 - San Luis Obispo County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**3-15-2027**	**6-14-2027**	0.1980	0.1980
2	**6-15-2027**	**9-14-2027**	0.2054	0.2054
		Highest	0.2054	0.2054

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0203	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Energy	4.4900e-003	0.0408	0.0343	2.4000e-004		3.1000e-003	3.1000e-003		3.1000e-003	3.1000e-003	0.0000	82.9771	82.9771	2.5900e-003	1.1800e-003	83.3921
Mobile	0.0563	0.2236	0.5863	2.1600e-003	0.2459	1.6700e-003	0.2476	0.0658	1.5600e-003	0.0673	0.0000	198.5809	198.5809	6.7100e-003	0.0000	198.7487
Waste						0.0000	0.0000		0.0000	0.0000	9.6624	0.0000	9.6624	0.5710	0.0000	23.9381
Water						0.0000	0.0000		0.0000	0.0000	0.3852	1.9901	2.3753	0.0397	9.5000e-004	3.6505
Total	**0.0811**	**0.2644**	**0.6206**	**2.4000e-003**	**0.2459**	**4.7700e-003**	**0.2507**	**0.0658**	**4.6600e-003**	**0.0704**	**10.0476**	**283.5482**	**293.5958**	**0.6200**	**2.1300e-003**	**309.7296**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0163	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Energy	4.3600e-003	0.0396	0.0333	2.4000e-004		3.0100e-003	3.0100e-003		3.0100e-003	3.0100e-003	0.0000	78.4986	78.4986	2.4300e-003	1.1200e-003	78.8935
Mobile	0.0563	0.2236	0.5863	2.1600e-003	0.2459	1.6700e-003	0.2476	0.0658	1.5600e-003	0.0673	0.0000	198.5809	198.5809	6.7100e-003	0.0000	198.7487
Waste						0.0000	0.0000		0.0000	0.0000	7.2468	0.0000	7.2468	0.4283	0.0000	17.9536
Water						0.0000	0.0000		0.0000	0.0000	0.3082	1.6031	1.9112	0.0317	7.6000e-004	2.9314
Total	**0.0770**	**0.2632**	**0.6196**	**2.4000e-003**	**0.2459**	**4.6800e-003**	**0.2506**	**0.0658**	**4.5700e-003**	**0.0703**	**7.5549**	**278.6827**	**286.2376**	**0.4691**	**1.8800e-003**	**298.5274**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**5.02**	**0.45**	**0.16**	**0.00**	**0.00**	**1.89**	**0.04**	**0.00**	**1.93**	**0.13**	**24.81**	**1.72**	**2.51**	**24.33**	**11.74**	**3.62**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	3.5400
Vegetation Land Change	0.0000
Total	**3.5400**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/15/2027	3/26/2027	5	10	No demo as completed in Phase 1
2	Site Preparation	Site Preparation	3/27/2027	3/29/2027	5	1	
3	Grading	Grading	3/30/2027	3/31/2027	5	2	Grading will be minimal as site is already prepped
4	Building Construction	Building Construction	4/1/2027	8/18/2027	5	100	Construction of Hotel B
5	Paving	Paving	8/19/2027	8/25/2027	5	5	Pavement of infrastrucutre and parking lot
6	Architectural Coating	Architectural Coating	8/26/2027	9/1/2027	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 6,000; Non-Residential Outdoor: 2,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Northeast Grover Beach Phase 3 - San Luis Obispo County, Annual

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	2.00	1.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	13.00	5.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8700e-003	0.0255	0.0368	6.0000e-005		1.0500e-003	1.0500e-003		1.0000e-003	1.0000e-003	0.0000	5.2123	5.2123	9.3000e-004	0.0000	5.2357
Total	**2.8700e-003**	**0.0255**	**0.0368**	**6.0000e-005**	**0.0000**	**1.0500e-003**	**1.0500e-003**	**0.0000**	**1.0000e-003**	**1.0000e-003**	**0.0000**	**5.2123**	**5.2123**	**9.3000e-004**	**0.0000**	**5.2357**

3.2 Demolition - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	9.5000e-004	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3096	0.3096	1.0000e-005	0.0000	0.3098
Total	**1.4000e-004**	**1.0000e-004**	**9.5000e-004**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3096**	**0.3096**	**1.0000e-005**	**0.0000**	**0.3098**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8700e-003	0.0255	0.0368	6.0000e-005		1.0500e-003	1.0500e-003		1.0000e-003	1.0000e-003	0.0000	5.2123	5.2123	9.3000e-004	0.0000	5.2357
Total	**2.8700e-003**	**0.0255**	**0.0368**	**6.0000e-005**	**0.0000**	**1.0500e-003**	**1.0500e-003**	**0.0000**	**1.0000e-003**	**1.0000e-003**	**0.0000**	**5.2123**	**5.2123**	**9.3000e-004**	**0.0000**	**5.2357**

3.2 Demolition - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	9.5000e-004	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3096	0.3096	1.0000e-005	0.0000	0.3098
Total	**1.4000e-004**	**1.0000e-004**	**9.5000e-004**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3096**	**0.3096**	**1.0000e-005**	**0.0000**	**0.3098**

3.3 Site Preparation - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.2000e-004	2.4000e-003	1.9100e-003	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.4274	0.4274	1.4000e-004	0.0000	0.4309
Total	**2.2000e-004**	**2.4000e-003**	**1.9100e-003**	**0.0000**	**2.7000e-004**	**8.0000e-005**	**3.5000e-004**	**3.0000e-005**	**8.0000e-005**	**1.1000e-004**	**0.0000**	**0.4274**	**0.4274**	**1.4000e-004**	**0.0000**	**0.4309**

3.3 Site Preparation - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	5.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0155	0.0155	0.0000	0.0000	0.0155
Total	**1.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0155**	**0.0155**	**0.0000**	**0.0000**	**0.0155**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.2000e-004	0.0000	1.2000e-004	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.2000e-004	2.4000e-003	1.9100e-003	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.4274	0.4274	1.4000e-004	0.0000	0.4309
Total	**2.2000e-004**	**2.4000e-003**	**1.9100e-003**	**0.0000**	**1.2000e-004**	**8.0000e-005**	**2.0000e-004**	**1.0000e-005**	**8.0000e-005**	**9.0000e-005**	**0.0000**	**0.4274**	**0.4274**	**1.4000e-004**	**0.0000**	**0.4309**

3.3 Site Preparation - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	5.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0155	0.0155	0.0000	0.0000	0.0155
Total	**1.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0155**	**0.0155**	**0.0000**	**0.0000**	**0.0155**

3.4 Grading - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.7000e-004	5.1000e-003	7.3600e-003	1.0000e-005		2.1000e-004	2.1000e-004		2.0000e-004	2.0000e-004	0.0000	1.0425	1.0425	1.9000e-004	0.0000	1.0471
Total	**5.7000e-004**	**5.1000e-003**	**7.3600e-003**	**1.0000e-005**	**7.5000e-004**	**2.1000e-004**	**9.6000e-004**	**4.1000e-004**	**2.0000e-004**	**6.1000e-004**	**0.0000**	**1.0425**	**1.0425**	**1.9000e-004**	**0.0000**	**1.0471**

3.4 Grading - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	1.9000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0619	0.0619	0.0000	0.0000	0.0620
Total	**3.0000e-005**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0619**	**0.0619**	**0.0000**	**0.0000**	**0.0620**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.4000e-004	0.0000	3.4000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.7000e-004	5.1000e-003	7.3600e-003	1.0000e-005		2.1000e-004	2.1000e-004		2.0000e-004	2.0000e-004	0.0000	1.0425	1.0425	1.9000e-004	0.0000	1.0471
Total	**5.7000e-004**	**5.1000e-003**	**7.3600e-003**	**1.0000e-005**	**3.4000e-004**	**2.1000e-004**	**5.5000e-004**	**1.9000e-004**	**2.0000e-004**	**3.9000e-004**	**0.0000**	**1.0425**	**1.0425**	**1.9000e-004**	**0.0000**	**1.0471**

3.4 Grading - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	1.9000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0619	0.0619	0.0000	0.0000	0.0620
Total	**3.0000e-005**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0619**	**0.0619**	**0.0000**	**0.0000**	**0.0620**

3.5 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0276	0.2741	0.3514	5.7000e-004		0.0121	0.0121		0.0111	0.0111	0.0000	50.1479	50.1479	0.0162	0.0000	50.5533
Total	**0.0276**	**0.2741**	**0.3514**	**5.7000e-004**		**0.0121**	**0.0121**		**0.0111**	**0.0111**	**0.0000**	**50.1479**	**50.1479**	**0.0162**	**0.0000**	**50.5533**

3.5 Building Construction - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.4400e-003	9.2000e-004	1.0000e-005	2.3000e-004	0.0000	2.3000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9154	0.9154	5.0000e-005	0.0000	0.9167
Worker	2.9000e-004	1.9000e-004	1.9100e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	0.0000	2.6000e-004	0.0000	0.6193	0.6193	1.0000e-005	0.0000	0.6196
Total	**3.8000e-004**	**3.6300e-003**	**2.8300e-003**	**2.0000e-005**	**1.1900e-003**	**1.0000e-005**	**1.2000e-003**	**3.3000e-004**	**0.0000**	**3.3000e-004**	**0.0000**	**1.5347**	**1.5347**	**6.0000e-005**	**0.0000**	**1.5363**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0276	0.2741	0.3514	5.7000e-004		0.0121	0.0121		0.0111	0.0111	0.0000	50.1478	50.1478	0.0162	0.0000	50.5533
Total	**0.0276**	**0.2741**	**0.3514**	**5.7000e-004**		**0.0121**	**0.0121**		**0.0111**	**0.0111**	**0.0000**	**50.1478**	**50.1478**	**0.0162**	**0.0000**	**50.5533**

3.5 Building Construction - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.4400e-003	9.2000e-004	1.0000e-005	2.3000e-004	0.0000	2.3000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9154	0.9154	5.0000e-005	0.0000	0.9167
Worker	2.9000e-004	1.9000e-004	1.9100e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	0.0000	2.6000e-004	0.0000	0.6193	0.6193	1.0000e-005	0.0000	0.6196
Total	**3.8000e-004**	**3.6300e-003**	**2.8300e-003**	**2.0000e-005**	**1.1900e-003**	**1.0000e-005**	**1.2000e-003**	**3.3000e-004**	**0.0000**	**3.3000e-004**	**0.0000**	**1.5347**	**1.5347**	**6.0000e-005**	**0.0000**	**1.5363**

3.6 Paving - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.4100e-003	0.0123	0.0176	3.0000e-005		5.5000e-004	5.5000e-004		5.1000e-004	5.1000e-004	0.0000	2.3502	2.3502	6.8000e-004	0.0000	2.3673
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4100e-003**	**0.0123**	**0.0176**	**3.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.1000e-004**	**5.1000e-004**	**0.0000**	**2.3502**	**2.3502**	**6.8000e-004**	**0.0000**	**2.3673**

3.6 Paving - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	8.6000e-004	0.0000	4.3000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.2787	0.2787	1.0000e-005	0.0000	0.2788
Total	**1.3000e-004**	**9.0000e-005**	**8.6000e-004**	**0.0000**	**4.3000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.2787**	**0.2787**	**1.0000e-005**	**0.0000**	**0.2788**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.4100e-003	0.0123	0.0176	3.0000e-005		5.5000e-004	5.5000e-004		5.1000e-004	5.1000e-004	0.0000	2.3502	2.3502	6.8000e-004	0.0000	2.3673
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4100e-003**	**0.0123**	**0.0176**	**3.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.1000e-004**	**5.1000e-004**	**0.0000**	**2.3502**	**2.3502**	**6.8000e-004**	**0.0000**	**2.3673**

3.6 Paving - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	8.6000e-004	0.0000	4.3000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.2787	0.2787	1.0000e-005	0.0000	0.2788
Total	**1.3000e-004**	**9.0000e-005**	**8.6000e-004**	**0.0000**	**4.3000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.2787**	**0.2787**	**1.0000e-005**	**0.0000**	**0.2788**

3.7 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0464					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3000e-004	2.8600e-003	4.5200e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.6383	0.6383	3.0000e-005	0.0000	0.6392
Total	**0.0468**	**2.8600e-003**	**4.5200e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.6383**	**0.6383**	**3.0000e-005**	**0.0000**	**0.6392**

3.7 Architectural Coating - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0464					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3000e-004	2.8600e-003	4.5200e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.6383	0.6383	3.0000e-005	0.0000	0.6392
Total	**0.0468**	**2.8600e-003**	**4.5200e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.6383**	**0.6383**	**3.0000e-005**	**0.0000**	**0.6392**

3.7 Architectural Coating - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0563	0.2236	0.5863	2.1600e-003	0.2459	1.6700e-003	0.2476	0.0658	1.5600e-003	0.0673	0.0000	198.5809	198.5809	6.7100e-003	0.0000	198.7487
Unmitigated	0.0563	0.2236	0.5863	2.1600e-003	0.2459	1.6700e-003	0.2476	0.0658	1.5600e-003	0.0673	0.0000	198.5809	198.5809	6.7100e-003	0.0000	198.7487

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
High Turnover (Sit Down Restaurant)	305.16	380.08	316.40	656,373	656,373
Total	305.16	380.08	316.40	656,373	656,373

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
High Turnover (Sit Down	13.00	5.00	5.00	8.50	72.50	19.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
High Turnover (Sit Down Restaurant)	0.608496	0.025331	0.199033	0.105470	0.015540	0.004582	0.012543	0.019850	0.002252	0.001068	0.004308	0.000715	0.000811

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	35.3574	35.3574	1.6000e-003	3.3000e-004	35.4959
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	38.5400	38.5400	1.7400e-003	3.6000e-004	38.6910
NaturalGas Mitigated	4.3600e-003	0.0396	0.0333	2.4000e-004		3.0100e-003	3.0100e-003		3.0100e-003	3.0100e-003	0.0000	43.1412	43.1412	8.3000e-004	7.9000e-004	43.3976
NaturalGas Unmitigated	4.4900e-003	0.0408	0.0343	2.4000e-004		3.1000e-003	3.1000e-003		3.1000e-003	3.1000e-003	0.0000	44.4371	44.4371	8.5000e-004	8.1000e-004	44.7012

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	832720	4.4900e-003	0.0408	0.0343	2.4000e-004		3.1000e-003	3.1000e-003		3.1000e-003	3.1000e-003	0.0000	44.4371	44.4371	8.5000e-004	8.1000e-004	44.7012
Total		**4.4900e-003**	**0.0408**	**0.0343**	**2.4000e-004**		**3.1000e-003**	**3.1000e-003**		**3.1000e-003**	**3.1000e-003**	**0.0000**	**44.4371**	**44.4371**	**8.5000e-004**	**8.1000e-004**	**44.7012**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	808436	4.3600e-003	0.0396	0.0333	2.4000e-004		3.0100e-003	3.0100e-003		3.0100e-003	3.0100e-003	0.0000	43.1412	43.1412	8.3000e-004	7.9000e-004	43.3976
Total		**4.3600e-003**	**0.0396**	**0.0333**	**2.4000e-004**		**3.0100e-003**	**3.0100e-003**		**3.0100e-003**	**3.0100e-003**	**0.0000**	**43.1412**	**43.1412**	**8.3000e-004**	**7.9000e-004**	**43.3976**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
High Turnover (Sit Down Restaurant)	132480	38.5400	1.7400e-003	3.6000e-004	38.6910
Total		**38.5400**	**1.7400e-003**	**3.6000e-004**	**38.6910**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
High Turnover (Sit Down Restaurant)	121540	35.3574	1.6000e-003	3.3000e-004	35.4959
Total		**35.3574**	**1.6000e-003**	**3.3000e-004**	**35.4959**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0163	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Unmitigated	0.0203	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	4.6400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0156					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Total	**0.0203**	**0.0000**	**7.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0000**	**1.4000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	7.0000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0156					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Total	**0.0163**	**0.0000**	**7.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0000**	**1.4000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	1.9112	0.0317	7.6000e-004	2.9314
Unmitigated	2.3753	0.0397	9.5000e-004	3.6505

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	1.21413 / 0.077498	2.3753	0.0397	9.5000e-004	3.6505
Total		**2.3753**	**0.0397**	**9.5000e-004**	**3.6505**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	0.971308 / 0.0727706	1.9112	0.0317	7.6000e-004	2.9314
Total		**1.9112**	**0.0317**	**7.6000e-004**	**2.9314**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	7.2468	0.4283	0.0000	17.9536
Unmitigated	9.6624	0.5710	0.0000	23.9381

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	47.6	9.6624	0.5710	0.0000	23.9381
Total		**9.6624**	**0.5710**	**0.0000**	**23.9381**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	35.7	7.2468	0.4283	0.0000	17.9536
Total		**7.2468**	**0.4283**	**0.0000**	**17.9536**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	3.5400	0.0000	0.0000	3.5400

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Grassland	0 / 0	0.0000	0.0000	0.0000	0.0000
Wetlands	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	5	3.5400	0.0000	0.0000	3.5400
Total		**3.5400**	**0.0000**	**0.0000**	**3.5400**

APPENDIX B - BIOLOGICAL

EL CAMINO REAL DEVELOPMENT PROJECT
1598 EL CAMINO REAL – TRACT 3122
CITY OF GROVER BEACH, CA

BIOLOGICAL RESOURCES ASSESSMENT

November 15, 2018

Prepared for:

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TABLE OF CONTENTS

APPENDIX A – FIGURES

EL CAMINO REAL DEVELOPMENT PROJECT TRACT 3122

1.0 EXECUTIVE SUMMARY

The proposed project site is located at 1598 El Camino Real between Oak Park Boulevard and N. 12th Street in the City of Grover Beach, California. The approximately 7.29-acre rectangular shaped project site abuts urbanization on three sides with the Meadow Creek riparian corridor extending downstream to the west. The proposed project includes the construction of two hotels and a restaurant with associated access roads, replacement of the bridge over Meadow Creek to create appropriately sized primary access, parking, El Camino Real frontage improvements, appurtenant hotel amenities, and seven residential lots. A landscape buffer setback on the western project boundary and a riparian preservation and enhancement lot are included as mitigation for impacts on riparian habitat. The retention of oak trees and replacement oak plantings will preserve the oak canopy and associated values for nesting birds.

The project site supports grassland, oak woodland and riparian habitats with varied somewhat terraced topography with grassland on the higher ground to the south, a steep slope with a band of oak woodland running through the center of the site, down to a lower terrace of grassland and riparian habitat. The willow riparian habitat follows Meadow Creek and expands into the floodway through the northern portion of the site. A floristic inventory and rare plant survey and a protocol California red-legged frog survey were conducted as part of the biological resources analysis. No special-status plants species occur on the project site. Three juvenile California red-legged frogs were observed in Meadow Creek during a July 2018 survey. No other listed special-status wildlife species area expected.

The project will impact native plant communities from conversion to urbanization, reduce habitat for locally common wildlife (nesting birds), and reduce the riparian habitat along Meadow Creek near the planned culvert extension bridge replacement and El Camino Real frontage improvements. Planned onsite preservation and restoration of the Meadow Creek riparian habitat, oak tree retention, preconstruction and construction wildlife impact avoidance and minimization measures, and regulatory compliance permits/authorizations for impacts on waters of the U.S./State and the California red-legged frog would reduce potentially significant project impacts to a less than significant level.

Based on the findings described in this biological assessment establishing the existing conditions of biological resources within the project site, and incorporation of the recommended mitigation measures, implementation of the proposed project would not result in any substantial adverse effects on biological, botanical, wetland habitat resources. Therefore, with mitigation measures incorporated into the project, direct and indirect project impacts on biological resources are considered to be less than significant under CEQA.

2.0 INTRODUCTION AND PURPOSE

Sage Institute, Inc. (SII) has completed this biological resource assessment (SII BA) to describe and map the existing conditions within the project site. The purpose of this biological resources assessment is to document existing conditions of the proposed project site and to evaluate the potential for any direct or indirect potentially significant impacts on biological or wetland resources, or adverse effects on any rare, threatened, or endangered plant or wildlife species (special-status species). This report is intended to support the environmental review documentation process for the City of Grover Beach.

2.1 PROJECT LOCATION

The proposed project site is located at 1598 El Camino Real between Oak Park Boulevard and N. 12th Street in the City of Grover Beach, California. The approximately 7.29-acre rectangular shaped project site abuts El Camino Real and Highway 101 on the north, the Holiday Inn Express, AJ Spurs, and Oak Park Boulevard development to the east, vacant annual grassland on the south, and residential development and the continuation of the Meadow Creek riparian habitat to the west. Figure 1 and Figure 2 in Appendix A provide a regional topographic map and aerial photograph vicinity location map respectively.

2.2 PROJECT DESCRIPTION

The proposed project includes the construction of two hotels and a restaurant with associated access roads, parking, and appurtenant hotel amenities. Seven residential lots are included along the southern project area with a landscape buffer setback between existing residential development on the west property line. The single point of access to the site will be from El Camino Real and will require the replacement of the existing timber bridge over Meadow Creek that is not of sufficient size to accommodate the proposed development. Emergency access is provided from Oak Park Boulevard. The extension of sidewalk, curb and gutter along the El Camino Real frontage will replace a compacted dirt road shoulder. A riparian preservation and enhancement open space lot is included as mitigation for impacts on riparian habitat from the northern edge of development and the temporary access bridge replacement with a culvert extension. The retention of oak trees and replacement oak plantings will preserve and mitigate the oak canopy and associated values for nesting birds.

3.0 EXISTING CONDITIONS

The project site supports grassland, oak woodland and riparian habitats that appear to be the onsite conditions dating back to at least 1994. There are eucalyptus trees along the eastern border, oak trees scattered in the grassland, and an existing residence in the center of the site. The willow riparian habitat follows Meadow Creek and expands into the floodway through the northern portion of the site. The active Meadow Creek channel runs east to west in a mostly straight alignment close to the El Camino Real frontage. The site has varied somewhat terraced topography with grassland on the higher ground to the south, a steep slope with a band of oak woodland running through the center of the site, down to a lower terrace of grassland and riparian habitat as you move north to El Camino Real. Figure 4 provides a habitat map with detailed description in Section 5.0 below.

The approximately 7.29-acre rectangular shaped project site abuts existing development on the north and east borders with no overland connectivity to native habitats. A small patch of grassland to the south ends abruptly at residential development along Atlantic City Avenue, Balboa Street, and Oak Park Boulevard also eliminating any overland connectivity to native habitats. The surrounding existing development essentially creates a “dead end” for wildlife movement on three sides of the project site. Meadow Creek enters the site from a culvert under Highway 101 and follows a varied width riparian corridor to a lagoon system near Highway 1 and the Pacific Ocean. The riparian habitat narrows substantially just downstream of the project site at N. 12th Street along the Nacimiento Avenue residential development. Soils onsite mapped by the Natural Resources Conservation Service (NRCS; San Luis Obispo County, Coastal Part, 1984) include four mapping units as shown on Figure 3 and described below.

Corralitos Variant Loamy Sand – The Corralitos variant component makes up 85 percent of the map unit and occurs along alluvial fans and is occasionally flooded. The parent material consists of alluvium derived from sedimentary rock with a depth to a root restrictive layer of greater than 60 inches. This is a somewhat poorly drained soil with low shrink-swell potential. This soil does not meet hydric criteria.

Oceano Sand, 9-30% Slopes – The Oceano component makes up 85 percent of the map unit made up of stabilized dunes from aeolian deposit parent material. This is an excessively drained soil that is not flooded or not ponded and lacks any zone of water saturation within a depth of 72 inches. This soil does not meet hydric soil criteria.

Pismo Loamy Sand, 9 to 30% Slopes – The Pismo component makes up 85 percent of the map unit. Slopes are 9 to 30 percent. This component is on hills from parent material consisting of residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, paralithic, is 8 to 20 inches. This is a somewhat excessively drained soil with low shrink-swell potential, and is not flooded or ponded. This soil does not meet hydric criteria.

Pismo-Tierra Complex, 9 to 15 % Slopes – The Pismo component makes up 40 percent of the map unit from parent material consisting of residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, paralithic, is 8 to 20 inches. This is a somewhat excessively drained soil with low shrink-swell potential, and is not flooded or ponded. This soil does not meet hydric criteria.

The Tierra component makes up 30 percent of the map unit from parent material consisting of alluvium derived from sedimentary rock. Depth to a root restrictive layer, abrupt textural change, is 9 to 30 inches. This is a moderately well drained soil with high shrink swell potential. This soil is not flooded or ponded. This soil does not meet hydric criteria.

4.0 METHODS

SII conducted a review of available background information including the proposed project information, available aerial photographs dating back to 1994, NRCS Soils Survey information, and a search and review of the current California Natural Diversity Data Base (CNDDB, July 2018) within a five-mile search radius of the proposed project site (Figures 5 and 6). The five-mile radius was used as opposed to the typical 10-mile search radius that would have included areas well outside of the area not relevant to this study such as the urbanized south county, higher elevation mountain areas, or immediately coastal areas. The CNDDB provided a list with mapped locations and reports of special-status plant and wildlife species recorded occurrences, as well as natural communities of special concern that have been recorded within the region of the project site. The CNDDB records helped focus the field survey efforts and evaluation of potential project effects on specific species or habitats, but are not intended to be definitive in terms of presence/absence of special-status biological resources.

SII Principal Ecologist David Wolff, SII Principal Biologist Jason Kirschenstein, and SII Botanist Matthew Beyers conducted field reconnaissance surveys of the proposed project site on various dates and times from November 2017 to July 2018 (see Table 1 below). The purpose of the field surveys was to document existing conditions within the project site in terms of habitat for plants and wildlife species, and the potential to support special-status species, jurisdictional wetlands, riparian habitats, and/or waters of the U.S./State. Plant and wildlife species observed in the field were recorded. The study area habitat types were described by the aggregation of plants and wildlife based on the existing land use, and the composition and structure of the dominant vegetation observed at the time the field reconnaissance was conducted. The surveys afforded 100 percent visual coverage of the project area and were conducted at the appropriate times during which any potential special-status plant or wildlife species would have been noticeable and identifiable within the project area.

A floristic inventory and rare plant survey was conducted during the 2018 growing season focused on the species recorded in the CNDDB but specifically the formally listed Pismo clarkia and Nipomo Mesa lupine that are known from the region. Known reference sites for the Pismo clarkia and Nipomo Mesa lupine were visited to determine if they were noticeable and identifiable during the rare plant survey conducted over the project site. To ensure adequacy of the floristic inventory and rare plant survey, it was conducted in accordance with the guidelines recommended by the California Native Plant Society (CNPS), the California Department of Fish and Wildlife (CDFW), and U.S. Fish and Wildlife Service (USFWS) that includes:

- Conducting the survey at the proper time of year when rare plants are both evident and identifiable. The survey was conducted at the peak 2018 springtime flowering and growing season.
- Surveys that are floristic in nature. All plant species noted in the field were identified to the level necessary to determine if it is rare, threatened, or endangered.
- Field surveys were conducting using systematic field techniques in all habitats of the project site that ensured a thorough visual coverage.
- Multiple site visits were conducted to ensure that seasonal variations in the flowering period of the target species documented at a reference site are adequately covered.

A protocol California red-legged frog survey was conducted in accordance with the U.S. Fish and Wildlife Service August 2005 *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog.* These surveys included three daytime and four nighttime surveys along Meadow Creek within the project boundaries as shown in Table 1.

TABLE 1
SAGE INSTITUTE BIOLOGICAL RESOURCES FIELD RECONNAISSANCE DATES AND PERSONNEL

DATE	SURVEYOR	PURPOSE
11/29/2017	David Wolff, Principal Ecologist	Habitat Assessment; CRLF Daytime survey
1/3/18	David Wolff, Principal Ecologist	Nighttime CRLF survey
1/17/18	David Wolff, Principal Ecologist	Nighttime CRLF survey
3/15/18	Jason Kirschenstein, Principal Biologist	Oak tree inventory mapping
3/23/2018	David Wolff, Principal Ecologist	Habitat Assessment
4/6/2018	Matthew Beyers, Botanist	Floristic Inventory and Rare Plant Survey
5/8/18	David Wolff, Principal Ecologist	Nighttime CRLF survey
5/9/2018	Matthew Beyers, Botanist	Floristic Inventory and Rare Plant Survey
5/19/2018	Matthew Beyers, Botanist	Floristic Inventory and Rare Plant Survey
7/7/2018	David Wolff, Principal Ecologist	Habitat Assessment
7/18/18	David Wolff, Principal Ecologist	Daytime/Nighttime CRLF survey*
8/2/2018	David Wolff, Principal Ecologist	Habitat Assessment; CRLF Daytime survey*
8/21/2018	David Wolff, Principal Ecologist	Habitat Assessment; CRLF Daytime survey**
9/6/2018	David Wolff, Principal Ecologist	El Camino Real Frontage Assessment

CRLF = California Red-legged Frog
* = CRLF Observed
** = 10 Bullfrogs Observed; 1 CRLF Observed

SII reviewed the available background information, conducted general and focused biological resources field surveys, and David Wolff is the principal in charge of surveys and report preparation. The survey data collected on plant and wildlife species and conclusions presented in this biological assessment are based on the methods and field reconnaissance conducted over the project site, as described above.

5.0 RESULTS

5.1 PLANT COMMUNITIES

The plant communities within the study area are generally described by the assemblages of observed plant species that occur together in the same area forming habitat types. Plant community descriptions are generally based on *A Manual of California Vegetation, 2nd Edition* (Sawyer et al. 2009). Plant names used in this report follow *The Jepson Manual, Vascular Plants of California, Second Edition Thoroughly Revised and Expanded* (Baldwin et al. 2012). The following describes the plant communities and habitat characteristics observed within the study area. The project site supports three distinct plant communities along with residential development in the middle of the site are as follow: 1) disturbed non-native annual grassland; 2) arroyo willow riparian; and 3) coast live oak woodland. Figure 4 provides a habitat map and Figure 7 provides a set of representative photographs of the existing conditions of the project site. A list of plant species observed during the 2018 floristic inventory and rare plant survey is included in Table
B-1 in Appendix B

DISTURBED NON-NATIVE ANNUAL GRASSLAND (3.59 ACRES) – The disturbed annual grassland habitat is dominated by non-native annual grasses and herbaceous broadleaf plant species. Disturbed non-native annual grassland habitat occurs in the third of the site and between the oak woodland and riparian habitat on the north portion of the site. This habitat within the study area was observed to be very low in native species diversity. The southern patch of grassland was dominated by veldt grass (*Ehrharta calycina)* and rip gut brome (*Bromus diandrus*). The lower portion on the slopes below the oaks into the flat between the riparian habitat was dominated by rip gut brome and oats (*Avena sativa*). Representative broad leaf herbaceous species characterizing the grassland habitat included common fiddleneck (*Amsinckia intermedia),* mustards (*Brassica* spp.), filarees (*Erodium* spp.), miner's lettuce (*Claytonia perfoliata*), wild radish (*Raphanus sativus*), ox-tongue (*Helminthotheca echioides*), and telegraph weed (*Heterotheca grandiflora*). There is 3.57 acres of non-native annual grassland on the project site.

COAST LIVE OAK WOODLAND/WALNUT/EUCALYPTUS (1.51 ACRES)– A band of coast live oaks (*Quercus agrifolia*) runs on an east/west alignment on the topographic break through the center of the site. There are other scattered individual live oaks and northern California walnut trees (*Juglans hindsii*) in the grassland and bordering the riparian habitat. Several eucalyptus trees and palm trees intermingle with the oak woodland. The oaks onsite do not truly represent an oak woodland as it is a narrow band of oaks with dominant understory of cape ivy (*Delairea odorata*) and nasturtium (*Tropaeolum majus*), with the existing residence under part of the oaks as well. There is not a native shrub understory and even the non-native annual grassland species are precluded by the cape ivy and nasturtium limiting the oak woodland habitat values. There are 1.20 acres of coast live oak woodland canopy, 0.27 acre of eucalyptus canopy, and 0.04 acre of walnut canopy on the project site.

MEADOW CREEK ARROYO WILLOW RIPARIAN (2.01 ACRES)– Arroyo willow (*Salix lasiolepis)* is the dominant species in the patch of Meadow Creek arroyo willow riparian habitat mixed with some red willow (*Salix laevigata)* and black cottonwood (*Populus balsaifera),* and northern California black walnut. Understory of the riparian habitat was dominated by California blackberry (*Rubus ursinus*), poison hemlock (*Conium maculatum*), poison oak (*Toxicodendron diversiloba*), and yellow sweetclover (*Melilotus indicus*). The invasive trailing vines cape ivy and English ivy (*Hedera helix*) occur in the riparian habitat as well. There are several cleared trails/pathways creating openings in the riparian. Meadow Creek runs along the northern edge of the site in a linear channel alignment with an approximately 10-foot wide bank-to-bank width. The riparian habitat extends well beyond the creek channel in the lower floodway of the site.

DEVELOPED (0.30 ACRE) – The developed areas are composed of the existing residence, access driveway from El Camino Real, and compacted road shoulder along the edge of pavement on El Camino Real. There are no landscape plantings around the residence but mostly maintained (mowed) non-native grassland under the oak canopy.

5.2 WILDLIFE

The habitat mosaic of patches of non-native annual grassland, oak trees/woodland, and riparian habitat on the project site can provide habitat for a variety of wildlife species. The project site is at the “end of the road” for wildlife habitat as described above because it is surrounded by urbanization. However, several common species have become adapted to the developed environment such as raccoons, opossums, ground squirrels, gophers, and other common rodents, and reptiles. The oak tree canopy can provide nesting habitat for a variety of resident and migratory birds. Given that the site is surrounded by a mix of urban uses, the site can be considered generally low in wildlife values as there is no overland connectivity to other natural habitat areas to the north, east, or south. The riparian corridor along Meadow Creek provides connectivity downstream but is compromised west of N. 12th Street where the riparian habitat narrows substantially along residential development. Interestingly, there are two regularly maintained beaver (*Castor canadensis*) dams in the onsite reach of Meadow Creek that creates backwater ponding up to the existing access bridge that would otherwise be a dry season trickle flow. No beavers have been observed during SII field surveys (such as nighttime CRLF surveys), but clearly they are active in that onsite reach of Meadow Creek.

Wildlife observed during the SII field visits were mostly locally common species including abundant evidence of Botta’s pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), western fence lizard (*Sceloporus occidentalis*), and gopher snake (*Pituophis melanoleucus*). Birds observed included Bewick's wren (*Thryomanes bewickii*), black-headed grosbeak (*Pheucticus melanocephalus*), Pacific-slope flycatcher (*Empidonax difficillis*), Chestnut-backed chickadee (*Poecile rufescens*), Anna’s hummingbird (*Calypte anna*), California scrub jay (*Aphelocoma californica*), acorn woodpecker (*Melanerpes formicivorus*), house finch (*Haemorhous mexicanus*), song sparrow (*Melospiza melodia*), white-crowned sparrow (*Zonotrichia albicollis*) spotted towhee (*Pipilo maculatus*), California towhee (*Melozone crissalis*), northern mockingbird (*Mimus polyglottos*), turkey vulture (*Cathartes aura*), and red-tailed hawk (*Buteo jamaicensis*). Pacific tree frogs (*Pseudacris regilla*) and California red-legged frogs (*Rana draytonii*) were observed in Meadow Creek.

5.3 WATERS OF THE U.S./STATE – JURISDICTIONAL DETERMINATION

Meadow Creek enters the site via a culvert under Highway 101 to an outfall at the northeast corner of the site. Meadow Creek channel runs along the northern edge of the site in a straight linear alignment with an approximately 10-foot wide bank-to-bank width that represents the Ordinary High Water Mark (OHWM). The OHWM typically represents the limits/extent of waters of the U.S. subject to U.S. Army Corps of Engineers (Corps) Clean Water Act (CWA) Section 404 regulations. Meadow Creek to the outside extent of arroyo willow riparian habitat and would be considered waters of the State by the California Department of Fish and Wildlife (CDFW) subject to Fish and Game Code Section 1600 et. seq. (Streambed Alteration Agreements) regulations (see Figure 4). The Regional Water Quality Control Board (RWQCB) administers the CWA Section 401 water quality certification program that covers waters of the U.S. and also exerts jurisdiction over waters of the State similarly to the CDFW.

5.4 SPECIAL-STATUS SPECIES AND NATURAL COMMUNITIES OF SPECIAL CONCERN

Special-status species are those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the United States Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) under the federal Endangered Species Act (FESA); those considered "species of concern" by the USFWS; those listed or proposed for listing as rare, threatened, or endangered by the CDFW under the California Endangered Species Act (CESA); animals designated as "Species of Special Concern" by the CDFW; and plants occurring on lists 1B, 2, and 4 of the CNPS *Inventory of Rare and Endangered Vascular Plants of California.* Natural Communities of Special Concern are habitat types considered rare and worthy of tracking in the California Natural Diversity Database (CNDDB) by the CNPS and CDFW because of their limited distribution or historic loss over time. The Fish and Game Code of California sections 3503 and 3503.5 (raptors specifically) protect birds from take that is interpreted to include the destruction of active bird nests or disturbance to active bird nests that could lead to nest abandonment or failure of the reproductive effort. This applies to both special-status and common resident and migratory birds. The Migratory Bird Treaty Act also protects migratory birds from take.

The search and review of the CNDDB revealed numerous historic and extant (presumed existing) occurrences of special-status plant and wildlife species within the five-mile search radius of the project site. Figures 5A and 5B in Appendix A provides a map and list of the CNDDB special-status plant and wildlife species respectively with recorded occurrences falling within the five-miles of the project site. Table B-2 in Appendix B provides a list of the CNDDB species recorded within the five-mile radius with common and scientific names, listing status, specific habitat detail, and findings regarding the suitability of the site to support these species. The following briefly describes or summarizes the special-status species issues and observations or potential for occurrence on the project site.

5.4.1 Special-Status Botanical Resources

The CNDDB search revealed the recorded occurrences of 30 special-status plant species and four natural communities of special concern within a five-mile radius of the project site. While the CNDDB list is exhaustive, most of the species and natural communities are associated with specific soil types, such as serpentine or other rock outcrops, heavy clay soils, sands, or specific habitat characteristics such as seasonal wetlands that (except for sandy soils) are lacking in the project area. No natural communities of special concern were recorded by the CNDDB on the project site and based on SII field surveys do not occur on the project site.

The springtime floristic inventory and rare plant survey conducted on the project site identified all plant species observed to determine if any rare, threatened or endangered plant species occur on the project site. The reference sites for Pismo clarkia and Nipomo Mesa lupine, used to draw comparison with the project site, would have been noticeable and identifiable during the rare plant survey period. No rare, threatened, or endangered plant species were observed within the project area during the SII 2018 field surveys. Table B-1 in Appendix B provides a list of all plant species observed during the SII 2018 floristic inventory and rare plant survey.

5.4.2 Special-Status Wildlife

The CNDDB search revealed the recorded occurrences of 19 special-status wildlife species within the five-mile search radius of the project site. Special-status wildlife species known from the region evaluated for this study have specific habitat use requirements (i.e., coastal dunes, terrestrial or aquatic). The following summarizes the potential for special-status wildlife species to occur within the project site.

Aquatic Species – The CNDDB has recorded occurrences of the tidewater goby (*Eucyclogobius newberryi*), steelhead (*Oncorhynchus mykiss)*, California red-legged frog (*Rana draytonii:* CRLF), and western pond turtle (*Emys marmorata*) within the five-mile search radius. All these species require highly aquatic habitat that is represented by Meadow Creek in the project site. The project site is outside the estuarine range of the tidewater goby. As noted above, the beaver dams create a backwater ponding in Meadow Creek that otherwise appears to be only a dry season trickle flow, with flushing flows during periods of rainfall. Meadow Creek is not a documented steelhead stream and would not be expected to occur in the stagnant backwater in the project area and with the long culvert under Highway 101 creating a substantial barrier to upstream migration. The western pond turtle was not observed during numerous CRLF surveys. The California red-legged frog was observed in Meadow Creek during the July 18, 2018 SII nighttime survey and affirmed on August 2 and 21, 2018 daytime surveys. Three juvenile CRLF were observed on August 2nd, and one CRLF juvenile along with ten juvenile bullfrogs were observed on the August 21st daytime survey. Prior to these observation, no CRLF, bullfrogs, tadpoles or any obvious macro-invertebrate aquatic life were observed in the onsite reach of creek during the CRLF surveys. The CRLF and bullfrogs may likely be dispersing from upstream and/or downstream undocumented locations. The beavers had constructed a dam at the existing bridge crossing in August that was ponding water back into the culvert that may have encouraged dispersal into this reach of creek from elsewhere that was not observed ponded in previous dry season surveys.

Upland Species – The CNDDB includes occurrences for species restricted to the coastal strand (right along the beach), estuarine, or coastal dune systems such as the California black rail (*Laterallus jamaicensis coturniculus*), California least tern (*Sternula antillarum browni*), western snowy plover (*Charadrius alexandrinus nivosus*), and the coastal/dune invertebrates Oso Flaco flightless moth, Oso Flaco patch butterfly, Oso Flaco robber fly, and white sand bear scarab beetle (see Table B-2). The project site does not support suitable habitat for any of these species. The few isolated eucalyptus trees do not provide suitable winter roost habitat for the monarch butterfly. The grass dominated onsite ground cover does not represent suitable habitat for the obscure bumblebee that ranges from California to Washington with little data supporting actual distribution and abundance.

The sandy and friable onsite soils are suitable for the northern California legless lizard (*Anniella pulchra*). None were readily observed during field surveys, however, a focused effort to find them was not conducted (raking through soils). There was no evidence of badger dens that have a characteristic "half-moon" shape with claw marks. The tricolored blackbird nests in cattail/tule marshes and thickets that are not present on the project site and would not be expected to occur. The site does not support suitable roost habitat nor are any present for the Townsend's big-eared bat that uses caves, crevices in rocks, and buildings.

6.0 IMPACT ASSESSMENT AND RECOMMENDED MITIGATION MEASURES

SII reviewed available background information and conducted multiple field surveys of the project site from November 2017 to August 2018. The field surveys included a floristic inventory and rare plant survey, and protocol California red-legged frog survey. The available data and field surveys provided sufficient information to establish existing conditions of the project site for plant and wildlife species, to evaluate potential project impacts on biological resources, and to identify any potentially significant impacts that may result from project implementation.

6.1 IMPACT ASSESSMENT

Implementation of the proposed project would result in the conversion of non-native annual grassland, oak woodland, and arroyo willow riparian habitat to urbanized uses for the hotels, restaurant, residential lots, parking, bridge replacement, and El Camino Real frontage sidewalk improvements. Replacing the existing timber bridge access to the site with a culvert extension would impact Meadow Creek with placement of a culvert structure and wingwalls in and across the creek, and vegetated rock slope protection downstream of the culvert extension. The following habitat impacts would result from the proposed project (see details in Figure 6):

- Non-native annual grassland: 3.58 acres
- Coast live oak woodland/eucalyptus/walnut tree canopy: 0.76 acre
- Arroyo willow riparian: 0.57 acre
  - 0.38 acre fill slope for development, lift station, and drainage outfall;
  - 0.15 acre entry road/culvert and rock slope protection;
  - 0.04 acre El Camino Real sidewalk frontage improvements
- Developed: 0.26 acre (existing roads, buildings, and El Camino Real road shoulder)

The conversion of native habitat types to developed urbanized uses would result in the loss of habitat for locally common plant and wildlife species, potential impacts on nesting resident and migratory birds, loss of riparian habitat associated with Meadow Creek, and potential impacts on the California red-legged frog. There would be no impacts on any rare, threatened or endangered plant species as none were observed during the 2018 floristic inventory and rare plant survey. **These would be considered potentially significant impacts requiring mitigation.**

Implementation of the proposed project would remove 14 healthy and eight dead/damaged coast live oak trees, impact five oak tree root zones, and retain 30 healthy coast live oak trees mostly in the woodland configuration through the center of the site (see figure 6). No oak trees would be removed for the El Camino Real frontage improvements. Based on the City required oak tree mitigation of a 5:1 ratio for oak trees removed, and a 3:1 ratio for oak trees damaged, 155 15-gallon replacement coast live oak trees will be planted onsite (37 will be planted as part of the riparian enhancement) in accordance with City policy. **As such, with oak tree replacement mitigation included as part of the proposed project, this would be considered a less than significant impact. No mitigation required.**

6.2 IMPACT STATEMENTS AND RECOMMENDED MITIGATION MEASURES

The following mitigation measures are recommended to avoid, minimize and compensate for potentially significant impacts on biological resources.

Ground Dwelling Wildlife. Implementation of the proposed project could result in the displacement of common and special-status (badger or legless lizard) ground dwelling wildlife. This is considered to be a potentially significant impact. Implementation of the following mitigation measures would reduce the potentially significant impact to a less-than-significant level.

MM BIO-1 Ground Dwelling Wildlife Impact Minimization

- *Prior to ground disturbing activities, a qualified biologist shall conduct a pre-construction survey within 30 days of initial ground disturbance* (*clearing, grubbing, grading*) *to identify whether any non-listed special-status upland wildlife species* (*i.e. northern California legless lizard; American badger*) *are using any portion of the project area where ground disturbance is proposed. Results of the pre-construction survey will be used to focus construction monitoring activities to salvage and relocate ground dwelling wildlife to the extent feasible.*
- *Highly visible construction fencing shall be placed around project elements to clearly delineate the limits of disturbance. No work shall be allowed outside of the delineated construction limits.*
- *A biological monitor shall be present during initial ground disturbing and vegetation removal activities to attempt active/passive relocation efforts for the ground dwelling wildlife that may be present such as the legless lizard, and common reptiles and small mammals. Salvaged individuals will be relocated to the riparian preservation area.*
- *Active natal American badger dens shall be avoided until the young are self-sufficient as determined by a qualified biologist. Then passive relocation efforts shall be implemented to avoid and minimize injury or mortality to any badgers.*

Nesting Birds. Implementation of the proposed project oak tree removal, and riparian and grassland impacts could result in the destruction of active bird nests or the disruption in the reproductive effort from abandonment of the nest and young birds if activities are conducted during the nesting season typically February 1st to August 31st. This is considered to be a potentially significant impact. Implementation of the following mitigation measures would reduce the potentially significant impact to a level of insignificance.

MM BIO-2: Vegetation removal and initial site disturbance for any project elements shall be conducted between September 1st and January 31st outside of the nesting season for birds. If vegetation removal is planned for the bird nesting season (February 1st to August 31st), then preconstruction nesting bird surveys shall be required to determine if any active nests would be impacted by project construction. If no active nests are found, then no further mitigation shall be required.

If any active nests are found that would be impacted by construction, then the nest sites shall be avoided with the establishment of a non-disturbance buffer zone around active nests as determined by a qualified biologist. Preferred non-disturbance buffers of 250 feet for passerines and 500-feet for raptors are recommended. Buffer zones may be adjusted based on sight lines, noise barriers, or other factors between the nest and project activities as determined by a qualified biologist. Nest sites shall be avoided and protected with the non-disturbance buffer zone until the adults and young of the year are no longer reliant on the nest site for survival as determined by a qualified biologist. As such, avoiding disturbance or take of an active nest would reduce potential impacts on nesting birds to a less-than-significant level.

<u>California Red-Legged Frog.</u> Implementation of the proposed project entry road culvert extension in Meadow Creek replacing the existing bridge, and El Camino Real frontage improvements (sidewalk) could result in the take of the California red-legged frog (mortality and/or displacement of individuals) that is protected as a threatened species under the Federal Endangered Species Act. As such, the proposed project may affect, and is likely to adversely affect, the California red-legged frog. This is considered to be a potentially significant impact. Implementation of the following mitigation measures would reduce the potentially significant impact to a level of insignificance.

MM BIO-3 Prior to commencement of any ground disturbing activities, the applicant shall obtain compliance with the Federal Endangered Species Act (FESA) for potential impacts on the California red-legged frog in the form of a take permits/authorizations or written documentation from the U.S. Fish and Wildlife Service (USFWS) that the proposed project would not result in take of the California red-legged frog, or would not otherwise adversely affect the species. Should a take permit/authorization be required, or conditions imposed by the USFWS to ensure that take is avoided and minimized (e.g. capture and relocation of individuals out of harm's way), the applicant shall implement all the terms and conditions of the USFWS permit or authorization recommendations to the satisfaction of the USFWS. The USFWS can only provide take authorization for projects that demonstrate the species affected would be left in as good as or better condition than before the project was implemented. Additionally, the USFWS cannot authorize any project that would jeopardize the continued existence of a listed species. The proposed project includes the preservation of Meadow Creek and the preservation/restoration of 1.63 acres of willow riparian habitat (Lot 12 and El Camino frontage) that restores and preserves habitat for the CRLF. As such, the proposed habitat preservation/restoration and regulatory compliance as described above would reduce potential impacts on the California red-legged frog to a less-than-significant level.

<u>Waters of the U.S./State/Riparian Habitat.</u> Implementation of the proposed project would result in impacts on Meadow Creek riparian habitat considered to be waters of the U.S./State that includes 0.15 acre of creek and riparian habitat impacts for the culvert extension, rock slope protection for localized impacts from the increased culvert size, entrance road replacement of the existing entry road access and bridge,; 0.38 acre of willow riparian habitat for the fill slope along the north edge of site development, lift station and local drainage outfall structure; and 0.04 acre of impacts for the El Camino Real frontage sidewalk improvements. The outfall structure included in the development footprint is for energy dissipation for minimal existing local drainage and not a discharge point for onsite development. This is considered to be a potentially significant impact. The proposed project includes the preservation of Meadow Creek and the preservation/restoration of 1.63 acres of willow riparian habitat (Lot 12) that preserves habitat for the riparian/creek associated species. The project includes the restoration of the open areas of the riparian canopy in the open space Lot 12 with native

riparian trees and shrubs, and incorporating native seed mix and willow sprigging into the rock slope protection to reduce localized impacts from the wider culvert extension. As such, the 2.9:1 onsite riparian habitat preservation and enhancement mitigation for Meadow Creek riparian habitat impacts, and implementation of the following mitigation measures to affirm acceptable regulatory compliance would reduce potentially significant impacts on waters of the U.S./State to a less than significant level.

MM BIO-4 The applicant shall obtain Clean Water Act (CWA) regulatory compliance in the form of a permit from the Corps or written documentation from the Corps that no permit would be required for the proposed bridge replacement, the applicant shall implement all the terms and conditions of the permit to the satisfaction of the Corps. Corps permits and authorizations require applicants to demonstrate that the proposed project has been designed and will be implemented in a manner that avoids and minimizes impacts on aquatic resources. Compliance with Corps permitting would also include obtaining and CWA 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB). In addition, the Corps and RWQCB may require additional onsite or offsite compensatory mitigation for unavoidable permanent impacts on non-wetland waters of the U.S. habitat to achieve the goal of a no net loss of aquatic resources values and functions. As such, with implementation of the 2.9:1 ratio of Meadow Creek riparian habitat preservation and enhancement mitigation (Lot 12) and regulatory compliance would reduce potential impacts on waters of the U.S. to a less-than-significant level.

MM BIO-5: The applicant shall obtain compliance with Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) in the form of a completed Streambed Alteration Agreement or written documentation from the CDFW that no agreement would be required for the proposed bridge replacement and willow riparian habitat removal. Should an agreement be required, the applicant shall implement all the terms and conditions of the agreement to the satisfaction of the CDFW. The CDFW Streambed Alteration Agreement process encourages applicants to demonstrate that the proposed project has been designed and will be implemented in a manner that avoids and minimizes impacts in the stream zone. In addition, CDFW may require additional onsite or offsite compensatory mitigation for unavoidable impacts riparian habitat. As such, with implementation of the 2.9:1 ratio of Meadow Creek riparian habitat preservation and enhancement mitigation (Lot 12) and regulatory compliance would reduce potential impacts on waters of the U.S. to a less-than-significant level.

7.0 CONCLUSIONS

Based on the findings described above establishing the existing conditions of biological resources within the project site and incorporation of the recommended mitigation measures, implementation of the proposed project would not result in any substantial adverse effects on biological, botanical, wetland habitat resources. Therefore, with project elements to minimize and compensate for impacts on oak trees and riparian habitat, and mitigation measures incorporated into the project, direct and indirect project impacts on biological resources would be considered to be at a less than significant level under CEQA.

8.0 REFERENCES

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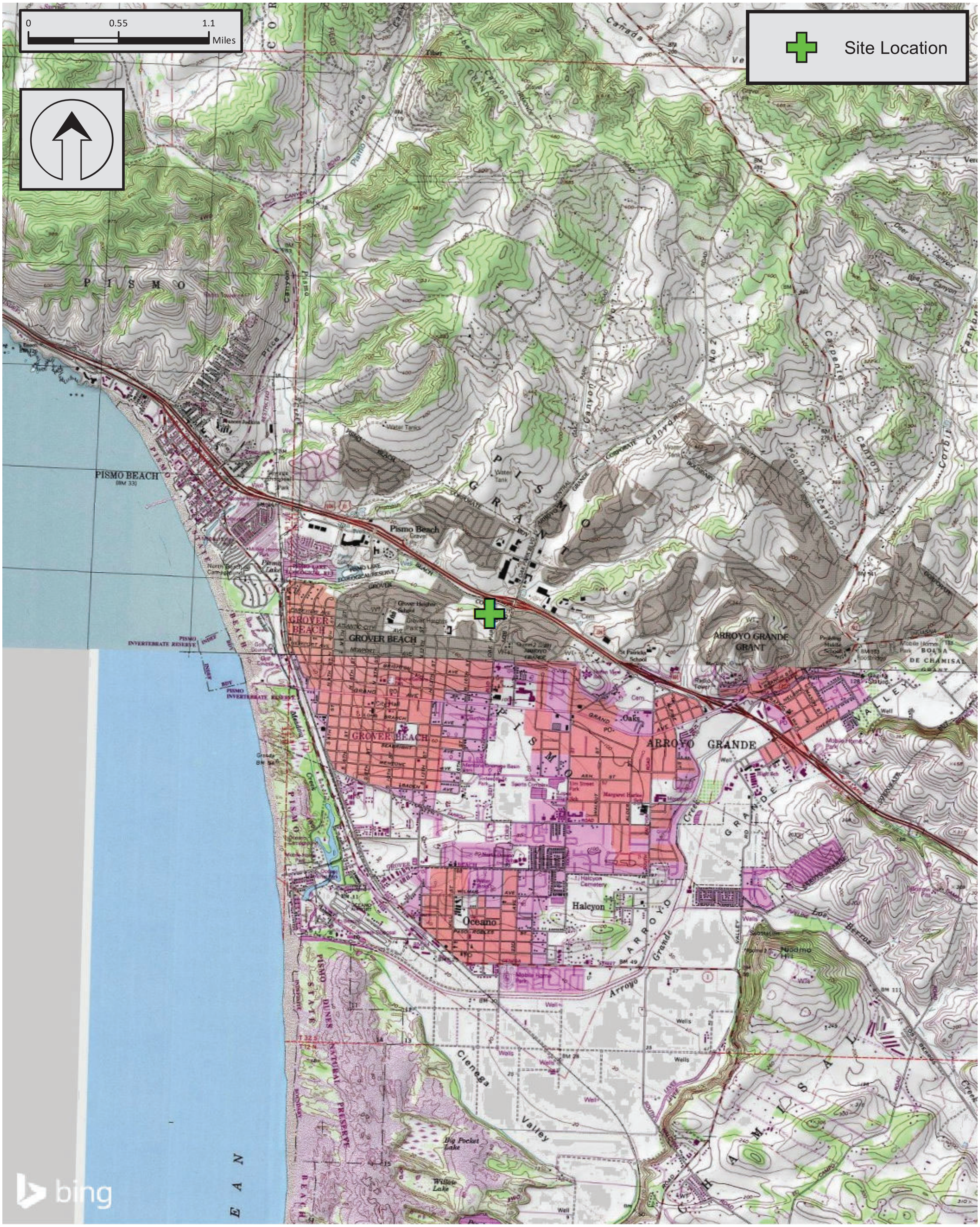
APPENDIX A

FIGURES



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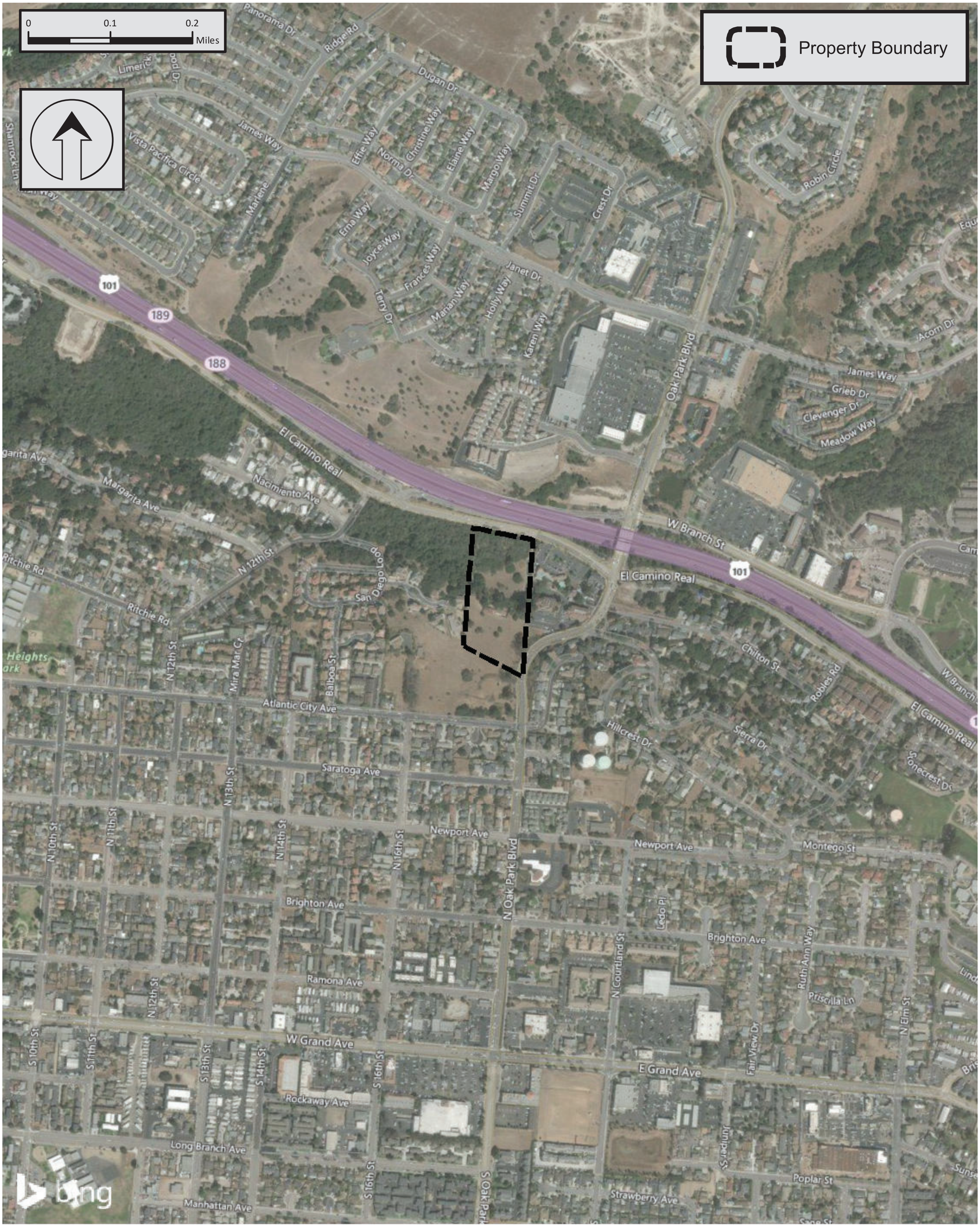
updated: 07/18/2018

El Camino Real Development, Grover Beach, CA	Figure 1
Ram Krupa Real Estate LLC	Regional Location Map



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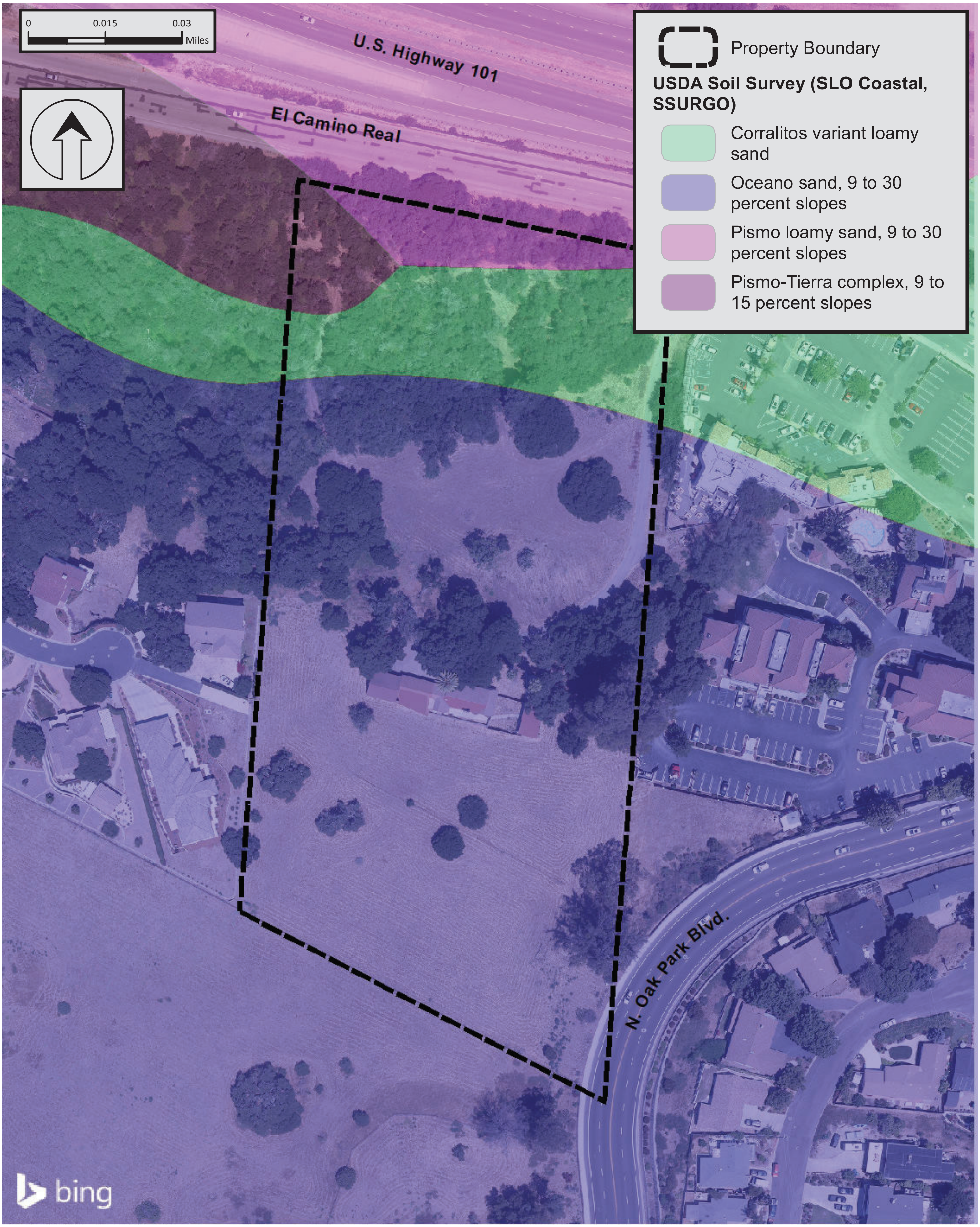
El Camino Real Development, Grover Beach, CA

Figure 2

Ram Krupa Real Estate LLC

Vicinity Location Map



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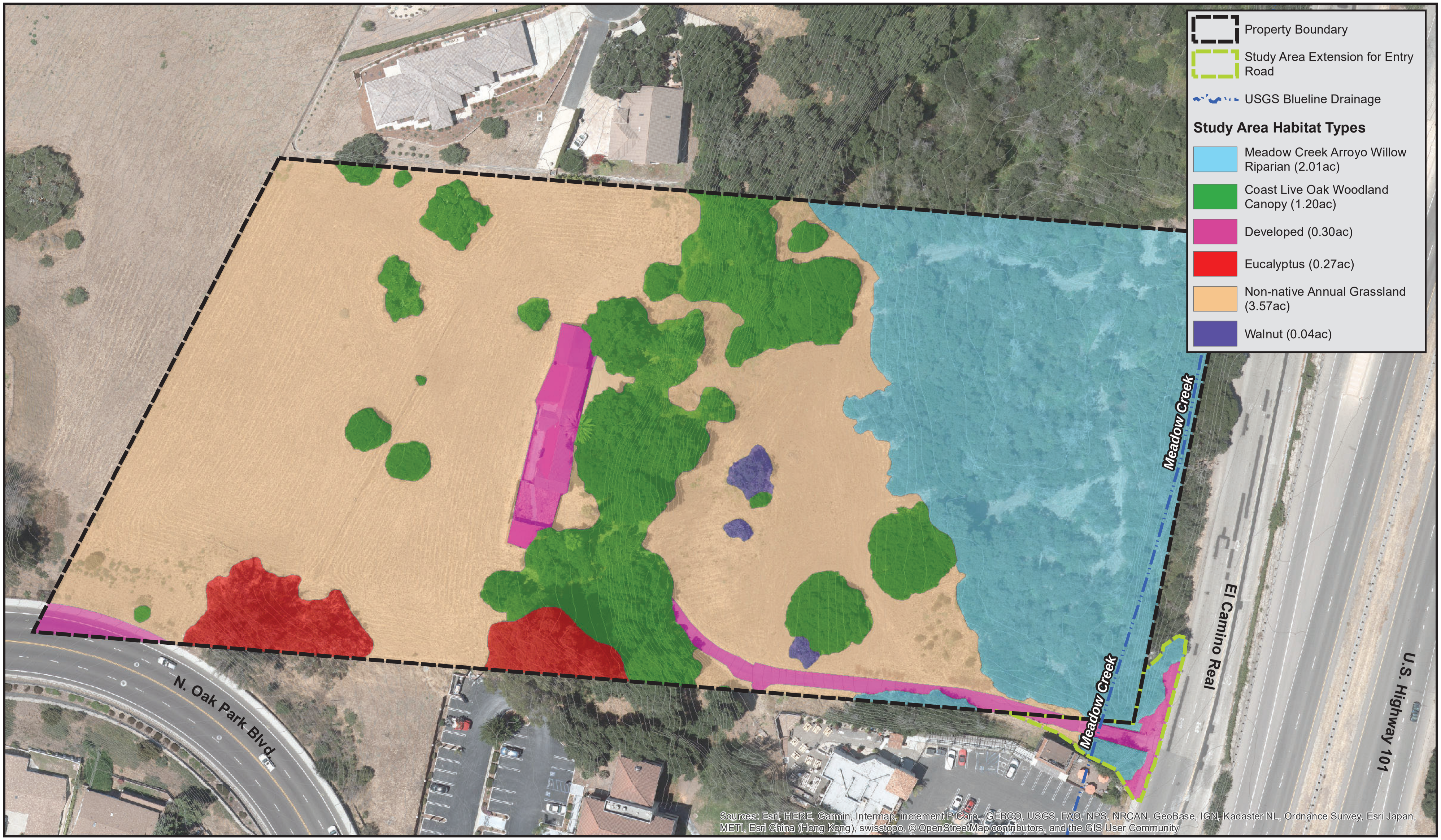
El Camino Real Development, Grover Beach, CA

Ram Krupa Real Estate LLC

Figure 3

Soils Map



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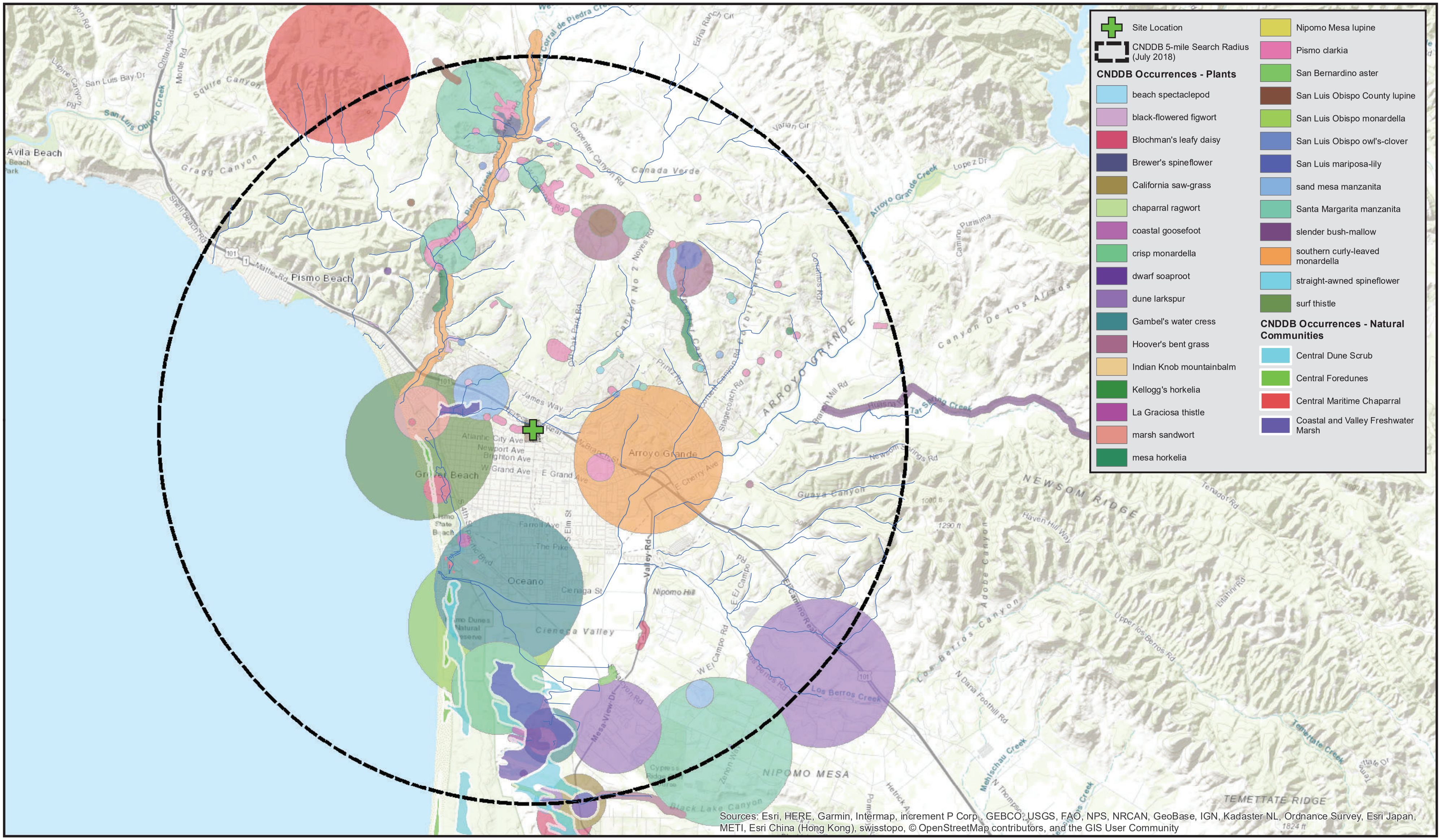
El Camino Real Development, Grover Beach, CA

Ram Krupa Real Estate LLC

Figure 4

Habitat Map



sage institute inc

map updated 07/19/18

Feet: 0 1,900 3,800 7,600 11,400 15,200

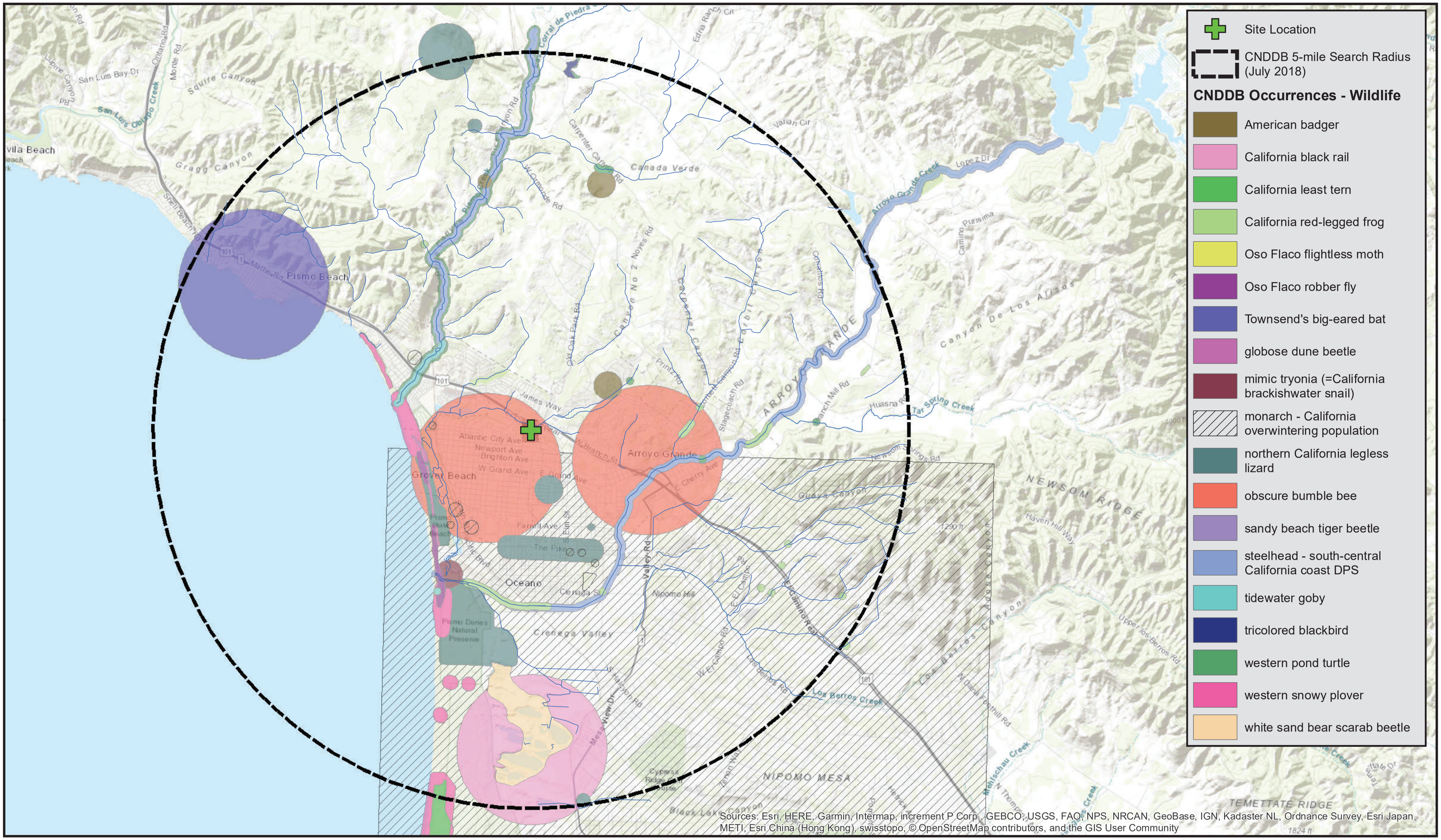
Meters: 0 1,150 2,300 4,600

El Camino Real Development, Grover Beach, CA

Ram Krupa Real Estate LLC

Figure 5A

CNDDB-Botanical (5-mile radius)



sage institute inc

map updated 07/19/18

Feet: 0, 1,900, 3,800, 7,600, 11,400, 15,200

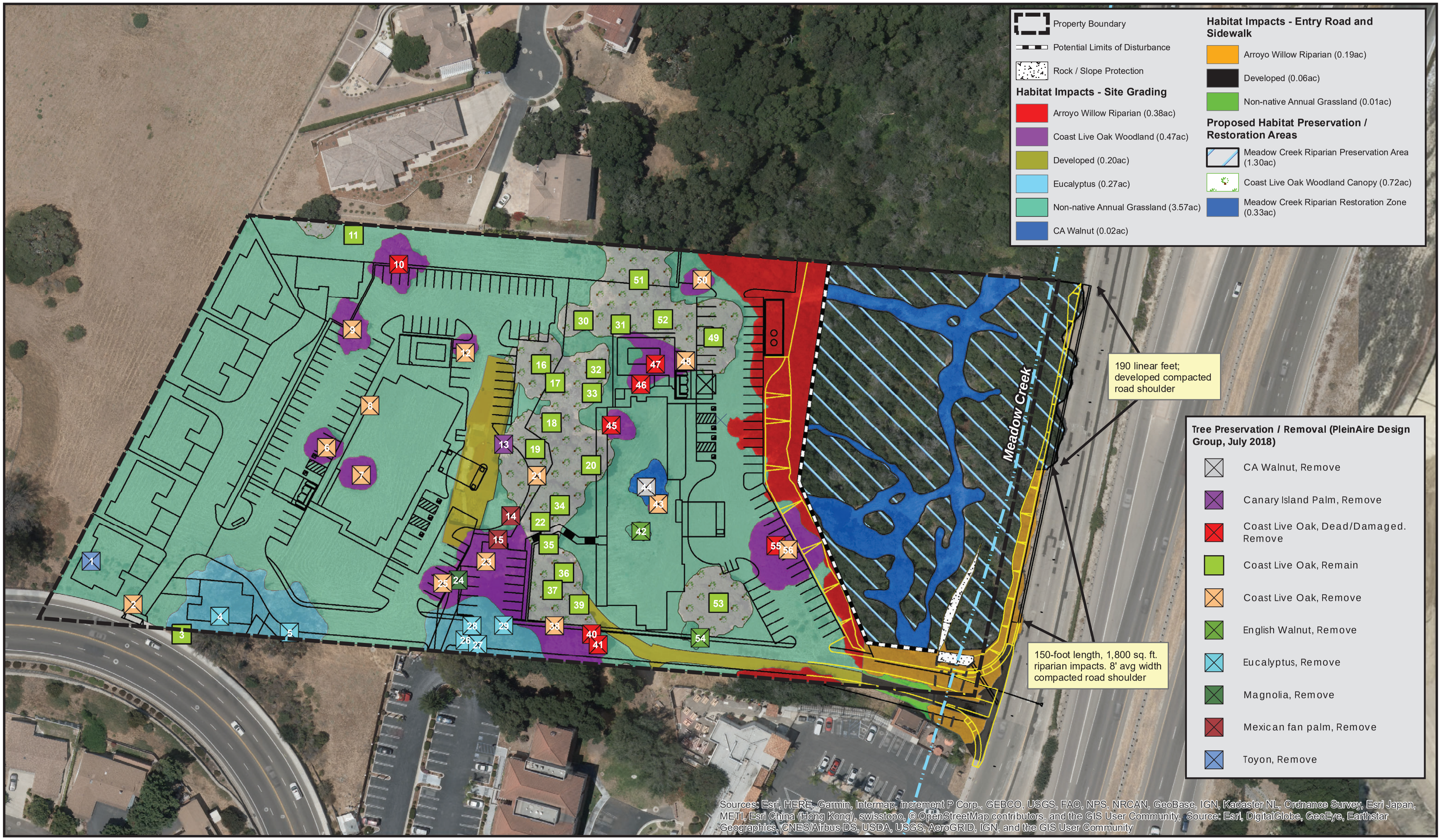
Meters: 0, 1,150, 2,300, 4,600

El Camino Real Development, Grover Beach, CA

Ram Krupa Real Estate LLC

Figure 5B

CNDDB - Wildlife (5-mile radius)



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El Camino Real Development, Grover Beach, CA

Ram Krupa Real Estate LLC

Figure 6

Project Impact and Mitigation

Photo 1: View west towards El Camino Real at existing bridge and access entry to site over Meadow Creek and arroyo will riparian habitat. **4/6/2018**

Photo 2: View west at arrow willow riparian habitat that extends in to the Meadow Creek floodway. California blackberry and non-native grassland understory. **4/6/2018**

Photo 3: View east (upstream) at Meadow Creek showing backwater ponding within creek banks from downstream beaver dams. **7/18/2018**

Photo 4: View west (downstream) at Meadow Creek showing backwater ponding from downstream beaver dams. Three CA red-legged frog observed around arrow. **7/18/2018**

Photo 5: View northeast at non-native grassland, scattered oaks and Meadow Creek riparian habitat in background. Existing access bridge/road at arrow. **4/6/2018**

Photo 6: View east along ecotone of riparian habitat and grassland along the flat north area of the site. Isolated oaks and hillside of oaks in background. **5/19/2018**

Photo 7: View south at line of oak woodland following along the topographic break in the center of the site. Residence is just beyond the oaks at the top of the hill. **4/6/2018**

Photo 8: View east along line of oak woodland followign along the topographic break in the center of the site. Cape ivy and English ivy understory. **4/6/2018**

Photo 9: View northeast at existing residence at edge of oak woodland in center of the site. Veldt grass dominated grassland in the southern portion of the site. **4/6/2018**

Photo 10: View east at existing residense at edge of oak woodland in center of the site. Veldt grass dominated grassland in the southern portion of the site.. **4/6/2018**

Photo 11: View northwest at veldt grass dominated grassland in the north area of the site. Existing residence in background at topographic break in center of site. **5/19/2018**

Photo 12: View north at veldt grass dominated grassland towards existing residence, oaks, eucalyptus, and adjacent hotel in background. **5/19/2018**

Photo 13: View west along El Camino Real frontage from current site access at compacted dirt road shoulder & Meadow Creek willow riparian habitat edge impact area. **9/6/2018**

Photo 14: : View east along El Camino Real frontage at existing compacted dirt road shoulder and Meadow Creek willow riparian habitat edge impact area. **9/6/2018**

Photo 15: View west along El Camino Real frontage at wide area of compacted dirt road shoulder and oak canopy edge along Meadow Creek. **9/6/2018**

Photo 16: View east along El Camino Real frontage from existing sidewalk and wide area of compacted dirt road shoulder along Meadow Creek willow riparian habitat edge. **9/6/2018**

APPENDIX B – TABLES

TABLE B-1: FLORISTIC INVENTORY AND RARE PLANT SURVEY SPECIES OBSERVED

TABLE B-2: CNDDB LIST OF SPECIAL-STATUS SPECIES

TABLE B-1
2018 FLORISTIC INVENTORY AND RARE PLANT SURVEY
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME
Acmispon brachycarpus	Short podded lotus
Acmispon glaber	Deerweed
Agapanthus africanus	Lily of the Nile
Agave sp.	Agave
Amaranthus albus	Pigweed amaranth
Amsinckia intermedia	Common fiddlneck
Amsinckia menziesii	small flowered fiddleneck
Amsinckia sp.	fiddleneck
Aptenia cordifolia	Baby sun rose
Arctostaphylos nudis	Sand mesa manzanita
Artemisia douglasiana	Mugwort
Astragalus sp.	Locoweed
Avena sativa	Oats
Baccharis glutinosa	Douglas' baccharis
Baccharis pilularis	Coyote brush
Berberis aquifolium	Mountain grape
Brassica nigra	Black mustard
Brassica rapa	Field mustard
Brassica spp.	Mustards
Brassica tournefortii	Saharan mustard
Bromus catharticus	Rescue grass
Bromus diandrus	Rip gut brome
Bromus hordeaceus	Soft chess
Bromus madritensis ssp. *rubens*	Red brome
Calandrinia ciliata	Red maids
Callistemon citrinus	Crimson bottlebrush
Camissonia strigulosa	Sun cup
Camissonia strigulosa	Sandysoil suncup
Camissoniopsis hardhamiae	Hardham's evening-primrose
Capsella bursa-pastoris	Shepard's purse
Cardamine hirsuta	hairy bitter cress
Carduus pycnocephalus	Italian thistle
Carpobrotus edulis	Sea fig
Carpobrotus sp.	Ice plant
Castilleja densiflora	Purple owl's clover
Chenopodium album	Lamb's quarters
Chenopodium sp.	Goosefoot

TABLE B-1
2018 FLORISTIC INVENTORY AND RARE PLANT SURVEY
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME
Chorizanthe angustifolia	Spineflower
Cirsium vulgare	Bull thistle
Cistus sp.	Rockrose
Clarkia unguiculata	Elegant clarkia
Claytonia perfoliata	Miner's lettuce
Clematis ligusticifolia	Creek clematis
Coleonema pulchra	Breath of Heaven
Conium maculatum	Poison hemlock
Convolvulus arvensis	Morning-glory
Cortaderia jubata	Pampas grass
Crassula connata	Pigmy weed
Crassula ovatum	Jade plant
Croton californicus	California Croton
Croton setigerus	Dove weed
Delairea odorata	Cape ivy
Distictis buccinatoria	Scarlet trumpet vine
Ehrharta calycina	Veldt grass
Epilobium ciliatum	Willow herb
Erigeron canadensis	Canada horseweed
Erodium botrys	Filaree
Erodium brachycarpum	White stemmed filaree
Erodium cicutarium	Redstem filaree
Eschscholzia californica	California poppy
Eucalyptus globulus	Blue gum
Euphorbia lathyris	Compass plant
Euphorbia peplus	Petty spurge
Festuca microstachys	Small fescue
Festuca myuros	Rattail sixweeks grass
Festuca perennis	Italian rye grass
Fragaria sp.	Strawberry
Galium aparine	Sticky willy
Geranium molle	Crane's bill geranium
Hedera helix	English ivy
Heliotropium curassavicum	Heliotrope
Helminthotheca echioides	Bristly ox-tongue
Heteromeles arbutifolia	Toyon
Heterotheca grandiflora	Telegraph weed

TABLE B-1
2018 FLORISTIC INVENTORY AND RARE PLANT SURVEY
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME
Heterotheca sessiliflora	Golden aster
Hirschfeldia incana	Shortpod mustard
Hordeum murinum ssp. *leporinum*	Foxtail barley
Hypochaeris glabra	Smooth cat's-ear
Isolepis cernua	low bulrush
Juglans hindsii	No. California black walnut
Juglans regia	English walnut
Juncus sp.	Rush
Juncus xiphioides	Iris leaved rush
Lactuca serriola	Prickly lettuce
Lobularia maritima	Sweet alyssum
Lotus corniculatus	Bird's foot trefoil
Lupinus arboreus	Bush lupine
Lupinus bicolor	Miniature lupine
Lupinus chamissonis	Beach blue lupine
Lupinus nanus	Sky lupine
Lupinus sp.	Lupine
Lysimachia arvensis	Scarlet pimpernel
Malva parviflora	Cheese weed
Marah fabaceus	California man-root
Matricaria discoidea	Pineapple weed
Medicago polymorpha	Bur-clover
Melilotus indicus	Yellow sweetclover
Mirabilis jalapa	Marvel of Peru
Nicotiana gluaca	Tree tobacco
Oxalis pes-caprae	Bermuda buttercup
Phoenix canariensis	Canary island palm
Pholistoma auritum	Blue fiesta flower
Plagiobothrys spp.	Popcorn flower
Poa annua	Annual bluegrass
Podocarpus sp.	Fern pine
Polycarpon tetraphyllum	Four leaved all seed
Polypogon monspeliensis	Rabbits foot grass
Populus balsaifera	Black cottonwood
Pseudognaphalium luteoalbum	Jersey cudweed
Pteridium aquilinum	Bracken fern
Quercus agrifolia	Coast live oak

TABLE B-1
2018 FLORISTIC INVENTORY AND RARE PLANT SURVEY
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME
Raphanus sativus	Wild radish
Raphiolepis sp.	Hawthorne
Rhamnus californica	Coffeeberry
Rubus ursinus	California blackberry
Rumex crispus	Curly dock
Salix laevigata	Red willow
Salix lasiolepis	Arroyo willow
Salsola tragus	Russian thistle
Salvia mellifera	Black sage
Senecio vulgaris	Common groundsel
Silene gallica	Catchfly
Silybum marianum	Milk thistle
Solanum douglasii	Douglas' nightshade
Sonchus oleraceus	Sowthistle
Sonchus spp.	Sow thistles
Spergula arvensis	Corn Spurry
Spergularia rubra	Red sandspurry
Spergularia sp.	Sandspurry
Stellaria media	Chickweed
Stellaria nitens	Shining chickweed
Tetragonia tetragonioides	New Zealand spinach
Toxicodendron diversilobum	Poison oak
Tropaeolum majus	Nasturtium
Umbellularia californica	California bay
Urtica urens	Dwarf nettle
Vicia sativa	Spring vetch
Vicia sp.	Vetch
Vicia villosa	Hairy vetch
Washingtonia filifera	California fan palm
Zantedeschia aethiopica	Calla lily

Table B-2
CNDDB Special-Status Species Recorded Occurrences (5-mile Radius)

Scientific Name	Common Name	FedList	CalList	SRank	CNPS RplantRank	General Habitat Description	Micro Habitat Description	# of CNDDB Occurrences w/in 5 miles	Potential to Occur Onsite
INVERTEBRATES									
Ablautus schlingeri	Oso Flaco robber fly	None	None	S1	--	Sand dunes.		2	none
Areniscythris brachypteris	Oso Flaco flightless moth	None	None	S1	--	Open, coastal sand dune slopes in San Luis Obispo County.	Larvae live in tubes attached to buried, green parts of plants at the margin of the active, moving sand dunes.	1	none
Bombus caliginosus	obscure bumble bee	None	None	S1S2	--	Coastal areas from Santa Barabara county to north to Washington state.	Food plant genera include *Baccharis, Cirsium, Lupinus, Lotus, Grindelia* and *Phacelia.*	3	none
Cicindela hirticollis gravida	sandy beach tiger beetle	None	None	S2	--	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico.	Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	1	none
Coelus globosus	globose dune beetle	None	None	S1S2	--	Inhabitant of coastal sand dune habitat; erratically distributed from Ten Mile Creek in Mendocino County south to Ensenada, Mexico.	Inhabits foredunes and sand hummocks; it burrows beneath the sand surface and is most common beneath dune vegetation.	1	none
Danaus plexippus	monarch - California overwintering population	None	None	S2S3	--	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico.	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	10	none; onsite eucalyptus does does not support suitable roosting
Lichnanthe albipilosa	white sand bear scarab beetle	None	None	S1	--	Inhabits coastal sand dunes of San Luis Obispo County, in the vicinity of Dune Lakes.	Found hovering close to the surface of the dunes near the lake, but some distance from the surf.	1	none
Tryonia imitator	mimic tryonia (=California brackishwater snail)	None	None	S2	--	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County.	Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities.	1	none
FISH									
Eucyclogobius newberryi	tidewater goby	Endangered	SSC	S3	--	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River.	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	2	none
Oncorhynchus mykiss irideus	steelhead - south-central California coast DPS	Threatened	None	S2	--	Federal listing refers to runs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River.	Perrenial streams with barrier free access to the ocean. Deep pools and lagoosns with cool temperatures for rearing.	2	none
REPTILES AND AMPHIBIANS									
Rana draytonii	California red-legged frog	Threatened	SSC	S2S3	--	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	13	yes - observed 07/18/2018 during protocol surveys
Anniella pulchra	northern California legless lizard	None	SSC	S3	--	Sandy or loose loamy soils under sparse vegetation.	Soil moisture is essential. They prefer soils with a high moisture content.	9	low; low potential around margins of riparian / shrubs in sandy soils
Emys marmorata	western pond turtle	None	SSC	S3	--	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation.	Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	6	low potential; not observed during 2018 protocol CRLF surveys

Table B-2

CNDDB Special-Status Species Recorded Occurrences (5-mile Radius)

BIRDS									
Agelaius tricolor	tricolored blackbird	None	Candidate Endangered; SSC	S1S2	--	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California.	Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	1	none
Charadrius alexandrinus nivosus	western snowy plover	Threatened	SSC	S2S3	--	Sandy beaches, salt pond levees & shores of large alkali lakes.	Needs sandy, gravelly or friable soils for nesting.	5	none
Laterallus jamaicensis coturniculus	California black rail	None	Threatened; FP	S1	--	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays.	Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	1	none
Sternula antillarum browni	California least tern	Endangered	Endangered; FP	S2	--	Nests along the coast from San Francisco Bay south to northern Baja California.	Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, land fills, or paved areas.	1	none
MAMMALS									
Corynorhinus townsendii	Townsend's big-eared bat	None	SSC	S2	--	Throughout California in a wide variety of habitats. Most common in mesic sites.	Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	1	none
Taxidea taxus	American badger	None	SSC	S3	--	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	3	none; potential dens not observed during 2018 surveys
PLANTS									
Agrostis hooveri	Hoover's bent grass	None	None	S2	1B.2	Chaparral, cismontane woodland, closed-cone coniferous forest, valley and foothill grassland.	Sandy sites. 60-765 m.	6	none; not observed during SII 2018 floristic inventory and rare plant surveys
Arctostaphylos pilosula	Santa Margarita manzanita	None	None	S2?	1B.2	Closed-cone coniferous forest, chaparral, broadleafed upland forest, cismontane woodland.	Shale outcrops & slopes; reported growing on decomposed granite or sandstone. 60-1220 m.	14	
Arctostaphylos rudis	sand mesa manzanita	None	None	S2	1B.2	Chaparral, coastal scrub.	On sandy soils in Lompoc/Nipomo area. 20-335 m.	4	
Arenaria paludicola	marsh sandwort	Endangered	Endangered	S1	1B.1	Marshes and swamps.	Growing up through dense mats of Typha, Juncus, Scirpus, etc. in freshwater marsh. Sandy soil. 3-170 m.	3	
Calochortus obispoensis	San Luis mariposa-lily	None	None	S2	1B.2	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland.	Often in serpentine grassland. 15-550 m.	2	
Castilleja densiflora var. obispoensis	San Luis Obispo owl's-clover	None	None	S2	1B.2	Valley and foothill grassland, meadows and seeps.	Sometimes on serpentine. 9-485 m.	6	
Chenopodium littoreum	coastal goosefoot	None	None	S2	1B.2	Coastal dunes.	10-30 m.	2	
Chlorogalum pomeridianum var. minus	dwarf soaproot	None	None	S3	1B.2	Chaparral.	Serpentine. 120-1220 m.	1	
Chorizanthe breweri	Brewer's spineflower	None	None	S3	1B.3	Chaparral, cismontane woodland, coastal scrub, closed-cone coniferous forest.	Rocky or gravelly serpentine sites; usually in barren areas. 45-765 m.	1	
Chorizanthe rectispina	straight-awned spineflower	None	None	S2	1B.3	Chaparral, cismontane woodland, coastal scrub.	Often on granite in chaparral. 45-1040 m.	6	
Cirsium rhothophilum	surf thistle	None	Threatened	S1	1B.2	Coastal dunes, coastal bluff scrub.	Open areas in central dune scrub; usually in coastal dunes. 3-60 m.	1	
Cirsium scariosum var. loncholepis	La Graciosa thistle	Endangered	Threatened	S1	1B.1	Coastal dunes, coastal scrub, brackish marshes, valley and foothill grassland, cismontane woodland.	Lake edges, riverbanks, other wetlands; often in dune areas. Mesic, sandy sites. 4-220 m.	4	
Cladium californicum	California saw-grass	None	None	S2	2B.2	Meadows and seeps, marshes and swamps (alkaline or freshwater).	Freshwater or alkaline moist habitats. - 20-2135 m.	1	
Clarkia speciosa ssp. immaculata	Pismo clarkia	Endangered	Rare	S1	1B.1	Chaparral, cismontane woodland, valley and foothill grassland.	On ancient sand dunes not far from the coast. Sandy soils; openings. 30-185 m.	16	

Table B-2
CNDDB Special-Status Species Recorded Occurrences (5-mile Radius)

Delphinium parryi ssp. blochmaniae	dune larkspur	None	None	S2	1B.2	Chaparral, coastal dunes (maritime).	On rocky areas and dunes. 18-305 m.	4	none; not observed during SII 2018 floristic inventory and rare plant surveys
Dithyrea maritima	beach spectaclepod	None	Threatened	S1	1B.1	Coastal dunes, coastal scrub.	Sea shores, on sand dunes, and sandy places near the shore. 3-65 m.	1	
Erigeron blochmaniae	Blochman's leafy daisy	None	None	S2	1B.2	Coastal dunes, coastal scrub.	Sand dunes and hills. 0-185 m.	7	
Eriodictyon altissimum	Indian Knob mountainbalm	Endangered	Endangered	S1	1B.1	Chaparral (maritime), cismontane woodland, coastal scrub.	Ridges in open, disturbed areas within chaparral on Pismo sandstone. 90-270 m.	1	
Horkelia cuneata var. puberula	mesa horkelia	None	None	S1	1B.1	Chaparral, cismontane woodland, coastal scrub.	Sandy or gravelly sites. 15-1645 m.	5	
Horkelia cuneata var. sericea	Kellogg's horkelia	None	None	S1?	1B.1	Closed-cone coniferous forest, coastal scrub, coastal dunes, chaparral.	Old dunes, coastal sandhills; openings. Sandy or gravelly soils. 5-430 m.	1	
Lupinus ludovicianus	San Luis Obispo County lupine	None	None	S1	1B.2	Chaparral, cismontane woodland.	Open areas in sandy soil, Santa Margarita formation. 85-525 m.	3	
Lupinus nipomensis	Nipomo Mesa lupine	Endangered	Endangered	S1	1B.1	Coastal dunes.	Dry sandy flats, restricted to back dunes, associated with central dune scrub habitat - a rare community type. 20-30 m.	2	
Malacothamnus gracilis	slender bush-mallow	None	None	S1	1B.1	Chaparral.	Dry, rocky slopes. 150-335 m.	1	
Monardella sinuata ssp. sinuata	southern curly-leaved monardella	None	None	S2	1B.2	Coastal dunes, coastal scrub, chaparral, cismontane woodland.	Sandy soils. 20-305 m.	3	
Monardella undulata ssp. crispa	crisp monardella	None	None	S2	1B.2	Coastal dunes, coastal scrub.	Often on the borders of open, sand areas, usually adjacent to typical backdune scrub vegetation. 5-125 m.	2	
Monardella undulata ssp. undulata	San Luis Obispo monardella	None	None	S2	1B.2	Coastal dunes, coastal scrub.	Stabilized sand of the immediate coast. 5-200 m.	3	
Nasturtium gambelii	Gambel's water cress	Endangered	Threatened	S1	1B.1	Marshes and swamps.	Freshwater and brackish marshes at the margins of lakes and along streams, in or just above the water level. 5-305 m.	2	
Scrophularia atrata	black-flowered figwort	None	None	S2?	1B.2	Closed-cone coniferous forest, chaparral, coastal dunes, coastal scrub, riparian scrub.	Sand, diatomaceous shales, and soils derived from other parent material; around swales and in sand dunes. 10-445 m.	5	
Senecio aphanactis	chaparral ragwort	None	None	S2	2B.2	Chaparral, cismontane woodland, coastal scrub.	Drying alkaline flats. 20-855 m.	1	
Symphyotrichum defoliatum	San Bernardino aster	None	None	S2	1B.2	Meadows and seeps, cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, valley and foothill grassland.	Vernally mesic grassland or near ditches, streams and springs; disturbed areas. 3-2045 m.	1	
NATURAL COMMUNITIES									
Central Dune Scrub	Central Dune Scrub	None	None	S2.2				3	none
Central Foredunes	Central Foredunes	None	None	S1.2				4	none
Central Maritime Chaparral	Central Maritime Chaparral	None	None	S2.2	--			1	none
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	None	None	S2.1	--			3	none

APPENDIX C

CALIFORNIA RED-LEGGED FROG PROTOCOL FIELD SURVEY FORMS

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

Site Assessment reviewed by ______ ______ ______
(FWS Field Office) (date) (biologist)

Date of Site Assessment: 11/29/2017
(mm/dd/yyyy)

Site Assessment Biologists: WOlFF David ______
(Last name) (first name) (Last name) (first name)

______ ______
(Last name) (first name) (Last name) (first name)

Site Location: City of Grover Beach, San Luis Obispo Co 35.130198° -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

ATTACH A MAP (include habitat types, important features, and species locations)

Proposed project name: El Camino Real Development Project
Brief description of proposed action:
2 Hotels
1 Restaurant
7 Residential Lots
1 Bridge Replacement

1) Is this site within the current or historic range of the CRF (circle one)? YES NO

2) Are there known records of CRF within 1.6 km (1 mi) of the site (circle one)? YES NO
If yes, attach a list of all known CRF records with a map showing all locations.

GENERAL AQUATIC HABITAT CHARACTERIZATION

(if multiple ponds or streams are within the proposed action area, fill out one data sheet for each)

POND:

Size: ______ Maximum depth: ______

Vegetation: emergent, overhanging, dominant species: ______

Substrate: ______

Perennial or Ephemeral *(circle one)*. If ephemeral, date it goes dry: ______

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

STREAM:

Bank full width: 10 Feet
Depth at bank full: 2-3 Feet
Stream gradient: ∠3%

Are there pools (circle one)? YES NO

If yes,

Size of stream pools: 1 Long Pool above beaver dam ± 400' Long
Maximum depth of stream pools: 3 Feet

Characterize non-pool habitat: run, riffle, glide, other: N/A

Vegetation: emergent, overhanging, dominant species:
overhanging arroyo willow riparian

Substrate: mud/Cobble

Bank description: mud; vertical

Perennial or Ephemeral *(circle one)*. If ephemeral, date it goes dry: ______

Other aquatic habitat characteristics, species observations, drawings, or comments:

Long pool created by beaver dam.
Otherwise dry season trickle flow input

Necessary Attachments:

1. All field notes and other supporting documents
2. Site photographs
3. Maps with important habitat features and species location

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by ______________________
(FWS Field Office) (date) (biologist)

Date of Survey: 11/29/2017 (mm/dd/yyyy) **Survey Biologist:** WOlFF David (Last name) (first name)

Survey Biologist: ______________________ (Last name) (first name)

Site Location: City of Grover Beach, SLO Co, CA 35.130198° -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: ______________________
Brief description of proposed action:
See Assesment App D

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): 1 2 3 4 5 6 7 8

Begin Time: 0930 **End Time:** 1230

Cloud cover: 0 **Precipitation:** 0

Air Temperature: 66°F **Water Temperature:** ______

Wind Speed: 0-5 mph **Visibility Conditions:** Excellent

Moon phase: N/A **Humidity:** ______

Description of weather conditions: ______________________

Brand name and model of light used to conduct surveys: 4D Maglight

Were binoculars used for the surveys (circle one)? **YES** **NO**
Brand, model, and power of binoculars: 8x42 Eagle

Ø Amphibians
Ø Aquatic life

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by ______________ (FWS Field Office) ______ (date) ______________ (biologist)

Date of Survey: 1/3/2018 (mm/dd/yyyy) **Survey Biologist:** Wolff (Last name) David (first name)

Survey Biologist: ______________ (Last name) ______________ (first name)

Site Location: City of Grover Beach, SLO, CA 35.130198° -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

ATTACH A MAP (include habitat types, important features, and species locations)**

Proposed project name: ______________
Brief description of proposed action:
See Assessment App D

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): 1 2 3 4 5 6 7 8

Begin Time: 1730 **End Time:** 1830

Cloud cover: overcast **Precipitation:** Ø

Air Temperature: 64°F **Water Temperature:** ______

Wind Speed: Ø **Visibility Conditions:** Excellent

Moon phase: 95% Full **Humidity:** ______

Description of weather conditions: Calm

Brand name and model of light used to conduct surveys: 4D maglight

Were binoculars used for the surveys (circle one)? **YES** **NO**
Brand, model, and power of binoculars: 8x42 eagle

Ø Amphibians
Ø Aquatic life

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by ______ ______ ______
(FWS Field Office) (date) (biologist)

Date of Survey: 1/17/2019 (mm/dd/yyyy) **Survey Biologist:** Wolff (Last name) David (first name)

Survey Biologist: ______ (Last name) ______ (first name)

Site Location: City of Grover Beach, SLO Co, CA 35.130198 -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: ______
Brief description of proposed action:

See Assessment App D

Type of Survey (circle one): **DAY NIGHT** **BREEDING NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time: 1730 2030 **End Time:** 1830 2130

Cloud cover: Clear **Precipitation:** Ø

Air Temperature: 63°F 61°F **Water Temperature:** ______

Wind Speed: Ø **Visibility Conditions:** Excellent

Moon phase: New moon **Humidity:** ______

Description of weather conditions: Calm

Brand name and model of light used to conduct surveys: 4D maglight

Were binoculars used for the surveys (circle one)? **YES NO**
Brand, model, and power of binoculars: 8X42 eagle

Ø Amphibians
Ø Aquatic life

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by ________ (FWS Field Office) ________ (date) ________ (biologist)

Date of Survey: 5/8/2018 (mm/dd/yyyy) **Survey Biologist:** Wolff (Last name) David (first name)

Survey Biologist: ________ (Last name) ________ (first name)

Site Location: City of Grover Beach, SLO Co, CA 35.130198° -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: ________
Brief description of proposed action:

See Assessment App D

Type of Survey (circle one): **DAY NIGHT** **BREEDING NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time: 2030 **End Time:** 2200

Cloud cover: Clear **Precipitation:** Ø

Air Temperature: 63°F - 61°F **Water Temperature:** ________

Wind Speed: Ø **Visibility Conditions:** Excellent

Moon phase: 1/2 full **Humidity:** ________

Description of weather conditions: Calm

Brand name and model of light used to conduct surveys: 4D maglight

Were binoculars used for the surveys (circle one)? **YES NO**
Brand, model, and power of binoculars: 8x42 eagle

Ø Amphibians
Ø Aquatic life

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by ____________ (FWS Field Office) ____________ (date) ____________ (biologist)

Date of Survey: 7/19/2018 (mm/dd/yyyy) **Survey Biologist:** Wolff (Last name) David (first name)

Survey Biologist: ____________ (Last name) ____________ (first name)

Site Location: City of Grover Beach, SLO Co, CA 35.130198° -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: ____________
Brief description of proposed action:
See Assessment App D

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time: 1800 **End Time:** 1900

Cloud cover: High thin clouds **Precipitation:** Ø

Air Temperature: 70°-63°F **Water Temperature:** ____________

Wind Speed: 0-3 mph **Visibility Conditions:** Excellent

Moon phase: ____________ **Humidity:** Humid

Description of weather conditions: Calm & Sunny

Brand name and model of light used to conduct surveys: N/A

Were binoculars used for the surveys (circle one)? **YES** **NO**
Brand, model, and power of binoculars: 8x42 eagle

Ø Amphibians
Ø Aquatic Life

P. 1 of 2

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by ______________ (FWS Field Office) ______ (date) ______________ (biologist)

Date of Survey: 7/19/2018 (mm/dd/yyyy) **Survey Biologist:** Wolff (Last name) David (first name)

Survey Biologist: ______ (Last name) ______ (first name)

Site Location: City of Grover Beach, SLO Co, CA 35.130198° -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: ______________
Brief description of proposed action:

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time: 2145 **End Time:** 2340

Cloud cover: Marine Layer **Precipitation:** Ø

Air Temperature: 59°F **Water Temperature:** ______

Wind Speed: Ø **Visibility Conditions:** Excellent

Moon phase: 1/3 Full **Humidity:** ______

Description of weather conditions: Calm

Brand name and model of light used to conduct surveys: 4D maglight

Were binoculars used for the surveys (circle one)? **YES NO**
Brand, model, and power of binoculars: 8x42 eagle

p. 2 of 2
7/18/2018
Night

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Rana draytonii	3	O	Juvenile	small	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No apparent threats

Other notes, observations, comments, *etc.*
CRLF observed in backwater ponding from beaver dam.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.

P. 1 of 2

California Red-legged Frog Survey Data Sheet

Survey results reviewed by ____________ ____________ ____________
(FWS Field Office) (date) (biologist)

Date of Survey: 8/12/2018 **(mm/dd/yyyy)**

Survey Biologist: Wolff David
(Last name) (first name)

Survey Biologist: ____________
(Last name) (first name)

Site Location: City of Grover Beach, SLO Co, CA 35.130148° -120.609314°
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

ATTACH A MAP (include habitat types, important features, and species locations)**

Proposed project name: ____________
Brief description of proposed action:
see Assessment App D

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): 1 2 3 4 5 6 7 8

Begin Time: 1220 **End Time:** 1300

Cloud cover: Clear **Precipitation:** Ø

Air Temperature: 76°F **Water Temperature:** ____________

Wind Speed: 0-3 mph **Visibility Conditions:** Excellent

Moon phase: N/A **Humidity:** ____________

Description of weather conditions: Calm + Sunny

Brand name and model of light used to conduct surveys: N/A

Were binoculars used for the surveys (circle one)? **YES** **NO**
Brand, model, and power of binoculars: 8x42 eagle

p. 2 of 2
8/2/2018
Day

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Rana draytonii	3	O	Juenile	small	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: NO Apparent threats

Other notes, observations, comments, *etc.*

3 CRLF Jumped of beaver dam (no sound)
Identification confirmed whe they surfaced
Backwater ponding from beaver dam.
Trickle flow entering from culvert under Hwy 101
Trickle flow below beaver dam.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

sage institute inc

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sage@sageii.com

June 10, 2019

Darshan Patel, Director of Development
Ram Krupa Real Estate LLC
845 Morro Avenue
Morro Bay, CA 93442

SUBJECT: Clarification of Biological Resources Evaluation and Impacts for the Ram Krupa Real Estate LLC, 1598 El Camino Real Development Tract 3122 Project, City of Grover Beach, California

Dear Darshan:

Sage Institute, Inc. (SII), is providing this clarification of biological resources evaluation and impacts at the request of the City of Grover Beach. This clarification is in reference to the SII November 15, 2018, *El Camino Real Development Project, 1598 El Camino Real – Tract 3122, City of Grover Beach, Biological Resources Assessment* (2018 BRA).

In the early stages of project planning and design a "typical" rectangular rock outfall structure was located near the sewer lift station that was only for pass-through, run-on water for existing runoff, and not for any post development stormwater management. The 2018 BRA on page 9 project description noted it as part of the arroyo willow riparian impacts of 0.38 acre fill slope for development, lift station, and drainage outfall. The 2018 BRA also included it in the impact statement for waters of the U.S./State on page 11 as follows:

> *"…; 0.38 acre of willow riparian habitat for the fill slope along the north edge of site development, lift station and local drainage outfall structure; and 0.04 acre of impacts for the El Camino Real frontage sidewalk improvements. The outfall structure included in the development footprint is for energy dissipation for minimal existing local drainage and not a discharge point for onsite development."*

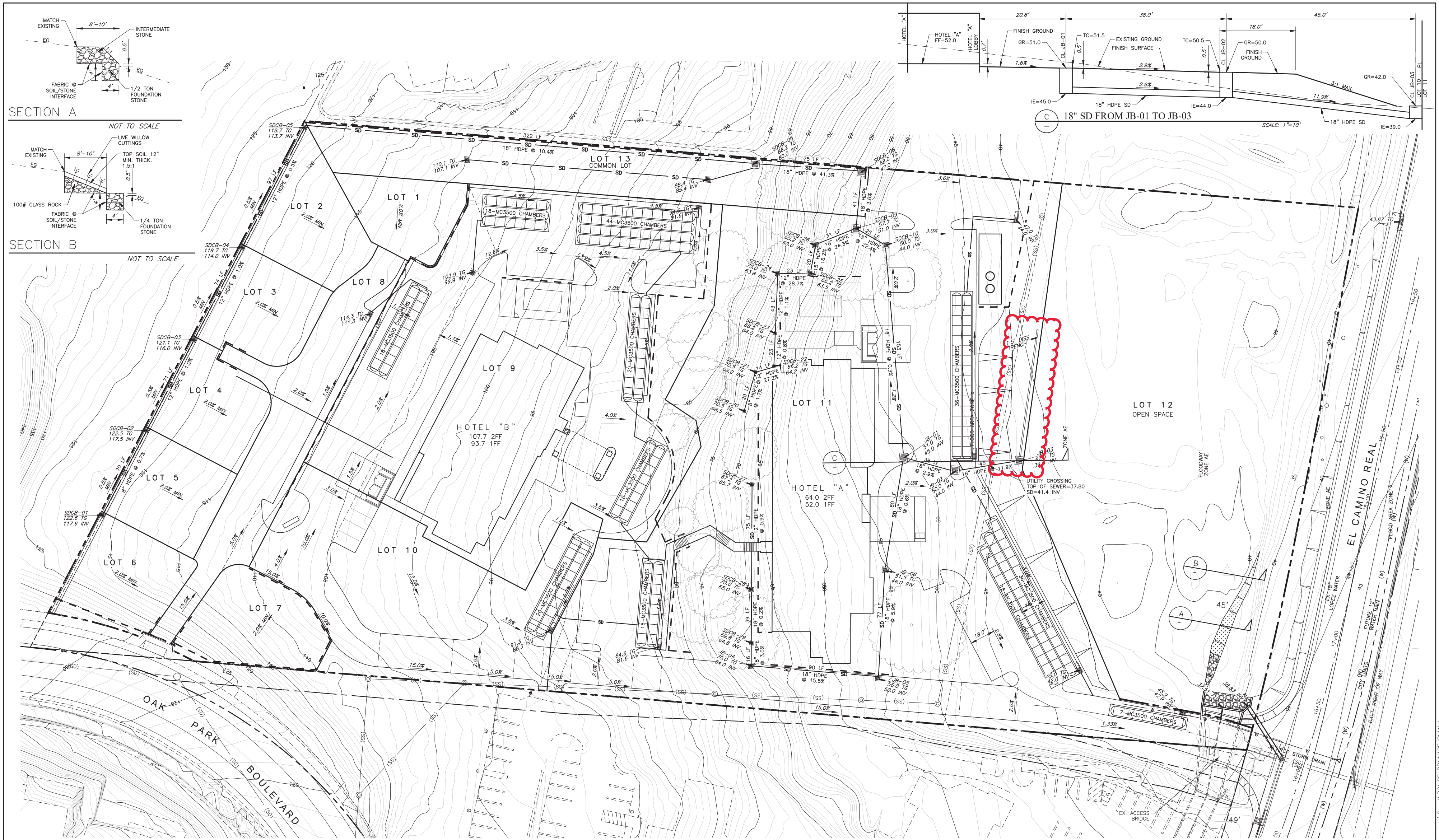
During the further refinement of the project design and regulatory permit application preparation process following the 2018 BRA completion, the originally proposed point-release drainage "typical" outfall structure was replaced with a pass-through, run-on water, 150-foot long by 1.5-foot-wide dissipation overflow outlet trench as shown on plan sheet PC1.2B (attached for your reference). This 1.5'x150' rock lined trench is within the 0.38-acre development impact limits as documented in the 2018 BRA (Figure 6) and included in the regulatory compliance permit applications. The administrative draft MND Section (5.c) on page 57 should include the development, lift station, and this dissipation trench all as the fourth bullet for the 0.38-acre riparian impact. The fifth bullet point in Section 5.c (page 57) should be deleted. Similarly, the third line on page 73 of the admin draft MND should be reworded by removing "drainage outfall structure" and replacing it with "local drainage dissipation trench."

Please contact me directly if you have any questions or need any additional information.

Sincerely,

David K. Wolff

David K. Wolff, Principal Ecologist
Attachment: Plan Sheet PC1.2B
C: Ron Reilly, Project Engineer, Garing, Taylor & Associates



PRELIMINARY CONTOUR DRAINAGE PLAN

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GTA
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CIVIL ENGINEERS SURVEYORS PLANNERS
141 SOUTH ELM STREET · ARROYO GRANDE, CA 93420 · (805) 489-1321
GTA PROJECT No. 17.660.003

PLEINAIRE
DESIGN GROUP
3203 LIGHTNING STREET, SUITE 201
SANTA MARIA, CALIFORNIA 93455-1805
805.349.9695 PLEINAIREDG.COM

PROJECT: TRACT NO. 3122
EL CAMINO REAL DEVELOPMENT
1598 El Camino Real, Grover Beach, Ca., 93433
RAM KRUPA REAL ESTATE LLC

SHEET Nº
PC1.2B

TREE SURVEY

Client: Ram Krupa Real Estate, LLC

Date: 19-Dec-17
Revised Date: 8-Oct-18

[1] Remain
[2] Remove
[3] Prune
[4] Dead/Damaged
[5] Replace

Tree #	Scientific Name	Common Name	DBH	Disposition	≤10% of Canopy over New Con.	Roots Impacted (≤20%)	Canopy Area Sq. Ft.	Mitigaton Note	Canopy Dimensions & Notes
1	Heteromeles	Toyon	3	2					
2	Quercus agrifolia	Coast Live Oak	4	2					
3	Quercus agrifolia	Coast Live Oak	2	1	0%	0%	92	A	N-5', E-4', S-7', W-3' Multi; estimated to be off property
4	Eucalyptus		120	2					
5	Eucalyptus		40	2					
6	Quercus agrifolia	Coast Live Oak	13	2					
7	Quercus agrifolia	Coast Live Oak	10	2					
8	Quercus agrifolia	Coast Live Oak	3	2					
9	Quercus agrifolia	Coast Live Oak	32	2					
10	Quercus agrifolia	Coast Live Oak	31	4					
11	Quercus agrifolia	Coast Live Oak	7	1	0%	0%	77	B	N-5', E-5', S-5' W-5'
12	Quercus agrifolia	Coast Live Oak	14	2					
13	Phoenix canariensis	Canary Island Palm	30	2					
14	Washingtomia robusta	Mexican fan palm	18	2					
15	Washingtomia robusta	Mexican fan palm	18	2					
16	Quercus agrifolia	Coast Live Oak	33	1	5%	22%	1696	C	N-30', E-17', S-25', W-26', (1) Additonal Mitigation Tree Provided
17	Quercus agrifolia	Coast Live Oak	20	1	0%	0%	1602	D	N-20', E-20', S-24', W-23
18	Quercus agrifolia	Coast Live Oak	19	1	0%	0%	1602	E	N-20', E-20', S-24', W-23' Multi
19	Quercus agrifolia	Coast Live Oak	16	1	15%	5%	637	F	N-10', E-20', S-18', W-6',(1) Additional Mitigation Tree Provided
20	Quercus agrifolia	Coast Live Oak	18	1	10%	2%	1079	G	N-20', E-20', S-15', W-10'
21	Quercus agrifolia	Coast Live Oak	20	2					
22	Quercus agrifolia	Coast Live Oak	10	1	1%	1%	310	H	N-10', E-10', S-10', W-10'
23	Quercus agrifolia	Coast Live Oak	29	2					
24	Magnolia grandiflora	Magnolia	7	2					
25	Quercus agrifolia	Coast Live Oak	14	2					
26	Eucalyptus		72	2					
27	Eucalyptus		69	2					
28	Eucalyptus		9	2					
29	Eucalyptus		20	2					
30	Quercus agrifolia	Coast Live Oak	14	1	4%	0%	1079	I	N-2', E-15', S-25', W-20'
31	Quercus agrifolia	Coast Live Oak	24	1	5%	11%	940	J	N-18', E-18', S-16', W-20'
32	Quercus agrifolia	Coast Live Oak	40	1	0%	19%	940	K	N-25', E-8', S-25', W-28'
33	Quercus agrifolia	Coast Live Oak	35	1	0%	15%	1319	L	N-18', E-20', S-28', W-18'
34	Quercus agrifolia	Coast Live Oak	24	1	1%	6%	1079	M	N-25', E-18', S-20', W-17'
35	Quercus agrifolia	Coast Live Oak	15	1	6%	0%	641	N	N-15', E-10', S-20', W-19' Multi
36	Quercus agrifolia	Coast Live Oak	22	1	0%	0%	1130	O	N-25', E-15', S-20', W-10' Multi, (2) Additional Mitigation Trees Provided
37	Quercus agrifolia	Coast Live Oak	44	1	0%	38%	1960	P	N-30', E-30', S-24', W-27'
38	Quercus agrifolia	Coast Live Oak	18	2					
39	Quercus agrifolia	Coast Live Oak	25	1	10%	3%	2343	Q	N-40', E-28', S-30', W-18' Multi
40	Quercus agrifolia	Coast Live Oak	32	4					
41	Quercus agrifolia	Coast Live Oak	23	4					
42	Juglans spp	Walnut	10	2					
43	Quercus agrifolia	Coast Live Oak	9	2					
44	Juglans nigra	Black Walnut	22	2					
45	Quercus agrifolia	Coast Live Oak	30	4					

TREE SURVEY

[1] Remain
[2] Remove
[3] Prune
[4] Dead/Damaged
[5] Replace

Client: Ram Krupa Real Estate, LLC

Date: 19-Dec-17
Revised Date: 8-Oct-18

Tree #	Scientific Name	Common Name	DBH	Disposition	≤10% of Canopy over New Con.	Roots Impacted (≤20%)	Canopy Area Sq. Ft.	Mitigaton Note	Canopy Dimensions & Notes
46	Quercus agrifolia	Coast Live Oak	19	4					
47	Quercus agrifolia	Coast Live Oak	20	4					
48	Quercus agrifolia	Coast Live Oak	17	2					
49	Quercus agrifolia	Coast Live Oak	20	1	75%	72%	1417	R	N-25', E-10', S-29', W-20', (5) Additional Mitigation Trees Provided
50	Quercus agrifolia	Coast Live Oak	10	2					
51	Quercus agrifolia	Coast Live Oak	33	1	0%	0%	3284	S	N-25', E-30', S-40', W-40'
52	Quercus agrifolia	Coast Live Oak	25	1	15%	9%	2008	T	N-30', E-25', S-20', W-15', (1) Additional Mitigation Tree Provided
53	Quercus agrifolia	Coast Live Oak	20	1	6%	0%	3433	U	N-37', E-33', S-30', W-35' Multi
54	Juglans spp	Walnut	12	2					
55	Quercus agrifolia	Coast Live Oak	27	4					
56	Quercus agrifolia	Coast Live Oak	21	2					
57	Quercus agrifolia	Coast Live Oak	33	1	0%	0%	427	V	N-2', E-16', S-0', W-36'
58	Quercus agrifolia	Coast Live Oak	12	1	0%	0%	183	W	N-4', E-18', S-0', W-4'
59	Quercus agrifolia	Coast Live Oak	12	1	0%	0%	197	X	N-10', E-0', S-0', W-16'
60	Quercus agrifolia	Coast Live Oak	12	1	0%	0%	156	Y	N-0', E-0', S-0', W-18'
61	Quercus agrifolia	Coast Live Oak	20	1	0%	0%	348	Z	N-0', E-18', S-0', W-26'
62	Quercus agrifolia	Coast Live Oak	14	1	0%	0%	191	AA	N-0', E-12', S-0', W-12'
63	Quercus agrifolia	Coast Live Oak	8	1	0%	0%	66	BB	N-10', E-4', S-0', W-4'
64	Quercus agrifolia	Coast Live Oak	8	1	0%	0%	74	CC	N-0', E-8', S-0', W-0'
65	Quercus agrifolia	Coast Live Oak	24	1	0%	0%	113	DD	N-0', E-6', S-0', W-11'
66	Quercus agrifolia	Coast Live Oak	20	4					
67									
68									
69									
70									
71									

NOTE: Great care has been take to locate and predict potential impacts to the existing tree canopy. In consideration of realistic post-construction tree viability, trees with greater than 20% root impact are planned to be removed and mitigation has been included. In addition, trees that will have greater than 10% canopy cover over new construction are planned to be removed and its mitigation has been included..

APPENDIX C - HISTORICAL RESORUCES

Cultural Resources Study and Historic Resource Evaluation of 1598 El Camino Real, Grover Beach, California

Ryan E. Wendel and Josh Patterson

Prepared by

Applied EarthWorks, Inc.
811 El Capitan Way, Suite 100
San Luis Obispo, CA 93401

Submitted To
Darshan Patel
Ram Krupa Real Estate LLC
845 Morro Avenue
Morro Bay, CA 93442

October 2017

[redacted]

MANAGEMENT SUMMARY

At the request of Darshan Patel of Ram Krupa, LLC, Applied EarthWorks Inc. (Æ) completed a Phase 1 cultural resource study and historical structure evaluation for the property at 1598 El Camino Real in Grover Beach, San Luis Obispo County, California. This study provides compliance with the California Environmental Quality Act (CEQA). CEQA mandates that government agencies consider the effects of permitted actions on important archaeological and historical resources (Public Resource Code 5020 and 21000 et seq. and California Code of Regulations 15000 et. seq.).

The Phase 1 cultural resource survey did not identify any archaeological materials on the property. However, two historical structures are present and required an evaluation for listing on the California Register of Historic Resources (CRHR). To facilitate this evaluation, Æ conducted a historical and architectural assessment and evaluation; and recorded the structures on California Department of Parks and Recreation site forms. Æ's evaluation recommends the two structures as not eligible for inclusion on the CRHR. No additional archeological studies are warranted for this property.

Field notes, maps, and a complete set of photographs from the current investigation are on file at Æ's office in San Luis Obispo, California. A copy of the final version of this report will be submitted to the Central Coast Information Center of the California Historical Resources Information System at the University of California, Santa Barbara.

CONTENTS

APPENDICES

TABLES

FIGURES

1
INTRODUCTION

At the request of Darshan Patel, Applied EarthWorks, Inc. (Æ) completed a Phase 1 cultural resource study and evaluated the historical significance of two structures in support of the proposed development on Assessor's Parcel Numbers (APN) 060-031-021 and 060-031-022 within the northeast corner of the city limits of Grover Beach, California. Proposed plans for these parcels include removal of two structures as well as extensive ground disturbance for development of a hotel (Project). The parcels at 1598 El Camino Real are within an unsectioned portion of Township 32 South, Range 13 East on the U.S. Geological Survey (USGS) Arroyo Grande NE 7.5-minute topographical quadrangle (Figures 1-1 and 1-2). The Project area measures approximately 250 meters north-south by 115 meters east-west (28,566 square meters or 7.1 acres; Figure 1-3).

1.1 PURPOSE OF THE INVESTIGATION

Development of this property requires discretionary permits from the County of San Luis Obispo, which requires compliance with the California Environmental Quality Act (CEQA). CEQA mandates that government agencies consider the effects of permitted actions on significant archaeological and historical resources (Public Resource Code [PRC] 5020 and 21000 et seq. and California Code of Regulations [CCR] 15000 et. seq.). Section 15064.5(a)(3) of the CEQA Guidelines (as amended) states that a resource shall be considered to be "historically significant" if the resource meets the criteria for listing on the California Register of Historic Resources (CRHR; PRC 5024.1, Title 14 CCR, Section 4852) Therefore, applicants are required to assess potential impacts of the proposed Project on archaeological and historical resources. The purpose of Æ's investigation is to identify any cultural resources that could be impacted by the Project and provide recommendations for any further cultural resource work, if necessary. Furthermore, this report provides an evaluation of two historical structures on the property. The investigation results will assist development planning for the property concerning cultural resources under CEQA.

1.2 PERSONNEL QUALIFICATIONS

Æ Staff Archaeologist Josh Patterson (M.A.) conducted the archaeological field survey, communicated with Native American representatives, and prepared portions of this report. Æ Associate Historic Archaeologist Ryan Wendel (M.A., RPA) conducted a survey and evaluation of two structures on the property. Æ Senior Archaeologist Erin Enright (M.A., RPA) served as principal investigator and project manager. She managed project tasks, oversaw background research, and provided a technical review of this document.

1.3 REPORT ORGANIZATION

This report is prepared in accordance with *Archaeological Resource Management Reports: Recommended Contents and Format* published by the California Office of Historic Preservation

(OHP 1990) and consists of six chapters. Following this introduction, Chapter 2 describes the natural and cultural setting of the Project area. Chapter 3 presents Æ's methods for the study, including background research, Native American correspondence, and field investigations. Chapter 4 discusses the results of the study. Chapter 5 presents an evaluation of the historic structures. Chapter 6 provides a summary and Project recommendations. A complete listing of references cited is provided in Chapter 7. Appendix A presents results of the records search; Appendix B contains California Department of Parks and Resources (DPR) site records; and Appendix C contains documentation of communication with the Native American Heritage Commission and local tribal representatives.

Figure 1-1 Project vicinity in San Luis Obispo County, California.

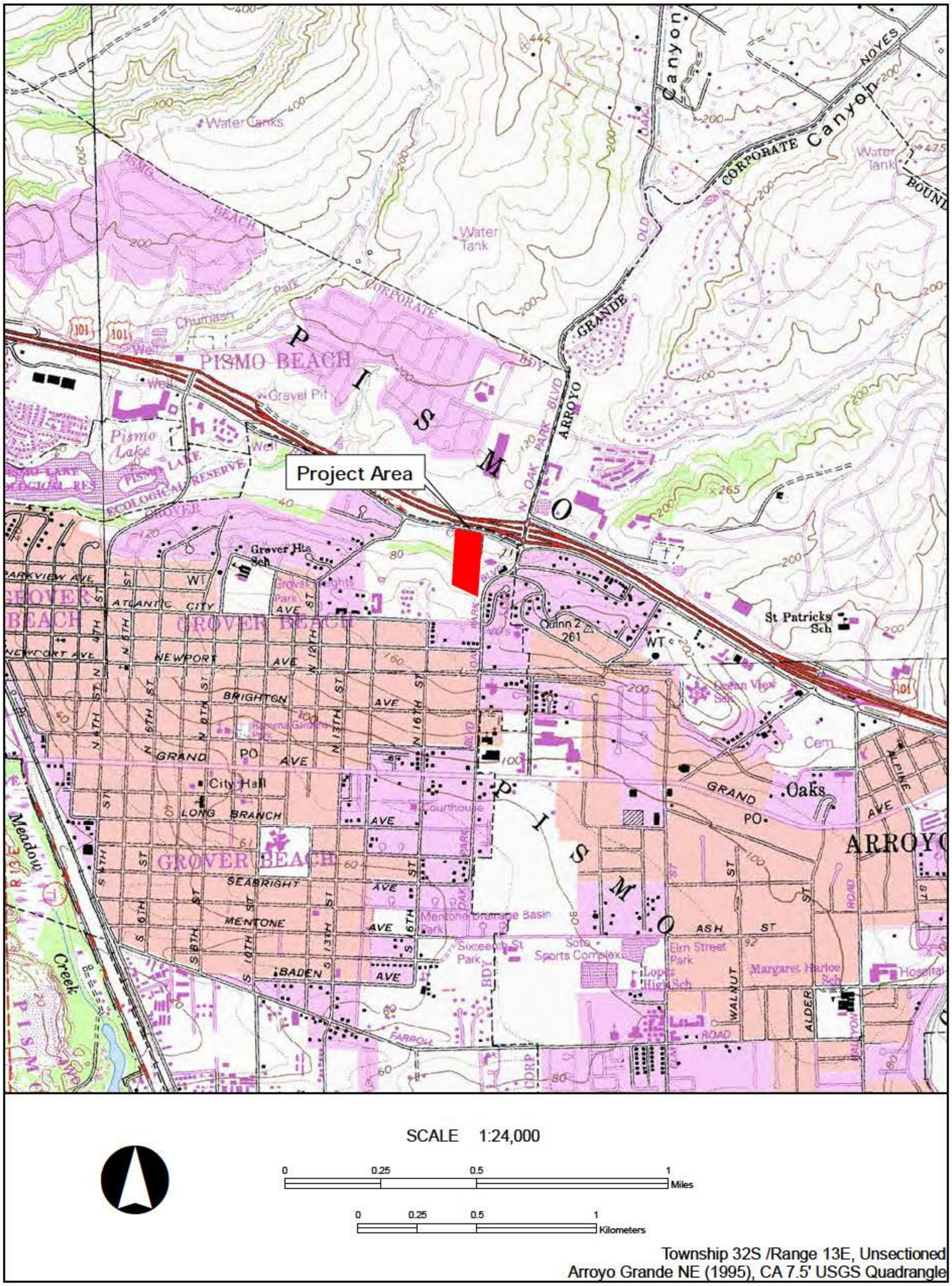

Figure 1-2 **Project area location on the Arroyo Grande, California,7.5-minute topographic quadrangle.**

Figure 1-3 Aerial view of the Project area in Grover Beach, California.

2
NATURAL AND CULTURAL CONTEXT

2.1 NATURAL ENVIRONMENT

The Project area lies within the southern extent of the Coast Ranges geologic province, formed by pressure between the North American and Pacific tectonic plates that created a series of northwest-southeast trending ridges and valleys and raised the coastline. Local coastal terraces were formed through this tectonic uplift and periodic fluctuations in sea levels, while rivers and streams flowing from the mountains cut through these terraces, creating coastal valleys (Pletka and Pletka 2004). Geologically, the Project area consists of Holocene to late Pleistocene alluvial valley deposits along the creek near the northern boundary and stationary sand dune deposits within the remainder of the Project area (California Geological Survey 2013).

The local Mediterranean climate is typically warm and dry in the summer, and cool and wet in the winter. Most of the county's rivers, creeks, and streams remain dry during the summer months. Temperatures near the coast are generally moderated by the proximity of the Pacific Ocean. Average annual temperatures in Grover Beach range from 48 to 68 degrees Fahrenheit, September is the warmest month and January is the coldest. Precipitation occurs primarily as winter rain between November and April, and the wettest month is usually January. Mean annual precipitation in Grover Beach is 17.14 inches (Western Regional Climate Center 2017).

Natural habitats and vegetation communities of San Luis Obispo County include coast live oak woodland and central coastal scrub in the interior mountains and valleys, coastal prairie, dunes, and the intertidal zone bordering the Pacific Ocean. Localized habitats include willow and mixed riparian vegetation along waterways, native bunch-grass, and nonnative and agricultural areas (Kuchler 1988). The Project area is on stabilized sand dunes along the southern bank of an unnamed creek, which supports a riparian corridor that consists of arroyo willow, coyote bush, summer mustard, and various grasses. Located within urban development, this area has been disturbed by construction of modern buildings and roads, including the two structures on property.

2.2 PREHISTORY

Most of the research into the prehistory of the Central Coast has concentrated on the Santa Barbara Channel region, where the Barbareño Chumash developed a highly complex social system during late prehistory; however, recent studies regarding the prehistory and archaeology of San Luis Obispo County have been conducted by Bertrando and Levulett (2004), Farquhar et al. (2011), Fitzgerald (2000), Jones et al. (1994), Jones and Waugh (1995), and Mikkelsen et al. (2000). While it is clear that there are many differences between the Chumash groups living north and south of Point Conception, there are some broad patterns of cultural change applicable to both regions.

Early attempts at regional cultural chronology by Rogers (1929) and Olson (1930) divided prehistory into three periods. However, extensive archaeological studies since then, and development of more precise dating methods, have allowed many refinements to the regional chronology. Currently, the most common chronological sequence—based on work by Erlandson and Colten (1991), Jones and Ferneau (2002), Jones et al. (2007), and King (1990)—divides Central Coast prehistory into six periods (Table 2-1).

Table 2-1
Regional Chronology of the Central Coast

Period	Years B.C./A.D.	Years B.P.
Paleo-Indian	pre–8000 B.C.	pre–10,000 B.P.
Early Archaic	8000–3500 B.C.	10,000–5500 B.P.
Early	3500–600 B.C.	5500–3000 B.P.
Middle	600 B.C.–A.D. 1000	3000–1000 B.P.
Middle-Late Transition	A.D. 1000–1250	1000–700 B.P.
Late	A.D. 1250–1769	700 B.P.–Historic

The Paleo-Indian Period represents the earliest human occupations in the region, which began prior to 10,000 years ago. Paleo-Indian sites throughout North America are known by the representative fluted projectile points, crescents, and large bifaces used as tools as well as flake cores along with a distinctive assemblage of small flake tools. Only three fluted points have been reported from Santa Barbara and San Luis Obispo counties, and all are isolated occurrences unassociated with larger assemblages of tools or debris (Erlandson et al. 1987; Gibson 1996; Mills et al. 2005). However, more evidence of Paleo-Indian sites on the mainland is slowly being uncovered. Recent work on Vandenberg Air Force Base (AFB) uncovered a late Paleo-Indian site (CA-SBA-1547) with a robust artifact assemblage (Lebow et al. 2016). Data recovery work at this location has documented a dense single-component shell midden dating to approximately 10,725 calibrated years before present (cal B.P.). Data from this site, also known as the Sudden Flats Site, points to an early culture that utilized a unique tool assemblage that exhibit traits derived from Alaska/Beringia (Lebow et al. 2016).

Interestingly, early sites on San Miguel and Santa Rosa islands have yielded numerous radiocarbon dates of older Paleo-Indian age than the Sudden Flats Site, although these sites do not contain fluted points or other notable artifacts typically associated with Paleo-Indian adaptations (Agenbroad et al. 2005; Erlandson et al. 1996). Nonetheless, both offshore and mainland sites provide clear evidence of watercraft use by California's earliest colonizers and also offer tantalizing evidence of pre-Clovis occupations. Overall, inhabitants of the Central Coast during the Paleo-Indian Period are thought to have lived in small groups with a relatively egalitarian social organization and a forager-type land-use strategy (Erlandson 1994; Glassow 1996; Greenwood 1972; Moratto 1984).

More robust assemblages of early human occupation have been found at sites dating to the Early Archaic, between 8000 and 3500 B.C. A growing number of Early Archaic components have been identified, most located in coastal or pericoastal settings. Two such components, CA-SLO-2 (Diablo Canyon) and CA-SLO-1797 (the Cross Creek site), are radiocarbon dated between 8300 and 6500 B.C., providing the earliest evidence for the widespread California Milling Stone Adaptive Pattern (Greenwood 1972; Jones et al. 2008). The most common artifacts in these assemblages are the eponymous milling slabs and handstones used to grind hard seeds and process other foodstuffs. Choppers, core tools, and large bifaces also are common, while side-notched dart points, pitted stones, simple bone awls, bipointed bone gorges, and possible eccentric crescents occur in lesser frequencies. Population density likely remained low, although settlements may have been semi-permanent. Subsistence activities appeared to be aimed broadly at a diverse spectrum of terrestrial and marine resources.

It is important to note that Early Archaic components from central California show substantial regional variability (Sutton and Gardner 2010). Differences in site location, artifact assemblages, and faunal remains suggest that populations were beginning to establish settlements tethered to the unique characteristics of the local environment and adopt subsistence practices responsive to local conditions. Obsidian from several of these components originated on the east side of the Sierra Nevada, suggesting that long-distance trade networks also were established during this era. Glassow (1990, 1996) infers that occupants of Vandenberg AFB sites during this time were sedentary and had begun using a collector-type (i.e., logistically mobile) land-use strategy. However, others have argued for a broader and less permanent subsistence base as over-exploitation of costal resources pushed human residents towards the interior (Jones and Richman 1995).

An important adaptive transition occurred along the Central Coast around 3500 B.C. (Jones et al. 2007; Price et al. 2012). Technological changes marking the transition into the Early Period (3500–600 B.C.) include an abundance of contracting-stemmed, Rossi square-stemmed, large side-notched, and other large projectile points (Jones et al. 2007:138). Mortars and pestles were introduced and gradually replaced manos and milling slabs as the primary plant processing tools, indicating expansion of the subsistence base to include acorns (Glassow and Wilcoxon 1988). Shell beads and obsidian materials indicate that trade between regions expanded (Jones et al. 1994). Site occupants appear more settled with more limited mobility, and they increasingly used sites for resource procurement activities such as hunting, fishing, and plant material processing (Jones et al. 1994:62; Jones and Waugh 1995:132). Farquhar et al. (2011:14) argue that cultural changes during this period are the result of population circumscription and economic intensification. Echoing Rogers (1929), Price et al. (2012:36–37) suggest such constraints might have been prompted by the arrival of new ancestral populations or adoption of new social norms in the region.

The Middle Period (600 B.C.–A.D. 1000) is defined by the continued specialization in resource exploitation and increased technological complexity. Contracting-stemmed points still existed, while square-stemmed and large side-notched variants disappeared (Rogers 1929). The use of mortars and pestles also increased. Additionally, expansion of trade is evident in the increased quantity of obsidian, beads, and sea otter bones (Farquhar et al. 2011:15). Circular shell fishhooks, which facilitated an increase in exploitation of fishes, appeared for the first time (Glassow and Wilcoxon 1988). The appearance of small leaf-shaped projectile points toward the end of the period is evidence for the arrival of bow and arrow technology (Jones et al. 2007:139).

The Middle-Late Transitional Period (A.D. 1000–1250) represents a rapid change in artifact assemblages as large numbers of arrow points appeared and most stemmed points disappeared (Jones et al. 2007:139). Hopper mortars also made their first entry in the archaeological record (Farquhar et al. 2011:16). At the same time, some evidence points to population decline and interregional trade collapse. Obsidian is not found in sites dating to this period (Jones et al. 1994). Settlement shifted away from the coast and people relocated to more interior settings (Jones 1995:215). Marine resources appear to have been largely dropped from the diet and instead people relied more on terrestrial resources such as small mammals and acorns (Farquhar et al. 2011:16). These changes may have been caused by an environmental shift that increased sea and air temperatures, resulting in decreased precipitation and overexploitation of resources (Arnold 1992; Graumlich 1993; Kennett et al. 1997; Pisias 1978; Stine 1990).

At the same time, it appears social complexity became more noticeable during the transition between the Middle and Late periods. It is during this time that craft specialization and social ranking developed (Arnold 1992). The *tomol* (plank canoe), which was utilized by the Chumash south of Point Conception where ocean conditions were more favorable, allowed for a greater reliance on marine resources, particularly fish, for food. However, these changes are again more noticeable south of Point Conception and may have been due, in part, to environmental changes occurring at that time.

Populations on the Central Coast expanded in the Late Period (A.D. 1250–1769; Farquhar et al. 2011:17). More sites were occupied during this period than ever before (Jones et al. 2007:143). It appears inhabitants of the Central Coast did not increase maritime subsistence activities but instead continued to demonstrate a terrestrial focus, although residents of the interior still made temporary forays to the coastal zone to procure marine products (Farquhar et al. 2011:17; Jones et al. 2007:140; Price 2005; Price et al. 1997:4.13–4.14).

Artifact assemblages from the Late Period within San Luis Obispo County contain an abundance of arrow points, small bead drills, bedrock mortars, hopper mortars, and a variety of bead types (Price 2005). Increasing numbers of shell and stone beads appeared in the Late Period and became a more standardized and common form of exchange (Jones et al. 2007:140, 145). The use of handstones and milling slabs continued during this period, but pestles and mortars occurred in greater proportions (Jones and Waugh 1995:121). In San Luis Obispo County, it appears that the absence of the *tomol* and a lower population density contributed to a different social and political organization than in neighboring areas to the south in the Santa Barbara Channel region. Moreover, the absence of imported obsidian after A.D. 1000 suggests a change in trade relationships that is likely associated with the shift in settlement patterns (Jones et al. 1994).

2.3 ETHNOGRAPHY

Grover Beach is within the area historically occupied by the Northern (Obispeño) Chumash, the northernmost of the Chumash people of California (Gibson 1991; Greenwood 1978; Kroeber 1976). The Northern Chumash occupied land from the Pacific Coast east to the Coast Ranges and from the Santa Maria River north to approximately Point Estero. Ethnographic information has documented the Chumash people living in large villages along the Santa Barbara Channel coast, with less dense populations in the interior regions, on the Channel Islands, and in coastal areas north of Point Conception. Their subsistence was focused on fishing, hunting, and gathering native plants, particularly acorns, although many animals and dozens of plants were used for food. Chumash people engaged in craft and occupational specialization, and maintained regional trade and religious systems that tied many villages together. Leadership was hereditary, and some chiefs had influence over several villages, indicating a simple chiefdom level of social organization (Arnold 1992; Johnson 1988).

The Chumash were hunter-gatherer-fishers who relied on a variety of resources for subsistence and raw materials. There was considerable seasonal and regional variability in land use, settlement, and subsistence practices across Chumash territory; people who lived near the coast focused animal procurement activities on the marine environment, while those north of Point Conception and in the interior regions were more terrestrially focused and are thought to have had lower population densities and greater seasonal mobility than coastal groups (Landberg 1965). Trade or acquisition of various resources through expeditions was a regular occurrence, and animal remains and lithic raw materials are often found in archaeological sites at some distance from their sources.

2.4 HISTORY

The first Europeans the Chumash encountered were Spanish explorers in the sixteenth century. In 1587, Pedro de Unamuno landed his ship in Morro Bay and explored inland to San Luis Obispo (Hoover et al. 1990:359). At first the native people they encountered were “extremely timid,” but later the Spanish were attacked by the natives who killed two explorers and wounded several others. The Gaspar de Portolá expedition may have passed through the Grover Beach area in 1769, and Juan Bautista de Anza followed practically the same route as Portolá in 1774 and 1776 (Hoover et al. 1990:359).

Mission San Luis Obispo de Tolosa was founded in 1772 by Padre Junipero Serra. In 1776, rebellious Northern Chumash damaged the mission buildings by shooting burning arrows into the roofs thatched with tule (Hoover et al. 1990:360). An adobe church replaced the original chapel in 1794. The native people at the mission suffered and the population declined rapidly. In 1803 there was a peak of 919 Native Americans residing at the mission, but by 1838 the population had declined to 170. According to the Roll of 1928 compiled by the Bureau of Indian Affairs, only four Native Americans living at the time claimed to be survivors of San Luis Obispo Mission Indians (Greenwood 1978:521).

After the mission was secularized in 1835, mission lands were divided into land grants and influential families were given the largest grants (Morrison and Hayden 1917:35). In 1835 Francis Ziba Branch, originally from New York, married Maria Manuela Carlon, a Mexican citizen of the area. In 1837 Governor Juan Bautista Alvarado granted Branch the Rancho San Manuela; where his family ran a successful cattle ranching operation that continued when California became a U.S. territory and then a state. Over time, Branch came to own Rancho Arroyo Grande, Rancho Bolsa de Chamisal, Rancho Huerhuero, and half of Rancho Pismo.

City of Grover Beach

The City of Grover Beach, originally called the Town of Grover, was founded on August 1, 1887 by Dwight William Grover who purchased the land from John Michael Price, the founder of the town of Pismo Beach (City of Grover Beach 2017). In 1890, Grover attempted to construct a rail station for the Southern Pacific line; however, Oceano was selected for the rail stop which would hinder the development of Grover Beach. The small size of Grover Beach is highlighted by its omission from Morrison's (1917) San Luis Obispo County History. Development in Grover Beach stagnated until 1935 when Horace V. Bagwell bought 1,100 acres and began advertising for development. By the 1940s, a store and post office were established. The community witnessed a housing boom in the 1950's, and Grover City was officially incorporated in 1959. Residents of the community voted to change the name to Grover Beach in 1992 (City of Grover Beach 2017).

3
METHODS

3.1 RECORDS SEARCH

On September 8, 2017, a records search was conducted at the Central Coast Information Center (CCIC) of the California Historical Resources Information System, housed at the University of California, Santa Barbara. Æ examined maps, site records, and archaeological reports to identify any previously recorded cultural resources, archaeological surveys, or data recovery projects within 0.25-mile of the Project. Additionally, the State Historic Property Data Files, National Register of Historic Places, National Register of Determined Eligible Properties, California Points of Historic Interest, California Office of Historic Preservation Archaeological Determinations of Eligibility, and Æ's in-house files were reviewed.

3.2 NATIVE AMERICAN COMMUNICATION

Æ contacted the California Native American Heritage Commission (NAHC) to determine whether any sites recorded in the Commission's Sacred Lands File occurred in or near the Project area. On September 8, 2017, the NAHC supplied a list of local Native American individuals and/or groups with interests and knowledge about the area (Appendix C). Those included on the list were contacted by letter and telephone to request comments or information about the Project area (see Section 4.2).

3.3 ARCHAEOLOGICAL RESOURCES INSPECTION

Æ Staff Archaeologist, Josh Patterson completed a pedestrian survey of the Project area on September 7, 2017. Patterson examined the ground surface by walking linear transect intervals spaced no more than 10 meters apart across the entire property. Vegetation was dense within the northern portion of the site, only a series of cleared pathways through this area were inspected. Modern disturbances and landscape features were documented in the field using a hand-held GPS device, and digital photographs were taken with a Fujifilm XP Camera.

3.4 HISTORICAL STRUCTURES EVALUATION

Æ Historic Archaeologist Ryan Wendel conducted archival research, and an architectural survey to document the two buildings at the Project parcel, and performed a historical significance evaluation of the buildings. Wendel consulted property and building records at the County of San Luis Obispo Assessor's and Recorder's offices, building permits at the City of Grover Beach, and USGS topographical maps.

Wendel conducted the architectural resources survey of the Project area on September 19, 2017. He recorded the two associated buildings as a single resource on a California Department of Parks and Recreation Primary Record (523A) and Building, Structure, and Object Record (523B). These forms describe the buildings' architectural features and summarize the evaluation of significance (Appendix B).

4
FINDINGS

4.1 PREVIOUS STUDIES

The CCIC records search identified 4 prior cultural resource investigations within the Project area (Table 4-1) and 22 previous studies within a 0.25 mile radius of the Project area. The 22 previous studies outside of the Project area were conducted for numerous types of development including residential, early warning systems for Diablo Canyon Power Plant, transportation, and communication projects (Appendix A).

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

4.2 ARCHAEOLOGICAL SITES

[redacted]

[redacted]

[redacted]

4.3 NATIVE AMERICAN COMMUNICATION

The NAHC responded to Æ's information request on September 7, 2017, and noted that its search of the Sacred Lands File failed to indicate the presence of any Native American cultural resources within the Project area. The NAHC also provided a contact list of local individuals and groups and suggested Æ request more information from these contacts. Æ sent a notification letter on September 13, 2017, to individuals on the NAHC's list informing them of the nature and intent of the Project and soliciting comments or concerns. Follow-up phones calls were initiated on October 6, 2017.

To date, only the Santa Ynez Tribal Elders Council (SYTEC) has responded to inquiries. Freddie Romero called back on September 26, 2017, and indicated that SYTEC would defer to the local San Luis Obispo County Native American groups in this case. Appendix C identifies individuals and groups on the list that were contacted and provides responses to the request for information.

4.4 ARCHAEOLOGICAL INSPECTION

On September 7, 2017, Æ Staff Archaeologist Josh Patterson completed a Phase 1 pedestrian survey of the 7.1-acre Project area. The central and southern portions of the Project area were covered with various annual grasses. These areas included numerous rodent burrows, which provided pockets of ground visibility (Figures 4-1 and 4-2). Overall surface visibility was approximately 75 percent, with observed sediments consisting of loose, light to medium brown silty sand. The northern portion of the Project area is along the south bank of an unnamed creek, and is heavily overgrown with vegetation (Figure 4-3). The surface visibility within this portion of the Project area was approximately 20 percent, but only within areas that had been cleared for roads or paths. The ground was completely covered in the uncleared areas.

No prehistoric or historic-era cultural materials were observed during surface inspection. Marine shell fragments were observed within the spoil piles of several rodent burrows approximately 20 meters south of the main residence. [redacted]

Figure 4-1 Project area overview from southeast corner, facing north.

Figure 4-2 Ground disturbance caused by rodent burrows within the southern portion of the Project parcel, plan view.

Figure 4-3 Heavy vegetation within the northern portion of the Project parcel, facing north.

4.5 ARCHITECTURAL RESOURCES

Two historical structures are present on parcel APN 060-031-021 in the Project area; a large residence (Structure 1), and an ancillary residence (Structure 2; Figure 4-4). Structure 1 is a single-family residence that has undergone at least two stages of additions. The building is composed of the original residence, a sun room, and a garage linearly arranged. Structure 2 is a shed-style single-family residence with no obvious modern additions or renovations.

4.5.1 Property History

Parcel APN 060-031-021 was originally part of unincorporated San Luis Obispo County. According to the County Assessor, the primary residence (Structure 1) was constructed in 1948. Unfortunately, archival research revealed little else about the early history of the property and associated structures. Building permits are a fairly recent requirement for home builders, and deed records in San Luis Obispo County are limited. Furthermore, the recent date of incorporation for the City of Grover Beach in 1959, appears to have resulted in a lack of documentary records.

Figure 4-4 Overview of Structures 1 (left) and 2 (far right), facing northeast.

The next mention of the property is in 1953 when a shed-style house (Structure 2) was constructed. According to the County Assessor's records, the garage structure was also constructed as a horse stable around this period. Although no building permits exist, a review of the USGS Arroyo Grande NE topographical maps shows the sun room addition was constructed prior to 1965.

Unfortunately, title searches and property records for 1598 El Camino Real did not reveal substantial additional information. The first listed owners of the property, the Elvin family, acquired the property prior to 1980 when they begin to appear on property deed and trust documents. The Elvins, including Scott, Arthur, and Julie retained ownership of the property until 2011 when the property was sold to Dorfman Homes. The property was sold to the current owner Martin Halldin in 2012.

4.5.2 Structure 1

4.5.2.1 Primary Residence

The original structure is an irregular, rectangular Modern Ranch style residence with National Folk and Spanish Eclectic design elements (Figures 4-5 to 4-7). The Modern Ranch style is a popular housing style that arose out of the post-war culture of the late 1940s (McAlester and McAlester 1984:477). The structure embodies these characteristics with its general rectangular floor plan and low-pitched side gabled roof.

Figure 4-5 Structure 1 - primary residence front, north elevation, facing east, southeast.

Figure 4-6 Structure 1 - primary residence rear, south elevation, facing north.

Figure 4-7 Structure 1 - primary residence, side, east elevation, facing west.

The irregular wings on the east and west elevations add National Folk style elements characterized by front-gabled wings added to simple side gabled I-floor plans. A common component of these wings are roof gables that are lower in elevation to the primary roof, which are present on this structure. National Folk style elements dominated many residential design from the late 1800s through the 1950s (McAlester and McAlester 1984:89, 92). The house's exterior and roof design also incorporate elements of Spanish Eclectic style, popular during the early 1900s (McAlester and McAlester 1984:417). Elements present on Structure 1 include the use of Spanish style roofing tiles on a low-pitched cross-gabled roof with eaves that have little overhang.

The residence includes a full covered front porch with exposed rafters and non-decorative support columns. The walls are white-painted stacked brick. The roof consists of a mix of barrel-shaped Spanish tiles and composite shingles with exposed eaves. Fenestration includes asymmetrical mixtures of rectangular one-over-one double-hung wood-framed windows, and sash fixed-pane windows with flanking casements. The primary entrance to the building, on the south elevation, is a plain wooden door. A secondary entry, a wood-framed fixed-glass door, is located on the north elevation. This entry opens into a walled-off-porch built into the hillside. All of the doors and windows are accented by architrave trim. The north, rear elevation, features a white-painted brick cave wall chimney. The interior of the structure consists of a two bedroom, two bathroom floor plan with a separated kitchen. The kitchen and living room are within the primary structure, while the bedrooms are in each wing.

4.5.2.2 Sun Room Addition

A non-contemporary sun room/rumpus room, constructed between 1953 and 1965, extends off the western elevation of the primary residence (Figure 4-8). The side-gabled single-story structure is wood framed with an open floor plan that derives similar stylistic elements of the main residence. The addition is irregular in shape. Three elevations, north, east, and west have straight walls while the south elevation has an oblique angle bend expanding out past the footprint of the primary residence to align with the primary residence's rear porch (Figure 4-9). Both exposed elevations, north and south, feature walls with large fixed-pane windows atop a short white-painted brick wall and foundation. The north, front elevation has centralized wood French doors with large fixed-pane glass panels. The roof is a low-pitched extended roof with exposed eaves. The expanded roof extends off the primary side gable to the south. The north half of the roof consists of modern Spanish tile while the southern extension has modern composite shingles. The southwest corner of the sun room has a modern brick gas fireplace.

Figure 4-8 Structure 1 - sun room front, north elevation, facing south.

Figure 4-9 Structure 1 - sun room rear, south elevation, facing north.

4.5.2.3 Garage Addition

A wood-framed garage constructed around 1953 extends off of the west elevation of the sun room (Figures 4-10 and 4-11). The single-story rectangular structure has a white-brick foundation that matches the primary residence. The roof is side gabled with modern composite shingles accented by Spanish tiles on the top of the gable and sides. The walls are a vertical flush barn wood-siding stained brown. The north elevation has two garage doors. The eastern door is a two car up-and-over style crafted of vertical brown-stained wood planks. The western door is a modern aluminum paneled roll-up style with no windows.

Figure 4-10 Structure 1 - garage addition front, north elevation, facing south.

Figure 4-11 Structure 1 - garage addition, side (west) and rear (south) elevations, facing northeast.

4.5.3 Structure 2

East of the primary residence is an ancillary residence constructed in 1953 (Figures 4-12 to 4-14). The structure is a west-facing rectangular Modern Shed style residence. Modern Sheds were a popular style of American residence during the mid to late 1900s (McAlester and McAlester 1984:477). The shed residence is one bedroom, one bathroom with an open floor plan that includes the kitchen and common area. The structure has a poured-concrete foundation. The walls are horizontal clapboard siding painted white. The roof is a front, west-facing shed roof with exposed eaves and composite shingles. Fenestrations include rectangular aluminum-framed sash fixed-pane windows flanked by casements, rectangular one-over-one double hung wood-framed windows, and a rectangular fixed single-pane window. The primary door is centered on the front, west elevation, and is a non-decorative wood door with an exterior metal security gate. The west elevation also has a contemporary poured-cement patio running the length of the side. A small square lean-to utility shed extends off of the south corner of the east elevation. The utility shed is constructed of vertical lap-board siding with a shed composite shingle roof. The front yard, off the west elevation, is fenced with a wooden privacy fence that extends to the western elevation of the primary residence of Structure 1.

Figure 4-12 Structure 2 - shed residence front, west elevation, facing east.

Figure 4-13 Structure 2 - shed residence side, north elevation, facing south.

Figure 4-14 Structure 2 - shed residence, side (south) and rear (east) elevations with utility shed, facing northwest.

5
EVALUATION OF SIGNIFICANCE

This chapter presents Æ's evaluation of the residential structures at 1598 El Camino Real. The structures are evaluated for eligibility for listing on the CRHR.

5.1 CALIFORNIA REGISTER OF HISTORIC RESOURCES CRITERIA

Section 15064.5(a)(3) of the CEQA Guidelines (as amended) states that a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (PRC 5024.1, Title 14 CCR, Section 4852), including the following:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(2) Is associated with the lives of persons important in our past;

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

A resource must also, except in rare circumstance, be 50 years old or older. In addition, the resource must retain enough of its historic character to convey the reason for its significance. This is assessed by examining seven aspects of integrity, which are defined as follows:

- Location is the place where the historic property was constructed or the place where the historic event occurred. . .
- Design is the combination of elements that create the form, plan, space, structure, and style of a property. . .
- Setting is the physical environment of a historic property. . .
- Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. . .
- Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. . .
- Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. . .
- Association is the direct link between an important historic event or person and a historic property. . . [National Park Service 2002:Part VIII].

"Integrity is based on significance: why, where, and when a property is important" (National Park Service 2002:Part VIII). Only after significance is fully established is the issue of integrity addressed. Ultimately, the question of integrity is answered by whether or not the property retains the identity for which it is significant.

5.2 LOCAL REGULATIONS

The City of Grover Beach has few local regulations governing historical structures. The County of San Luis Obispo currently defers to the eligibility criteria for the CRHR in determining significance of historic properties located within the County.

5.3 CRHR SIGNIFICANCE EVALUATION

5.3.1 Criterion 1 – Association with Important Historical Events and Trends

To be eligible under Criterion 1, a resource must be associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

Structures 1 and 2, were originally built during the second development boom of Grover Beach (1940s–1950s), when Horace V. Bagwell advertisements for development and new infrastructure attracted many new residents. The property appears to be associated with this broad pattern of population growth. The buildings at 1598 El Camino Real served as simple family residences and are not associated with specific activities, organizations, or functions important to the larger community. Neither are they associated with a specific event important in the history of the community. Therefore, both structures are not recommended not eligible for the CRHR under Criterion 1.

5.3.2 Criterion 2 – Association with Important Individuals

To be eligible under Criterion 2, a resource must be associated with the lives of persons significant in our past and/or identified with a person or group that contributed significantly to the culture and development of the state. This applies to properties associated with individuals whose specific contributions to history can be identified and documented.

Archival research indicates that the property is most closely associated with the Elvin family. Archival and historic sources did not indicate that the family or any individuals were active in the community, held important offices, or influenced the development of Grover Beach. Therefore, the Elvin family does not appear to be significant in the history of San Luis Obispo County or Grover Beach. For that reason, both structures are recommended not eligible for the CRHR under Criterion 2.

5.3.3 Criterion 3 – Distinctive Architecture or Artistic Value

To be eligible under Criterion 3, a resource must (1) embody the distinctive characteristics of a type, period, or method of construction, or (2) represent the work of a master, or (3) possess high artistic values. The first requirement "refers to the way in which a property was conceived, designed, or fabricated by a people or culture in past periods of history" (National Park Service

2002:17). The work of a master refers to the technical or aesthetic achievements of an architect applies to aesthetic achievement.

Structure 1 is a Modern Ranch style residence constructed in 1948. These homes were easy to build, and by borrowing details from more “high-style” architecture, the middle class could think themselves fashionable. Structure 2 is a Modern Shed style residence constructed in 1953. These structures are utilitarian in nature and were constructed with efficiency of cost, space, and materials in mind. Both Modern Ranch and Modern Shed styles were popular around the mid twentieth century and are found in most towns in California and San Luis Obispo County, making these buildings a common construction type and not a rare example of the form. Most homes built during this time were designed by homeowners and influenced by surrounding architecture and availability of construction materials.

Due to the lack of available information regarding the history of both structures, they most likely fit this category and do not appear to represent the work of a master or define a type or period of construction. Therefore, both structures are recommended not eligible for the CRHR under Criterion 3.

5.3.4 Criterion 4 – Potential to Yield Important Information

To be eligible under Criterion 4, the buildings would have to have potential to yield important information that could not be found in any other source. This criterion is often applied to archaeological sites, but may be applied to structures or industrial facilities if they contain information that would not be available by any means other than studying the structures themselves. As explained above, the buildings are extremely common in construction, materials, and design, and information about such structures and their construction techniques are amply available from both published and unpublished sources. Therefore, both structures are recommended not eligible for the CRHR under Criterion 4.

5.4 CONCLUSION AND RECOMMENDATIONS

The existing buildings at 1598 El Camino Real in Grover Beach meet the age criterion for historical resources (i.e., 50 years or older), but do not possess important historical associations and/or architectural characteristics to qualify for inclusion in the CRHR, and as a result are not considered a significant resource. Therefore, Æ recommends no further investigations or management measures for the buildings.

6
SUMMARY AND RECOMMENDATIONS

On behalf of Darshan Patel, Æ conducted a Phase 1 cultural resource inventory and historic structural evaluation in support of the proposed construction at 1598 El Camino Real, within the city limits of Grover Beach, California.

6.1 PHASE 1 INVENTORY

The Phase 1 cultural resources study included a record search, pedestrian surface survey, and outreach to local Native Americans. Record search results found four previously recorded cultural resources within a 0.25 mile radius of the Project area. [redacted] No cultural resources have been recorded within the Project parcel or were observed during the current survey.

[redacted] given the absence of archaeological deposits and the low potential for artifact deposition, Æ recommends no further archaeological studies are warranted for the Project.

While this study found a low sensitivity for cultural materials within the Project area, there is always the potential for encountering prehistoric or historic-period materials during construction. If cultural materials are encountered during ground-disturbing work, it is recommended that all work in the immediate vicinity is halted until a Registered Professional Archaeologist can evaluate the finds and make recommendations.

If human remains are discovered during project construction, work must stop at the discovery location and any nearby area suspected to contain human remains (PRC 7050.5). The San Luis Obispo County Coroner must be contacted to determine whether the cause of death should be investigated. If the coroner determines that the remains are of Native American origin, it is necessary to comply with state laws relating to the disposition of Native American burials (PRC 5097), which fall within the jurisdiction of the NAHC. The coroner will contact the NAHC. The NAHC will contact the most likely descendant (MLD) who will be afforded the opportunity to recommend means for treatment of the human remains following protocols in PRC 5097.98.

6.2 BUILT ENVIRONMENT

The existing structures at 1598 El Camino Real in Grover Beach meet the age criterion for historical resources (i.e., 50 years or older), but do not possess important historical associations and/or architectural characteristics to qualify for inclusion in the CRHR, and as a result are not considered a significant resource. Therefore, Æ recommends no further investigations or management measures for these buildings.

7
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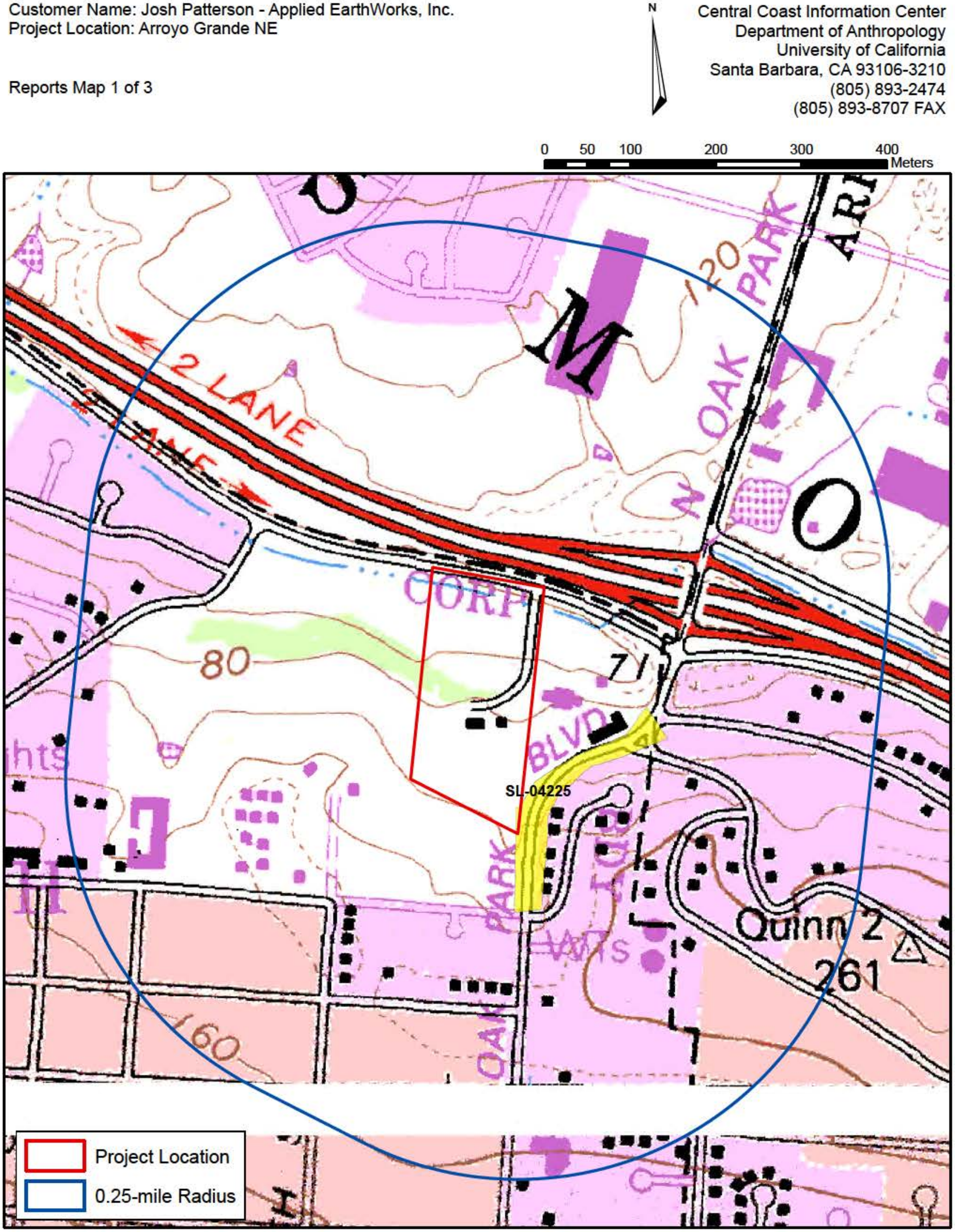
Ram Krupa Phase I (Job#3759)

Customer Name: Josh Patterson - Applied EarthWorks, Inc.
Project Location: Arroyo Grande NE

Reports Map 1 of 3

Central Coast Information Center
Department of Anthropology
University of California
Santa Barbara, CA 93106-3210
(805) 893-2474
(805) 893-8707 FAX

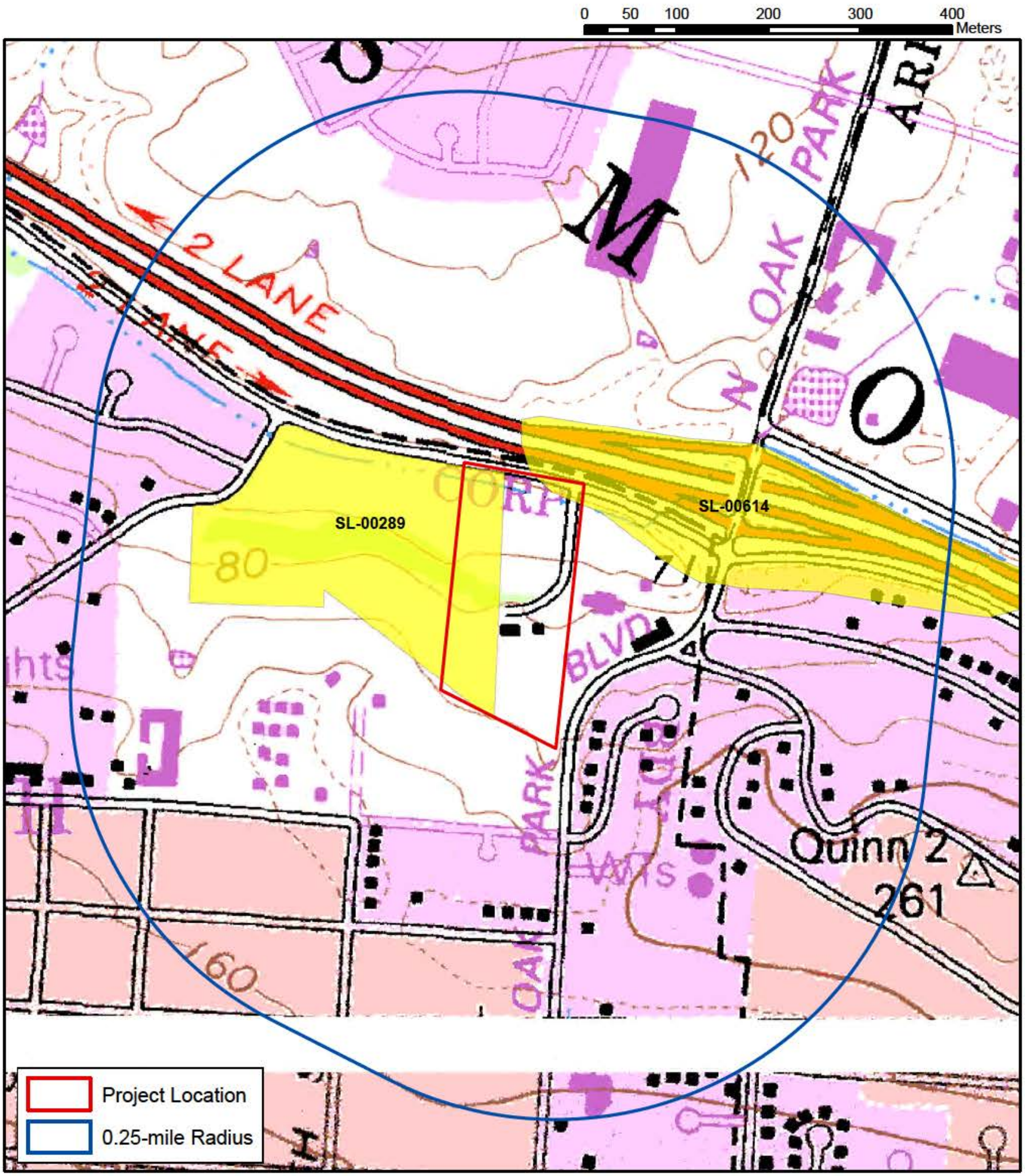


Ram Krupa Phase I (Job#3759)

Customer Name: Josh Patterson - Applied EarthWorks, Inc.
Project Location: Arroyo Grande NE

Reports Map 2 of 3

Central Coast Information Center
Department of Anthropology
University of California
Santa Barbara, CA 93106-3210
(805) 893-2474
(805) 893-8707 FAX



Ram Krupa Phase I (Job#3759)

Customer Name: Josh Patterson - Applied EarthWorks, Inc.
Project Location: Arroyo Grande NE

Reports Map 3 of 3

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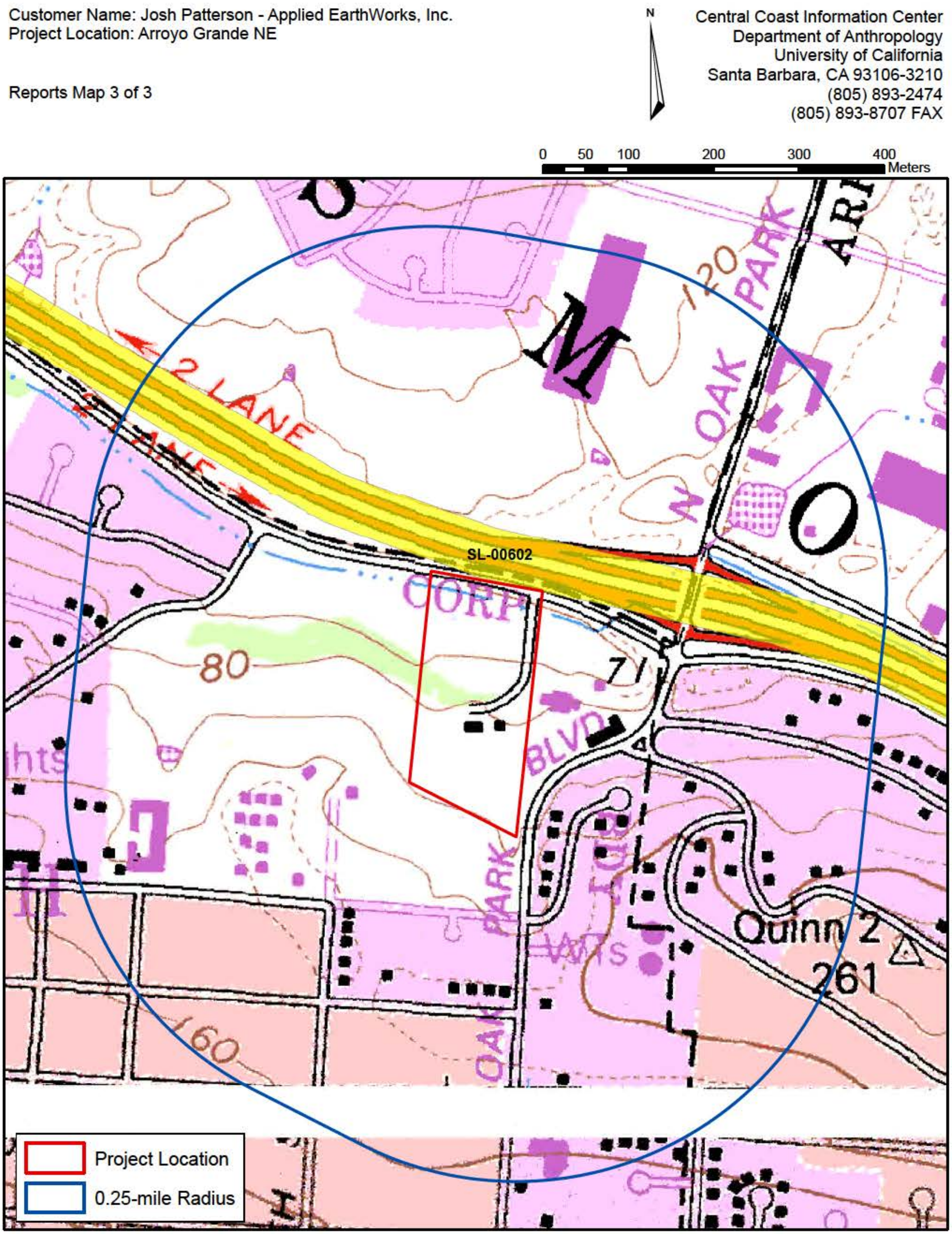


Resource List

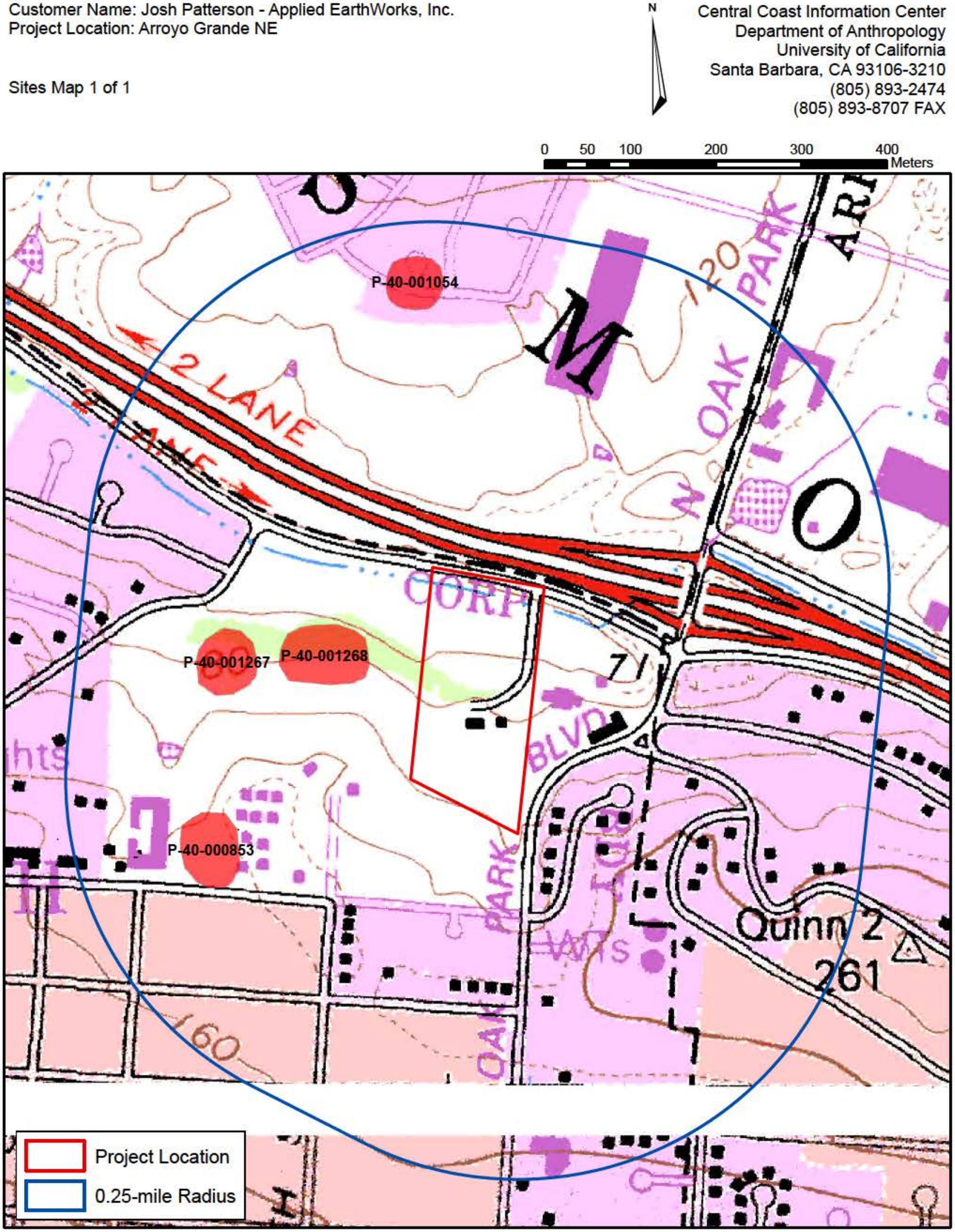
Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-40-000853	CA-SLO-000853	Other - 4-SLO-AS-853	Site	Prehistoric	AP16 (Other) - Shell	1978 (Charles E. Dills)	SL-00019, SL-00119, SL-00320, SL-01426, SL-01664, SL-01718, SL-03269, SL-06407
P-40-001054	CA-SLO-001054	Other - Site 1	Site	Prehistoric	AP16 (Other) - Shell	1981 (R. Brown)	SL-00377, SL-06407
P-40-001267	CA-SLO-001267	Other - AS5068; Other - Hearn III	Site	Prehistoric	AP02 (Lithic scatter); AP16 (Other) - Shell	1989 (W. B. Swyer, Lei Lynn Odom)	SL-06407
P-40-001268	CA-SLO-001268	Other - AS5069; Other - Hearn II	Site	Prehistoric	AP02 (Lithic scatter); AP16 (Other) - Shell	1989 (W. B. Sawyer, Lei Lynn Odom)	SL-06407

Ram Krupa Phase I (Job#3759)

Customer Name: Josh Patterson - Applied EarthWorks, Inc.
Project Location: Arroyo Grande NE

Sites Map 1 of 1

Central Coast Information Center
Department of Anthropology
University of California
Santa Barbara, CA 93106-3210
(805) 893-2474
(805) 893-8707 FAX



APPENDIX B

DPR Site Record

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code   Reviewer   Date

   Resource Name or # 1598 El Camino Real

P1. Other Identifier:

***P2. Location: a. County:** San Luis Obispo   ☐ **Not for Publication**   ☒ **Unrestricted**
b. USGS 7.5′ Quad: Arroyo Grande NE   **Date:** 1995   T 32S, R 13E; Unsectioned   **B.M.**
c. Address: 1598 El Camino Real
d. UTM: NAD 83, Zone 10; 717831 **mE /** 3889946 **mN**
e. Other Locational Data: APN 060-031-021 and 060-031-022, southwest corner of El Camino Real and Oak Park Boulevard

***P3a. Description:** The site consists of two historical structures; a large residence (Structure 1), and an ancillary residence (Structure 2). Structure 1 is a single-family residence that has undergone at least two stages of additions. The building is composed of the original residence, a sun room, and a garage linearly arranged. Structure 2 is a shed-style single-family residence with no obvious modern additions or renovations.

Structure 1 consists of a primary residence and two additions. The primary residence is an irregular, rectangular Modern Ranch style building with National Folk and Spanish Eclectic design elements. This structure embodies these characteristics with its general rectangular floor plan and low-pitched side gabled roof. The irregular wings on the east and west elevations add National Folk style elements characterized by front-gabled wings added to simple side-gabled I-floor plans. A common component of these wings are roof gables which are lower in elevation to the primary roof, which are present on this structure. [Continued]

***P3b. Resource Attributes:** HP2. Single Family Property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other:

***P5a. Photograph or Drawing:**

P5b. Description of Photo: View looking southwest of the north elevation of Structure 1

***P6. Date Constructed/Age and Sources:**
☐ Prehistoric ☒ Historic ☐ Both

***P7. Owner and Address:**
Martin Halldin

***P8. Recorded By:** Ryan Wendel
Applied EarthWorks, Inc.
811 El Capitan Way, Suite 100
San Luis Obispo, CA 93401

***P9. Date Recorded:** September 19, 2017

***P10. Survey Type:** ☒ Intensive
☐ Reconnaissance ☐ Other
Describe:

***P11. Report Citation:** Ryan E. Wendel and Josh Patterson
2017 *Cultural Resources Study and Historic Resource Evaluation of 1598 El Camino Real, Grover Beach, California.* Applied EarthWorks, Inc., San Luis Obispo, California. Prepared for Ram Krupa Real Estate LLC, San Luis Obispo, California.

***Attachments:** ☐ NONE ☒ Building, Structure, and Object Record ☒ Location Map ☐ Archaeological Record ☐ Milling Station Record ☒ Sketch Map ☐ District Record ☐ Rock Art Record ☐ Continuation Sheet ☐ Linear Feature Record ☐ Artifact Record

***P3a. Description Continued:** The house's exterior and roof design also incorporate elements of Spanish Eclectic style which was popular in the west during the early 1900s. Elements present on Structure 1 include the use of Spanish style roofing tiles on a low-pitched cross-gabled roof with eaves that have little overhang.

The residence includes a full covered front porch with exposed rafters and non-decorative support columns. The walls are white-painted stacked brick. The roof consists of a mix of barrel-shaped Spanish tiles and composite shingles with exposed eaves. Fenestration includes asymmetrical mixtures of rectangular one-over-one double-hung wood-framed windows, and sash fixed-pane windows with flanking casements. The primary entrance to the building, on the south elevation, is a plain wooden door. A secondary entry, a wood-framed fixed-glass door, is located on the north elevation. This entry opens into a walled-off-porch built into the hillside. All of the doors and windows are accented by architrave trim. The north, rear elevation, features a white-painted brick cave wall chimney. The interior of the structure consists of a two bedroom, two bathroom floor plan with a separated kitchen. The kitchen and living room are within the primary structure, while the bedrooms are in each wing.

A non-contemporary sun room/rumpus room, constructed between 1953 and 1965, extends off the western elevation of the primary residence. The side-gabled single-story structure is wood framed with an open floor plan that derives similar stylistic elements of the main residence. The addition is irregular in shape. Three elevations, north, east, and west have straight walls while the south elevation has an oblique angle bend expanding out past the footprint of the primary residence to align with the primary residence's rear porch. Both exposed elevations, north and south, feature walls with large fixed-pane windows atop a short white-painted brick wall and foundation. The north, front elevation has centralized wood French doors with large fixed-pane glass panels. The roof is a low-pitched extended roof with exposed eaves. The expanded roof extends off the primary side gable to the south. The north half of the roof consists of modern Spanish tile while the southern extension has modern composite shingles. The southwest corner of the sun room has a modern brick gas fireplace.

A wood-framed garage constructed around 1953 extends off of the west elevation of the sun room. The single-story rectangular structure has a white-brick foundation that matches the primary residence. The roof is side gabled with modern composite shingles accented by Spanish tiles on the top of the gable and sides. The walls are a vertical flush barn wood-siding stained brown. The north elevation has two garage doors. The eastern door is a two car up-and-over style crafted of vertical brown-stained wood planks. The western door is a modern aluminum paneled roll-up style with no windows.

Structure 2 is a west facing rectangular Modern Shed style residence located east of Structure 1. The shed residence is a one bedroom, one bathroom with an open floor plan that includes the kitchen and common area. The structure has a poured-concrete foundation. The walls are horizontal clapboard siding painted white. The roof is a front, west-facing shed roof with exposed eaves and composite shingles. Fenestrations include rectangular aluminum-framed sash fixed-pane windows flanked by casements; rectangular one-over-one double hung wood-framed windows; and a rectangular fixed single-pane window. The primary door is centered on the front, west elevation and is a non-decorative wood door with an exterior metal security gate. The west elevation also has a contemporary poured-cement patio running the length of the side. A small square lean-to utility shed extends off of the south corner of the east elevation. It is constructed of vertical lap board siding with a shed composite shingle roof. The front yard, off the west elevation, is fenced with a wooden privacy fence that extends to the western elevation of the primary residence of Structure 1.

State of California — The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI #/Trinomial**

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**

Page 3 **of** 6 **Resource Name or #:** 1598 El Camino Real (Structure 1)

B1. Historic Name:

B2. Common Name: Structure 1

B3. Original Use: Single-family residence **B4. Present Use:** Same

***B5. Architectural Style:** Modern Ranch style with National Folk and Spanish Eclectic design elements

***B6. Construction History:** According to the County Assessor, the primary residence was constructed in 1948. Extending off the western elevation of the primary residence, a sun room/rumpus room was constructed between 1953 and 1965. A wood framed garage was constructed around 1953, and extends off of the west elevation of the sun room.

***B7. Moved?:** ☒ No ☐ Yes ☐ Unknown Date: Original Location:

***B8. Related Features:** Structure 2

B9. a. Architect: Unknown **b. Builder:** Unknown

***B10. Significance:** Theme: Area:
Period of Significance: Property Type: Applicable Criteria: None

Structure 1 was originally built during the second development boom of Grover Beach (1940s-1950s), when Horace V. Bagwell's advertisements for development and new infrastructure began attracting many new residents. This single-family residence appears to be associated with this broad pattern of population growth, and is not associated with specific activities, organizations, or functions important to the larger community. Neither is it associated with a specific event important in the history of the community. Therefore, the structure is recommended not eligible for the California Register of Historic Resources (CRHR) under Criterion 1. Archival research indicates that the structure is most closely associated with the Elvin family. Archival and historic sources did not indicate that the family or any individuals were active in the community, held important offices, or influenced the development of Grover Beach. Therefore, the Elvin family does not appear to be significant in the history of San Luis Obispo County or Grover Beach and the structure is recommended not eligible for the CRHR under Criterion 2. The residence was constructed in 1948 in the Modern Ranch style. These homes were easy to build, and by borrowing details from more "high style" architecture, the middle class could think themselves fashionable. This style was popular around the mid twentieth century and is found in most towns in California and San Luis Obispo County, making this building a common construction type and not a rare example of the form. Most homes built during this time were designed by homeowners and influenced by surrounding architecture and availability of construction materials. Due to the lack of available information regarding the history of this building, it most likely fits into this category and does not appear to represent the work of a master, or define a type or period of construction, and is recommended not eligible for the CRHR under Criterion 3. Lastly, the residence is not likely to yield information important to history or about construction methods; therefore, the property is not eligible for the CRHR under Criterion 4.

B11. Additional Resource Attributes (list attributes and codes):

***B12. References:**

B13. Remarks:

***B14. Evaluator:** Ryan Wendel
Date of Evaluation: September 19, 2017

This space reserved for official comments.

Sketch Map

State of California — The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI #/Trinomial**

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code**

Page 4 **of** 6 **Resource Name or #:** 1598 El Camino Real (Structure 2)

B1. Historic Name:

B2. Common Name: Structure 2

B3. Original Use: Single-family residence **B4. Present Use:** Same

***B5. Architectural Style:** Modern Shed style

***B6. Construction History:** According to the County Assessor, this ancillary residence was constructed in 1953.

***B7. Moved?:** ☒ No ☐ Yes ☐ Unknown Date: Original Location:

***B8. Related Features:** Structure 1

B9. a. Architect: Unknown **b. Builder:** Unknown

***B10. Significance:** Theme: Area:
Period of Significance: Property Type: Applicable Criteria: None

Structure 2 was originally built during the second development boom of Grover Beach (1940s-1950s), when Horace V. Bagwell advertisements for development and new infrastructure began attracting many new residents. This single-family residence appears to be associated with this broad pattern of population growth, and is not associated with specific activities, organizations, or functions important to the larger community. Neither is it associated with a specific event important in the history of the community. Therefore, the structure is recommended not eligible for the California Register of Historic Resources (CRHR) under Criterion 1. Archival research indicates that the structure is most closely associated with the Elvin family. Archival and historic sources did not indicate that the family or any individuals were active in the community, held important offices, or influenced the development of Grover Beach. Therefore, the Elvin family does not appear to be significant in the history of San Luis Obispo County or Grover Beach and the structure is recommended not eligible for the CRHR under Criterion 2. The residence was constructed in 1953 in the Modern Shed style. Stylistically these structures are utilitarian in nature and were constructed with efficiency of cost, space, and materials in mind. This style was popular around the mid twentieth century and is found in most towns in California and San Luis Obispo County, making this building a common construction type and not a rare example of the form. Most homes built during this time were designed by homeowners and influenced by surrounding architecture and availability of construction materials. Due to the lack of available information regarding the history of this building, it most likely fits into this category and does not appear to represent the work of a master, or define a type or period of construction, and is recommended not eligible for the CRHR under Criterion 3. Lastly, the residence is not likely to yield information important to history or about construction methods; therefore, the property is not eligible for the CRHR under Criterion 4.

B11. Additional Resource Attributes (list attributes and codes):

***B12. References:**

B13. Remarks:

***B14. Evaluator:** Ryan Wendel
Date of Evaluation: September 19, 2017

This space reserved for official comments.

Sketch Map

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

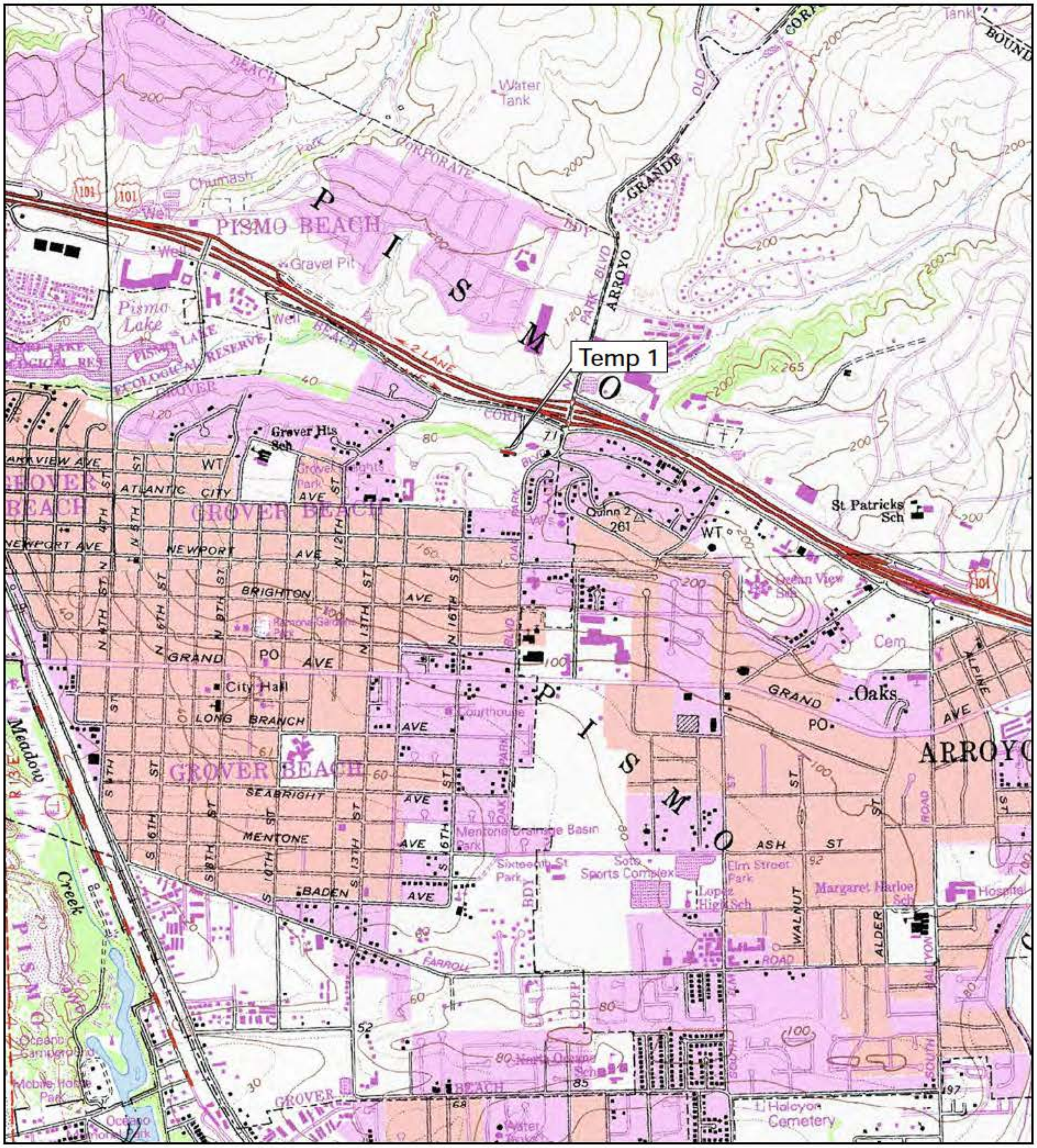
Primary #
HRI#
Trinomial

*Resource Name or #: Temp 1

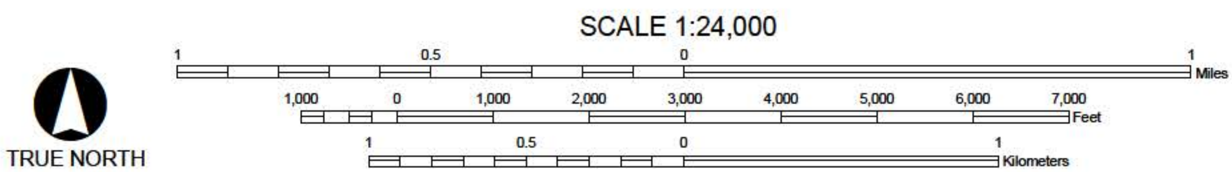
Scale: 1:24,000

Map Name: Arroyo Grande NE, CA, USGS 7.5' quadrangle

Date: 1995



SCALE 1:24,000



*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

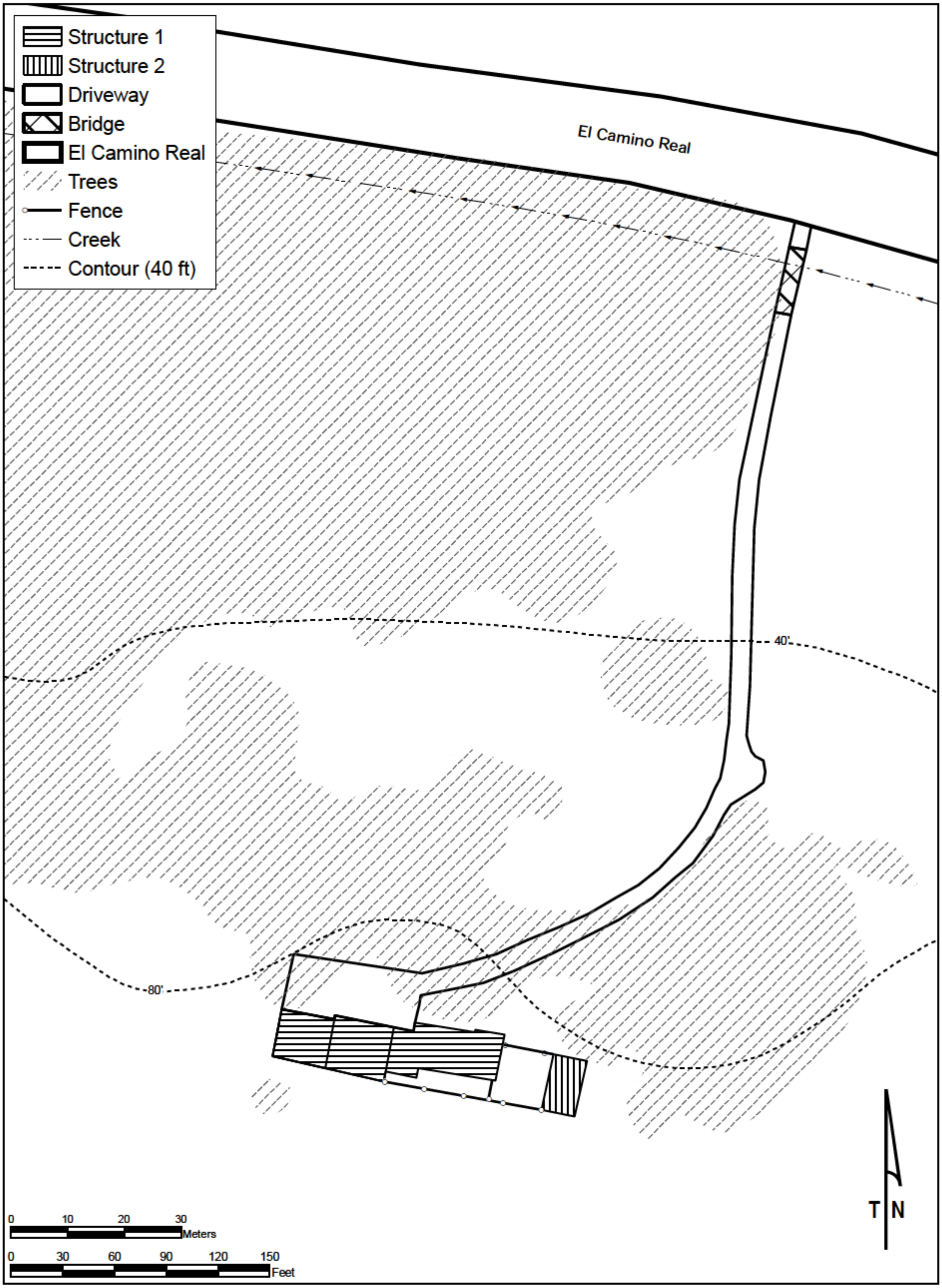
Primary #
HRI#
Trinomial

*Resource Name or #: Temp 1

*Drawn by: Josh Patterson

*Scale: 1 inch equals 25 meters

*Date of map: September 25, 2017



APPENDIX C

Native American Communication

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

September 7, 2017

Joshua Patterson
Applied Earth Works

Email to: jpatterson@appliedearthworks.com

RE: Ram Krupa Phase 1 Project, San Luis Obispo County

Dear Mr. Patterson,

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not preclude the presence of cultural resources in any project area. Other sources for cultural resources should also be contacted for information regarding known and/or recorded sites.

Enclosed is a list of Native Americans tribes who may have knowledge of cultural resources in the project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these tribes, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at frank.lienert@nahc.ca.gov.

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contacts
9/7/2017

Santa Ynez Band of Chumash Indians
Kenneth Kahn, Chairperson
P.O. Box 517 — Chumash
Santa Ynez , CA 93460
kkahn@santaynezchumash.org
(805) 688-7997
(805) 686-9578 Fax

yak tityu tityu - Northern Chumash Tribe
Mona Olivas Tucker, Chairwoman
660 Camino Del Rey — Chumash
Arroyo Grande , CA 93420
olivas.mona@gmail.com
(805) 489-1052 Home
(805) 748-2121 Cell

Barbareno/Ventureno Band of Mission Indians
Julie Lynn Tumamait-Stenslie, Chair
365 North Poli Ave — Chumash
Ojai , CA 93023
jtumamait@hotmail.com
(805) 646-6214

Northern Chumash Tribal Council
Fred Collins, Spokesperson
P.O. Box 6533 — Chumash
Los Osos , CA 93412
fcollins@northernchumash.org
(805) 801-0347 (Cell)

Salinan Tribe of Monterey, San Luis Obispo Counties
Patti Dunton, Tribal Administrator
7070 Morro Road, Suite A — Salinan
Atascadero , CA 93422
salinantribe@aol.com
(805) 464-2650
(805) 235-2730 Cell
(805) 460-9204

Barbareno/Ventureno Band of Mission Indians
Eleanor Arrellanes
P.O. Box 5687 — Chumash
Ventura , CA 93005
(805) 701-3246

Xolon-Salinan Tribe
Karen White, Council Chairperson
P.O. Box 7045 — Salinan
Spreckels , CA 93962
blukat41@yahoo.com
831-238-1488

Barbareno/Ventureno Band of Mission Indians
Raudel Joe Banuelos, Jr.
331 Mira Flores Court — Chumash
Camarillo , CA 93012
(805) 427-0015

Coastal Band of the Chumash Nation
Mia Lopez
, — Chumash
(805) 324-0135

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessments for the proposed
Ram Krupa Phase 1 Project, San Luis Obispo County

Applied EARTHWORKS Inc.

811 El Capitan Way, Suite 100
San Luis Obispo, CA 93401
O: (805) 594-1590 | F: (805) 594-1577

September 12, 2017

Mia Lopez
Coastal Band of the Chumash Nation

Re: Cultural Resources Study for the Ram Krupa Phase 1 Project, Grover Beach, California

Dear Ms. Lopez:

Applied EarthWorks, Inc. is conducting a cultural resources study for the proposed development of a residential lot at 1598 El Camino Real in Grover Beach, California. The project area is depicted on the attached copy of the Arroyo Grande NE CA 7.5' Quadrangle Map and is located in an unsectioned portion of Township 32S, Range 13E.

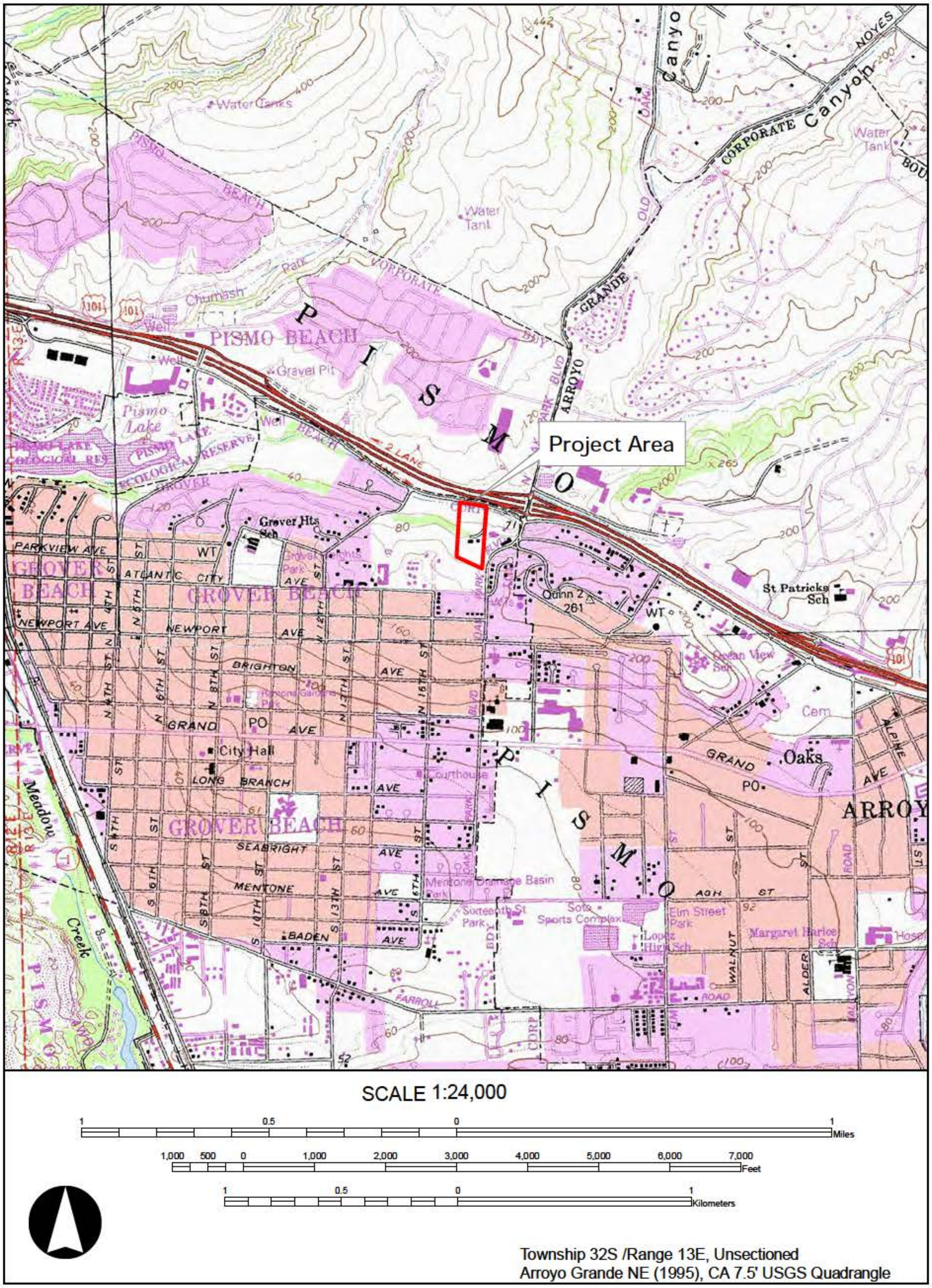
Your name and address were provided to us by the Native American Heritage Commission (NAHC), which lists you as an individual with knowledge of Native American resources in San Luis Obispo County, California. This letter is being submitted to formally request any information you may have regarding Native American cultural resources within or adjacent to the project site. If you have information regarding the study area or have interest in the project, please call or send a letter to my attention. Your comments will be included in our cultural resources study report.

Please call me at (805) 594-1590 or email me at jpatterson@appliedearthworks.com if you have any questions or require additional information.

Sincerely,

Joshua Patterson

Joshua Patterson, Staff Archaeologist
Applied EarthWorks, Inc.



Project location map for the ***Ram Krupa Phase 1 - AE# 3759***.

APPENDIX D - GEOTECHNICAL

GEOTECHNICAL FEASIBILITY STUDY
AND GEOLOGIC HAZARDS EVALUATION
1598 EL CAMINO REAL
HOTELS, RESTAURANT, AND RESIDENTIAL LOTS
GROVER BEACH, CALIFORNIA

February 7, 2018

Prepared for

Mr. Darshan Patel
Ram Krupa Development, LLC

Prepared by

Earth Systems Pacific
4378 Old Santa Fe Road
San Luis Obispo, CA 93401

Earth Systems
4378 Old Santa Fe Road | San Luis Obispo, CA 93401 | Ph: 805.544.3276 | www.earthsystems.com

February 7, 2018

FILE NO.: SL-18228-SA

Mr. Darshan Patel
Ram Krupa Development, LLC
845 Morro Avenue
Morro Bay, CA 93442

PROJECT: 1598 EL CAMINO REAL
HOTELS, RESTAURANT, AND RESIDENTIAL LOTS
GROVER BEACH, CALIFORNIA

SUBJECT: Geotechnical Feasibility Study and Geologic Hazards Evaluation

REF: Proposal for a Geotechnical Feasibility Study and Geologic Hazards Evaluation, 1598 El Camino Real, Grover Beach, California, Doc. No. 1709-121.PRP.REV, dated November 8, 2017

Dear Mr. Patel:

In accordance with your authorization of the referenced proposal, we have performed a geotechnical feasibility study and geologic hazards evaluation for the proposed development to be located at 1598 El Camino Real, Grover Beach, California. This report presents information regarding the geotechnical characteristics of the subsurface conditions encountered and a geologic hazards assessment. General geotechnical and geologic constraints have been identified and presented herein; a design-level geotechnical engineering and geologic report should be prepared once building type and layout, and other improvements are developed.

We appreciate the opportunity to have provided services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific

Keith P. Askew, PE, GE
Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
KEITH P. ASKEW
GE 2946
GEOTECHNICAL
STATE OF CALIFORNIA

Richard T. Gorman, CEG
Principal Geologist

PROFESSIONAL GEOLOGIST
RICHARD T. GORMAN
NO. CEG 1325
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Doc. No.: 1802-026.FEA/pm

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION AND SITE SETTING

This report presents a geotechnical feasibility study and geologic hazards evaluation for the proposed hotels, restaurant, and residential lots planned at 1598 EL Camino Real, Grover Beach, California. Specifically, the proposed development is located south of El Camino Real and west of Oak Park Boulevard (see Figure 1, Vicinity Map).

The site currently contains a single-story residence, storage buildings, and associated improvements. Access into the site is located at the northeastern corner of the property and is provided by a single lane bridge extending over Meadow Creek, adjacent to El Camino Real. An access road extends along the eastern property line from the bridge to the residence located near the center of the property. The bridge and access road appear to be designed for light traffic. The topography descends from an elevation of 120 in the south to 40 in the north. Drainage culminates into Meadow Creek located at the northernmost boundary. The creek channel is vegetated with dense brush and mature trees and is mapped as being within the 100-year flood zone. Mature trees are also present surrounding the residence, and the remaining ground surface areas are vegetated with natural grasses. An overall depiction of the site is presented on Figure 2, Exploration Location Map. The base map used for Figure 2 depicts the topography, 100-year flood zone, and conceptual layout of the project as prepared by Garing, Taylor & Associates, Inc., dated October 18, 2017.

The proposed project will include developing two four-story hotel buildings, a single-story restaurant, seven residential lots, a new culvert/bridge, paved parking and driveways, and associated utility improvements. Each of the buildings will have a basement and will be constructed of masonry, structural steel, and wood. Building loads are unknown at this time. Due to the topography of the site, we anticipate that grading will consist of cuts and fills on the order of 10 feet. Retaining or basement walls are assumed to have maximum heights on the order of 10 feet.

2.0 PURPOSE OF STUDY

The purpose of this geotechnical feasibility study is to assess the major geotechnical or geologic issues that could potentially affect development of the project. This report identifies general geotechnical or geologic constraints and provides guidance for a future design-level geotechnical engineering and geologic report once building type and layout, and other details for improvements, are developed. The report is intended to be used by the client for planning the project.

In the event that there are any changes in the proposed development concepts, or if any of the assumptions used in the preparation of this report are incorrect, the conclusions contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report verified or modified by the geotechnical engineer in writing. This report is not intended as a geotechnical design-level document; design of the project is currently at a conceptual level. The conclusions presented in this report are considered preliminary until such time as they are modified or verified by additional study such as that performed during design-level geotechnical engineering or geologic investigation.

3.0 SCOPE OF SERVICES

Our scope of work included a field reconnaissance by a registered geotechnical engineer and a certified engineering geologist, a geologic literature review, subsurface exploration consisting of seven exploratory borings, laboratory testing of samples retrieved during the field investigation, geotechnical analyses of the data, and preparation of this report. The analysis and subsequent conclusions provided herein are based on the preliminary information gathered during our investigation, a site map provided by the client via email, and our experience in the general area.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of fill soils during compaction, excavation techniques/equipment, shoring, temporary slope angles, construction means and methods, etc. Evaluation or analyses of the soil for corrosivity, radioisotopes, hydrocarbons, or other chemical properties are beyond the scope of this report, as is assessment of the site for mold potential, lead, or man-made materials containing asbestos. Ancillary features such as temporary access roads, fences, flagpoles, signage, and nonstructural fills are not within our scope and are also not addressed.

4.0 FIELD INVESTIGATION

Seven exploratory borings were drilled on December 7 and 8, 2017 to a maximum depth of approximately 50 feet below the existing ground surface (bgs) using a Mobile Drill Model B-53 truck-mounted drill rig, equipped with 6-inch outside diameter hollow stem auger, and an automatic trip hammer for sampling. As the borings were drilled, soil samples were obtained using a ring-lined barrel sampler (ASTM D 3550-17 with shoe similar to D 2937-17). Standard penetration tests (SPT) were also performed in the borings (ASTM D 1586-11) at selected depths. Bulk soil samples were obtained from the auger cuttings. After sampling was complete, the borings were backfilled with the soil cuttings. Locations of the borings are depicted on Figure 2, Exploration Location Map.

Soils encountered in the borings were categorized and logged in general accordance with the Unified Soil Classification System and ASTM D 2488-17. Copies of the boring logs and a Boring Log Legend are included in Appendix A.

In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the soil characteristics as observed during drilling. These include, but are not limited to, the presence of cobbles or boulders, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting the subsurface characteristics, possibly resulting in soil descriptions that vary somewhat from the legend.

5.0 LABORATORY ANALYSIS

Selected samples were tested in our laboratory for bulk density (ASTM D 2937-17, modified for ring liners) and moisture content (ASTM D 2216-10), maximum density and optimum moisture content (moisture density relationship, ASTM D 1557-12), expansion index (ASTM D 4829-11), cohesion and angle of shearing resistance (ASTM D 3080/3080M-11, modified for consolidated, undrained conditions), sieve analysis (ASTM D 422-63/07), and plasticity index (ASTM D 4318-17). The geotechnical laboratory test results are presented in Appendix B.

6.0 GEOLOGIC SETTING AND GENERAL SUBSURFACE PROFILE

The site lies on the northeastern edge of the Pismo Mesa, an oval-shaped, relatively flat landmass bounded to the north by the southern limb of the Pismo Syncline and the San Luis Range, to the east by Arroyo Grande Creek and Valley, and to the west by the Pacific Ocean (Hall, 1973). The Pismo Mesa is a thick deposit of Older Dune Sand deposit; see the Geologic Map, Figure 3, for a graphic depiction of these geologic features. In the vicinity of the site, the Pismo Mesa slopes gently to the north.

The subsurface conditions encountered within the seven borings were generally similar, with the profiles consisting of older dune sands with a thickness on the order of 17.5 to 49 feet, underlain by older alluvium. The dune sands varied in density from loose to medium dense, and consisted of poorly graded sand with variable amounts of silt. The underlying alluvial soils consisted of interbedded layers of loose to dense clayey sand and silty sand, which were encountered to the maximum depths explored of 51.5 feet bgs.

During drilling, groundwater was encountered in Borings 3, 5, 6 and 7 at depths ranging from 30.5 feet bgs in Boring 3, to 5 feet bgs in Boring 7. The measured groundwater depths generally became shallower as the site elevation decreased.

A more detailed description of the subsurface conditions encountered is presented on the boring logs provided in Appendix A.

7.0 SEISMICITY

Faulting

The San Luis Range, San Andreas, Los Osos, and Hosgri-San Simeon Faults are the most significant regional faults within a 65-mile radius of the site, which could affect the proposed development during its anticipated lifespan. The closest significant fault to the site is the late Pleistocene-age Wilmar Avenue Fault segment of the San Luis Range Fault System, located approximately 500 feet north of the site. The approximate location of the Wilmar Avenue Fault is shown on the Geologic Map, Figure 3. The closest state delineated earthquake fault zone, previously referred to as an Alquist Priolo Special Studies Zone, is approximately 12 miles northwest of the site and includes the Irish Hills segment of the Los Osos Fault. Regional faults and locations of historic earthquake events are depicted on the Historical Earthquake/Fault Map, Figure 4.

Earthquake History

The historic seismicity in the site region was researched using EQSEARCH (Blake 2016). EQSEARCH is a software program that performs automated searches of a custom catalog of historical Central California earthquakes. As the program searches the catalog, it computes the epicentral distance from the selected site to each of the earthquakes within the specified search area. The epicentral distances should be considered estimates, particularly for earthquake data prior to 1932, when modern instruments were first used to record earthquake data. The parameters used for the search consisted of earthquake Richter magnitudes ranging from 5.0 to 9.0 that occurred within a 65-mile radius from the site from 1800 to 2016. The ground motion attenuation relationship used was Boore and others (1997) for a 2016 CBC Site Class E – Soft Soil Profile. The site coordinates used in this search are latitude 35.1291 North and longitude 120.6093 West (Google Earth 2018). The Historical Earthquake/Fault Map, Figure 4, graphically depicts the results of the search within the region of the project, including historical earthquake epicenters, and their corresponding magnitudes.

The results of the search indicate that within the search parameters, 42 earthquakes have occurred within the last 217 years. The closest earthquake to the site had a magnitude of 5.7. This earthquake occurred in 1916, was located approximately 8 miles northwest of the site, and was the event with the second highest peak horizontal ground acceleration estimated to have occurred at the site (0.21g). The highest peak horizontal ground acceleration (PGA) estimated to have occurred at the site from those historical earthquakes is 0.34g. This earthquake had a 7.5 magnitude, occurred in 1927, and was located approximately 17 miles southwest of the site. This earthquake probably occurred on the southern end of the Hosgri fault, and is known as the Lompoc earthquake. The September 2004 earthquake near Parkfield occurred approximately 50 miles northeast of the site. It had a magnitude of 6.0 and produced a peak horizontal ground acceleration of 0.065g.

Design Acceleration Parameters

An assessment was made to determine the need for employing "Site Specific Procedures" to determine the ground motion parameters for the project. A determination was made that the site is not located in an Alquist-Priolo Earthquake Fault Zone. In addition, the S_1 ground motion value obtained from the United States Geological Survey Earthquake Hazards Program website (USGS 2018) using the ASCE 7-10 (2013) Standard Analysis Method for Site Class "E", a "Soft Soil Profile," was below 0.75g (see table below). Therefore, the project does not require a site-specific ground motion analysis.

To characterize the seismicity at the site and to provide seismic design parameters for the architect/engineer, a General Procedure Ground Motion Analysis was performed to calculate the potential ground motions at the site, using the methods previously described. The results of this analysis are presented in the following table:

TABLE 1
SUMMARY OF DESIGN RESPONSE ACCELERATION PARAMETERS

Mapped Spectral Response Acceleration for Site Class B		**Site Coefficients for Site Class E**		**Adjusted MCE Spectral Response Accelerations for Site Class E**		**Design Spectral Response Accelerations for Site Class E**	
Seismic Parameter	Value (g)	Site Coefficient	Value	Seismic Parameter	Value (g)	Seismic Parameter	Value (g)
S_S	1.303	F_a	0.900	S_{MS}	1.173	S_{DS}	0.782
S_1	0.477	F_v	2.400	S_{M1}	1.144	S_{D1}	0.763
Peak Mean Ground Acceleration (PGA_M) = 0.501 g							
Seismic Design Category = D							

8.0 GEOLOGIC AND SEISMIC HAZARD CONSIDERATIONS

Surface Fault Rupture

Surface fault rupture generally occurs at sites that are traversed by, or lie very near to, an active fault. The site is not located in any State Earthquake Fault Zones (Bryant & Hart 2007) and there are no mapped faults crossing the site. The closest mapped fault zone to the site is the Irish Hills segment of the Los Osos Fault System, located approximately 12 miles northwest. Therefore, the potential for surface fault rupture to occur at the site is considered to be very low.

Seismically Induced Settlement and Lateral Spreading

Liquefaction refers to a phenomenon that tends to occur in saturated soils of low density that have grain sizes within a certain range, usually fine- to medium-grained poorly graded sands, silty sands, and silts. A sufficiently strong earthquake is also required to cause liquefaction. During liquefaction, the energy from the earthquake causes the water pressure within the pores of the soil to increase. The increase in water pressure decreases the friction between the soil grains, allowing the soil grains to move relative to one another. During this state, the soil will behave as a viscous liquid, temporarily losing its ability to support foundations and other improvements. The high pressure water will flow through the soil along the path of least resistance. As the pressure is released, the soils typically settle in a process called "dynamic settlement." Dynamic settlement can cause damage to structures and other surface and subsurface improvements.

Dynamic settlement may also result within unsaturated soils during a seismic event. Unsaturated loose to medium dense cohesionless soils above the groundwater table may also settle during seismic shaking.

Lateral spreading is the lateral movement of liquefied soils adjacent to a slope or open face, where the soils flow toward the slope or open face, and can cause additional subsidence.

The site is located in an area mapped by the County as having a moderate potential for liquefaction (County of San Luis Obispo 2017). Due to the subsurface soil and geologic conditions encountered and the presence of groundwater, the potential for liquefaction was assessed. Groundwater is a required element for liquefaction, and as groundwater rises, the potential for liquefaction becomes more likely. Groundwater was encountered in Borings 3, 5, 6 and 7 at depths ranging from 5 to 30.5 feet below the ground surface. Our analyses of the subsurface soil conditions indicate there is a high potential for liquefaction and seismically induced settlement to occur due to the calculated PGA, anticipated groundwater level, and the loose to medium dense cohesionless soils at the site. Additionally, there is also a high potential for dynamic settlement of unsaturated, loose to medium dense sand layers above the groundwater table.

The potential for lateral spreading is also high where the where the potentially liquefiable soils were encountered. The "Seismically Induced Settlement and Lateral Spreading" discussion in the "Geotechnical Engineering Considerations" Section of this report provides a more detailed discussion of the potential for liquefaction on this site.

Slope Stability

The site generally slopes gently to the north, toward Highway 101. There is a slope that is approximately 25 feet high with a gradient of 2.5:1 (horizontal:vertical) on the north side of the existing residential home in the central part of the site that has a high potential for surficial soil slumps to occur. An existing soil slump is present on the slope near the western end of the residential home. The potential for gross instability on this slope is considered to be low.

Flooding

According to the Flood Insurance Rate Map Number 06079C1363H (FEMA 2017), published by the Federal Emergency Management Agency, the proposed building areas on site are not located within a 100-year flood zone or located within Flood Zone X, which indicates areas that have been determined to be an area of minimal flood hazard in any given year. There is 100-year flood zone that crosses along the northern part of the site which is outside of the locations of the proposed site development. The location of the 100-year flood zone is marked on Figure 2, Exploration Location Map. The site is also located in a downstream dam failure inundation area mapped by the County (County of San Luis Obispo 2017).

Tsunami and Seiche Potential

According to the State of California Tsunami Inundation Zone map for the County of San Luis Obispo, Pismo Beach Quadrangle (State of California 2009), the project site does not lie within a Tsunami Inundation Zone. Furthermore, the site is located approximately 2 miles from the Pacific Ocean, and at an approximate elevation of 110 feet above sea level; therefore, the potential for a tsunami to flood the site is considered to be very low.

A seiche is a single water wave that can be generated in a reservoir, lake or pond as the result of long-period surface waves normally generated by strong local earthquakes or larger earthquakes at farther distances. There are no reservoirs, lakes, or ponds in the vicinity of the site; therefore, there is no potential for a seiche to affect the project site.

Naturally Occurring Asbestos

There are no naturally occurring asbestos-bearing rock formations (serpentinite or ultramafic rock) known on the site. The site is underlain by poorly graded sand (Older Dune Sand) deposits, which are not asbestos-bearing geologic units. Therefore, there is no potential for naturally occurring asbestos on the site.

Radon

Radon is a naturally-occurring, colorless, odorless gas present in certain soils and rock, which is derived from the decay of radium atoms. The occurrence of radon correlates with the presence of specific minerals, and its concentrations in soil or rock will vary depending on the mineralogy of the surrounding bedrock, temperature, barometric pressure, moisture and other factors. Prolonged exposure to elevated levels of radon is associated with an increased risk of lung cancer. The route of exposure is via inhalation in an enclosed space, such as a structure.

According to Special Report 208, by the California Geological Survey (Churchill 2008) radon is most commonly found in areas of San Luis Obispo County that are underlain by bedrock of the Monterey Formation. As the site is underlain by poorly graded sand (Older Dune Sand) deposits, the project site is considered to be in an area of low radon potential.

9.0 GEOTECHNICAL ENGINEERING CONSIDERATIONS

Based on the findings of this feasibility study it is our opinion that, from a geotechnical engineering standpoint, the site is suitable for the proposed development. No conditions were observed that would constitute a sufficiently severe geotechnical or geological constraint that constructing the proposed project would be completely precluded; however, there are potential geotechnical considerations that are significant enough that they will affect the planning, design, and construction that should be considered in the overall analyses of costs. In our opinion, the primary geotechnical considerations are the potential for seismically induced settlement and lateral spreading, and the erosion potential of the site soils. The upper soils were classified as being non-expansive; therefore, no special measures with respect to expansive soils are considered necessary.

Seismically Induced Settlement and Lateral Spreading

Due to the loose to medium dense cohesionless soils encountered in the exploratory borings, the relatively shallow subsurface water conditions, and calculated PGA, we performed a preliminary analysis of the potential for liquefaction. Groundwater was encountered in the exploratory borings at depths ranging from 5 to 30.5 feet; these depths were used for our liquefaction analysis. Additionally, an earthquake magnitude of 7.2 (developed using a Probabilistic Seismic Hazard Deaggregation) and a PGA_M of 0.501 were used in the analyses.

Borings 3, 5, 6 and 7 were reviewed and analyzed for liquefaction potential, following the guidelines of Special Publication 117A (CDMG 1997, Revised 2008), and using LiqSVs, an SPT-based liquefaction analysis program developed by GeoLogismiki (2016). The program allows the use of analysis methods developed by NCEER (1997), with recommendations from Youd et al. (2001), and Idriss and Boulanger (2014). Input parameters included the depth to groundwater, SPT N values, fines contents and the plasticity of fines, and the seismic parameters developed from the seismic analyses.

Our analysis of the SPT data indicates that there is a high potential for liquefaction to occur on this site. Seismically induced settlement corresponding to soil liquefaction settlement was calculated to range from approximately 5 to 9.5 inches at Borings 5, 6 and 7. No significant settlement due to liquefaction was calculated using data from Boring 3. Additionally, the work of Youd and Garris (1995) indicates the non-liquefiable cap above the soils susceptible to liquefaction does not have sufficient thickness to prevent ground rupture resulting from liquefaction; therefore, the estimated settlement above resulting from liquefaction appears to be valid.

In addition to settlement resulting from liquefaction, there is also a high potential for seismically induced settlement resulting from shaking of the unsaturated, cohesionless loose to medium dense sands at the site. For all borings, we used the work of Pradel (1998) to perform an analysis on the potential settlement resulting from shaking of the sand layers above the groundwater table. Our analysis indicated that seismically induced settlement corresponding to dry sand settlement would range from approximately 0.75 to 6 inches.

Total seismically induced settlement resulting from both liquefaction and dry sand settlement is estimated to range from 0.75 to 13 inches. Additionally, lateral spreading of up to several feet is possible at the areas where liquefaction is probable.

The methods of SPT data analysis available to date are generally thought to slightly overestimate the magnitude of dynamic settlement that would actually occur. Additional analysis of liquefaction potential using SPT and CPT equipment during the design-level geotechnical engineering investigation(s) would provide additional estimates of the potential for liquefaction; however, such analyses are not likely to change our overall opinion that conventional shallow foundation systems may not be suitable for the majority of this site given the amount of settlement anticipated and the type of structures proposed.

Potential Mitigation Options

For structures that would be susceptible to settlement resulting only from dry sand shaking, there is the potential for mitigation by over-excavating the loose to medium dense soils to a sufficient depth, and replacing the soil as engineered fill. For structures that would be subject to both liquefaction and dry sand settlements, as well as lateral spreading resulting from liquefaction, more elaborate mitigation options would be required.

One option to reduce the effects of liquefaction and lateral spreading is to utilize deep foundations (i.e., piles) for structure support; however, the piles would need to extend to depths of 50 feet or more, to account for the negative pile capacity resulting from downdrag forces due to seismically induced settlement. Another option is ground improvement, which may consist of deep soil mixing, or other methods such as stone or grout columns, which involve displacing the soil with an auger to the bottom of the liquefiable layers and consolidating gravel, or injecting grout into the resulting soil voids, thus densifying the soil; conventional shallow or mat slab foundations could then be constructed over the ground improvement elements. Due to the depth and thickness of liquefiable zones and resulting magnitude of potential settlement, and the potential for large lateral spread displacements, ground improvement is the recommended option for mitigation.

Specialty ground improvement contractors typically use the data provided in this report to assist in determining the pros and cons of various methods, and to develop preliminary cost estimate to aid in planning. As the site design progresses, additional geotechnical engineering investigation(s) should be undertaken and comprehensive design-level report should be prepared. The design level geotechnical report(s) should be prepared considering the method(s) selected for ground improvement and providing additional exploration and testing as necessary. The explorations and testing for the investigation should be planned to address specific additional design considerations based on the preferred method of site mitigation. Recommendations for mitigation limits should be provided at that time, and once building layouts and structural foundation loads are determined or can be reasonably estimated. The design-level report should provide recommendations for site preparation and grading, total and differential static and seismic settlement under the structure loads, foundation types and depths, retaining wall design parameters, slabs-on-grade, expansive soils, pavement sections, and other geotechnical related recommendations as needed for the development.

Erosion Potential

The soils at the site are erodible; stabilization of soils by vegetation or other means during and following construction is essential to reduce erosion damage. Care should be taken to establish and maintain vegetation. Landscaping should be planned and installed to maintain surface drainage.

General Preliminary Geotechnical Design Parameters

<u>Retaining Walls</u>

Retaining walls connected to or forming part of a structure should be supported by the same foundation system as the structure. Assuming sitework retaining walls do not exceed 5 feet in height, and that it would be acceptable for them to experience some degree of settlement under static and/or dynamic conditions, it is possible that they can be supported on conventional continuous foundations bearing in recompacted site soils (on the order of 5 feet thick). Relatively low bearing values should be anticipated (1,500 to 2,000 psf) for footings with minimum depths of 18 to 24 inches below lowest adjacent grade. Active pressures in the range of 30 to 40 pcf and passive pressures of 250 to 350 pcf should be anticipated for retaining walls bearing in the site soils and using on site backfill.

<u>Flexible Pavement Sections</u>

R-value testing to determine pavement sections was not performed due to the uncertainty of the condition and type soils that will be underlying vehicular areas. For planning purposes, an R-value of 20 could be assumed. The overall thickness of pavement sections that would be recommended for the driveways and parking lots of the proposed project will depend on the Traffic Index (TI) values required to accommodate the anticipated traffic. For planning purposes only, a TI of 5.0 is typically selected for on-site parking, and a TI of 7.0 might be utilized for main drive areas. Using these two TIs as a range, flexible pavement sections calculated using the Highway Design Manual (Caltrans 2012) would consist of 2.75 to 4.00 inches of asphalt concrete (AC) over 8 to 12 inches of aggregate base (AB).

10.0 CLOSURE

Our intent was to perform this geotechnical feasibility study in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this site under similar conditions at this time. No representation, warranty, or guarantee is either express or implied. This report is intended for the exclusive use by the client, as discussed in the "Scope of Services" section of this report. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the types of projects described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm should be notified for modifications to this report. Ultimately, the geotechnical design of the project should comply with a design-level geotechnical engineering report, the CBC, other applicable standards, and the requirements of the governing jurisdiction.

The preliminary conclusions of this report are based upon the geotechnical conditions encountered at the site, and should be augmented by additional conclusions and recommendations provided by the geotechnical engineer based in a design-level geotechnical engineering report.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

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FIGURES

N

NOT TO SCALE

Earth Systems Pacific
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(805) 544-3276 • Fax (805) 544-1786

SITE VICINITY MAP
1598 EL CAMINO REAL
Grover Beach, California

Date
February, 2018

Project No.
SL-18228-SA

Figure 1

1598 EL CAMINO REAL-121817maps.dwg

1598 EL CAMINO REAL–121817maps.dwg

LEGEND

7 Boring Location (Approx.)

NOT TO SCALE

BASE MAP PROVIDED BY: GARING, TAYLOR & ASSOCIATES, INC.

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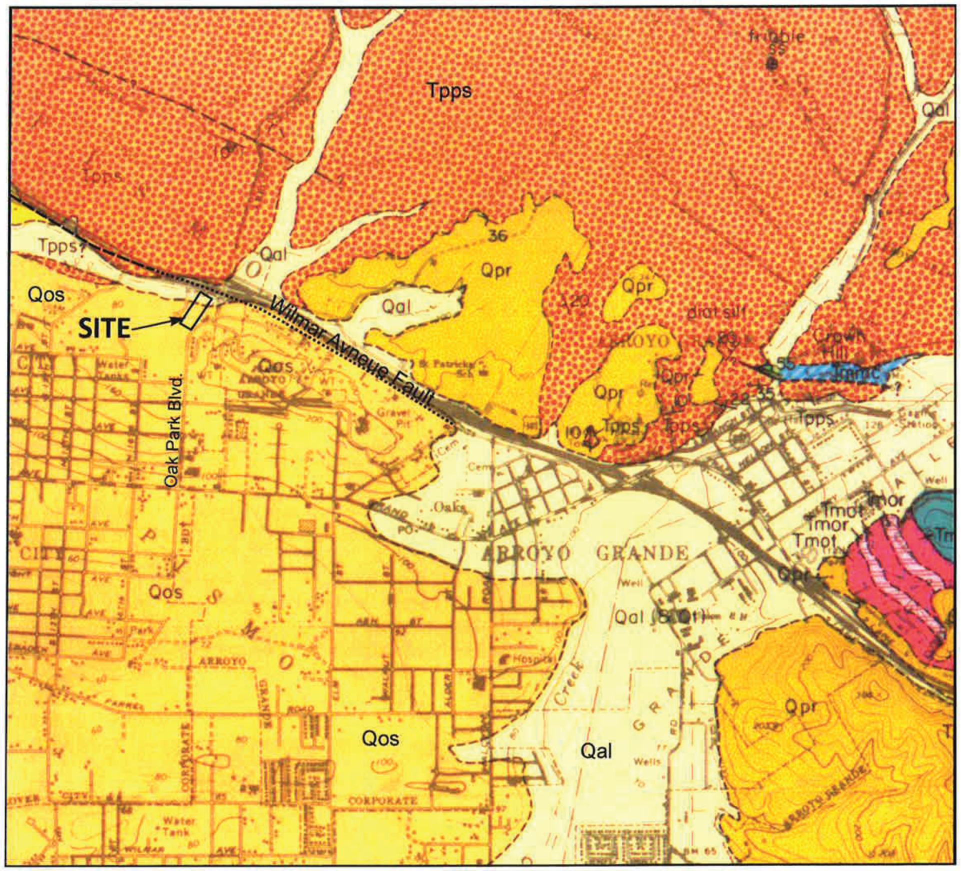
EXPLORATION LOCATION MAP
1598 EL CAMINO REAL
Grover Beach, California

Date
February, 2018

Project No.
SL-18228-SA

Figure 2



Extract from: Geologic Map of the Arroyo Grande Quadrangle, San Luis Obispo County, California, by Clarence A. Hall, 1973

EXPLANATION

Geologic Units

Qal
Alluvial deposits
-unconsolidated gravels, sand, silt and clay

Qos
Older Sand Dune deposits

Qpr
Paso Robles Formation
Sandstone, siltstone, claystone

Tpps
Pismo Formation
Squire member
-massive, white, medium to coarse grained sandstone

Tmmb
Monterey Formation
-siltstone or chert and blocky weathering dolomitic claystone or silt

Tmmc
Monterey Formation
-cherty shale, some dolomite

Tmor
Obispo Formation
-silicified or zeolitized tuff

Tmot
Obispo Formation
-fine to coarse grained white tuff or crystalline tuff

Geologic Symbols

Contact
Dashed where approximately located or inferred

High-angle fault
Dashed where approximately located or inferred; dotted where concealed

Thrust or reverse fault
Dashed where approximately located or inferred; dotted where concealed.
Saw-teeth on upper plate. Dip of fault plane between 30° and 80°

Anticline
Showing axis at surface. Dashed where approximately located; dotted where concealed

Syncline
Showing axis at surface. Dashed where approximately located; dotted where concealed

Horizontal | 30 Inclined | 90 Vertical
Strike and dip of beds

N

Approx. Scale: 1" = 1000'

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GEOLOGIC MAP
1598 EL CAMINO REAL
Grover Beach, California

FIGURE 3
Date
February 2018
Project No.
SL-18228-SA

LEGEND

- Historic rupture (<200 years)
- Holocene fault (<10,000 years)
- Late Quaternary (<700,000 years)
- Quaternary fault (<1.6 million)

HISTORICAL EARTHQUAKE MAGNITUDE

○ 5.0 to 5.9 ● 6.0 to 6.9 ● 7.0 to 7.9

FAULTS

1 Los Osos	11 Lions Head
2 San Juan	12 Santa Maria River
3 La Panza	13 Little Pine
4 South Cuyama	14 Los Alamos
5 East Huasna	15 Santa Ynez River
6 West Huasna	16 Santa Ynez
7 San Miguelito	17 Mission Ridge/ Arroyo Parida
8 Hosgri-San Simeon	18 San Luis Bay
9 Oceano	19 Wilmar Avenue
10 Orcutt Frontal (Casmalia)	

Note: Not all faults are shown on map

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N

(Approximate Scale: 1" = 6 miles)

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HISTORICAL EARTHQUAKE/ FAULT MAP
1598 EL CAMINO REAL
Grover Beach, California

FIGURE 4
Date
February 2018
Project No.
SL-18228-SA

Legend

Other Structure

Primary Frontal Dunes

Flood Hazard Boundaries

Limit Lines

SFHA / Flood Zone Boundary

Other Boundaries

Flood Hazard Zones

1% Annual Chance Flood Hazard

Regulatory Floodway

Special Floodway

Area of Undetermined Flood Hazard

0.2% Annual Chance Flood Hazard

Future Conditions 1% Annual Chance Flood Hazard

Area with Reduced Risk Due to Levee

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FEMA FLOOD ZONE MAP
1598 EL CAMINO REAL
Grover Beach, California

Figure 5
Date
February 2018
Project No.
SL-18228-SA

APPENDIX A

Boring Log Legend
Boring Logs

Earth Systems Pacific

BORING LOG LEGEND

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS	HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAPH. SYMBOL

SAMPLE / SUBSURFACE WATER SYMBOLS

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS

BLOWS/FOOT SPT	BLOWS/FOOT CA SAMPLER	DESCRIPTIVE TERM
0-10	0-16	LOOSE
11-30	17-50	MEDIUM DENSE
31-50	51-83	DENSE
OVER 50	OVER 83	VERY DENSE

FINE GRAINED SOILS

BLOWS/FOOT SPT	BLOWS/FOOT CA SAMPLER	DESCRIPTIVE TERM
0-2	0-3	VERY SOFT
3-4	4-7	SOFT
5-8	8-13	MEDIUM STIFF
9-15	14-25	STIFF
16-30	26-50	VERY STIFF
OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

drafting/masters/Boring Log Legend121714.dwg

Earth Systems Pacific

Boring No. 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: SL-18228-SA
DATE: 12/07/17

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP	POORLY GRADED SAND: light orange brown, loose, slightly moist, fine grained (Older Dune Sand)					
2			2.0 - 3.5	Ring Sample			2 3 3
3.5			1.0 - 5.0	Grab Sample			
5			5.0 - 6.5	Ring Sample			2 2 3
5.5		light yellow brown					
8.5	SP-SM	POORLY GRADED SAND WITH SILT: light yellow brown, loose, slightly moist					
10			10.0 - 11.5	Ring Sample	97.1	4.7	4 6 9
15			15.0 - 16.5	SPT		6.6	3 4 5
20		medium dense	20.0 - 21.5	SPT		6.1	3 5 7
23			23.0 - 24.5	SPT		4.7	4 5 10
24.5		End of Boring @ 24.5' No subsurface water encountered.					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: SL-18228-SA
DATE: 12/07/17

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP-SM	POORLY GRADED SAND WITH SILT: brown, loose, slightly moist, fine grained (Older Dune Sand)					
2			2.0 - 3.5	Ring Sample			2 3 3
5		light brown	5.0 - 6.5	Ring Sample	96.7	1.6	2 6 8
10		light yellow brown, medium dense, moist	10.0 - 11.5	Ring Sample	98.4	5.9	3 7 10
15			15.0 - 16.5	SPT		4.7	3 6 9
19	SC	CLAYEY SAND: gray brown, loose, very moist					
20			20.0 - 21.5	SPT		21.9	2 3 5
22		medium dense, decreasing clay content					
24			23.0 - 24.5	Ring Sample	105.2	18.4	9 16 30
24.5		End of Boring @ 24.5' No subsurface water encountered.					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 3

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: SL-18228-SA
DATE: 12/07/17

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, loose, slightly moist, fine grained (Older Dune Sand)					
2				2.0 - 3.5	Ring Sample	No Return		2, 2, 3
4				4.0 - 8.0	Grab Sample			
4			light yellow brown					
5				5.0 - 6.5	Ring Sample			2, 3, 7
8	SP-SM		POORLY GRADED SAND WITH SILT: light yellow brown, loose, moist					
10				10.0 - 11.5	Ring Sample	97.7	5.7	4, 6, 9
15			medium dense	15.0 - 16.5	Ring Sample			4, 6, 12
17.5	SP		POORLY GRADED SAND: light yellow brown, medium dense, slightly moist					
20				20.0 - 21.5	SPT		4.4	5, 9, 11
25				25.0 - 26.5	SPT		4.9	6, 11, 16

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: SL-18228-SA
DATE: 12/07/17

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP	POORLY GRADED SAND: light yellow brown, dense, moist					
30			30.0 - 31.5	●			11 16 25
30.5		light gray brown/light orange brown mottled, dense, wet, fine to medium grained, trace clay					
32.5	SP-SM	POORLY GRADED SAND WITH SILT: light yellow brown, dense, moist					
35			35.0 - 36.5	●		18.0	9 18 22
40	SM	SILTY SAND: light gray brown/light orange brown mottled, medium dense, wet, fine grained, thin lenses of medium to coarse grained sand, trace fine gravel (Older Aulluvium)	40.0 - 41.5	●		24.9	3 13 13
45		fine to medium grained	45.0 - 46.5	●			3 8 22
49.5	SC	CLAYEY SAND: gray brown, medium dense, wet					
50			50.0 - 51.5	●			4 7 16
51		decreasing clay content					
51.5		End of Boring @ 51.5' Subsurface water encountered @ 30.5'					

LEGEND: Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 4

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: SL-18228-SA
DATE: 12/07/17

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP	POORLY GRADED SAND: brown, loose, slightly moist, fine grained (Older Dune Sand)					
2			2.0 - 3.5	Ring Sample	No Return		2 3 5
3.5		light yellow brown					
5			5.0 - 6.5	Ring Sample	97.5	3.3	3 5 6
10	SP-SM	POORLY GRADED SAND WITH SILT: light yellow brown, medium dense, moist	10.0 - 11.5	Ring Sample	97.7	5.3	5 6 10
15			15.0 - 16.5	Ring Sample	93.9	4.8	6 10 16
20			20.0 - 21.5	Ring Sample			6 16 23
23			23.0 - 24.5	Ring Sample			8 16 25
24.5		End of Boring @ 24.5' No subsurface water encountered.					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 5

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: SL-18228-SA
DATE: 12/08/17

1598 EL CAMINO REAL
Grover Beach, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP	POORLY GRADED SAND: brown, loose, slightly moist, fine grained (Older Dune Sand)					
4		moist	5.0 - 6.5	Ring Sample			3 5 8
10		medium dense	10.0 - 11.5	Ring Sample	97.3	4.7	3 7 9
			10.0 - 15.0	Grab Sample			
15		loose, fine to medium grained	15.0 - 16.5	Ring Sample	No Return		3 5 6
19.5	SP-SM	POORLY GRADED SAND WITH SILT: brown, loose, wet	20.0 - 21.5	SPT		24.6	0 2 3
24		light gray brown, medium dense	25.0 - 26.5	SPT		24.2	4 9 12

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 5

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: SL-18228-SA
DATE: 12/08/17

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND WITH SILT: as above					
28								
29								
30			light gray	30.0 - 31.5	SPT	No Return		8 12 9
31								
32								
33	SM		SILTY SAND: light gray brown, medium dense, wet					
34								
35				35.0 - 36.5	SPT		23.8	2 5 8
36								
37								
38								
39								
40				40.0 - 41.5	SPT			3 7 6
41	SC		CLAYEY SAND: gray, medium dense, wet, trace silt, thin lenses of well graded sand (Older Alluvium)					
42								
43								
44			decreasing clay content					
45				45.0 - 46.5	SPT	96.7	25.1	8 16 18
46	SM		SILTY SAND: gray, dense, wet					
47								
48								
49								
50			slightly cemented	50.0 - 51.5	SPT			8 14 23
51								
52			End of Boring @ 51.5' Subsurface water encountered @ 19.5'					
53								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 6

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: SL-18228-SA
DATE: 12/08/17

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	CLAYEY SAND: brown, loose, slightly moist, some gravel (Fill)					
1	SP	POORLY GRADED SAND: brown, loose, slightly moist, fine grained (Older Dune Sand)	2.0 - 3.5	Ring Sample	No Return		2 2 3
3.5	SP-SM	POORLY GRADED SAND WITH SILT: brown, loose, moist	5.0 - 6.5	Ring Sample	94.6	6.9	2 2 3
9		wet, very fine grained	10.0 - 11.5	SPT		25.7	2 3 4
			15.0 - 16.5	SPT			0 0 2
17.5	SP	SILTY SAND: brown, loose, wet	20.0 - 21.5	SPT		23.2	0 2 2
24	SC	CLAYEY SAND: gray, loose, wet (Older Alluvium)	25.0 - 26.5	SPT			1 1 5
26.5		End of Boring @ 26.5' Subsurface water encountered @ 9.0'					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 7
PAGE 1 OF 1
JOB NO.: SL-18228-SA
DATE: 12/08/17

LOGGED BY: R. Wagner
DRILL RIG: Mobile Drill, Model B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

1598 EL CAMINO REAL
Grover Beach, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, loose, slightly moist, fine grained (Fill)					
2				2.0 - 3.5	■	No Return		1 1 2
2.5			dark brown, moist, some organics					
3				1.0 - 5.0	○			
5	CL		SANDY LEAN CLAY: dark brown, very soft, wet	5.0 - 6.5	■	90.5	29.9	1 1 1
7.5	SP-SM		POORLY GRADED SAND WITH SILT: gray brown, loose, wet, medium grained (Alluvium)					
10				10.0 - 11.5	●		21.0	4 5 4
15				15.0 - 16.5	●		29.3	1 1 1
15.5	SM		SILTY SAND: gray, loose, wet, fine grained, trace organics					
17.5	SC		CLAYEY SAND: gray, loose, wet					
20				20.0 - 21.5	●		26.1	2 2 4
22			decreasing clay content					
25				25.0 - 26.5	●			3 4 4
26.5			End of Boring @ 26.5' Subsurface water encountered @ 5.0'					

LEGEND: ■ Ring Sample ○ Grab Sample □ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

APPENDIX B

Geotechnical Laboratory Test Results

1598 El Camino Real

SL-18228-SA

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

January 15, 2018

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1	11.0 - 11.5	4.7	101.7	97.1
1	15.0 - 15.5	6.6	---	---
1	20.0 - 20.5	6.1	---	---
1	23.0 - 23.5	4.7	---	---
2	6.0 - 6.5	1.6	98.2	96.7
2	11.0 - 11.5	5.9	104.3	98.4
2	15.0 - 15.5	4.7	---	---
2	20.0 - 20.5	21.9	---	---
2	24.0 - 24.5	18.4	124.5	105.2
3	11.0 - 11.5	5.7	103.3	97.7
3	20.0 - 20.5	4.4	---	---
3	25.0 - 25.5	4.9	---	---
3	35.0 - 35.5	18.0	---	---
3	40.0 - 40.5	24.9	---	---
4	6.0 - 6.5	3.3	100.8	97.5
4	11.0 - 11.5	5.3	102.9	97.7
4	16.0 - 16.5	4.8	98.4	93.9
5	11.0 - 11.5	4.7	101.9	97.3
5	20.0 - 20.5	24.6	---	---
5	25.0 - 25.5	24.2	---	---
5	35.0 - 35.5	23.8	---	---
5	46.0 - 46.5	25.1	120.9	96.7
6	6.0 - 6.5	6.9	101.1	94.6
6	10.0 - 10.5	25.7	---	---
6	20.0 - 20.5	23.2	---	---
7	6.0 - 6.5	29.9	117.5	90.5
7	10.0 - 10.5	21.0	---	---
7	15.0 - 15.5	29.3	---	---
7	20.0 - 20.5	26.1	---	---

EXPANSION INDEX TEST RESULTS

ASTM D 4829-11

BORING NO.	DEPTH feet	EXPANSION INDEX
7	1.0 - 5.0	0

1598 El Camino Real

SL-18228-SA

EXPANSION INDEX TEST RESULTS

ASTM D 4829-11

BORING NO.	DEPTH feet	EXPANSION INDEX
7	1.0 - 5.0	0

1598 El Camino Real

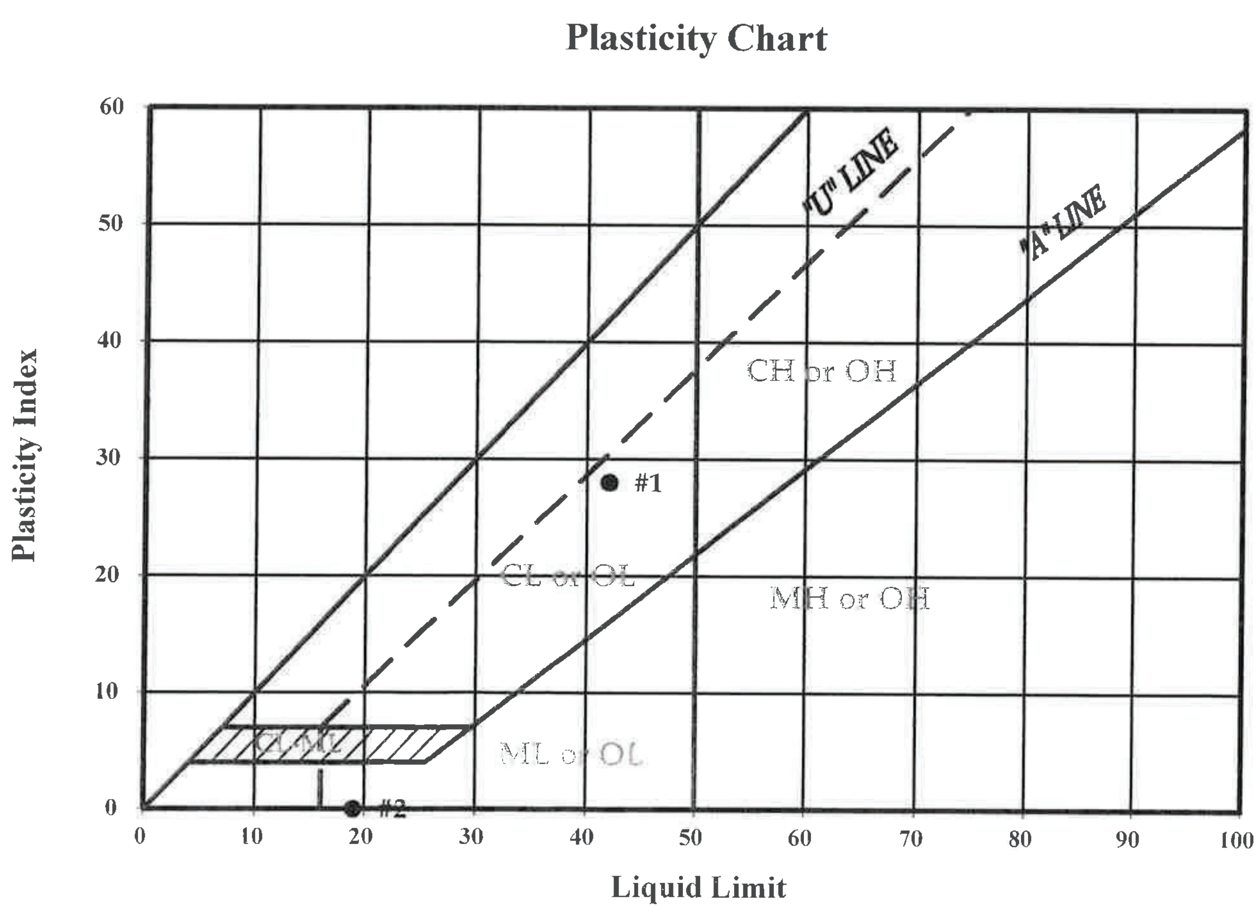
SL-18228-SA

PLASTICITY INDEX

ASTM D 4318-17

January 15, 2018

Test No.:	1	2	3	4	5
Boring No.:	2	7			
Sample Depth:	20.0 - 21.5'	15.0 - 16.5'			
Liquid Limit:	42	19			
Plastic Limit:	14	25			
Plasticity Index:	28	NL/NP			



1598 El Camino Real

SL-18228-SA

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 15, 2018

Boring #3 @ 4.0 - 8.0'

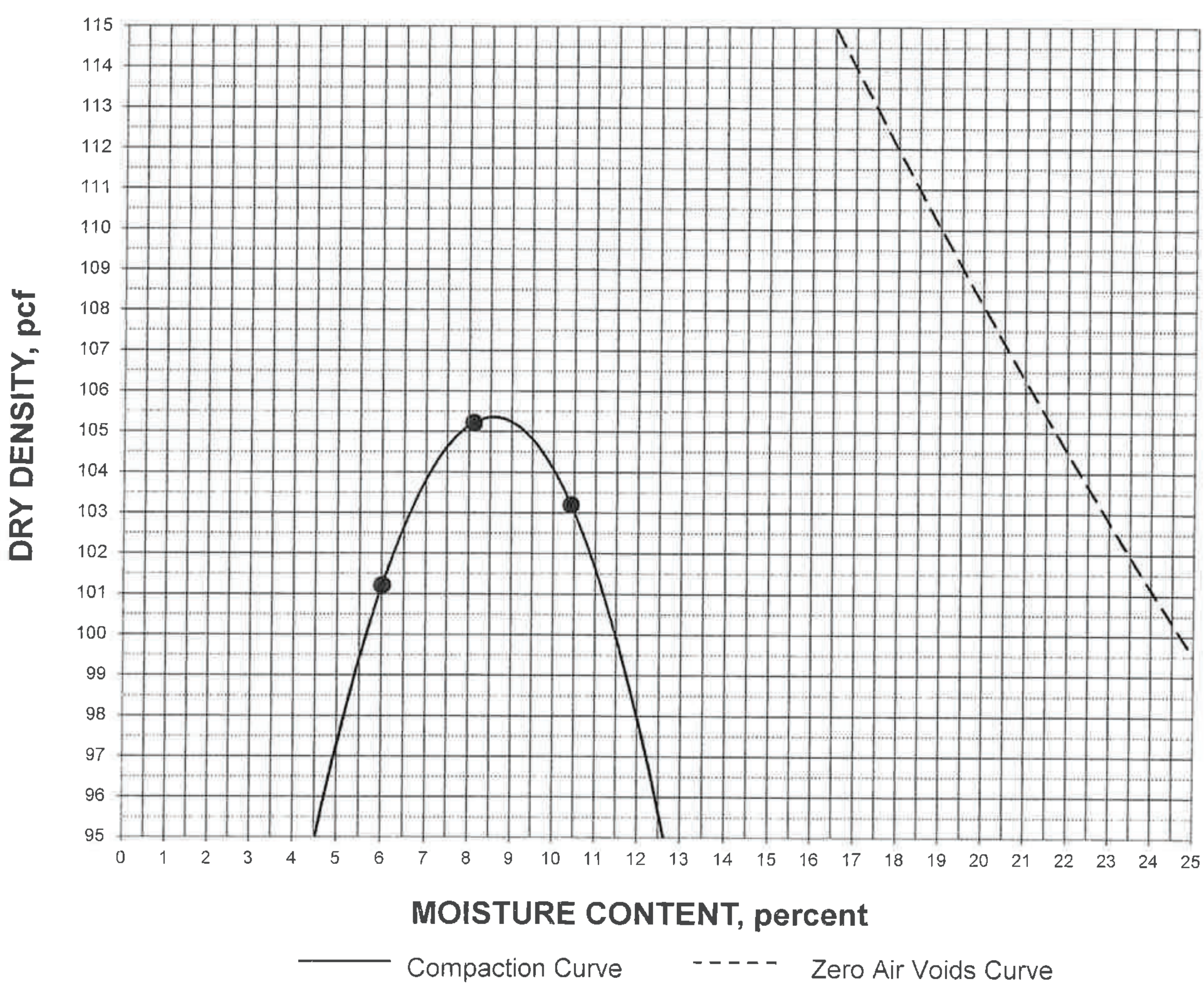
Brown Poorly Graded Sand (SP)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 105.4 pcf

OPTIMUM MOISTURE: 8.6%



1598 El Camino Real

SL-18228-SA

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 15, 2018

Boring #5 @ 10.0 - 15.0'

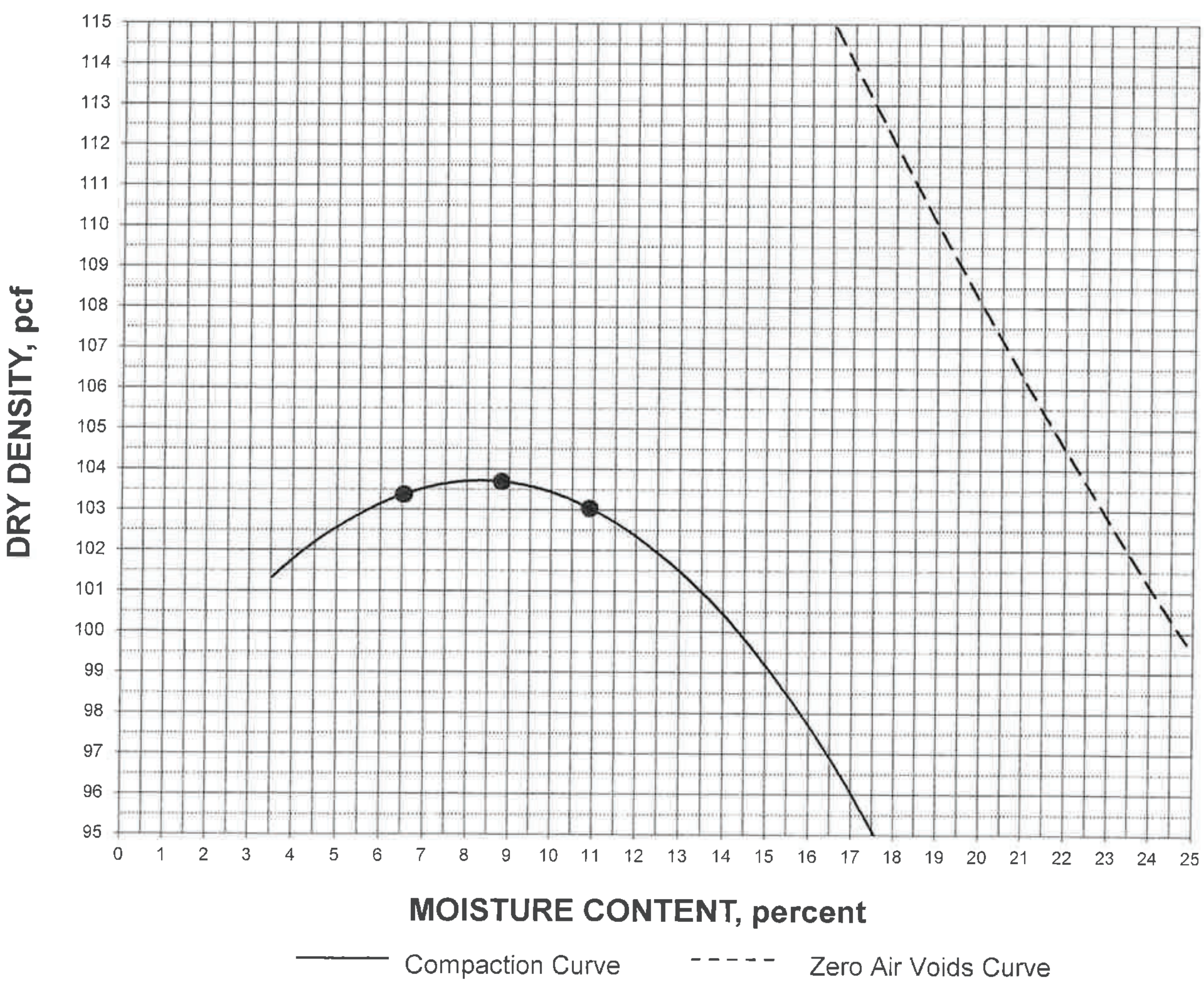
Brown Poorly Graded Sand (SP)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 103.7 pcf

OPTIMUM MOISTURE: 8.3%



1598 El Camino Real

SL-18228-SA

DIRECT SHEAR

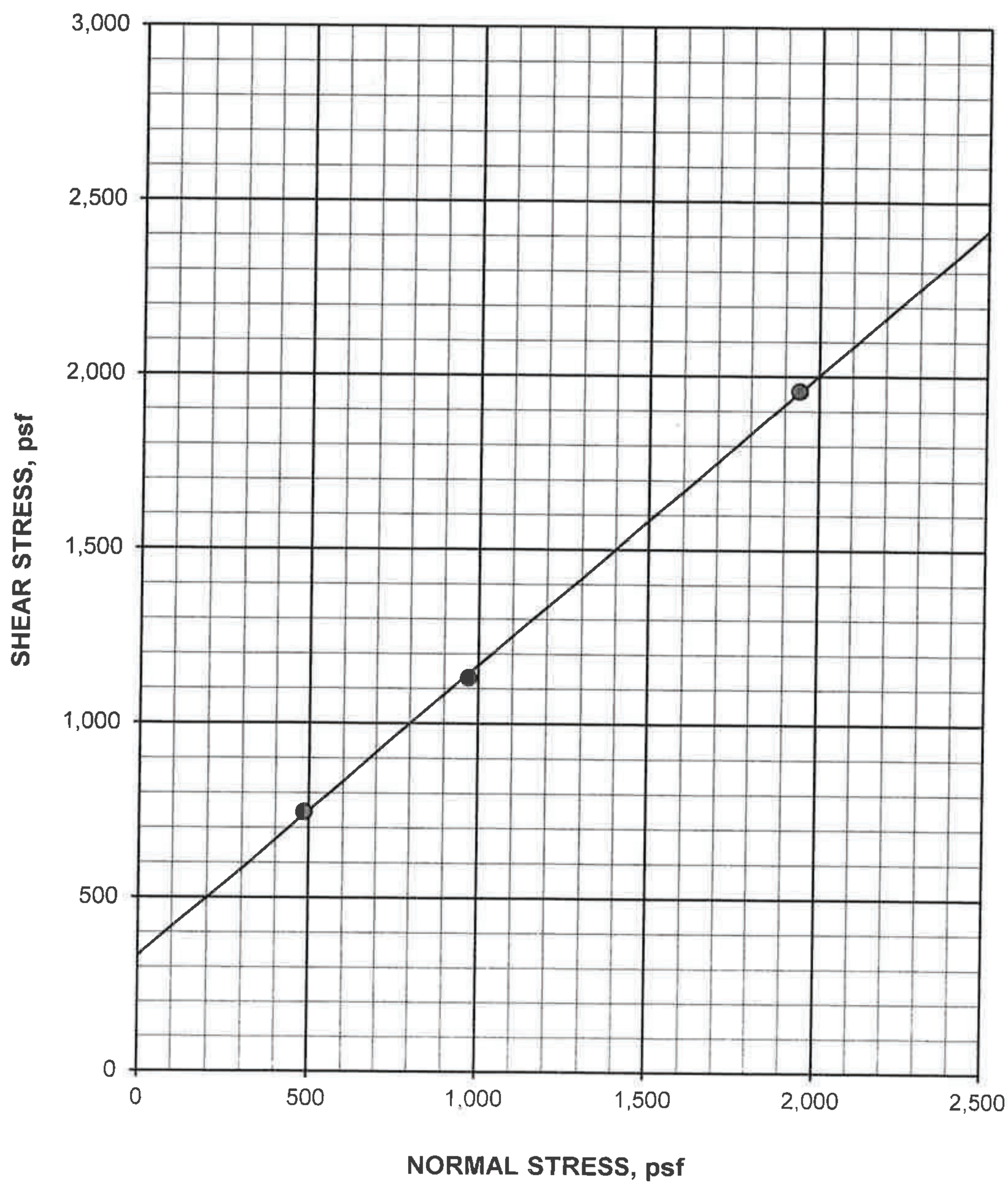
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

January 15, 2018

Boring #3 @ 4.0 - 8.0'
Poorly Graded Sand (SP)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 94.8 pcf
INITIAL MOISTURE CONTENT: 8.6 %
PEAK SHEAR ANGLE (Ø): 40°
COHESION (C): 333 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #3 @ 4.0 - 8.0'

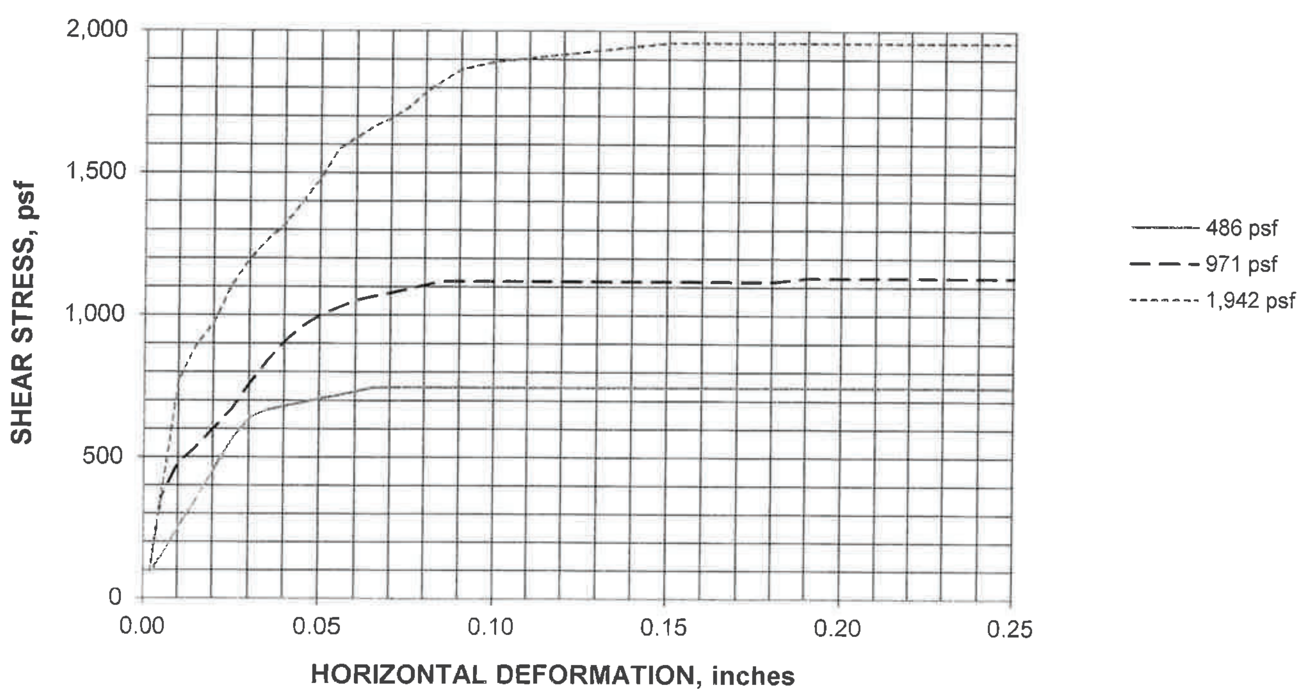
January 15, 2018

Poorly Graded Sand (SP)

Compacted to 90% RC, saturated

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	8.6	8.6	8.6	8.6
DRY DENSITY, pcf	94.8	94.8	94.8	94.8
SATURATION, %	30.6	30.6	30.6	30.6
VOID RATIO	0.744	0.744	0.744	0.744
DIAMETER, inches	2.410	2.410	2.410	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	27.4	26.3	24.4	
DRY DENSITY, pcf	96.1	97.7	100.8	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.721	0.693	0.641	
HEIGHT, inches	0.99	0.97	0.94	



1598 El Camino Real

SL-18228-SA

DIRECT SHEAR

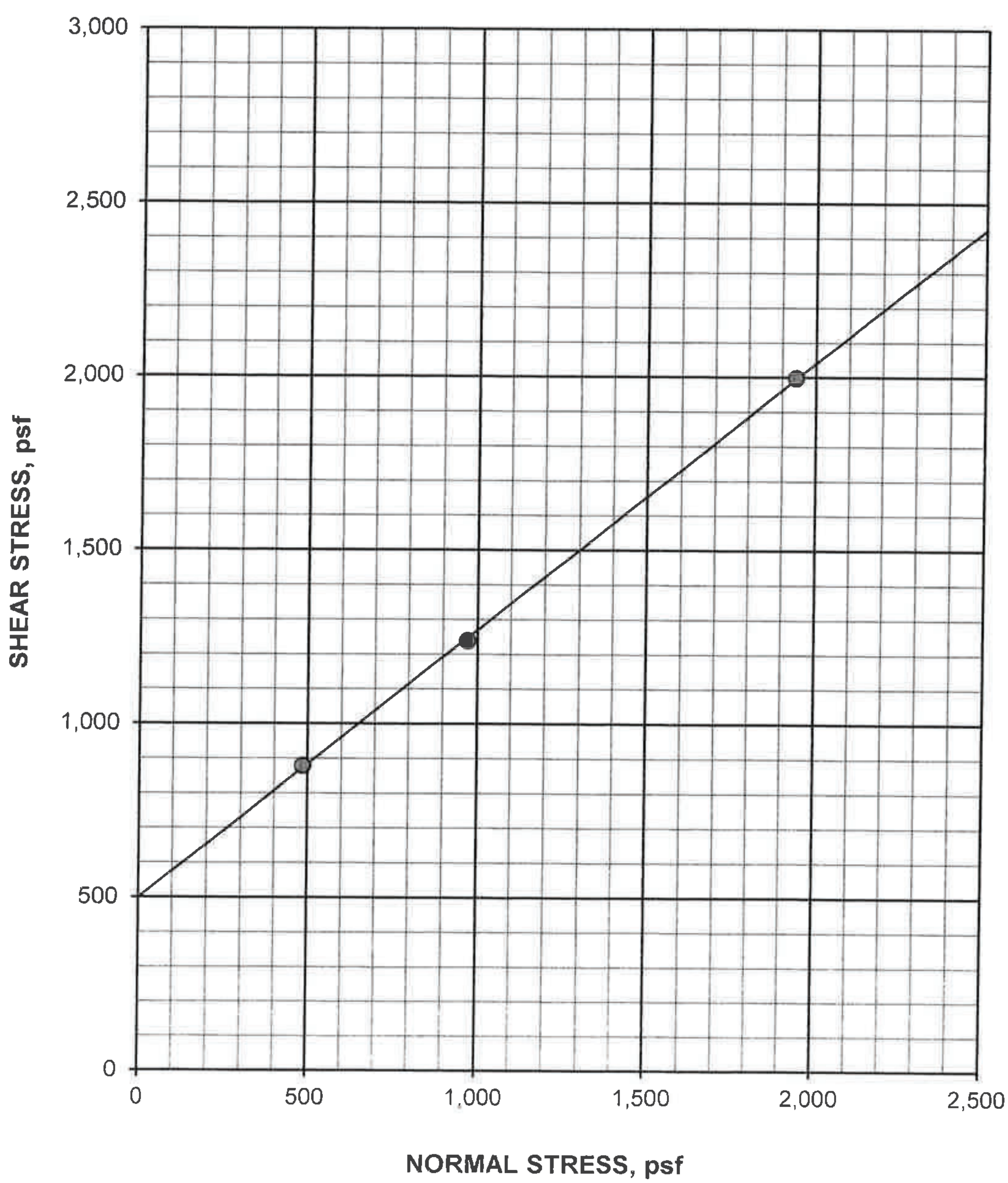
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

January 15, 2018

Boring #4 @ 6.0 - 6.5'
Poorly Graded Sand (SP)
Ring sample, saturated

INITIAL DRY DENSITY: 96.0 pcf
INITIAL MOISTURE CONTENT: 3.3 %
PEAK SHEAR ANGLE (Ø): 38°
COHESION (C): 500 psf

SHEAR vs. NORMAL STRESS



1598 El Camino Real

SL-18228-SA

DIRECT SHEAR continued

ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #4 @ 6.0 - 6.5'

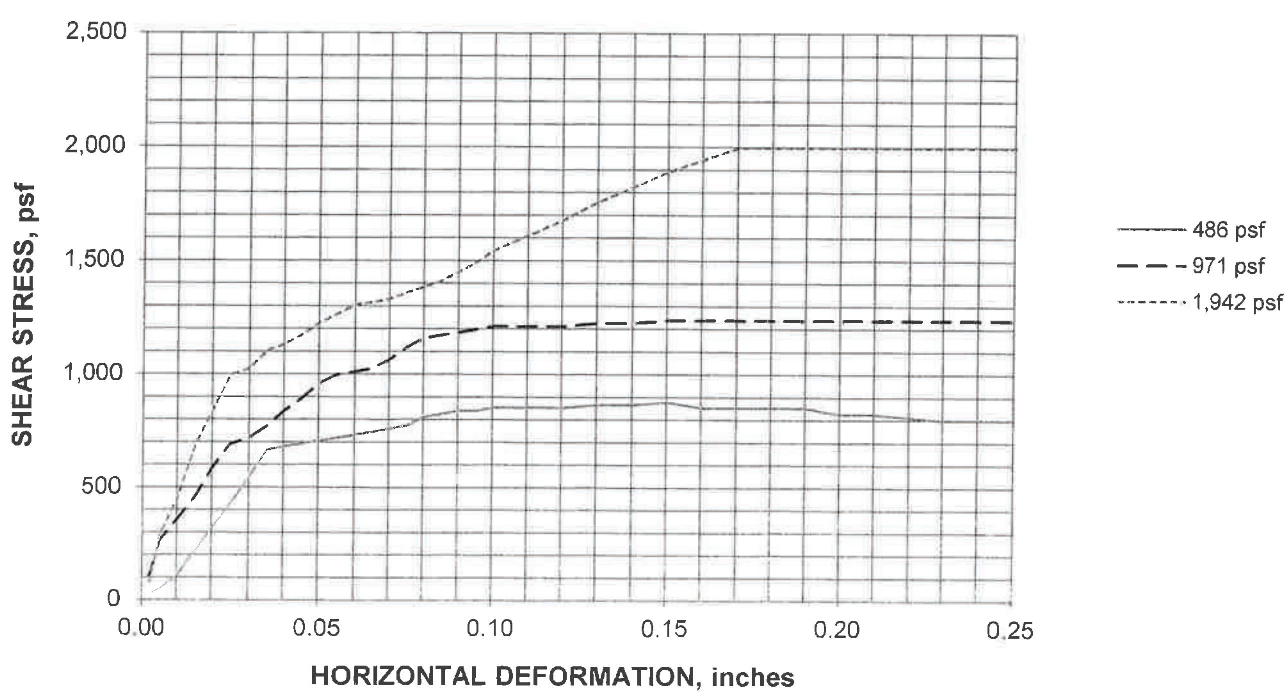
January 15, 2018

Poorly Graded Sand (SP)

Ring sample, saturated

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	3.3	3.3	3.3	3.3
DRY DENSITY, pcf	97.5	95.7	94.7	96.0
SATURATION, %	12.6	12.0	11.7	12.1
VOID RATIO	0.696	0.728	0.747	0.723
DIAMETER, inches	2.410	2.410	2.410	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	25.1	26.4	25.8	
DRY DENSITY, pcf	99.5	98.4	101.2	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.662	0.681	0.633	
HEIGHT, inches	0.98	0.97	0.94	



1598 El Camino Real

SL-18228-SA

DIRECT SHEAR

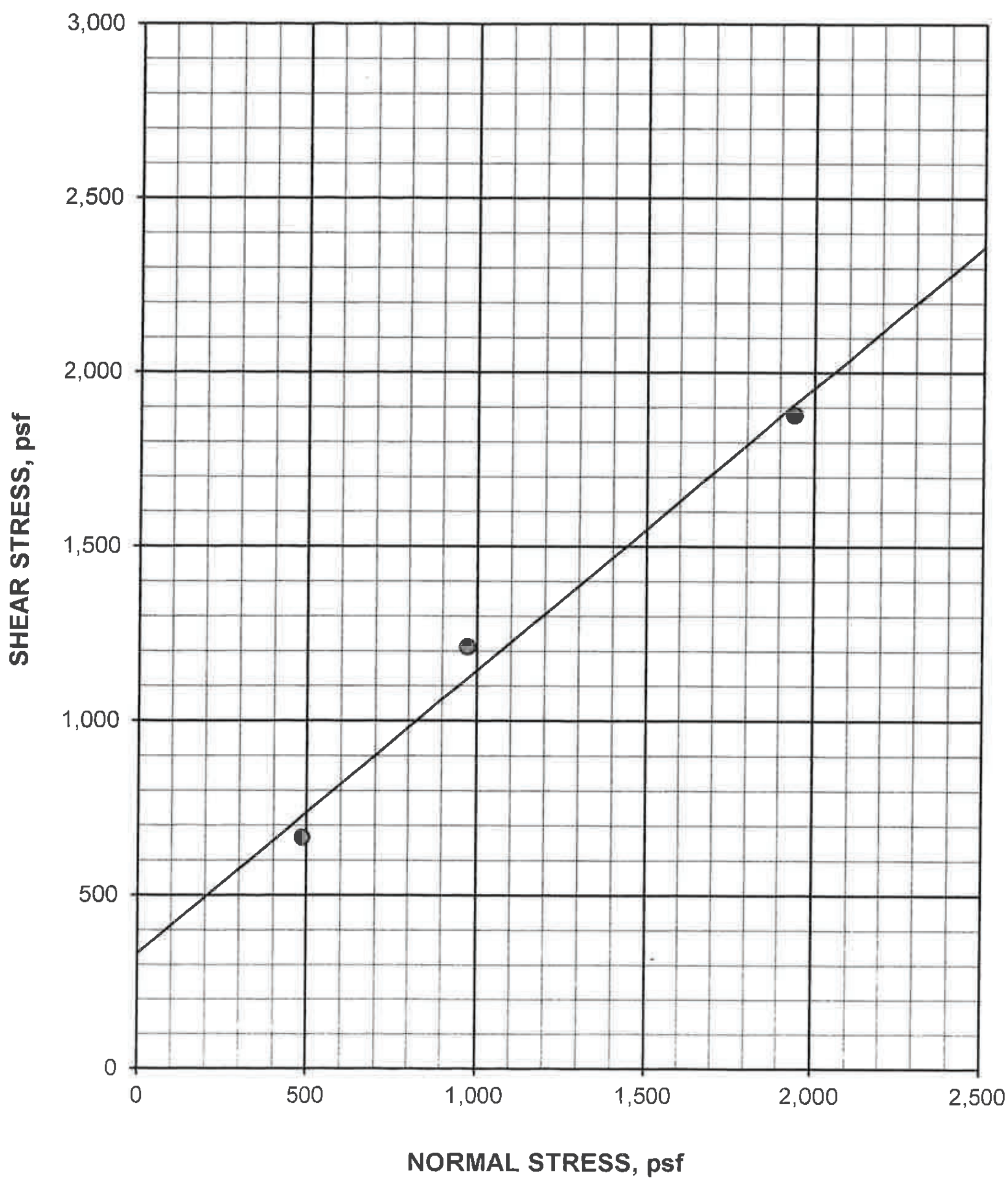
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

January 15, 2018

Boring #5 @ 11.0 - 11.5'
Poorly Graded Sand (SP)
Ring sample, saturated

INITIAL DRY DENSITY: 98.5 pcf
INITIAL MOISTURE CONTENT: 4.7 %
PEAK SHEAR ANGLE (Ø): 39°
COHESION (C): 333 psf

SHEAR vs. NORMAL STRESS



1598 El Camino Real

SL-18228-SA

DIRECT SHEAR continued

ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #5 @ 11.0 - 11.5'

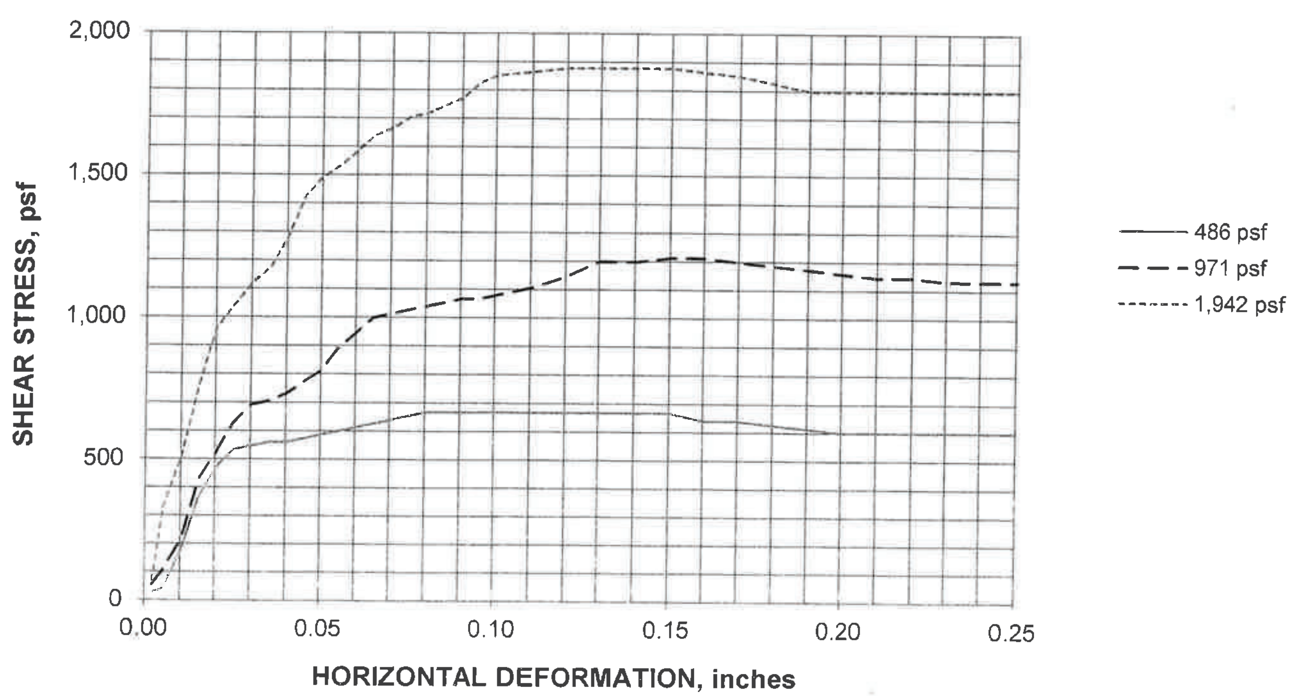
January 15, 2018

Poorly Graded Sand (SP)

Ring sample, saturated

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	4.7	4.7	4.7	4.7
DRY DENSITY, pcf	97.8	99.4	98.4	98.5
SATURATION, %	18.0	18.8	18.3	18.4
VOID RATIO	0.691	0.664	0.680	0.678
DIAMETER, inches	2.410	2.410	2.410	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	23.4	21.7	21.5	
DRY DENSITY, pcf	102.3	105.4	106.6	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.617	0.569	0.551	
HEIGHT, inches	0.96	0.94	0.92	



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SL-18228-SA

CONSOLIDATION TEST

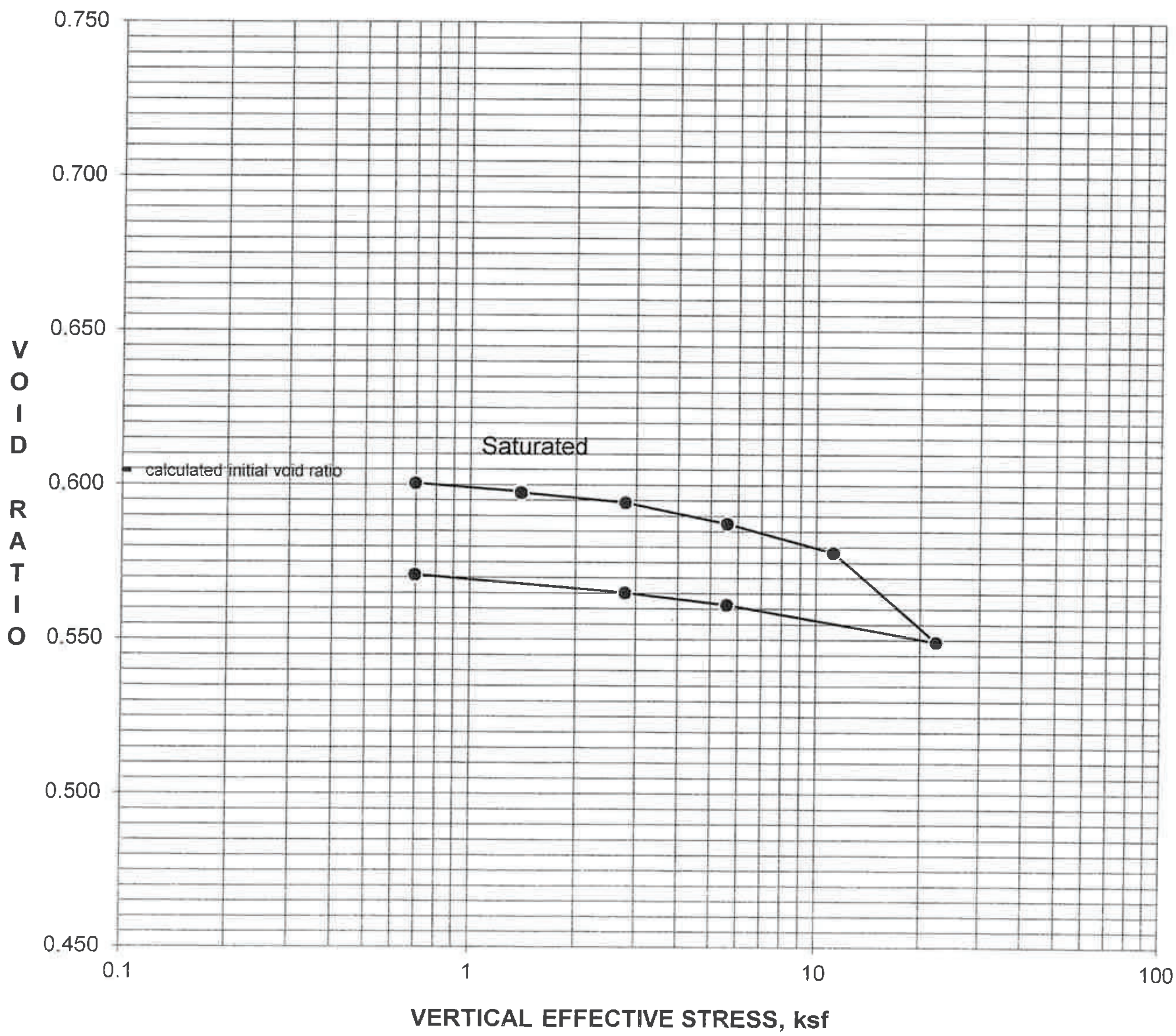
ASTM D 2435/D2435M-11

January 15, 2018

Boring #2 @ 24.0 - 24.5'
Clayey Sand (SC)
Ring Sample

DRY DENSITY: 103.1 pcf
MOISTURE CONTENT: 18.4%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.604

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



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CONSOLIDATION TEST

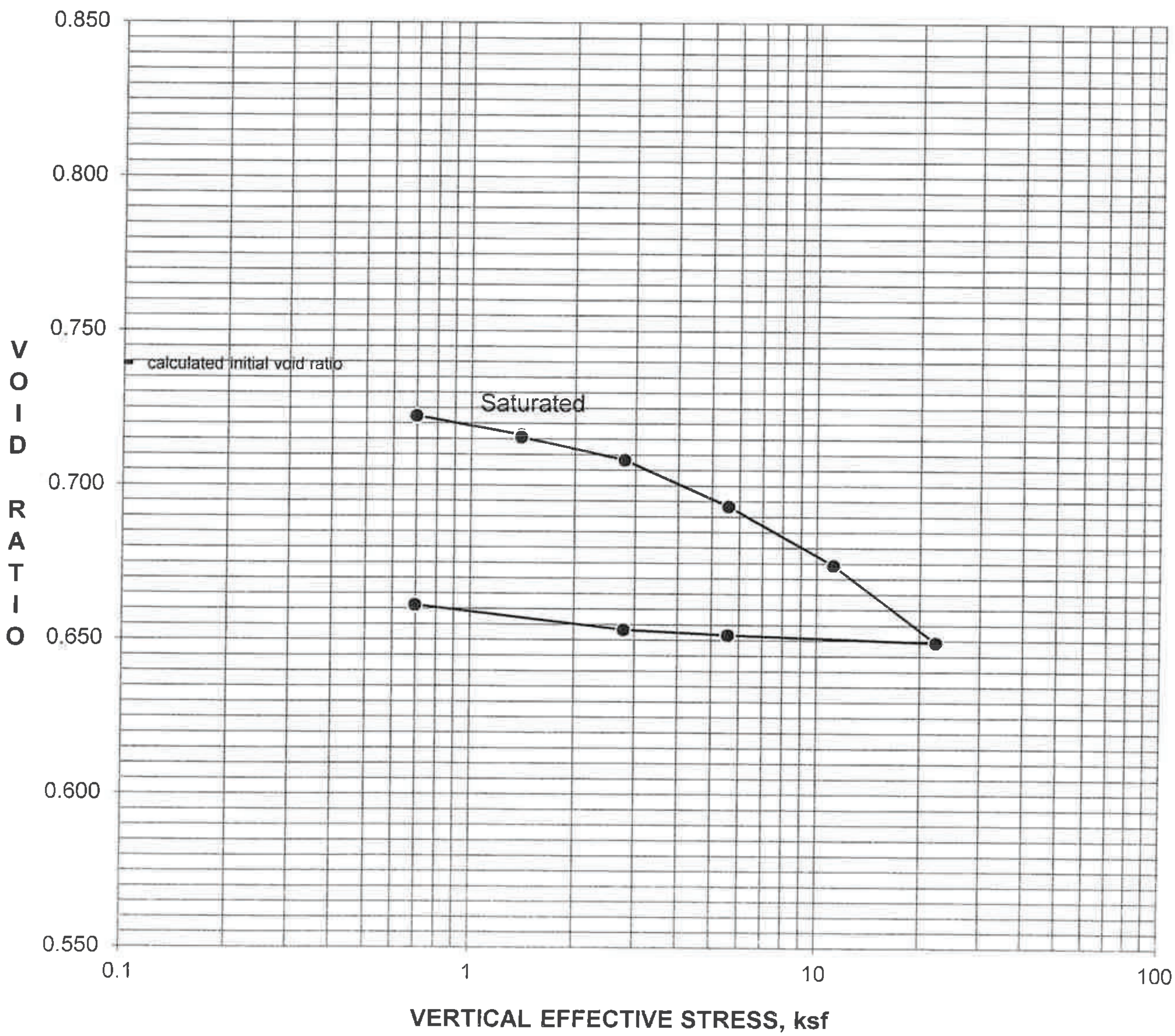
ASTM D 2435/D2435M-11

January 15, 2018

Boring #5 @ 46.0 - 46.5'
Silty Sand (SM)
Ring Sample

DRY DENSITY: 95.1 pcf
MOISTURE CONTENT: 25.1%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.739

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



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SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

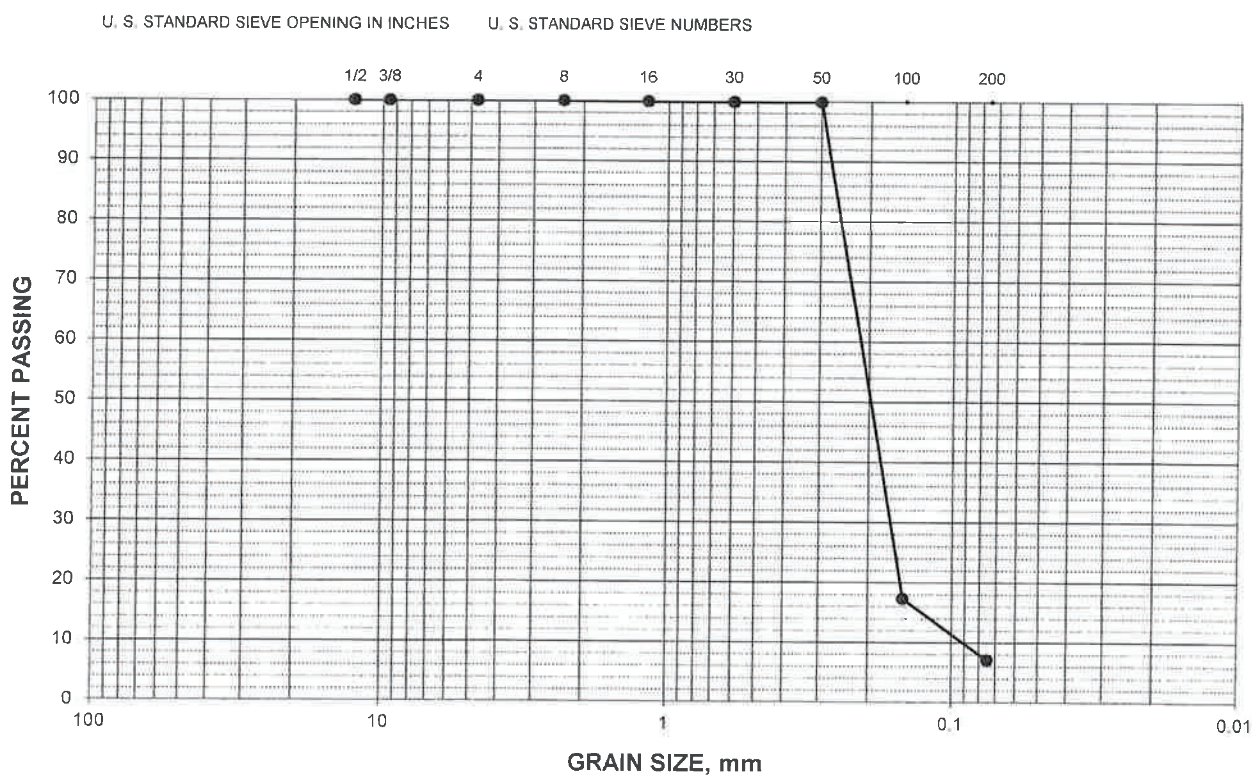
Boring #1 @ 10.5 - 11.0'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.4; Cc = 1.4

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	83	17
#200 (75-µm)	92.9	7.1



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

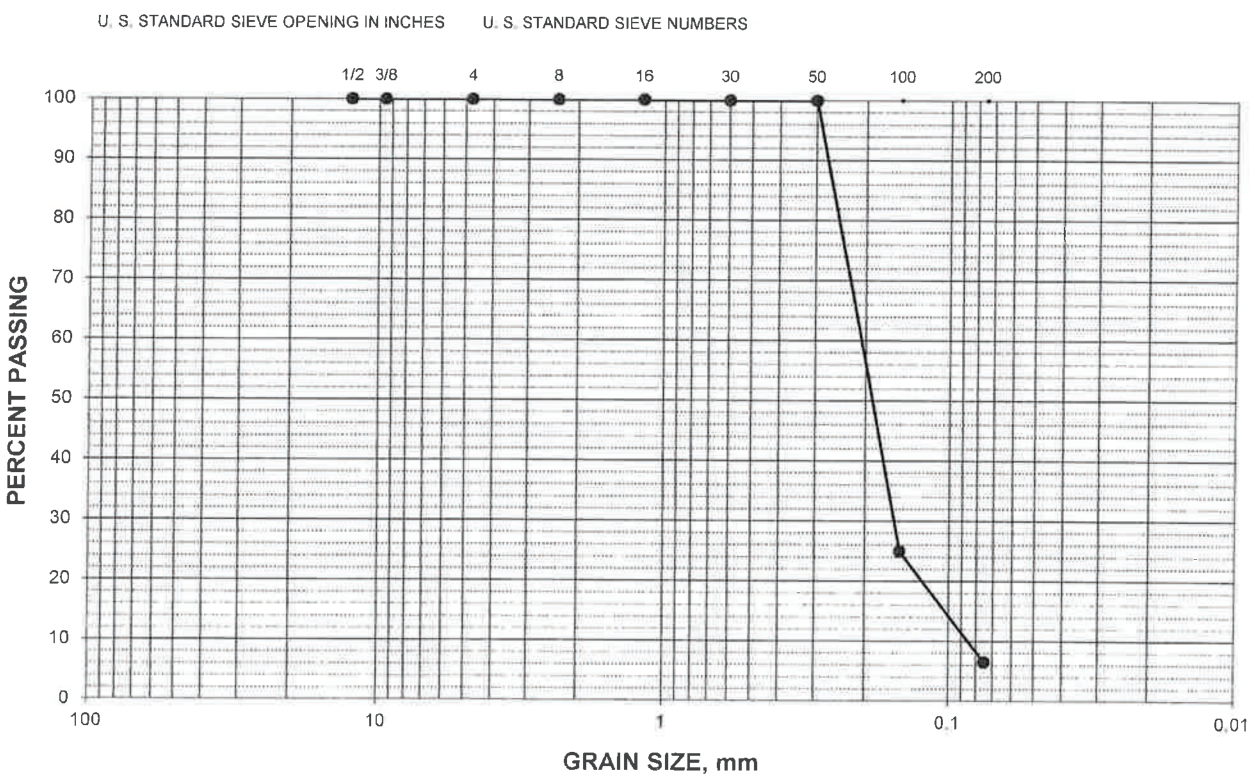
Boring #1 @ 15.0 - 16.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.4; Cc = 1.4

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	75	25
#200 (75-µm)	93.5	6.5



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

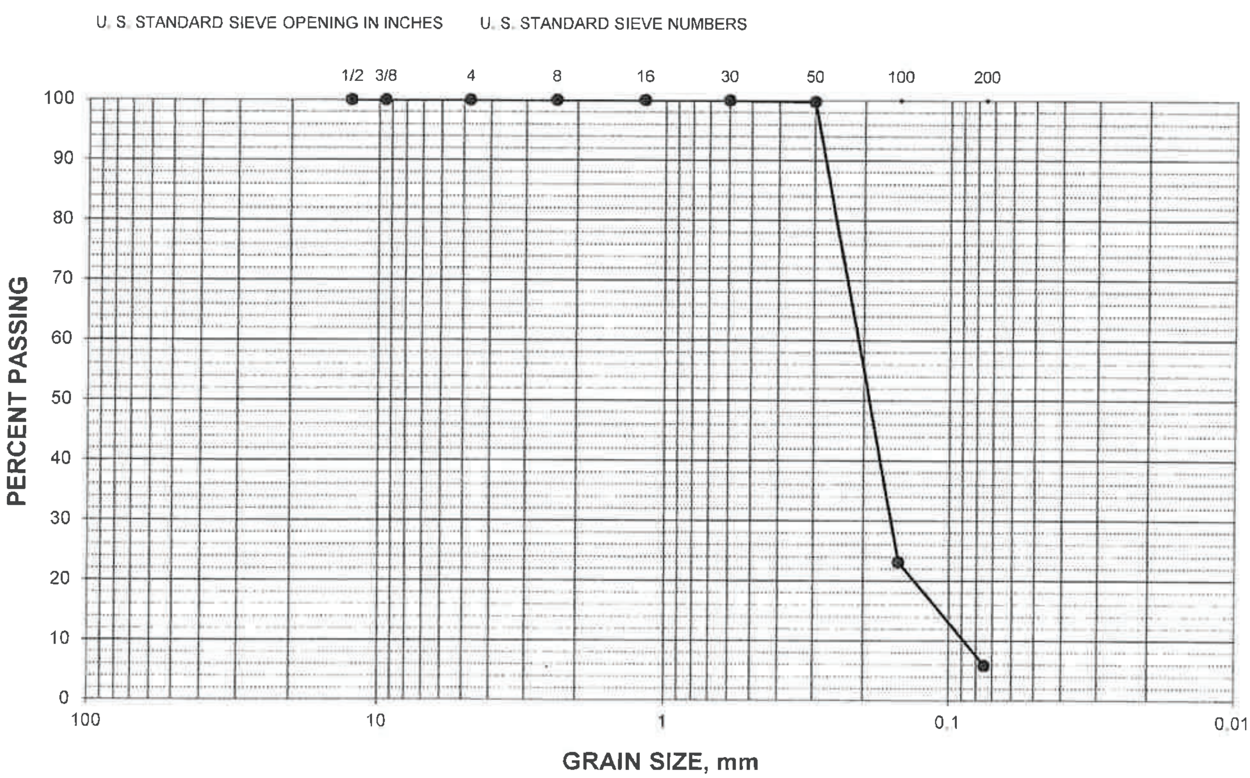
Boring #1 @ 23.0 - 24.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.4; Cc = 1.4

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	77	23
#200 (75-µm)	94.2	5.8



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PARTICLE SIZE ANALYSIS

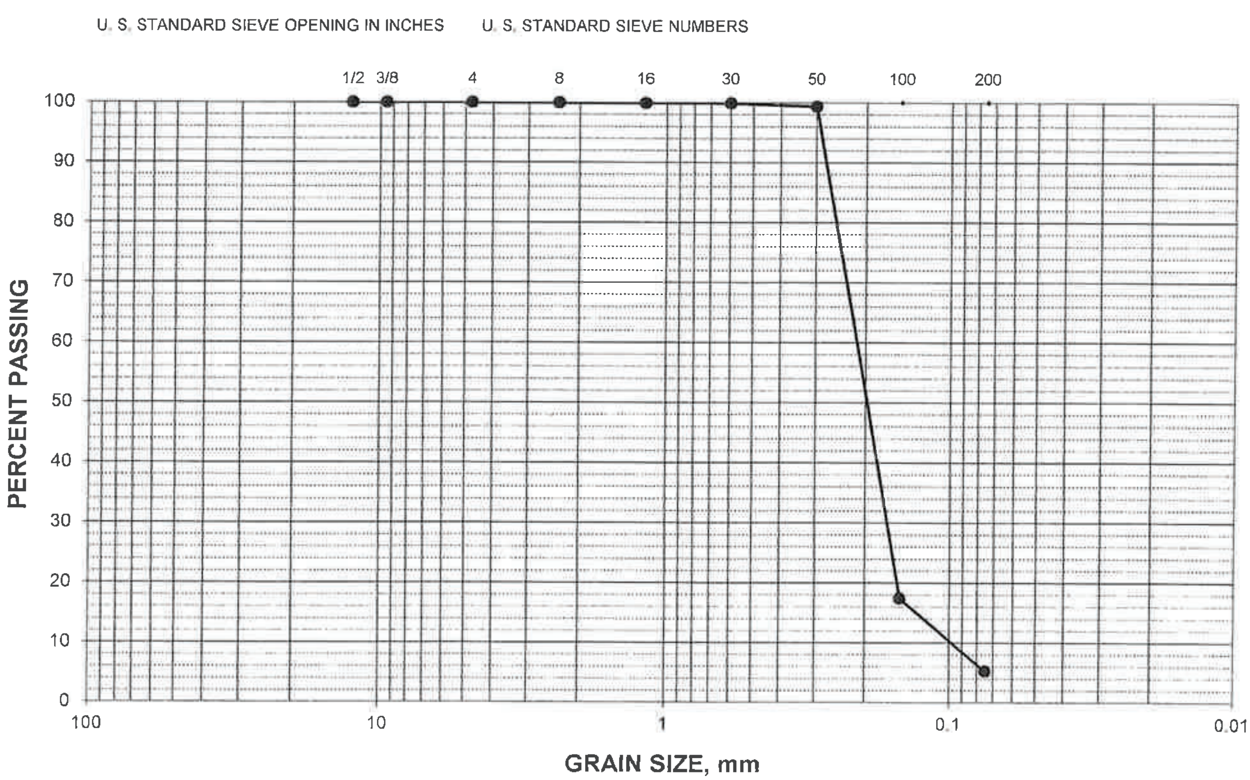
ASTM D 422-63/07; D 1140-17

Boring #2 @ 5.0 - 6.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	1	99
#100 (150-µm)	83	17
#200 (75-µm)	94.8	5.2



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

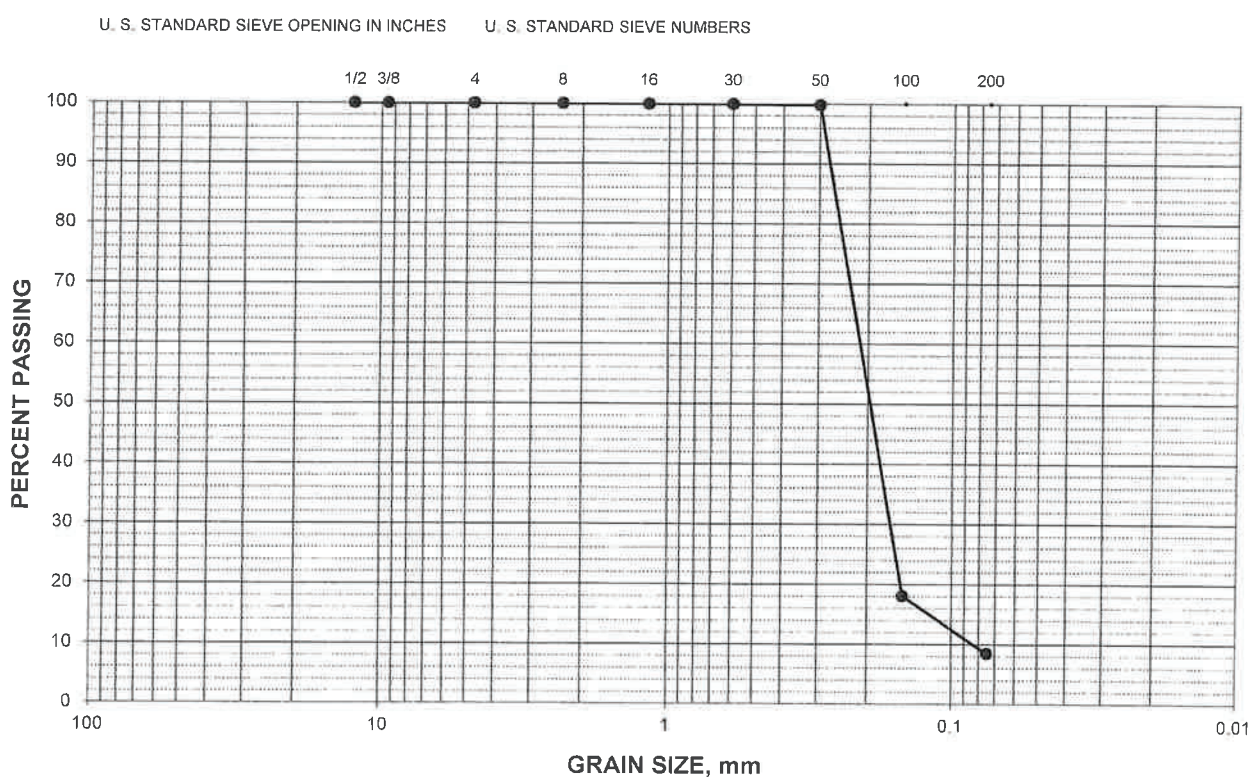
Boring #2 @ 11.0 - 11.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.6; Cc = 1.5

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	82	18
#200 (75-µm)	91.5	8.5



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SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

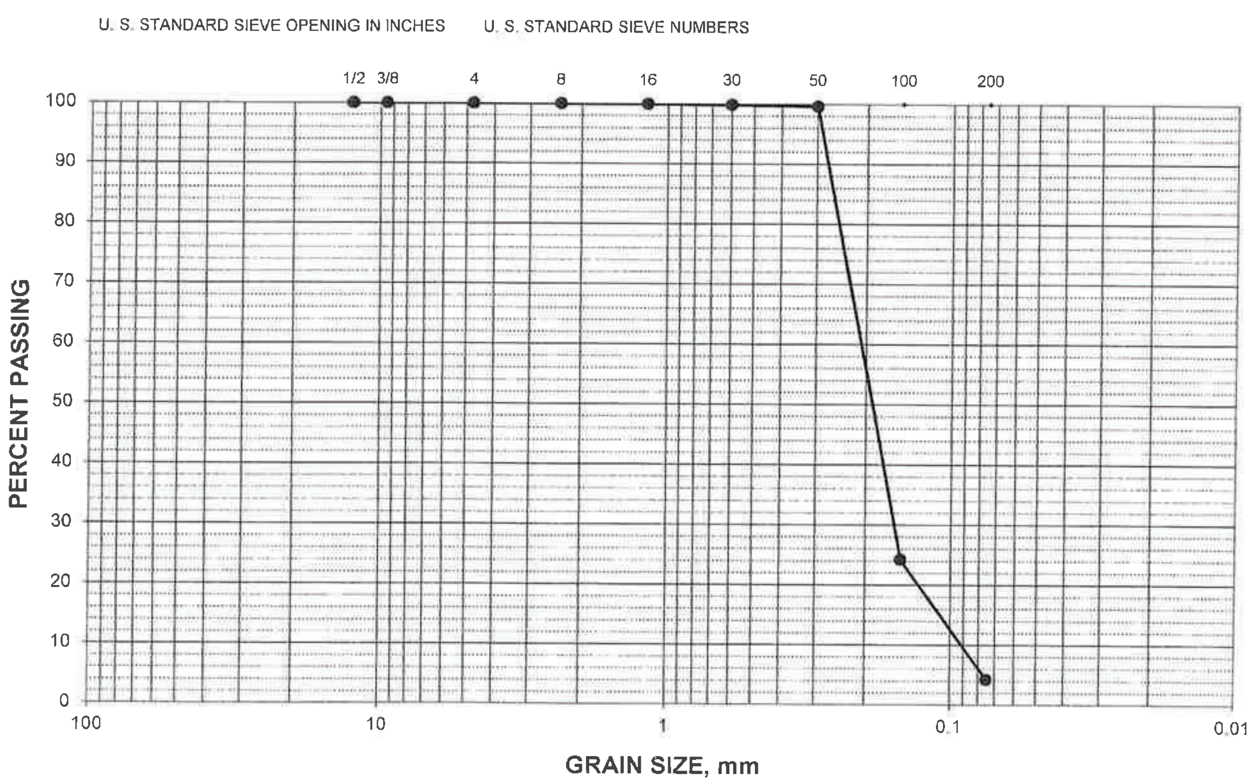
Boring #2 @ 15.0 - 16.5'

January 15, 2018

Poorly Graded Sand (SP)

Cu = 2.3; Cc = 1.3

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	76	24
#200 (75-µm)	95.8	4.2



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

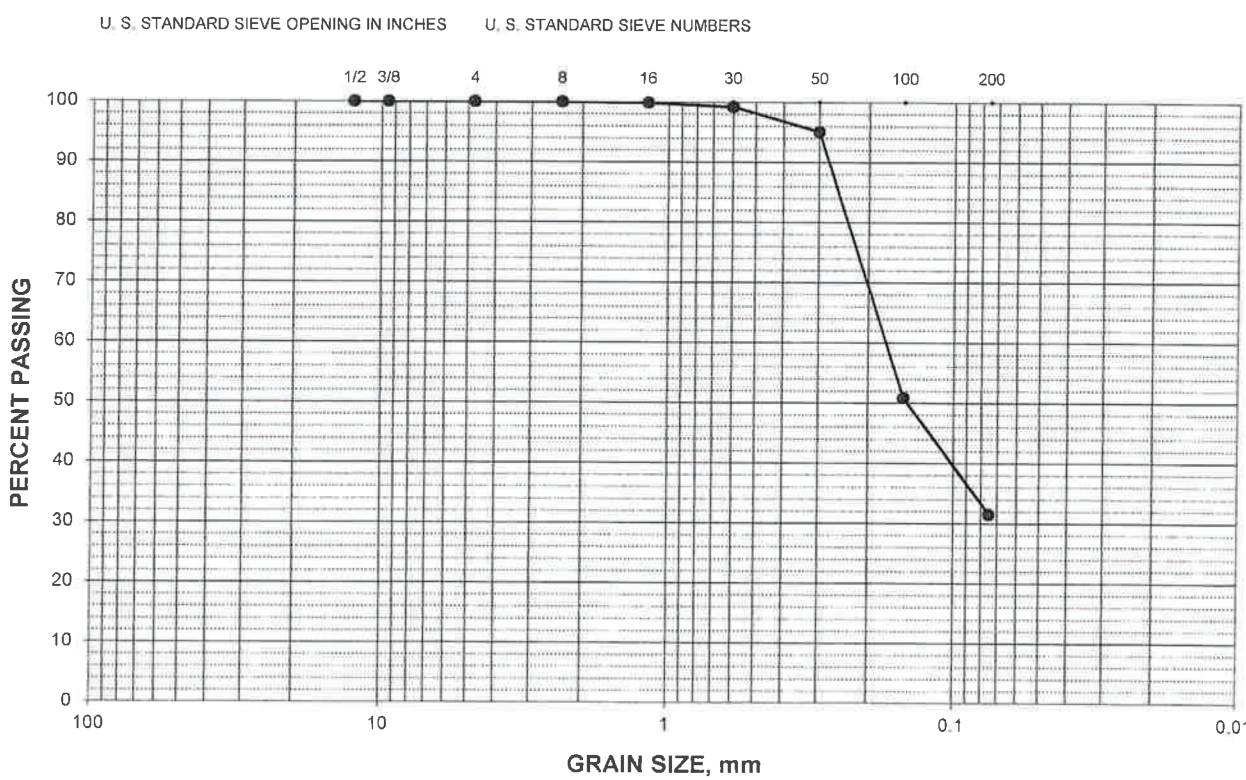
Boring #2 @ 20.0 - 21.5'

January 15, 2018

Clayey Sand (SC)

LL = 42; PL = 14; PI = 28

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	1	99
#50 (300-µm)	5	95
#100 (150-µm)	49	51
#200 (75-µm)	68	32



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SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

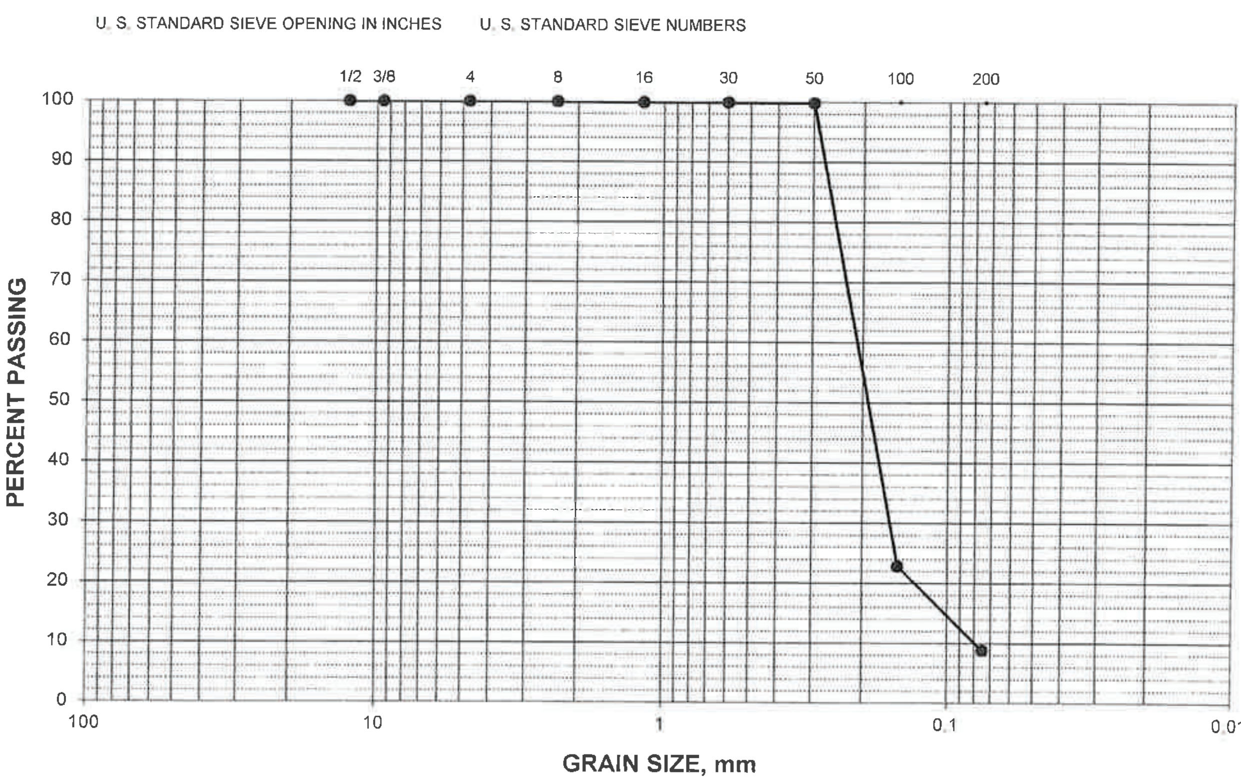
Boring #3 @ 10.0 - 11.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.6; Cc = 1.5

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	77	23
#200 (75-µm)	91.2	8.8



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

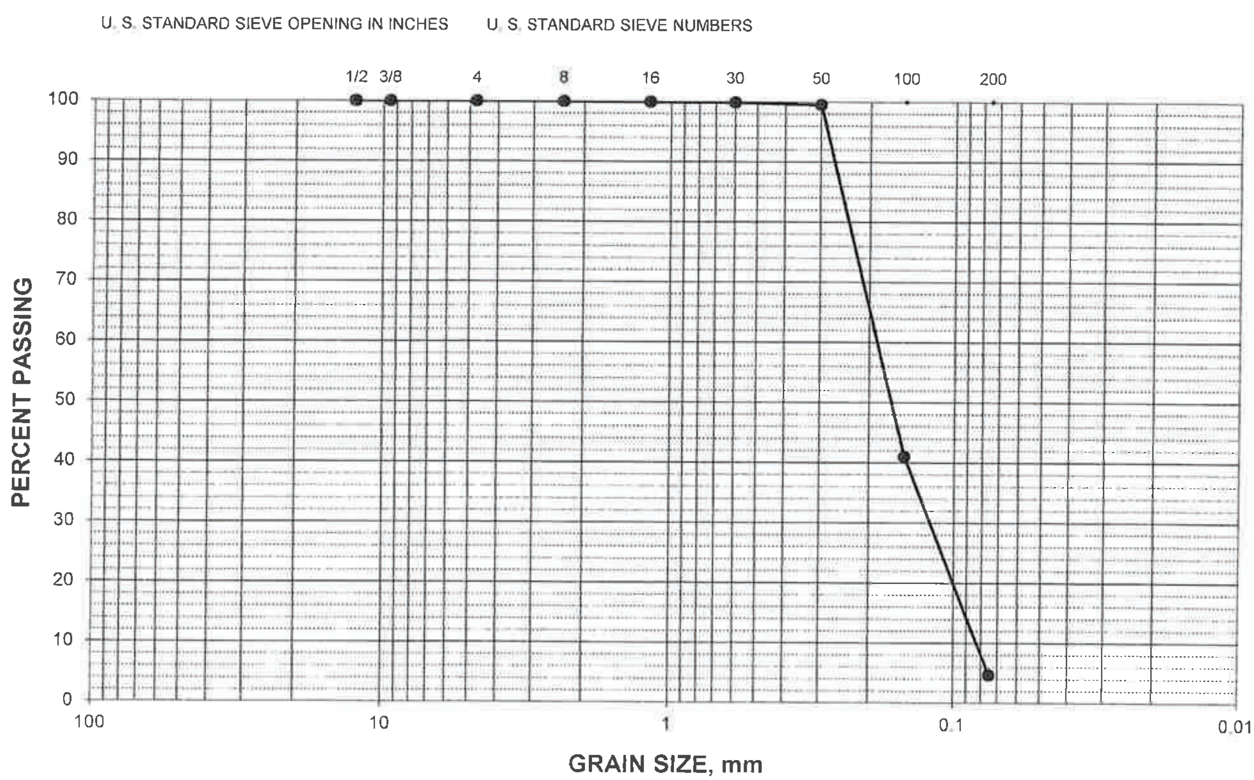
Boring #3 @ 20.0 - 21.5'

January 15, 2018

Poorly Graded Sand (SP)

Cu = 2.3; Cc = 0.9

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	59	41
#200 (75-µm)	95.3	4.7



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SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

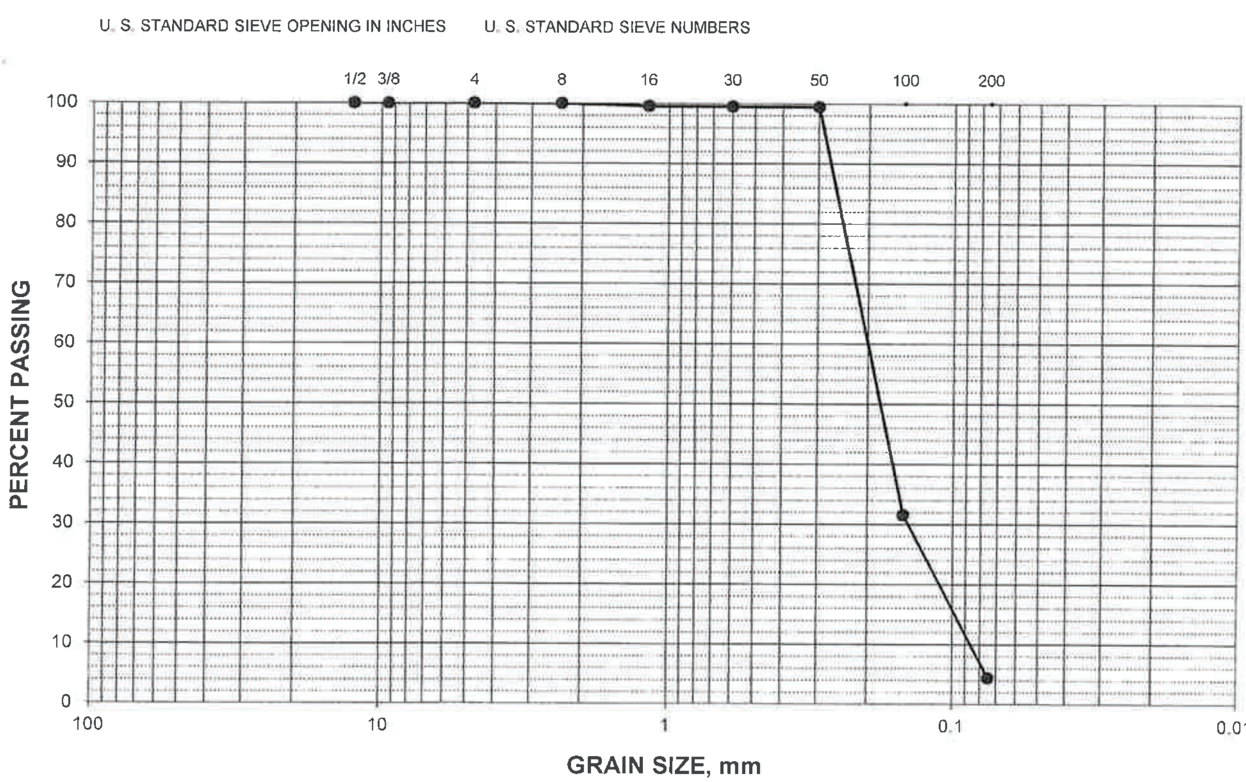
Boring #3 @ 25.0 - 26.5'

January 15, 2018

Poorly Graded Sand (SP)

Cu = 2.3; Cc = 1.2

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	1	99
#100 (150-µm)	68	32
#200 (75-µm)	95.6	4.4



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SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

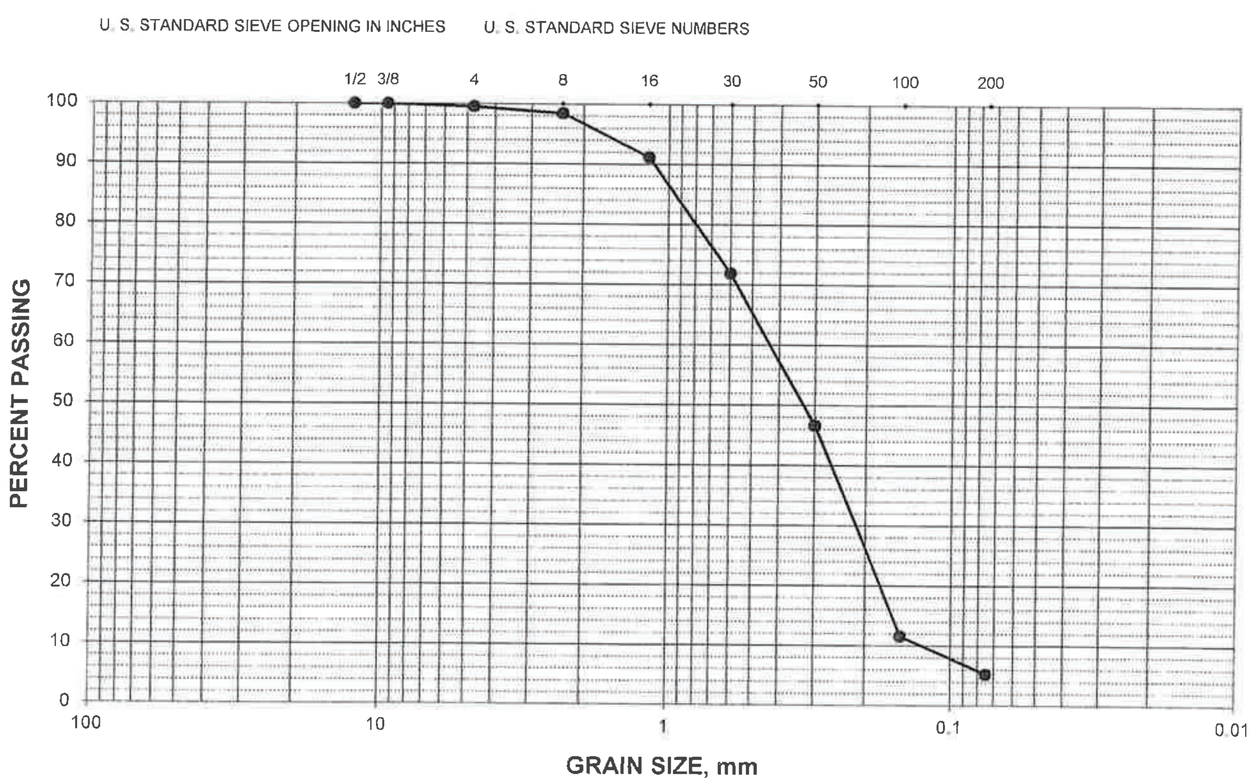
Boring #3 @ 35.0 - 36.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 3.4; Cc = 0.9

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	2	98
#16 (1.18-mm)	9	91
#30 (600-µm)	28	72
#50 (300-µm)	53	47
#100 (150-µm)	88	12
#200 (75-µm)	94.7	5.3



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PARTICLE SIZE ANALYSIS

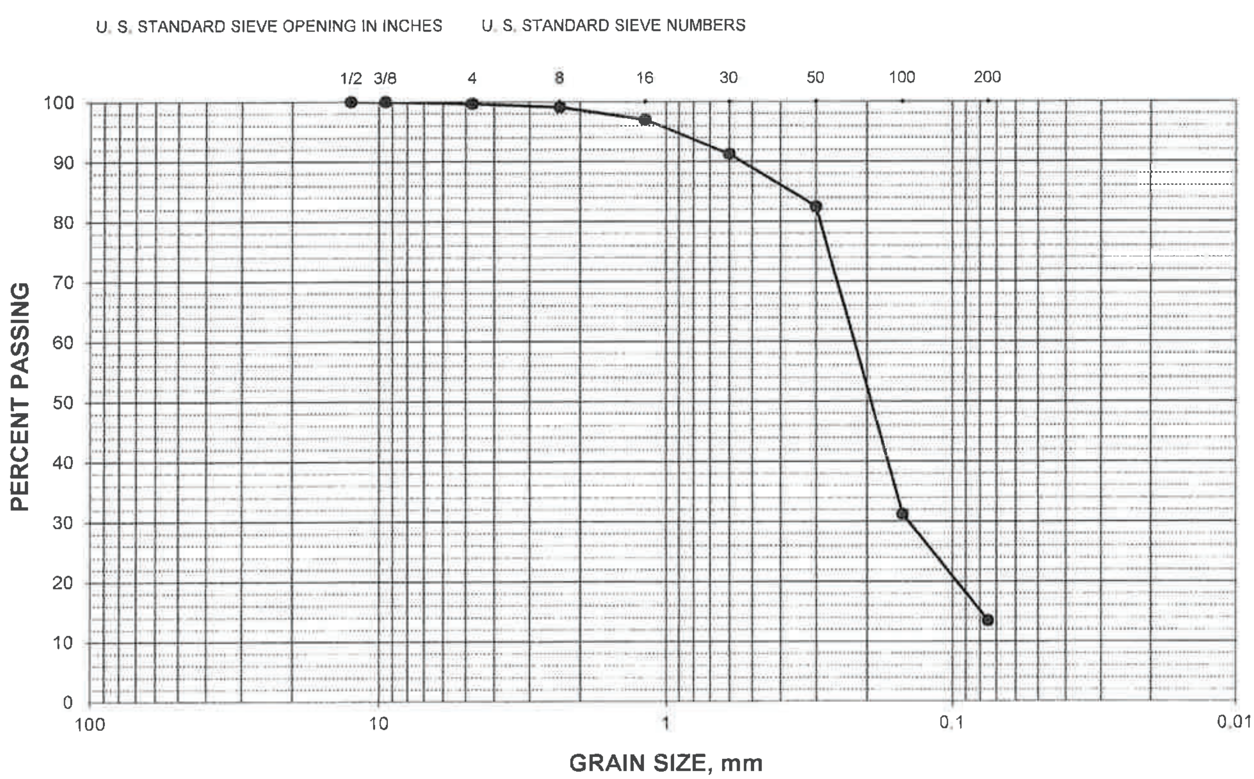
ASTM D 422-63/07; D 1140-17

Boring #3 @ 40.0 - 41.5'

January 15, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	3	97
#30 (600-µm)	9	91
#50 (300-µm)	18	82
#100 (150-µm)	69	31
#200 (75-µm)	87	13



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

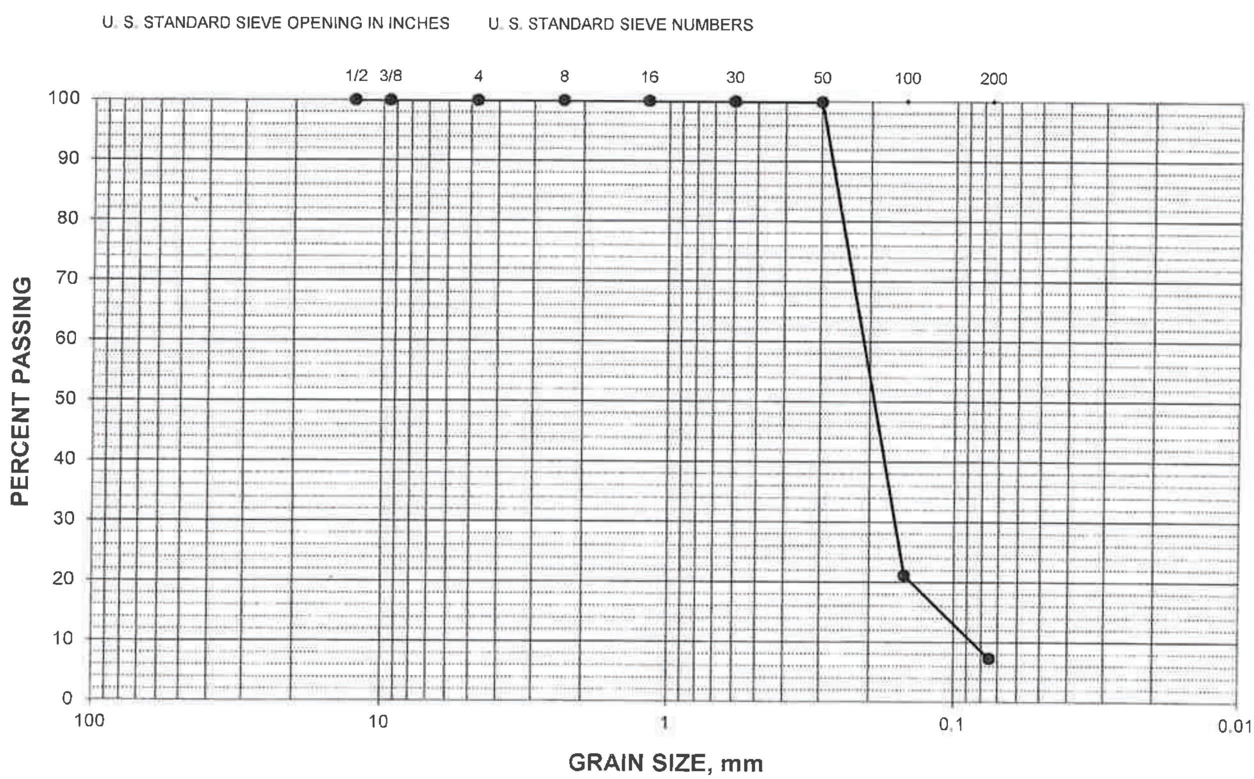
Boring #4 @ 10.0 - 11.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.5; Cc = 1.4

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	79	21
#200 (75-µm)	92.7	7.3



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

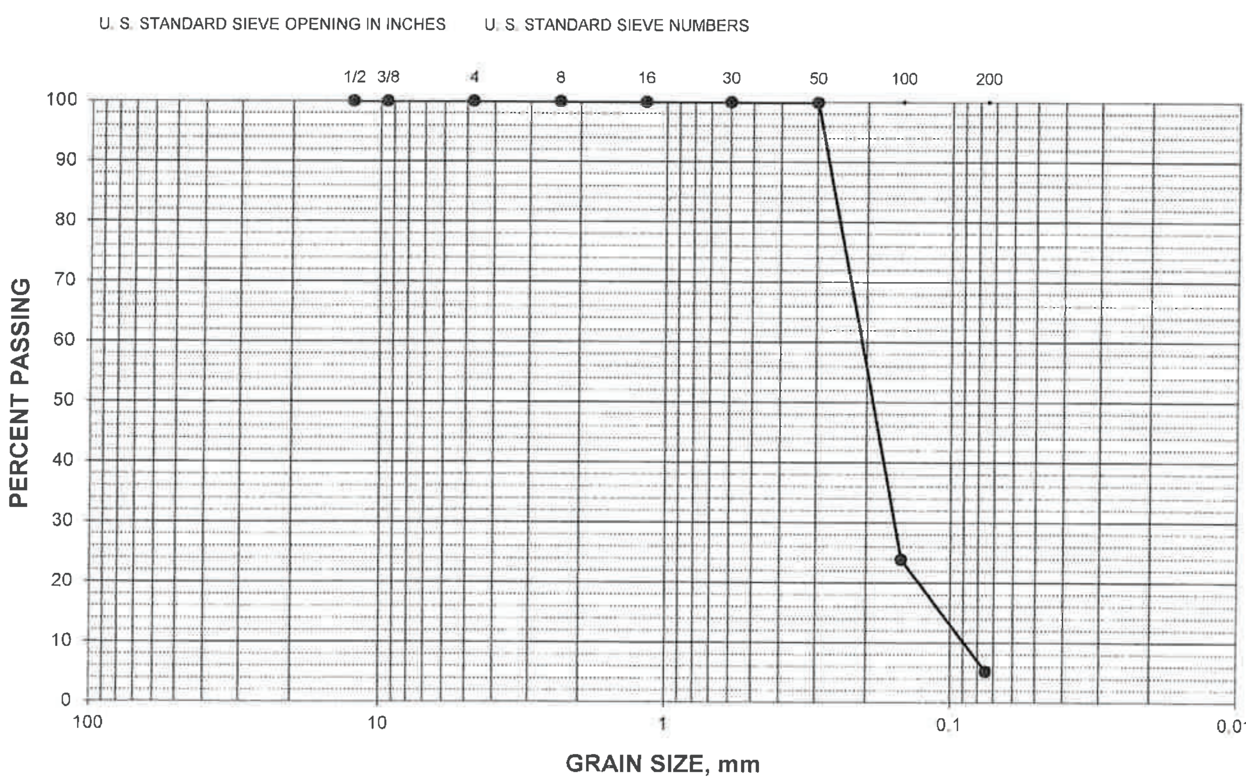
Boring #4 @ 15.0 - 16.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.3; Cc = 1.3

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	76	24
#200 (75-µm)	94.8	5.2



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PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

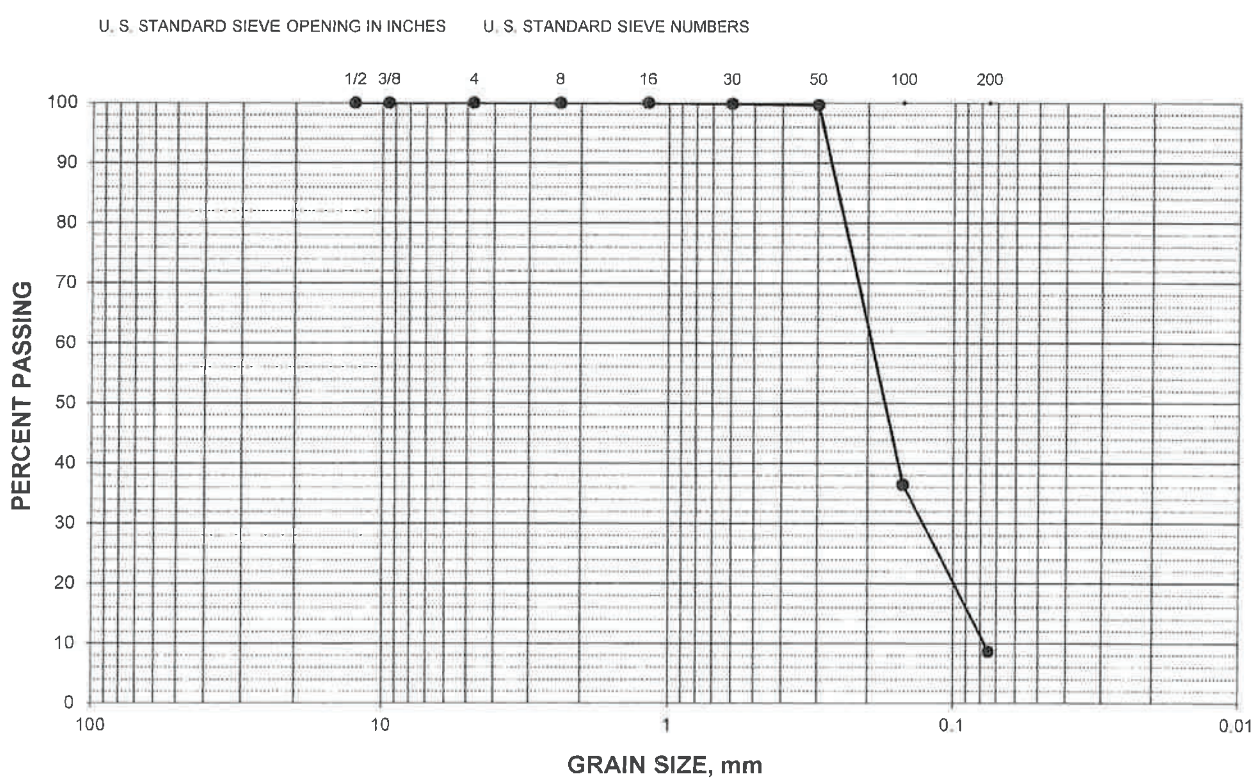
Boring #5 @ 20.0 - 21.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.5; Cc = 1.1

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	64	36
#200 (75-µm)	91.4	8.6



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PARTICLE SIZE ANALYSIS

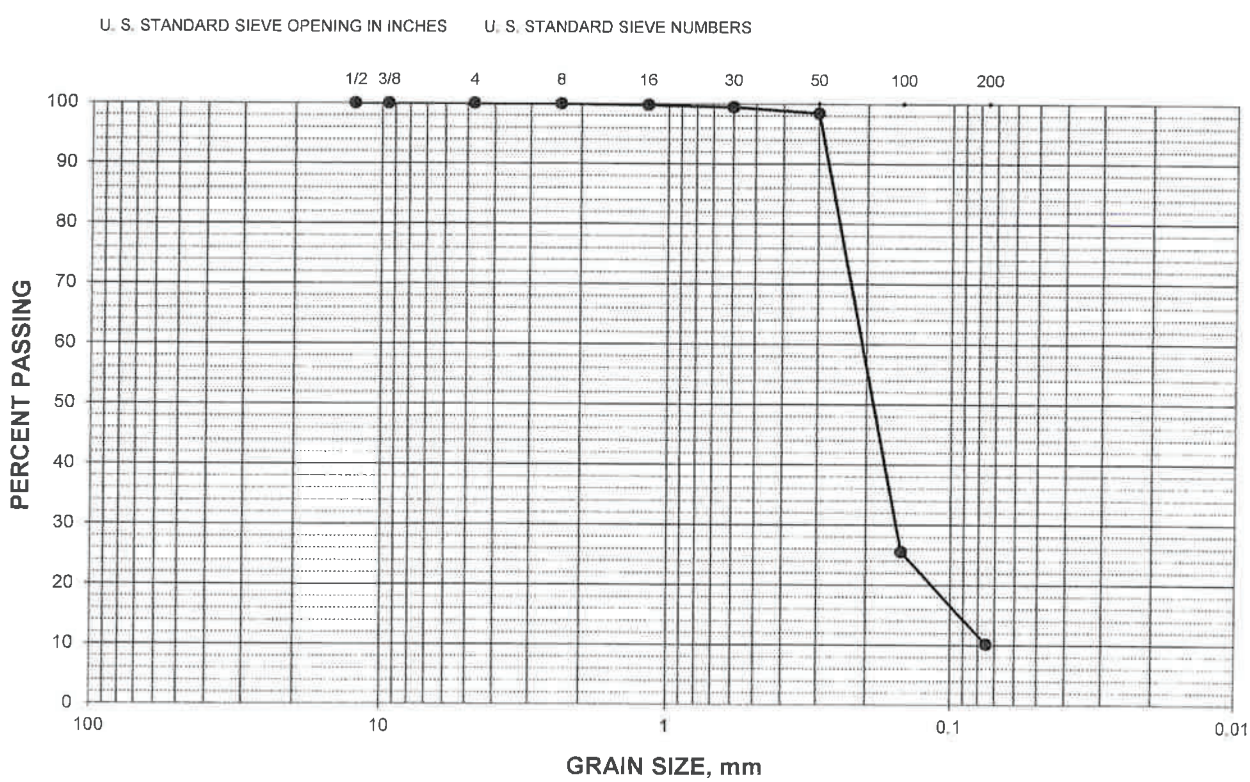
ASTM D 422-63/07; D 1140-17

Boring #5 @ 25.0 - 26.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	1	99
#50 (300-µm)	2	98
#100 (150-µm)	74	26
#200 (75-µm)	90	10



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PARTICLE SIZE ANALYSIS

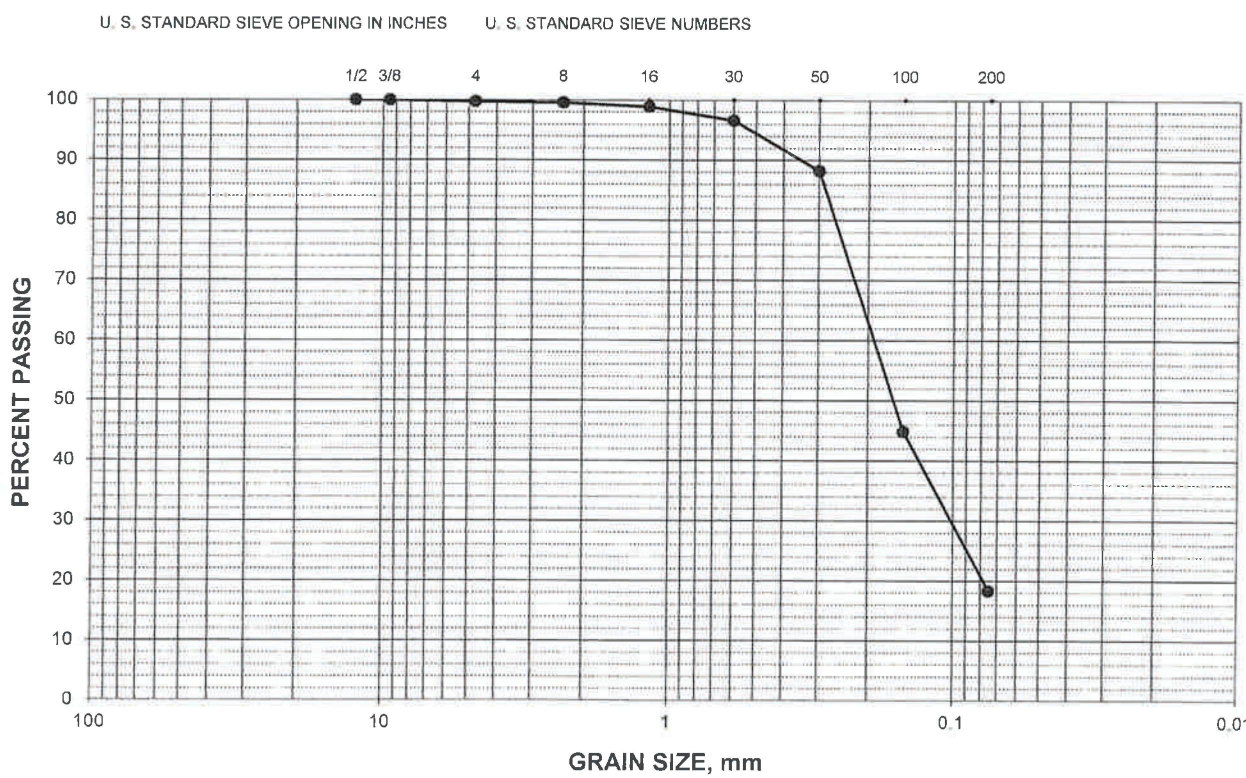
ASTM D 422-63/07; D 1140-17

Boring #5 @ 35.0 - 36.5'

January 15, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	3	97
#50 (300-µm)	12	88
#100 (150-µm)	55	45
#200 (75-µm)	82	18



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SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

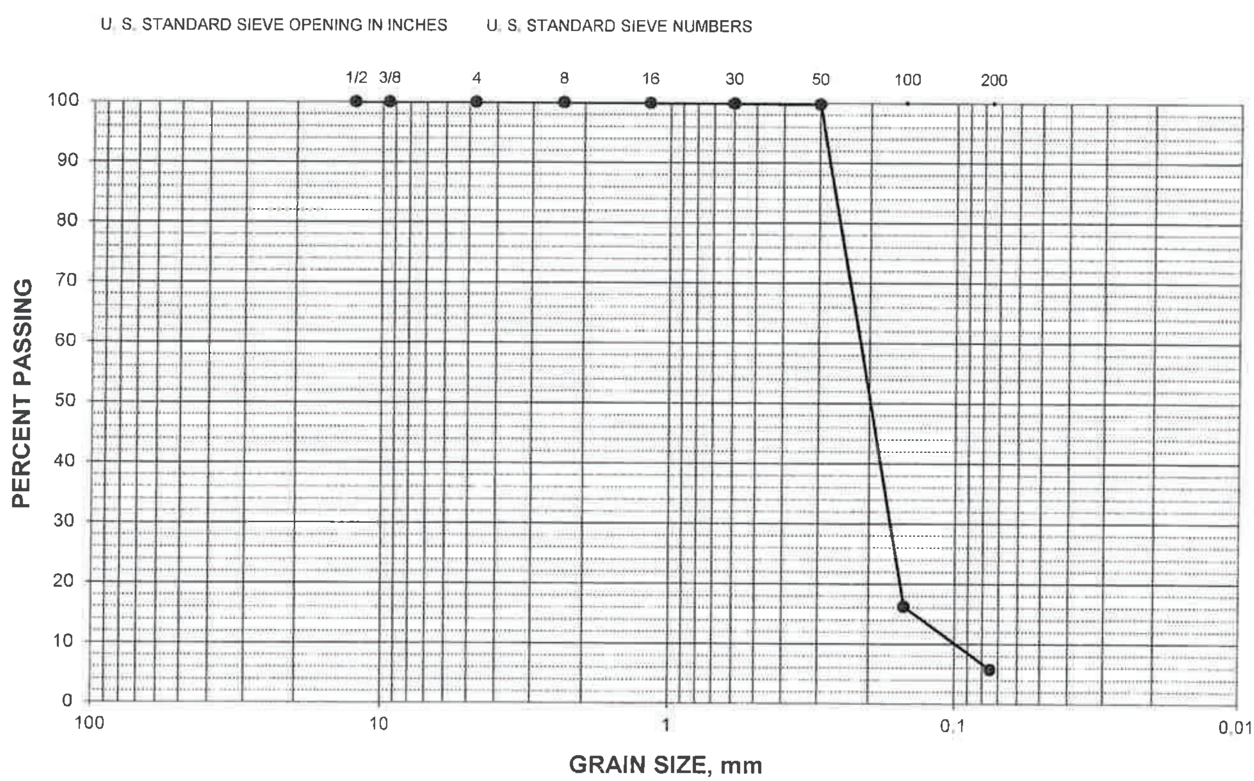
Boring #6 @ 5.0 - 6.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.2; Cc = 1.3

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	84	16
#200 (75-µm)	94.3	5.7



Earth Systems Pacific

4378 Old Santa Fe Road
San Luis Obispo, CA 93401-8166

(805) 544-3276 • FAX (805) 544-1786
E-mail: esp@earthsystems.com

1598 El Camino Real

SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

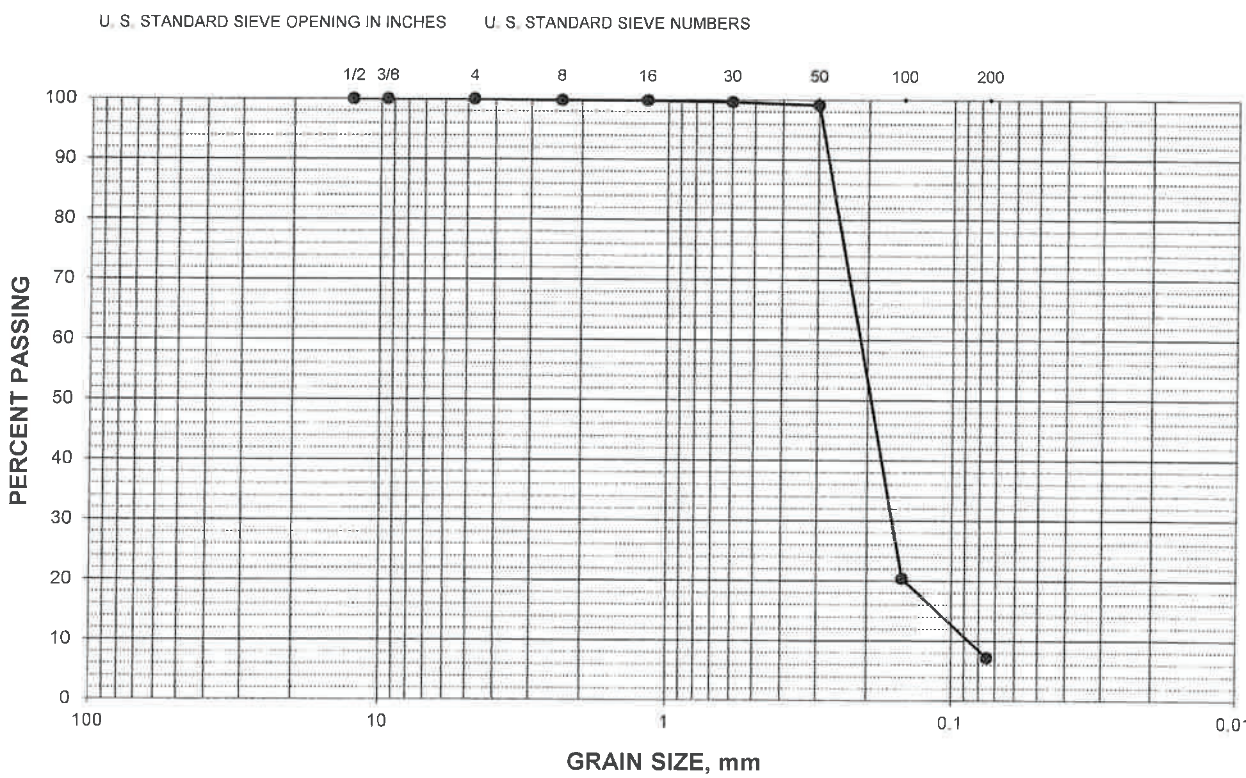
Boring #6 @ 10.0 - 11.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 2.4; Cc = 1.4

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	1	99
#100 (150-µm)	80	20
#200 (75-µm)	92.8	7.2



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1598 El Camino Real

SL-18228-SA

PARTICLE SIZE ANALYSIS

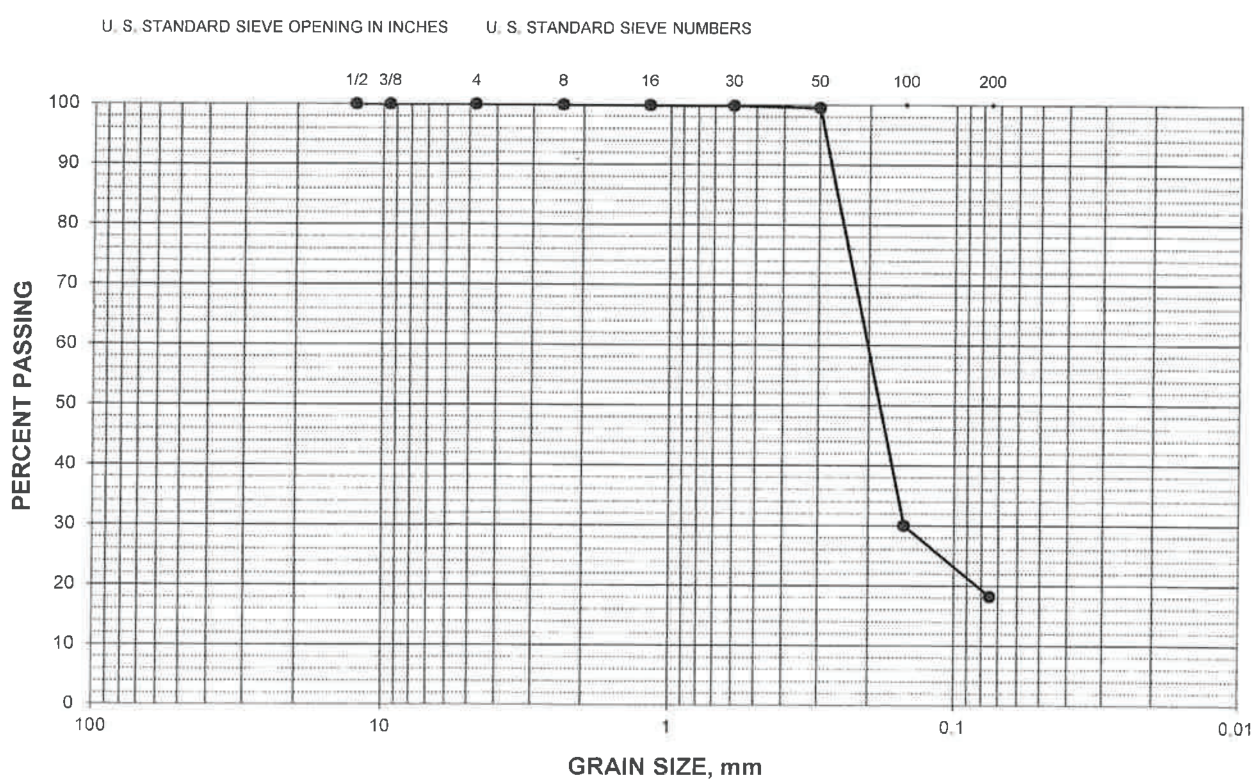
ASTM D 422-63/07; D 1140-17

Boring #6 @ 20.0 - 21.5'

January 15, 2018

Silty Sand (SM)

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	0	100
#100 (150-µm)	70	30
#200 (75-µm)	82	18



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PARTICLE SIZE ANALYSIS

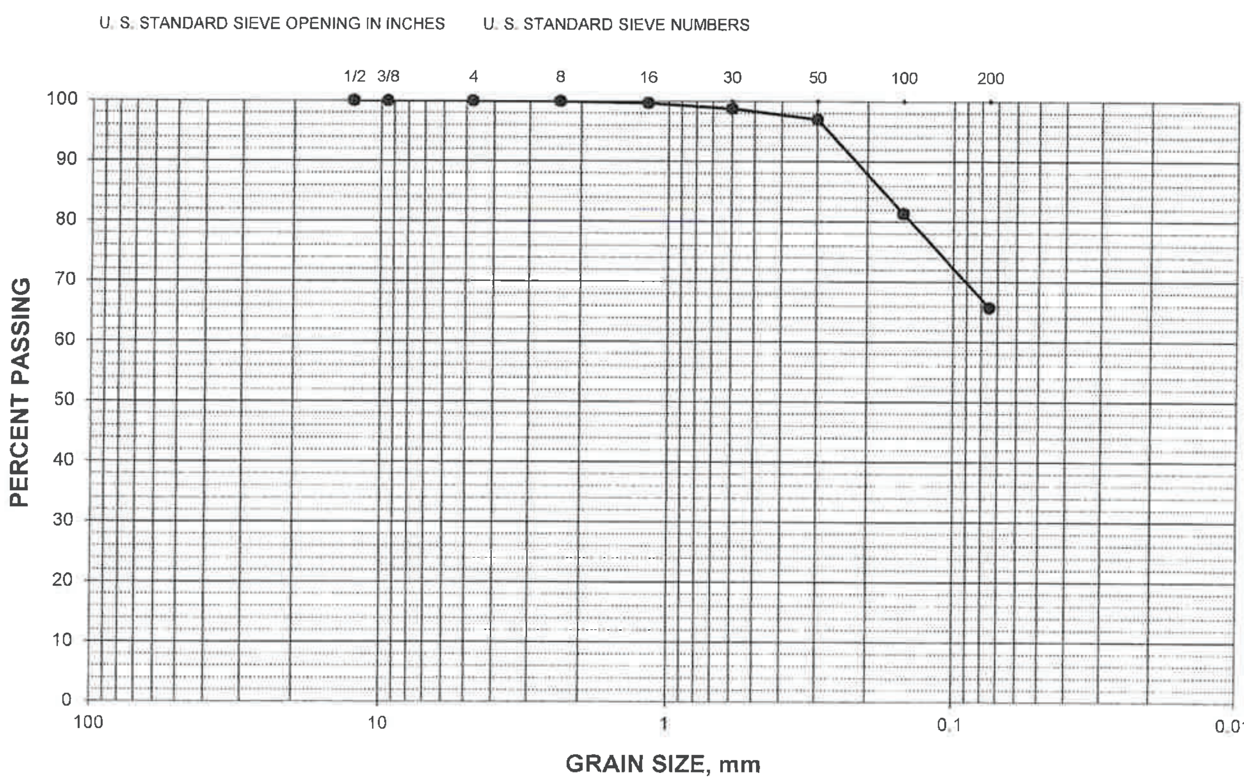
ASTM D 422-63/07; D 1140-17

Boring #7 @ 5.0 - 6.5'

January 15, 2018

Sandy Lean Clay (CL)

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	1	99
#50 (300-µm)	3	97
#100 (150-µm)	19	81
#200 (75-µm)	34	66



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1598 El Camino Real

SL-18228-SA

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

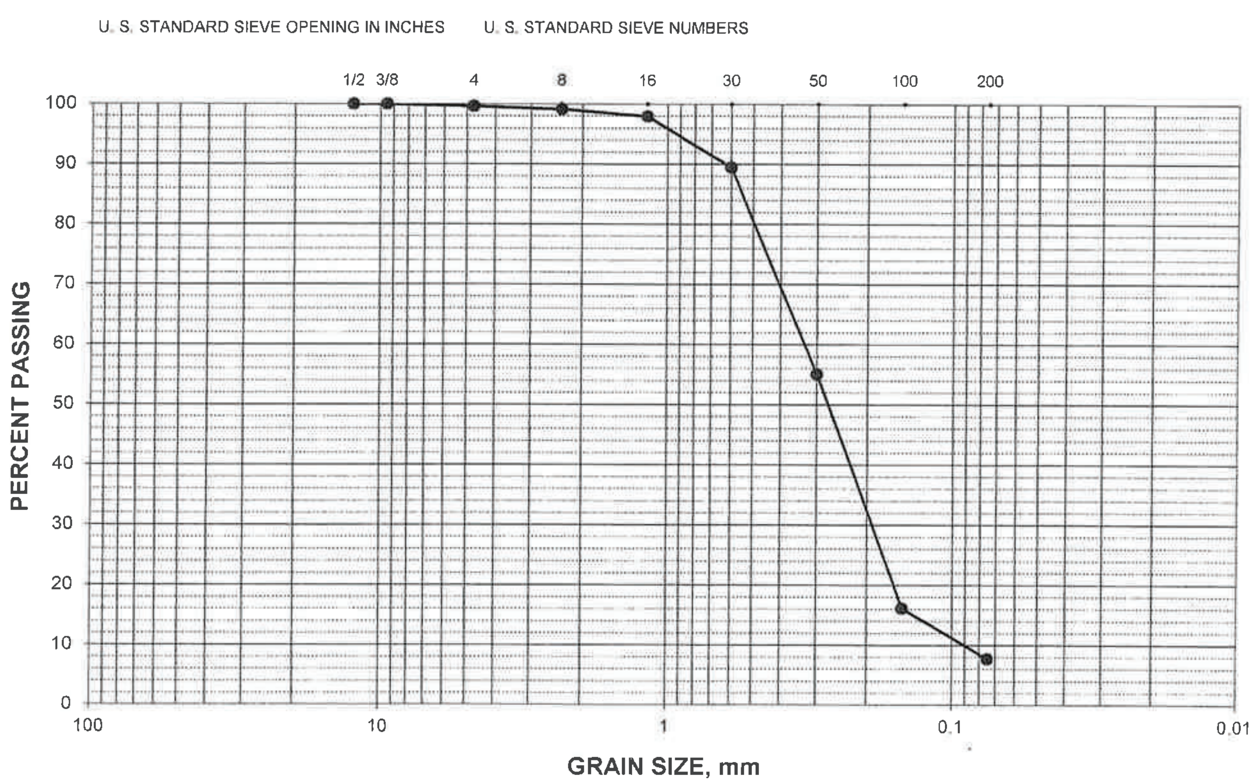
Boring #7 @ 10.0 - 11.5'

January 15, 2018

Poorly Graded Sand with Silt (SP-SM)

Cu = 3.7; Cc = 1.2

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	2	98
#30 (600-µm)	11	89
#50 (300-µm)	45	55
#100 (150-µm)	84	16
#200 (75-µm)	92.3	7.7



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1598 El Camino Real

SL-18228-SA

PARTICLE SIZE ANALYSIS

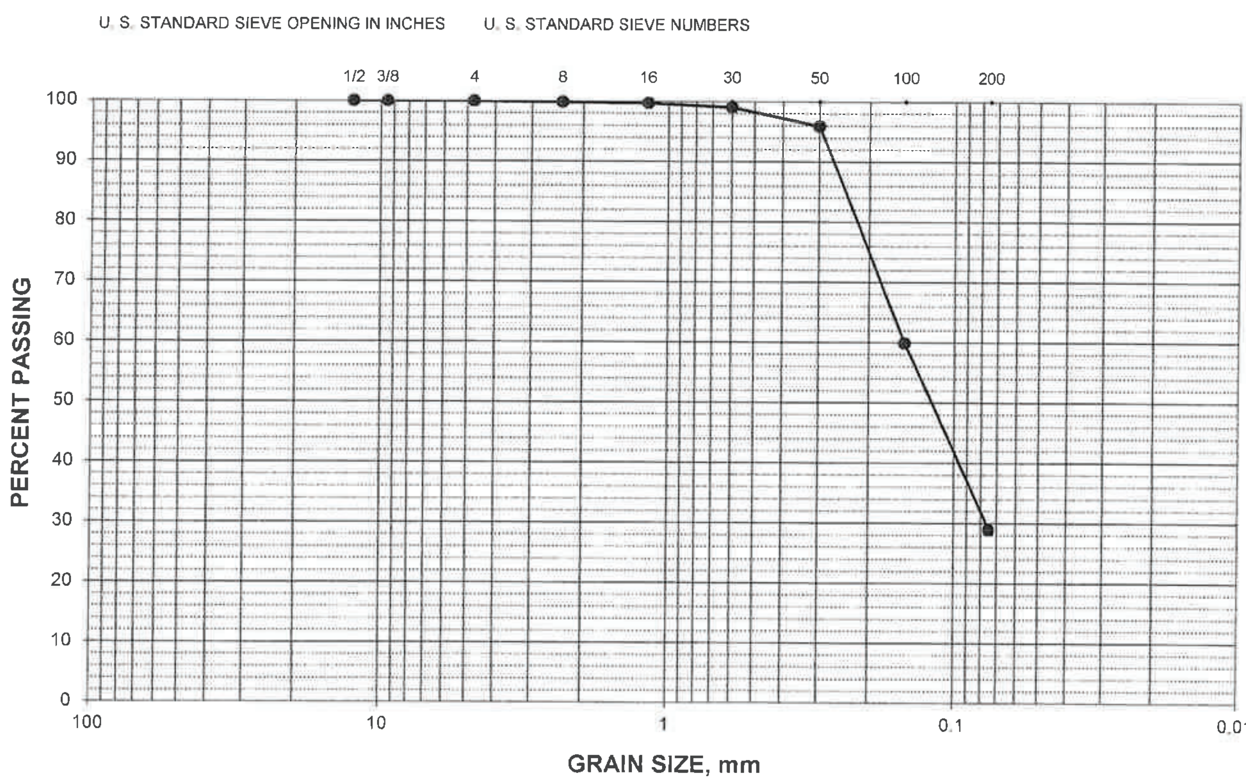
ASTM D 422-63/07; D 1140-17

Boring #7 @ 15.0 - 16.5'
Silty Sand (SM)

January 15, 2018

LL = 19; PL = 25; PI = NL/NP

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	1	99
#50 (300-µm)	4	96
#100 (150-µm)	40	60
#200 (75-µm)	71	29



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1598 El Camino Real

SL-18228-SA

PARTICLE SIZE ANALYSIS

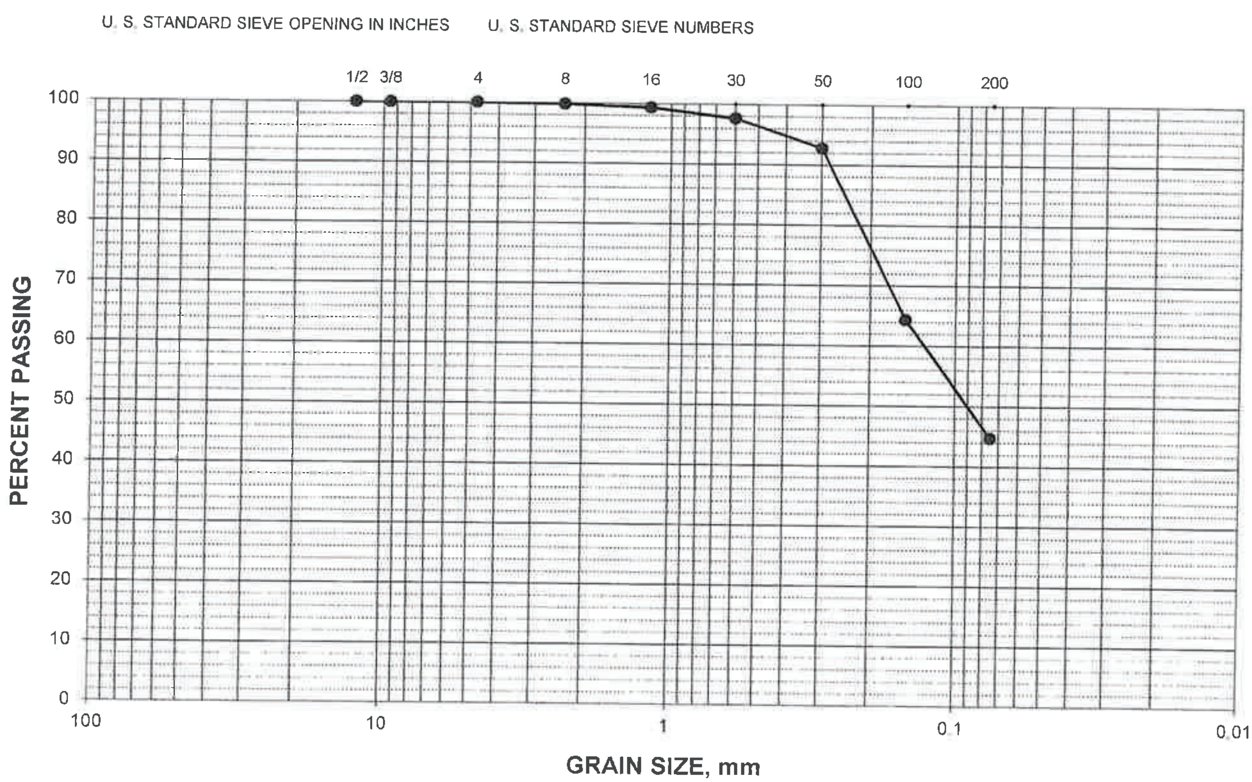
ASTM D 422-63/07; D 1140-17

Boring #7 @ 20.0 - 21.5'

Clayey Sand (SC)

January 15, 2018

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	2	98
#50 (300-µm)	7	93
#100 (150-µm)	36	64
#200 (75-µm)	55	45



APPENDIX E - STORMWATER

PRELIMINARY STORMWATER CONTROL PLAN (SWCP)

Tract 3211- El Camino Real Development
Grover Beach, California

DATE: OCTOBER 19, 2018

GARING, TAYLOR & ASSOCIATES, INC.
CIVIL ENGINEERS SURVEYORS PLANNERS
141 South Elm Street | Arroyo Grande, CA 93420
Phone: (805) 489-1321 | Fax: (805) 489-6723

Prepared for: Ram Krupa Real Estate, Inc
Job # 17-660.003
T:\17-660.003 Vesting TM\Civil\Drainage\SWCP

____
Ronald G. Reilly, RCE 78107
Exp. 09/30/2019

Table of Contents

Project Overview

The project site consists of two properties to be joined and divided into 13 separate parcels on a 316,890 square-foot property (Site Disturbance = approx. 244,750 SF) of which 9,820 square feet are currently developed including a residence, and paved areas. The property is vegetated, with over 30 oak trees, some palm trees, native grasses and scrub brush, and approximately three acres of riparian area.

The proposed project includes the demolition of an existing residence with associated impervious areas and construction of two hotels, one restaurant and seven single family homes. The development of this site qualifies for Performance Requirement: 1-4, as specified in the San Luis Obispo County Post Construction Requirements Handbook.

PROJECT NAME / PERMIT NUMBER	1598 El Camino Real Tract 3122
PROJECT LOCATION	1598 El Camino Real, Grover Beach, CA
PROJECT PHASE NO.	N/A
PROJECT TYPE & DESCRIPTION	2 hotels, 1 restaurant and 7 single family residences
TOTAL PROJECT SITE AREA (SF)	244,750
TOTAL PRE-PROJECT IMPERVIOUS AREA (SF)	9,820
TOTAL NEW IMPERVIOUS AREA (SF)	141,548
TOTAL REPLACED IMPERVIOUS AREA (SF)	0
TOTAL POST-PROJECT IMPERVIOUS AREA (SF)	151,368
NET IMPERVIOUS AREA (SF)	151,368

Site Stormwater Assessment

Pre-Development: single family residence.
Post-Development: two hotels, one restaurant, seven single family residences

Hydrologic information was obtained from the SLO County Post-Construction Requirements Handbook, Appendix A. This map shows the nearest isohyetals for 24-hour storms are 1.1” for the 85th percentile storm, and 1.65” for the 95th Percentile storm event. See the 95th Percentile map in the attached SWCP and Performance Requirements Checklist, page 9 of 12 (Attachment A).

Design Strategy Narrative

Meadow Creek traverses the northerly border of the site, flowing from east to west (See attached Flood Study). Pre-development, significant run-on tributary areas exist to the south. Although the terrain is steep through the site and the areas to the south, the soils and vegetation allow for significant infiltration.

Design and layout of this site takes great care to preserve existing vegetation, specifically oaks as well as willows, etc. within the riparian area. A 35' landscape buffer is also provided along the westerly border (Lot 13).

Drainage stemming from run-on (areas not requiring treatment, primarily native grasses and clusters of oak trees) is collected and discharged to Meadow Creek through the energy dissipater, which mimics the pre-project conditions. The remainder of the development (the portion producing *new* run-off) will utilizes a series of catch basins to capture run-off, then routes the runoff into underground infiltration systems (Infiltration was selected as the LID treatment system per Resolution R3-2013-0032). The underground systems are sized to retain the necessary volume at peak flow and reduces run-off to pre-construction rates. As the study and calculations show the project is in overall compliance with *Performance Requirements 1-4.* An additional calculation has been performed to verify the project complies with the City of Grover Beach ordinance requiring storage of 0.325 x 151,369 = 49,195 CF.

Documentation of Drainage Design

The following Performance Requirements apply to this site:

Performance Requirement 1 – Site Design and Runoff Reduction
Performance Requirement 2 – Water Quality Treatment
Performance Requirement 3 – Run-off Retention
Performance Requirement 4 – Peak Management

Performance requirement 1: The site is designed to take advantage of existing vegetation (mainly oaks and riparian habitat) and creates a more than 14,000 square foot landscape buffer on the westerly property line (Lot 13). Runoff is reduced by maintaining areas of natural infiltration, and by placing inlets in-line with infiltration systems in impervious areas.

Performance requirement 2 and 3: The underground infiltration system on-site will retain and infiltrate the 95th percentile storm event, producing 1.65" of rain fall across the site *and* the greater volume (49,195 CF) obtained through GB standard method. Table 1 provides estimated post-construction composite "C" values based on preliminary plans.

Composite run-off coefficients are estimated in accordance with the City of Grover Beach Standards and Specifications adopted June 2006, which states the "c" value as the ratio of impervious coverage to total area (COGB STD. D.2). The composite "c" value was calculated for each DMA (See Attachment D for DMA identification). See Table 1 for the results of composite "c" calculation for each DMA.

TABLE 1 - DMA "C" & IMPERVIOUS AREA APPROXIMATIONS

DMA #	SQUARE FEET	IMPERVIOUS PRE-CONSTRUCTION (%)	APPROXIMATE IMPERVIOUS POST-CONSTRUCTION (%)	APPROXIMATE POST-CONSTRUCTION COMPOSITE "C" VALUE	APPROXIMATE IMPERVIOUS AREA ADDED (SF)
1A	103,457	0%	0%	0.4	0
1B	29,280	0%	0%	0.4	0
1Ca	26,790	0%	0%	0.4	0
1Cb	23,422	0%	0%	0.4	0
1D	56,983	0%	0%	0.4	0
1E	3,776	0%	0%	0.4	0
1F	6,094	0%	0%	0.4	0
1Ga	12,792	0%	0%	0.4	0
1Gb	12,049	0%	0%	0.4	0
1Gc	3,840	0%	0%	0.4	0
2	35,614	0%	78%	0.80	27,779
3	31,707	0%	78%	0.80	24,731
4	18,732	15%	90%	0.90	14,049
5	23,308	0%	88%	0.90	20,511
6a	10,619	10%	78%	0.80	7,221
6b	7,273	10%	78%	0.80	4,946
7	5,084	0%	78%	0.80	3,966
8	35,870	0%	88%	0.90	31,566
9	24,392	10%	67%	0.70	13,903
10	4,023	25%	90%	0.90	2,615
				TOTAL ADDED:	**151,286**

The equation for the volume of the 95th percentile storm is as follows:

Retention Volume for 95th Percentile 24-hr Rainfall Depth =

= *"c" x Rainfall Depth*$_{(95th)}$ *x Tributary Area*
= *("c") (1.65 inches) (DMA SF)(1ft/12inches)*
= ***vol cubic feet***

Table 2 provides the results of the 95th Percentile Storm event by DMA and Table 3 demonstrates that adequate storage is available.

Table 2 - RWQCB 85TH PERCENTILE RUN-OFF CALCULATION & AVAILABLE UNDERGROUND STORAGE				
DMA ID	COMPOSITE "c"	95TH DEPTH (in)	TOTAL AREA	95TH % RUN-OFF CF
1A RUN ON	0.4	1.65	103457	---
1B RUN ON	0.4	1.65	29280	---
1Ca RUN ON	0.4	1.65	26790	---
1Cb RUN ON	0.4	1.65	23422	---
1D RUN-ON	0.4	1.65	56983	---
1E	0.4	1.65	3776	208
1F	0.4	1.65	6094	335
1Ga	0.4	1.65	12792	704
1Gb	0.4	1.65	12049	663
1Gc	0.4	1.65	3840	211
2	0.8	1.65	35614	3918
3	0.8	1.65	31707	3488
4	0.9	1.65	18732	2318
5	0.9	1.65	23308	2884
6a	0.8	1.65	10619	1168
6b	0.8	1.65	7273	800
7	0.8	1.65	5084	559
8	0.9	1.65	35870	4439
9	0.7	1.65	24392	2348
10	0.9	1.65	4,023	498
			TOTAL CF	24540

Table 3 demonstrates that the infiltrator banks on the preliminary grading plan (see Attachment C) are adequate for retention of the tributary DMAs. Additionally, extra storage is provided to meet local ordinances (50,777 CF > 49,195 CF).

Table 3 - Chamber Bank Retention Adequacy						
INFILTRATOR BANK ID	TRIBUTARY DMAs	CHAMBERS	VOLUME / CHAMBER (CF)	END CAPS	VOLUME / END CAP (CF)	TOTAL VOLUME (CF)
A	2	18	184	4	47.7	3502.8
B	5	16	184	6	47.7	3230.2
C	4,5	44	184	8	47.7	8477.6
D	5	20	184	4	47.7	3870.8
E	6a	16	184	4	47.7	3134.8
F	3	20	184	4	47.7	3870.8
G	6b	32	184	8	47.7	6269.6
H	7,8	36	184	4	47.7	6814.8
I	9	54	184	6	47.7	10222.2
J	10	7	184	2	47.7	1383.4
						50777

Performance requirement 4: Calculations were performed for storm events with recurrence frequencies of 2 through 10-years and with times of concentration varying from 10 minutes through 10 hours. Calculations were performed for pre and post construction conditions. These volumes and run-off rates are compared to the storage volumes for the project site. The calculation for the 2-year and 10-year storm events are provided in Tables series 4 and 5 for Infiltrator Banks A – J, and Tributary DMAs 2-10.

The areas of historic run-on (non-treatment flows) will be routed through the *energy dispersal* outfall trench and are released to Meadow Creek. See the attached Flood Study for additional data.

Table 4 SHORT PERIOD (10 Minute) - 2 YEAR PRE-CONSTRUCTION VERSUS 2 YEAR POST-CONSTRUCTION RUN-OFF RESULTS & AVAILABLE STORAGE

DMA ID	TOTAL AREA SF	PRE-CON "c"	PRE-CON 10-YEAR FLOW (cfs)	POST-CON COMPOSITE "c"	POST-CON 10-YEAR FLOW (cfs)	REQUIRED STORAGE VOLUME	INFILTRATOR BANK	BANK CAPACITY
1A RUN ON	103,457	0.4	1.615	0.4	1.62	0	---	---
1B RUN ON	29,280	0.4	0.457	0.4	0.46	0	---	---
1Ca RUN ON	26,790	0.4	0.418	0.4	0.42	0	---	---
1Cb RUN ON	23,422	0.4	0.366	0.4	0.37	0	---	---
1D RUN-ON	56,983	0.4	0.890	0.4	0.89	0	---	---
1E	3,776	0.4	0.059	0.4	0.06	0	---	---
1F	6,094	0.4	0.095	0.4	0.10	0	---	---
1Ga	12,792	0.4	0.200	0.4	0.20	0	---	---
1Gb	12,049	0.4	0.188	0.4	0.19	0	---	---
1Gc	3,840	0.4	0.060	0.4	0.06	0	---	---
2	35,614	0.4	0.556	0.8	1.11	334	A	3,503
3	31,707	0.4	0.495	0.8	0.99	297	F	3,871
4	18,732	0.4	0.292	0.9	0.66	219	C	8,478
5	23,308	0.4	0.364	0.9	0.82	273	B	3,230
6a	10,619	0.4	0.166	0.8	0.33	99	E	3,135
6b	7,273	0.4	0.114	0.8	0.23	68	G	6,270
7	5,084	0.4	0.079	0.8	0.16	48	D	3,871
8	35,870	0.4	0.560	0.9	1.26	420	H	6,815
9	24,392	0.4	0.381	0.7	0.67	171	I	10,222
10	4,023	0.4	0.063	0.9	0.14	47	J	1,383
	235,173				TOTAL CF	1,976	TOTAL CF	50,777

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Table 4a LONG PERIOD (10 Hour) - 2 YEAR PRE-CONSTRUCTION VERSUS 2 YEAR POST-CONSTRUCTION RUN-OFF RESULTS & AVAILABLE STORAGE

DMA ID	TOTAL AREA SF	PRE-CON "c"	PRE-CON 2-YEAR FLOW (cfs)	POST-CON COMPOSITE "c"	POST-CON 2-YEAR FLOW (cfs)	REQUIRED STORAGE VOLUME	INFILTRATOR BANK	BANK CAPACITY
1A RUN ON	103,457	0.4	0.209	0.4	0.209	0	---	
1B RUN ON	29,280	0.4	0.059	0.4	0.059	0		
1Ca RUN ON	26,790	0.4	0.054	0.4	0.054	0		
1Cb RUN ON	23,422	0.4	0.047	0.4	0.047	0		
1D RUN-ON	56,983	0.4	0.115	0.4	0.115	0		
1E	3,776	0.4	0.008	0.4	0.008	0		
1F	6,094	0.4	0.012	0.4	0.012	0		
1Ga	12,792	0.4	0.026	0.4	0.026	0		
1Gb	12,049	0.4	0.024	0.4	0.024	0		
1Gc	3,840	0.4	0.008	0.4	0.008	0		
2	35,614	0.4	0.072	0.8	0.14	43	A	3,503
3	31,707	0.4	0.064	0.8	0.13	38	F	3,871
4	18,732	0.4	0.038	0.9	0.09	28	C	8,478
5	23,308	0.4	0.047	0.9	0.11	35	B	3,230
6a	17,891	0.4	0.036	0.8	0.07	22	E	3,135
6b	7,273	0.4	0.015	0.8	0.03	9	G	6,270
7	5,084	0.4	0.010	0.8	0.02	6	D	3,871
8	35,870	0.4	0.072	0.9	0.16	54	H	6,815
9	24,392	0.4	0.049	0.7	0.09	22	I	10,222
10	4,023	0.4	0.008	0.9	0.02	6	J	1,383
					TOTAL CF	256	TOTAL CF	50,777

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Table 5 SHORT PERIOD (10 Minute) - 10 YEAR PRE-CONSTRUCTION VERSUS 2 YEAR POST-CONSTRUCTION RUN-OFF RESULTS & AVAILABLE STORAGE

DMA ID	TOTAL AREA SF	PRE-CON "c"	PRE-CON 2-YEAR FLOW (cfs)	POST-CON COMPOSITE "c"	POST-CON 2-YEAR FLOW (cfs)	REQUIRED STORAGE VOLUME	INFILTRATOR BANK	BANK CAPACITY
1A RUN ON	103,457	0.4	0.209	0.4	0.209	0	---	
1B RUN ON	29,280	0.4	0.059	0.4	0.059	0		
1Ca RUN ON	26,790	0.4	0.054	0.4	0.054	0		
1Cb RUN ON	23,422	0.4	0.047	0.4	0.047	0		
1D RUN-ON	56,983	0.4	0.115	0.4	0.115	0		
1E	3,776	0.4	0.008	0.4	0.008	0		
1F	6,094	0.4	0.012	0.4	0.012	0		
1Ga	12,792	0.4	0.026	0.4	0.026	0		
1Gb	12,049	0.4	0.024	0.4	0.024	0		
1Gc	3,840	0.4	0.008	0.4	0.008	59		
2	35,614	0.4	0.072	0.8	0.14	549	A	3,503
3	31,707	0.4	0.064	0.8	0.13	611	F	3,871
4	18,732	0.4	0.038	0.9	0.09	361	C	8,478
5	23,308	0.4	0.047	0.9	0.11	360	B	3,230
6a	10,619	0.4	0.021	0.8	0.04	164	E	3,135
6b	7,273	0.4	0.015	0.8	0.03	112	G	6,270
7	5,084	0.4	0.010	0.8	0.02	98	D	3,871
8	35,870	0.4	0.072	0.9	0.16	415	H	6,815
9	24,392	0.4	0.049	0.7	0.09	470	I	10,222
10	4,023	0.4	0.008	0.9	0.02	78	J	1,383
					TOTAL CF	3,200	TOTAL CF	50,777

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Table 5a LONG PERIOD (10 Hour) - 10 YEAR PRE-CONSTRUCTION VERSUS 10 YEAR POST-CONSTRUCTION RUN-OFF RESULTS & AVAILABLE STORAGE

DMA ID	TOTAL AREA SF	PRE-CON "c"	PRE-CON 10-YEAR FLOW (cfs)	POST-CON COMPOSITE "c"	POST-CON 10-YEAR FLOW (cfs)	REQUIRED STORAGE VOLUME	INFILTRATOR BANK	BANK CAPACITY
1A RUN ON	103,457	0.4	0.065	0.4	0.07	0	---	
1B RUN ON	29,280							
1Ca RUN ON	26,790							
1Cb RUN ON	23,422							
1D RUN-ON	56,983							
1E	3,776							
1F	6,094							
1Ga	12,792							
1Gb	12,049							
1Gc	3,840							
2	35,614	0.4	0.124	0.8	0.25	75	A	3,503
3	31,707	0.4	0.111	0.8	0.22	66	F	3,871
4	18,732	0.4	0.065	0.9	0.15	49	C	8,478
5	23,308	0.4	0.081	0.9	0.18	61	B	3,230
6a	10,619	0.4	0.037	0.8	0.07	22	E	3,135
6b	7,273	0.4	0.025	0.8	0.05	15	G	6,270
7	5,084	0.4	0.018	0.8	0.04	11	D	3,871
8	35,870	0.4	0.125	0.9	0.28	94	H	6,815
9	24,392	0.4	0.085	0.7	0.15	38	I	10,222
10	4,023	0.4	0.014	0.9	0.03	11	J	1,383
					TOTAL CF	442	TOTAL CF	50,777

The storm times of concentration (tc) and intensities were taken from the San Luis Obispo County Engineering Standards.

The pre-construction run-off coefficient ("c" = 0.4 for sand and >10%) was selected from "20,000 Sq Ft" at 0.4 from the COGB City Standards D.2.

The run-off flow rates, *Q* (**PRE-CON 10-YEAR FLOW (cfs)** and **POST-CON 10-YEAR FLOW (cfs)**), were calculated from the rational method, Q=cIA, for pre and post-construction conditions.

The storage volume (**REQUIRED STORAGE VOLUME**) is determined by multiplying Q by the time of concentration. The short period event has a 10-minute time of concentration. The long period event utilizes a 10-hour time of concentration.**REQUIRED STORAGE VOLUME** (cubic feet) was calculated by subtracting the Pre-Con and Post-con flow rates. The resultant was then multiplied by the time of concentration to establish the minimum volume.

REQUIRED STORAGE VOLUME =

(Q_{post} (**POST-CON 10-YEAR FLOW (cfs)** – Q_{pre} (**PRE-CON 10-YEAR FLOW (cfs)**) x (ft3/second) x 60 seconds/minutes x tc minutes.

The **BANK CAPACITY** is the available storage volumes of the on-site chambers systems. The calculations show (Table 2) the 95th percentile storm event requires the largest storage volume as required by the RWQCB.

Stormwater Facilities Operation and Maintenance

For this project there is a centralized basin system that will utilize a sub-surface storage system to collect stormwater run-off and meet performance requirements 1-4.

Summary of Site Pervious and Impervious Areas

The table below demonstrates the pre and post-construction impervious area added calculations.

TABLE 6 -

DMA #	SQUARE FEET	IMPERVIOUS PRE-CONSTRUCTION (%)	APPROXIMATE IMPERVIOUS POST-CONSTRUCTION (%)	APPROXIMATE POST-CONSTRUCTION COMPOSITE "C" VALUE	APPROXIMATE IMPERVIOUS AREA ADDED (SF)
1A	103,457	0%	0%	0.4	0
1B	29,280	0%	0%	0.4	0
1Ca	26,790	0%	0%	0.4	0
1Cb	23,422	0%	0%	0.4	0
1D	56,983	0%	0%	0.4	0
1E	3,776	0%	0%	0.4	0
1F	6,094	0%	0%	0.4	0
1Ga	12,792	0%	0%	0.4	0
1Gb	12,049	0%	0%	0.4	0
1Gc	3,840	0%	0%	0.4	0
2	35,614	0%	78%	0.80	27,779
3	31,707	0%	78%	0.80	24,731
4	18,732	15%	90%	0.90	14,049
5	23,308	0%	88%	0.90	20,511
6a	10,619	10%	78%	0.80	7,221
6b	7,273	10%	78%	0.80	4,946
7	5,084	0%	78%	0.80	3,966
8	35,870	0%	88%	0.90	31,566
9	24,392	10%	67%	0.70	13,903
10	4,023	25%	90%	0.90	2,615
				TOTAL ADDED:	**151,286**

Attachment A – SWCP and Performance Requirements Checklist

STANDARD PLAN P.1

STORMWATER CONTROL PLAN

APPLICATION AND COVERSHEET

Public Works Department City of Grover Beach

154 S. Eighth Street, Grover Beach, CA 9343 ● (805) 473-4520

1) APPLICATION INFORMATION

Applicant Name: Ram Krupa, LLC

Mailing Address: 845 Morro Ave, Morro Bay, CA 93442

Daytime Phone: (805) 538-0241

Email Address: darshanpatel@ramkrupallc.com

2) PROJECT INFORMATION

☒ **PRELIMINARY** – Subdivision or Land Use Permit ☐ **FINAL** – Construction Permit

Permit Number: TR 3122

Property APN: 060-031-021 and 060-031-022

For items # 3, 4, and 5 – Please refer to Chapter 3 of the SLO County LID Handbook

3) IMPERVIOUS SURFACE VALUES – *Refer to the Glossary or Appendix C in the SLO County LID Handbook*

Pre-Project (sqft)

Impervious Area: 9,820 SF   Total Project Area: 316,890 SF

Post-Project (sqft)

Total Impervious Area: 151,368 SF   Pervious Area: 165,522 SF

New Imp. Surface: 141,548 SF   *Removed Imp. Surface:* ______

Replaced Imp. Surface: 9,820 SF

Total Site Disturbance: 244,750 SF

4) REVIEW FOR EXCEPTION – *Refer to Figure 3-2 in the SLO County LID Handbook*

☒ **SWCP REQUIRED** – The project involves at least 2,500 square feet of impervious surface area.

☐ **SWCP EXEMPT** – The project is exempt from a Stormwater Control Plan for the following reason:

- ☐ The project creates or replaces less than 2, 500 square feet of impervious area.
- ☐ Previous land use approval. The project has received land use approval prior to March 6, 2014. List project number: ______________________

5) PERFORMANCE REQUIREMENTS

☐ **Exempt from SWCP**

☒ **#1 – Site Design** Performance Requirement Met? ☒ YES ☐ NO

☒ **#2 - Water Quality Treatment** Performance Requirement Met? ☒ YES ☐ NO

☒ **#3 – Runoff Retention** Performance Requirement Met? ☒ YES ☐ NO

☒ **#4 – Peak Management** Performance Requirement Met? ☒ YES ☐ NO

Are structural stormwater control measures proposed? ☒ YES ☐ NO

6) DESIGN CRITERIA

☐ **EXEMPT from SWCP**

Watershed Management Zone No.: 1 *Refer to Appendix A*

Applicable Rainfall Event (percentile): 95th (1.65") *Refer to table 3-3 in the SLO County LID Handbook*

24-hour Rainfall Isohyetal Line (in): 1.65" *Refer to Appendix A, Figure 2 and/or 3.*

7) CERTIFICATION

☐ **Exempt.** This project is exempt from submitting a SWCP.

☒ **Full Compliance.** This project fully complies with all applicable Performance Requirements.

☐ **Alternative Compliance.** This project is unable to fully comply with all applicable Performance Requirements. As such, the applicant is requesting to use methods of alternative compliances:

Reason for non-compliance:

____

____

____

____

____

Method for alternative compliances:

____

____

____

____

____

This SWCP was prepared by a Registered Civil Engineer: ☒ YES ☐ NO

Engineer Name: William Rebik License No. 35,337

I have completed this form accurately and declare that all statements here are true.

Prepare signature William Rebik Date 2018-10-25

Preparer's name (if other than the Engineer listed above)

STORMWATER SITE DESIGN ANALYSIS

Public Works Department City of Grover Beach File No. TR 3122

SITE DESCRIPTION

Is the project site located with the Business District?	☐ YES	☒ NO
Was the project site previously developed?	☒ YES	☐ NO
Is the project site surrounded on all sides by development?	☐ YES	☒ NO

SITE DESIGN

For each of the following, describe how this project has complied to the maximum extent practicable with the following site design and runoff reductions strategies (attach additional pages if necessary)

1. Limit disturbance of creeks and natural drainage features.

   Creek and natural drainage features have been preserved to all extents possible to construct the project. The creek corridor is preserved, no other natural drainage is present. See the Pre and Post-Construction Exhibits located in Attachment C of the *Preliminary Stormwater Control Plan (SWCP). The sensitive area (undeveloped area) within the "Development Footprint" will have the run-off collected and released via a 150' dispersal trench above the creek corridor located at the east most portion of the development footprint. See the Post-Construction Exhibit in Attachment C for the location of drain system network.*

2. Minimize compaction of highly permeable soils.

   Compaction of highly permeable soils has been minimized to all extents possible and per the soils engineer recommendation in order to complete the project. See the Pre and Post-Construction Exhibits located in Attachment C of the Preliminary Stormwater Control Plan (SWCP).

3. Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection.

   Clearing and grading has been minimized. Vegetation buffers have been established per the SWCP and Hydrology Study and the creek corridor is preserved. See the Pre and Post-Construction Exhibits located in Attachment C of the Preliminary Stormwater Control Plan (SWCP).

4. Minimize impervious surfaces by concentrating improvements on the least-sensitive portions of the site, while leaving the remaining land in a natural, undisturbed state.

   Impervious surfaces have been concentrated on the least-sensitive areas and preserving riparian areas and establishing landscaped buffers.

Stormwater Control Plan (SWCP) Checklist

Report

- ☒ Stormwater Control Plan (SWCP) Application (**Pages 1 and 2 of this package**)
- ☒ Stormwater Site Design Analysis (**Page 3 of this package**)
- ☒ SWCP Completed according to SWCP Template (**Appendix G of the SLO County LID Handbook**)

Attachments

- ☒ Supporting Calculations
- ☒ Completed checklists (**Pages 5-11 of this package**) for SWCP and each applicable Performance Requirement or Alternative Compliance, as appropriate
- ☒ Site Stormwater Assessment Exhibit
  - o Site map with (existing and proposed) topographic information
  - o Delineation of sensitive areas, native vegetation and soils types. (Can be provided on multiple exhibits to supplement design strategy narrative)

For projects subject to Performance Requirements 2, 3 and/or 4:

- ☒ Drainage Management Area (DMA) Exhibit.
  - o Uniquely identify each DMA and indicate if the DMA is self-retaining (zero discharge), self-treating, or draining to a treatment/flow control facility.
  - o Include location of all infiltration, treatment, or flow-control facilities, their tributary area and basis for sizing (rational C, NRCS CN value, Tc, etc.)
  - o Potential pollutant source areas (if applicable), including loading docks, food service areas, refuse areas, outdoor processes and storage, vehicle cleaning, repair or maintenance, fuel dispensing, equipment washing, etc.
  - o Plan Set with Construction Details for drainage related items (as appropriate)
- ☒ Operation and Maintenance Documentation (if applicable) (**Appendix B, this package**)
  - o Constructive Notification
  - o EXHIBIT A – Post Construction Stormwater Management System Operations & Maintenance Plan
    - ▪ PART 1 – General Information and Specifications
    - ▪ PART 2 – Drawings & Photos
    - ▪ PART 3 – Certification and Approval
  - o EXHIBIT B – Post Construction Stormwater Management System Operations & Maintenance Checklist

Performance Requirement 1: Site Design and Runoff Reduction SWCP Checklist			
DESIGN STRATEGY (SLO CO HANDBOOK LOCATION)		MEANS OF DEMONSTRATING COMPLIANCE	
1.	Limit disturbance of creeks and natural drainage features. (4.2.1)	Pre and post drainage feature map. Delineate natural drainage features on-site stormwater assessment exhibit and DMA exhibit, as applicable. X	(See "Pre &Post-Construction Ex." Attch C)
2.	Minimize compaction of highly permeable soils. (4.2.2)	Site Stormwater Assessment Exhibit of soil types, overlain with development footprint X	(See "Soil Type Ex." Attch C)
3.	Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection. (4.2.3)	Site Stormwater Assessment Exhibit with native vegetation, overlain with development footprint X	(See "Pre-Construction Ex. Attch C)
4.	Minimize impervious surfaces by concentrating improvements on the least-sensitive portions of the site, while leaving the remaining land in a natural undisturbed state. (4.2.4)	Site Stormwater Assessment Exhibit with delineated sensitive areas overlain with development footprint X	(See "Pre &Post-Construction Ex." Attch C)

MINIMIZE STORMWATER RUNOFF BY IMPLEMENTING ONE OR MORE OF THE FOLLOWING DESIGN MEASURES:

		MANDATORY SITE DESIGN MEASURES SELECT AT LEAST ONE, (CO. HANDBOOK LOCATION)	Selected	Reason, for not selecting
5.	a.	Roof runoff directed into cisterns or rain barrels for reuse? (5.2.1)	**No**	**Financial**
	b.	Roof runoff directed into vegetated areas (safely away from building foundations and footings)? (5.2.2)	**Yes**	
	c.	Runoff from sidewalks, walkaways, and/or patios directed onto vegetated areas (safely away from the building foundations and footings)? (5.2.3)	**Yes**	
	d.	Runoff from driveways and/or uncovered parking lots onto vegetated areas (safely away from the building foundations and footings)? (5.2.4)	**Yes**	
	e.	Are bike lanes, driveways, uncovered parking lots, sidewalks, walkways, and patios constructed with permeable surfaces? (5.2.5)	**No**	**Financial**

This checklist must be included with every project application (except for projects deemed EXEMPT). See Figure 3-2 of Chapter 3, SLO County Handbook to determine if your project is considered exempt, or regulated.

Performance Requirement 2: Water Quality Treatment SWCP Checklist

Project Level Documentation, identify

☒ Project Net Impervious Area

☒ Certification that on-site water quality treatment measures have been met on-site, or if not achievable:
- o Documentation of the volume of runoff for which compliance cannot be achieved on site and the associated off-site compliance requirements
- o Statement of intent to comply with Water Quality Treatment Performance Requirement through Alternative Compliance

For each Drainage Management Area, provide:

☒ Unique DMA Number, area, and likely pollutant(s) of concern

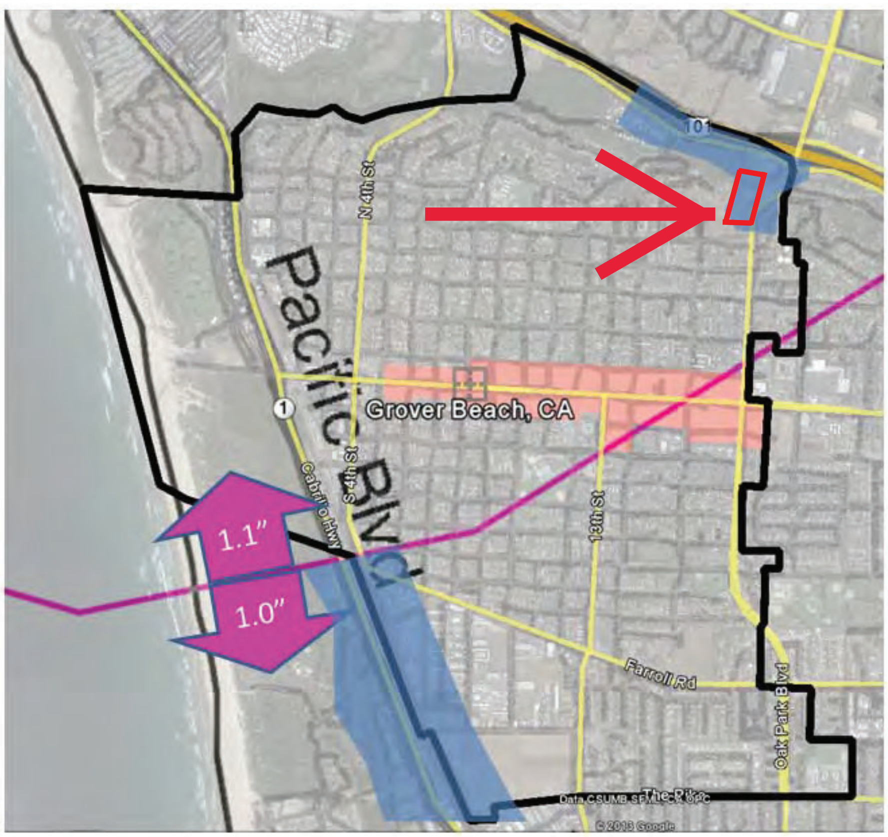
☒ Water Quality Treatment Approach
N/A if self-treating, or,
Through the use of LID, Biofiltration or Non-retention Based Treatment System)

☒ Supporting calculations demonstrating compliance with Treatment Performance Requirement

☒ Plan sheet page and detail number (if appropriate) of Drainage Management Areas (DMA) Exhibit where construction details are provided for each DMA.

For DMAs using Low Impact Development Treatment Systems, provide:

☒ 85th percentile 24-hour storm event value, and basis on the rainfall depths provided in figure below.



Projects subject to PR2 must treat the 85th percentile storm event.
For projects above the pink line, the 85th percentile storm is a 1.1-inch storm.
For projects below the pink line, the 85th percentile storm is a 1.0-inch storm.
For projects in the blue shaded area, the 85th percentile storm is a 0.9-inch storm.

Performance Requirement 2: Water Quality Treatment SWCP Checklist

For DMAs using Biofiltration Systems, provide:

- ☐ Statement indicating why an LID treatment system was not appropriate
- ☐ Surface loading rate approach, and basis of determination
  (0.2 x per hour intensity, or 2 x 85^{th} percentile hourly rainfall intensity)
- ☐ Calculations to demonstrate that the minimum surface reservoir volume is equal to the biofiltration treatment system surface area time a depth of 6-inches
- ☐ Construction detail (or reference to page on plans) which provides:
  - o Minimum planting depth
  - o Planting medium specifications. Either:
    - ▪ Specify 60 to 70% ASTM C33 sand, with 30-40% compost , or
    - ▪ Provide testing documentation demonstrating planting medium specified can minimally infiltrate at a rate of 5 inches per hour)
  - o Plant selection consistent with Appendix L
  - o Subsurface drainage/storage (gravel) layer with an area equal to the biofiltration treatment system surface area and having a minimum depth of 12 inches;
  - o Underdrain with discharge elevation at top of gravel layer;
  - o No compaction of soils beneath the biofiltration facility (ripping/loosening of soils required if compacted)
  - o No liners or other barriers interfering with infiltration, except for situations where lateral infiltration is not technically feasible.

For **DMAs using Non-Retention Based Treatment Systems**, provide:

- ☐ Statement indicating why an LID, or Biofiltration treatment system was not appropriate
- ☐ Hydraulic Sizing Criteria used, and basis of determination
  (Volume = to 85^{th} percentile, 24-hour storm, or flow basis (2 x 85^{th} percentile hourly rainfall intensity or 0.2 x inches per hour intensity)

Performance Requirement 3: Runoff Retention SWCP Checklist	
SITE ASSESSMENT MEASURES: (see table 3.5 SLO Co Handbook) Include an exhibit and narrative of the opportunities and constraints to implementing LID Stormwater Control measures based on the following items (as applicable):	
☒ Site topography	☒ Run-on characteristics (source and estimated runoff from offsite which discharges to the project area)
☒ Hydrologic features including contiguous natural areas, wetlands, watercourses, seeps, or springs	☐ Existing drainage infrastructure for the site and nearby areas, including the location of municipal storm drains
☐ Depth to seasonal high groundwater	☐ Structures, including retaining walls
☐ Locations of groundwater wells used for drinking water	☐ Utilities
☐ Depth to an impervious layer such as bedrock	☒ Easements
☐ Presence of unique geology (e.g., karst)	☐ Covenants
☐ Geotechnical hazards	☐ Zoning/Land Use
☐ Documented soil and/or groundwater contamination	☒ Setbacks
☐ Soil types and hydrologic soil groups	☒ Open space requirements
☐ Vegetative cover/trees	☐ Other pertinent overlay(s)

SITE DESIGN MEASURES

Include in narrative, and provide supporting exhibits as necessary, to demonstrate that the project design has implemented the following design strategies (as applicable)

	DESIGN STRATEGY	MEANS OF DEMONSTRATING COMPLIANCE	
1.	Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.	Site Stormwater Assessment Exhibit.	X
2.	Conserve natural areas, including existing trees, other vegetation, and soils	Site Stormwater Assessment Exhibit with native vegetation, overlain with development footprint	
3.	Limit the overall impervious footprint of the project	Discussion regarding other building configurations considered (and ultimately rejected)	X
4.	Construct streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided that public safety or mobility uses are not compromised	Discussion on minimum allowable widths, and rationale for using larger values (if applicable) or confirmation that minimum values were used (where applicable).	
5	Set back development from creeks, wetlands, and riparian habitats	Discussion on set-back dimensions chosen.	X
6	Conform the site layout along natural landforms	Within the Drainage Management Area (DMA) Exhibit, show Topo survey with existing and planned contours cut and fill lines. Discussion of grading approach.	X
7	Avoid excessive grading and disturbance of vegetation and soils	Exhibit with native vegetation, overlain with planned disturbed area limits.	X

Performance Requirement 3: Runoff Retention SWCP Checklist Continued

STORMWATER STRUCTURAL CONTROL MEASURE SIZING

For Overall project,

☒ Certification statement indicating that the selection, sizing, and design of Stormwater Control measures meets the applicable Water Quality Treatment and Runoff Retention Performance Requirements, or, if not achievable

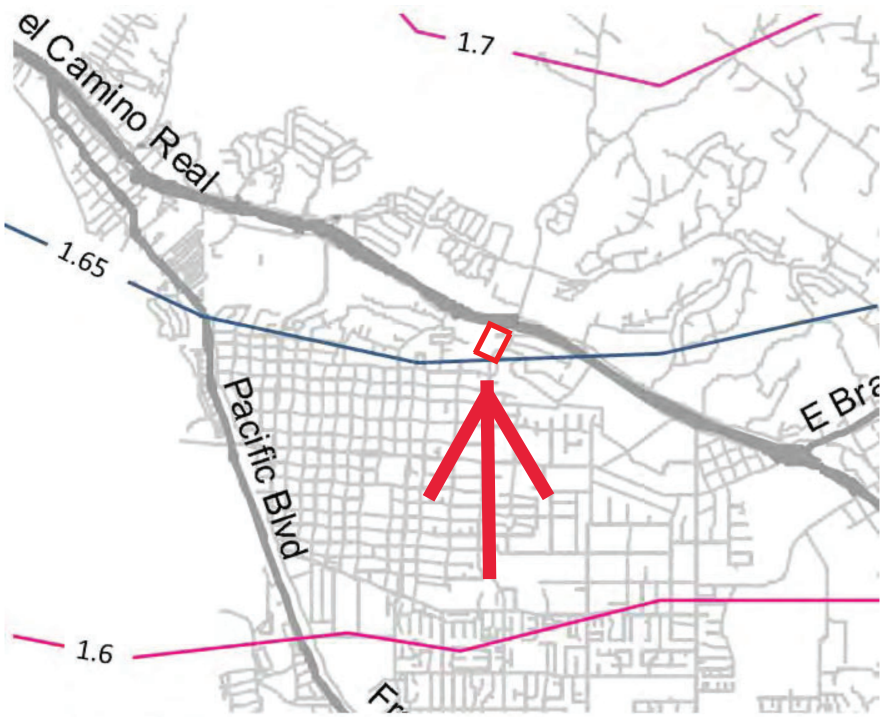
- o Provide documentation of the volume of runoff for which compliance cannot be achieved on-site and the associated off-site compliance volume
- o Statement of intent to comply with Water Quality Treatment and Runoff Retention Performance Requirements through an Alternative Compliance Agreement

☒ Documentation demonstrating percentage of the project's Equivalent Impervious Surface Area dedicated to retention-based Stormwater Control Measures

For each DMA,

☒ Indicate sizing strategy used

- 0 Hydrologic analysis and sizing methods as outline in **Attachment C, SLO Co Handbook**
- 0 Locally/regionally calibrated continuous simulation model that results in equivalent optimization of on-site runoff retention volumes
- 0 Hydrologic analysis and sizing methods, equally effective in optimizing on-site retention volumes of the runoff generated by the rainfall events specified below:



Projects subject to PR3 must retain the 95th percentile storm event.
The required infiltration storm is between 1.6 and 1.65 inches, 24-hour rainfall depth event.

☒ Provide supporting calculations demonstrating compliance with Runoff Retention Performance Requirement

☐ Indicate if a ten percent adjustment (based on technical infeasibility) is included in design approach (see **Appendix D, SLO Co Handbook**)

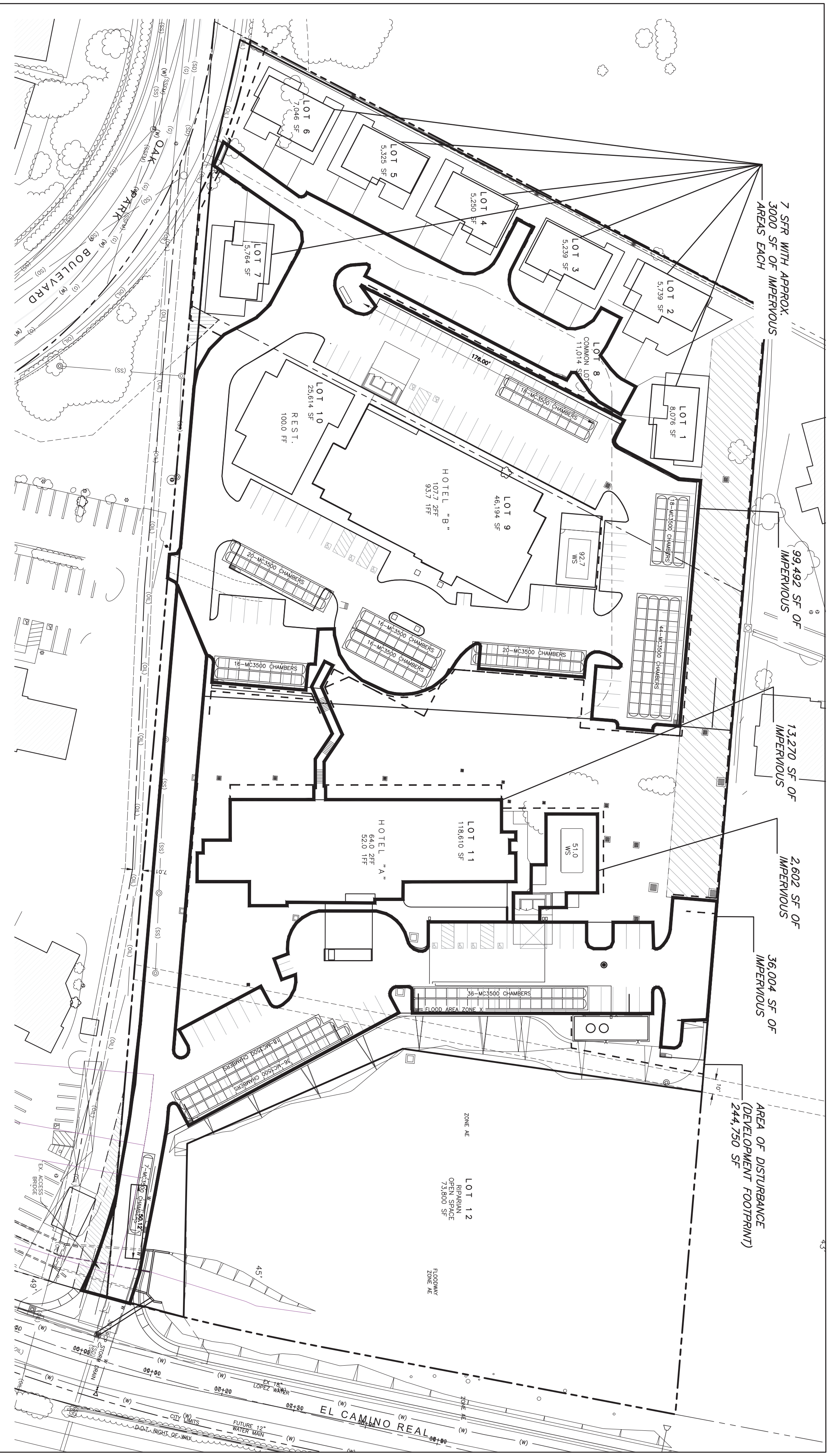
☐ Indicate if off-site mitigation is included in design approach (see **Appendix D, SLO Co Handbook**)

Performance Requirement 4: Peak Management SWCP Checklist
Project Level Documentation, identify ☒ Point source discharge locations ☒ Hydraulic Report demonstrating that post development storm water runoff peak flows discharged from the site do not exceed pre-project peak flows for the 2- through 10-year storm events) ☒ Certification that on-site water quality treatment measures have been met on-site, or if not achievable: o Documentation of the volume of runoff for which compliance cannot be achieved on site and the associated off-site compliance requirements o Statement of intent to comply with Water Quality Treatment Performance Requirement through Alternative Compliance

Attachment B – Site Stormwater Assessment Exhibit

T:\17-660.003 Vesting TM\Civil\Drainage\SWCP\2018-10-19 SWCP and Hydrology\17-660.003 SWCP.dwg, 12/6/2018 1:45:41 PM

DRAINAGE MANAGEMENT AREAS - SITE LAYOUT & IMPERVIOUS SURFACES



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CHECKED BY: RGR	
DATE: 2018-05-23	
JOB NO. 17-660.003	
FILE NAME:	
SCALE: 1" = 30'	
PLOT DATE: 05/23/2018	
SHEET: X	

REVISIONS:

CLIENT:
RAM KRUPA LLC
DARSHAN PATEL

SHEET TITLE:
SWCP SITE LAYOUT
& IMPERVIOUS SURFACES

PROJECT:
1598 EL CAMINO REAL
GROVER BEACH CA 93433

GARING, TAYLOR & ASSOCIATES, INC.
CIVIL ENGINEERS SURVEYORS PLANNERS
141 SOUTH ELM STREET · ARROYO GRANDE, CA 93420 · (805) 489-1321

REGISTERED PROFESSIONAL ENGINEER
JEFFREY J. EMRICK
No. 40657
CIVIL
STATE OF CALIFORNIA

JEFFREY J. EMRICK DATE

SAVE DATE: 12/6/2018 1:22 PM PLOT BY: A COSCIA PLOT DATE: 05/23/2018

Attachment C– Topography, Grading, Pre and Post Construction DMA Exhibits

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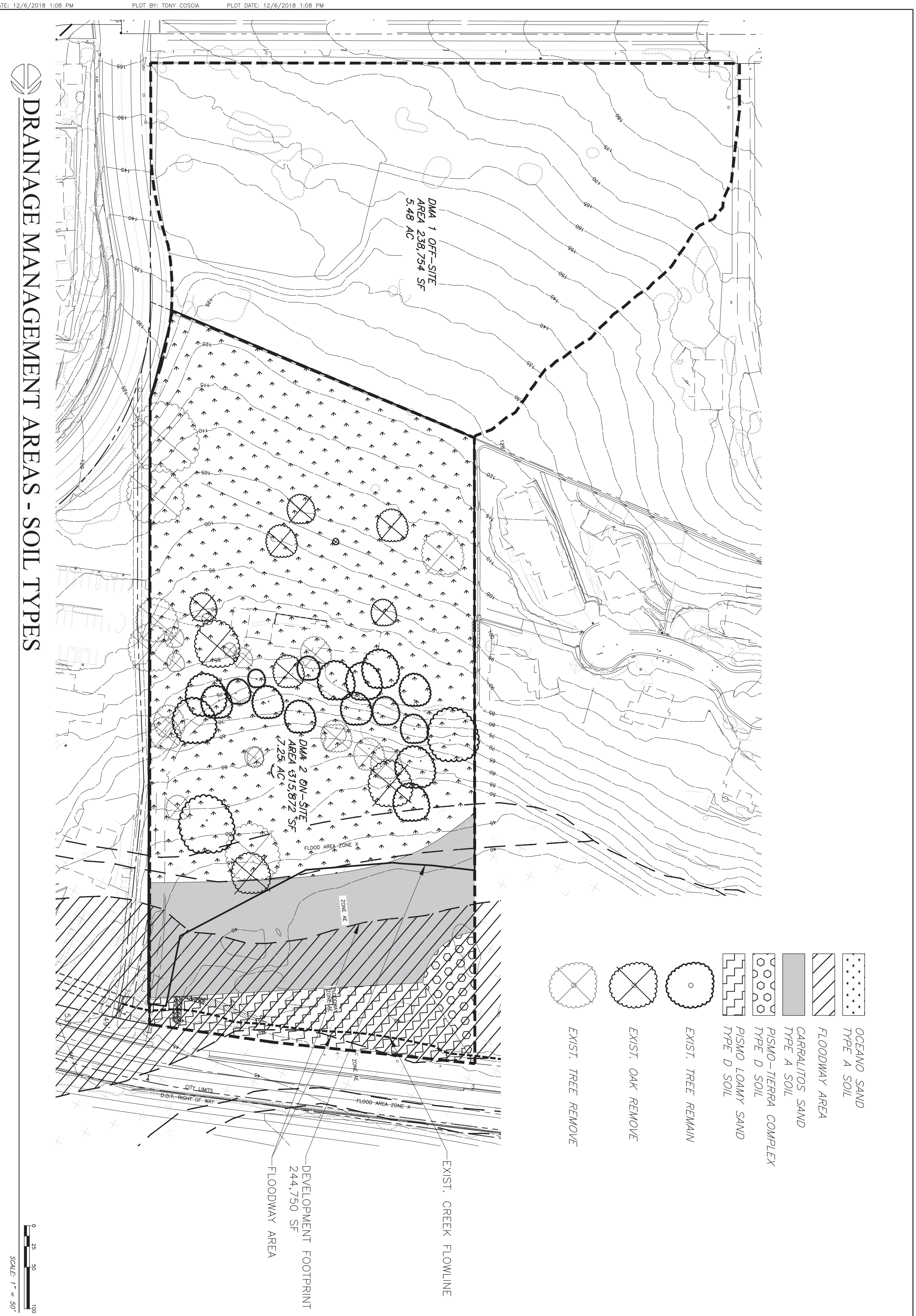

DRAWN BY: RR CHECKED BY: RR DATE: 9/1/2017 JOB NO. 17-660 FILE NAME: SCALE: 1" = 50' PLOT DATE: 6/15/2018 SHEET:	REVISIONS:	CLIENT: RAM KRUPA LLC DARSHAN PATEL	SHEET TITLE: DRAINAGE MANAGEMENT AREAS – SOIL TYPES PROJECT: 1598 EL CAMINO REAL GROVER BEACH CA 93433

GARING, TAYLOR & ASSOCIATES, INC.
CIVIL ENGINEERS SURVEYORS PLANNERS
141 SOUTH ELM STREET · ARROYO GRANDE, CA 93420 · (805) 489-1321

JEFFREY J. EMRICK DATE

REGISTERED PROFESSIONAL ENGINEER JEFFREY J. EMRICK No. 40657 CIVIL STATE OF CALIFORNIA

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DRAINAGE MANAGEMENT AREAS - PRE CONSTRUCTION

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SCALE: 1" = 50'

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REGISTERED PROFESSIONAL ENGINEER
JEFFREY J. EMRICK
No. 40657
CIVIL
STATE OF CALIFORNIA

JEFFREY J. EMRICK DATE

SHEET TITLE:
DRAINAGE MANAGEMENT AREAS – PRE CONSTRUCTION

PROJECT:
1598 EL CAMINO REAL
GROVER BEACH CA 93433

CLIENT:
RAM KRUPA LLC
DARSHAN PATEL

REVISIONS:

DRAWN BY: RR
CHECKED BY: RR
DATE: 9/1/2017
JOB NO. 17-660
FILE NAME:
SCALE: 1" = 50'
PLOT DATE: 6/15/2018
SHEET:

SAVE DATE: 12/6/2018 1:07 PM PLOT BY: TONY COSCIA PLOT DATE: 12/6/2018 1:07 PM

DRAINAGE MANAGEMENT AREAS - POST CONSTRUCTION

0 25 50 100

SCALE: 1" = 50'

GARING, TAYLOR & ASSOCIATES, INC.
CIVIL ENGINEERS SURVEYORS PLANNERS
141 SOUTH ELM STREET · ARROYO GRANDE, CA 93420 · (805) 489-1321

REGISTERED PROFESSIONAL ENGINEER JEFFREY J. EMRICK No. 40657 CIVIL STATE OF CALIFORNIA

JEFFREY J. EMRICK DATE

SHEET TITLE:
DRAINAGE MANAGEMENT AREAS – POST CONSTRUCTION

PROJECT:
1598 EL CAMINO REAL
GROVER BEACH CA 93433

CLIENT:
RAM KRUPA LLC
DARSHAN PATEL

REVISIONS:

DRAWN BY: RR
CHECKED BY: RR
DATE: 9/1/2017
JOB NO. 17-660
FILE NAME:
SCALE: 1" = 50'
PLOT DATE: 6/15/2018
SHEET:

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APPENDIX F - NOISE

612 12th Street, Suite 201
Paso Robles, CA 93446
805.226.2727
www.Ambient.Consulting

NOISE IMPACT ASSESSMENT

Date: 10/23/2018

To: Ram Krupa Real Estate, LLC

From: Kurt Legleiter

Subject: **Noise Impact Analysis for the Proposed El Camino Real Development Project**
1598 El Camino Real, Grover Beach, CA

Introduction

This report provides a summary of the existing noise environment, regulatory framework, and potential impacts associated with the proposed El Camino Real Development Project. Mitigation measures have been included for potentially significant impacts. With mitigation, noise impacts associated with the proposed project would be considered less than significant. To aid in the understanding of this report a summary of acoustic fundamentals and terms used in this analysis is included in Appendix A of this report.

Proposed Project Overview

The proposed project includes the construction of two four-story hotels (91 rooms and 60 rooms), a 4,000 square-foot restaurant, seven single-family residential lots, and on-site parking areas. The project site is located at 1598 El Camino Real and is bound by El Camino Real to the north, commercial land uses to the east, and residential/undeveloped land uses to the west and south. Oak Park Boulevard is located adjacent to the southeastern portion of the project site. The site plan for the proposed development is depicted in Figure 1.

Ambient Noise Environment

To document existing ambient noise levels in the project area, short-term ambient noise measurements were conducted on June 6, 2018 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter. The meter was calibrated before use and is certified to be in compliance with ANSI specifications.

Measured noise levels are summarized in Table 1. As depicted, measured daytime average-hourly noise levels (in dBA L_{eq}) ranged from the upper-60s to the lower 70s along the northern and eastern boundaries of the project site. Measured noise levels along the northern and eastern boundaries were primarily influenced by vehicle traffic on U.S. Highway 101, El Camino Real and Oak Park Boulevard. Nighttime noise levels are typically 5 to 10 dBA lower than daytime noise levels.

Figure 1. Proposed Site Plan

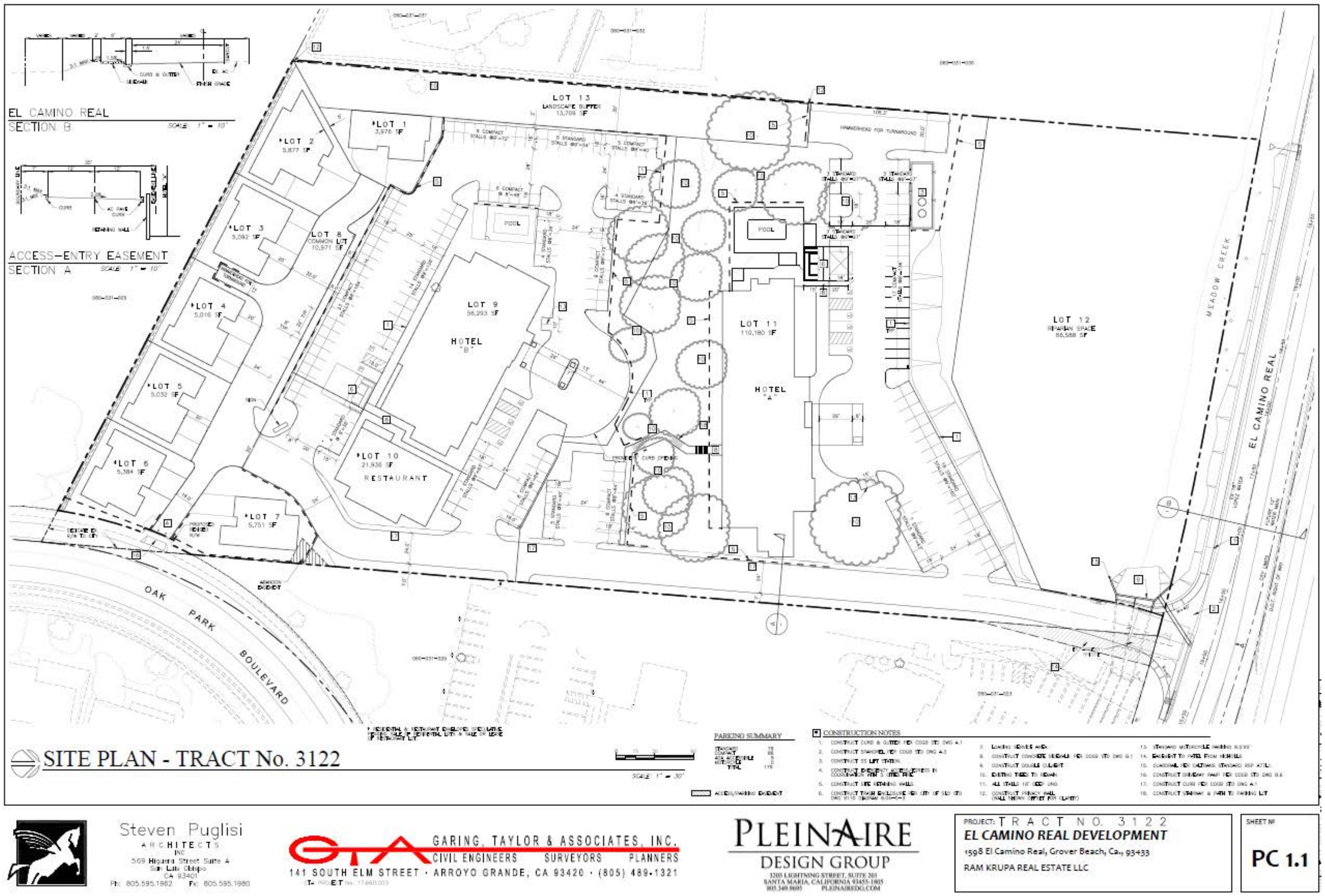

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Table 1. Summary of Measured Ambient Noise Levels

Location	Time	Noise Level (dBA)[1]	
		Average-Hourly (L_{eq})	Maximum (L_{max})
Northern Project Site Boundary. Approximately 56 feet from the centerline of El Camino Real.	07:10 – 07:20	72.5	80.3
	10:30 – 10:40	70.7	79.8
	17:10 – 17:20	72.7	79.9
Southeastern Project Site Boundary. Approximately 38 feet from the centerline of Oak Park Boulevard.	07:45 – 07:55	68.4	75.3
	10:50 – 11:00	67.2	74.6
	17:40 – 17:50	68.6	74.9
Measurements conducted using a Larson Davis Model 820 Type I sound level meters on June 6, 2018.			

Existing Noise-Sensitive Land Uses

Noise-sensitive land uses located in the vicinity of the project site consist predominantly of residential land uses. The nearest residential land uses are located adjacent to the western boundary of the project site. Residential land uses are also located east of the project site, across Oak Park Boulevard.

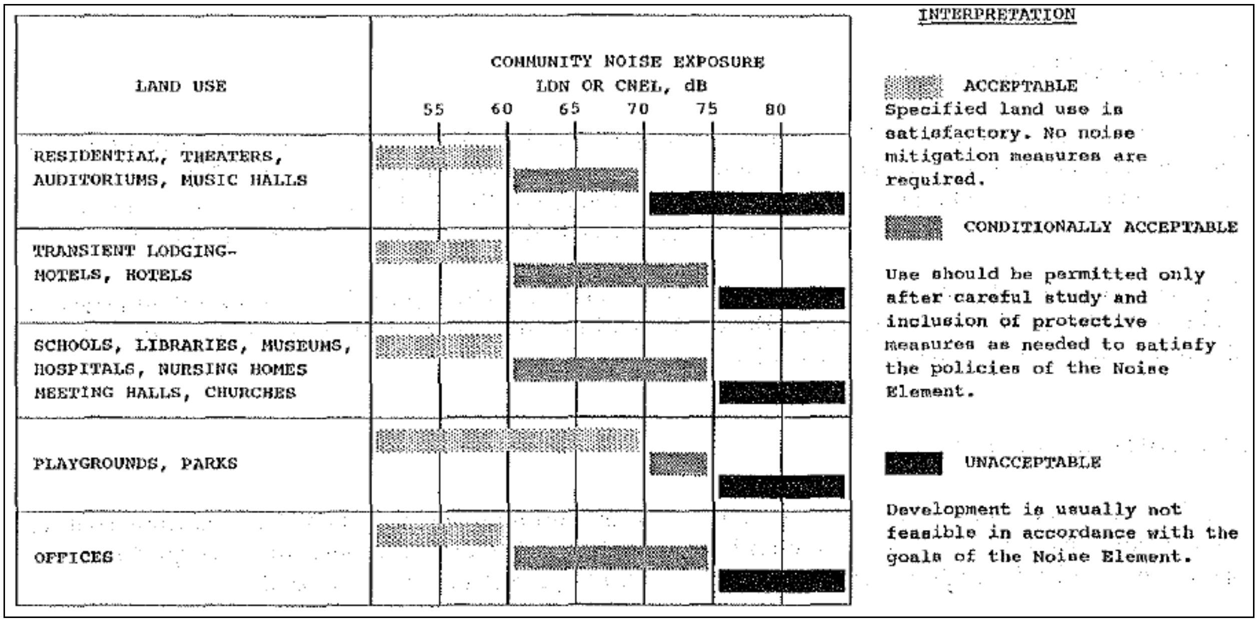
Regulatory Framework

City of Grover Beach General Plan

The City's noise criteria for determination of land use compatibility are presented in Figure 2. These criteria are used to assess whether or not proposed land uses would be compatible with projected future noise levels. For hotel land uses, an exterior noise level of 60 dBA CNEL/L_{dn}, or less, would be considered "normally acceptable." Exterior noise levels between 60 and 75 dBA CNEL/L_{dn} are considered "conditionally acceptable" and exterior levels in excess of 75 dBA CNEL/L_{dn} are considered "unacceptable." For residential land uses, an exterior noise level of 60 dBA CNEL/L_{dn}, or less, would be considered "normally acceptable." Exterior noise levels between 60 and 70 dBA CNEL/L_{dn} are considered "conditionally acceptable" and exterior levels in excess of 70 dBA CNEL/L_{dn} are considered "unacceptable." Within noise environments considered "conditionally acceptable", new development should be undertaken only after noise-reduction measures have been incorporated to ensure an acceptable noise environment (i.e., 65 dBA CNEL/L_{dn} in outdoor activity areas and an interior noise level of 45 dBA CNEL/L_{dn}).

Additional policies have also been included in the City's general plan to further minimize noise exposure associated with newly proposed transportation and non-transportation noise sources. The City's noise standards for transportation and non-transportation (i.e., stationary) noise sources are summarized in Table 2 and Table 3. As noted in Table 2, the City's noise standards for hotel and residential land uses is 60 dBA CNEL/L_{dn}. Noise levels up to 65 dBA CNEL/L_{dn} are considered conditionally acceptable for hotel and residential land uses provided noise-mitigation measures have been incorporated to reduce exterior noise levels within outdoor activity areas and interior noise levels would not exceed 45 dBA CNEL/L_{dn}. As noted in Table 3, non-transportation noise levels during the daytime and nighttime hours are limited to 50 and 45 dBA L_{eq}, respectively. Maximum instantaneous noise levels for these same periods of the day are limited to 70 and 65 dBA L_{max}. These maximum instantaneous noise standards are reduced by an additional 5 dB for instantaneous noise sources, such as pile driving.

Figure 2. City of Grover Beach Land Use Compatibility Noise Criteria



Source: City of Grover Beach 1993

Impact Analysis

Standards of Significance

Criteria for determining the significance of noise impacts were developed based on information contained in the California Environmental Quality Act Guidelines (CEQA Guidelines, Appendix G). According to those guidelines, a project may have a significant effect on the environment if it would result in the following conditions:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

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Table 2. Maximum Allowable Noise Exposure for New Development Transportation Noise Sources

Land Use	Outdoor Activity Area[1] L_{dn}/CNEL, dB	Interior Spaces L_{dn}/CNEL, dB	Interior Spaces L_{eq},db[2]
Residential	60[3]	45	--
Transient Lodging	60[3]	45	--
Hospitals, Nursing Homes	60[3]	45	--
Theaters, Auditoriums	--	--	35
Churches, Meeting Halls	60[3]	--	45
Office Buildings	60[3]	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

1 The exterior noise level standard shall apply to the property line of the receiving land use when the outdoor activity area is unknown.

2 As determined for a typical worst-case hour during use periods.

3 An exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed if:
   a. exterior noise level reduction measures were implemented; and
   b. the best-available exterior noise level reduction measures do not result in 60 dB, L_{dn}/CNEL; and
   c. interior noise levels comply with this table.

Source: City of Grover Beach 1993

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Table 3. Maximum Allowable Noise Exposure for New Development Stationary Noise Sources

	Daytime (7 a.m. to 10 p.m.)	Nighttime[2] (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65
Maximum Level, dB-Impulsive Noise	65	60

1 As determined at the property line of the receiving use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures. Add ten decibels to the noise level standards in this table for parks and playgrounds.

2 Applies only where the receiving land use operates or is occupied during nighttime hours.

Source: City of Grover Beach 1993

Methodologies & Thresholds

Land Use Compatibility

Determination of land use compatibility was based on projected future year 2035 traffic noise levels. Predicted future year 2035 on-site traffic noise levels were calculated using the *SoundPlan* computer program. The *SoundPlan* computer program is capable of calculating noise levels taking into account variations in terrain and intervening structures. On-site noise levels were calculated at the exterior façade of the proposed hotel and residential land uses, including lower and upper floor locations, and at outdoor activity areas. To be conservative, the outdoor activity areas for residential lots 6 and 7 were located at the property line nearest Oak Park Boulevard. Depending on final site design, actual noise levels at outdoor activity areas could be less. The computer program was calibrated based on measured transportation noise levels obtained at the project site and traffic noise levels calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108). Calculated noise levels for El Camino Real and Oak Park Boulevard were based on peak-hour traffic data derived from the traffic analysis prepared for this project and assuming peak-hour traffic data represents ten percent of the average-daily traffic volumes.[1] Future cumulative traffic noise levels for U.S. Highway 101 were derived from the recently completed *Pismo Beach General Plan Circulation Element Update* (2018).[2] Predicted future on-site average-daily noise levels (in dBA CNEL/L_{dn}) were compared to the City of Grover Beach's noise standards for land use compatibility and transportation noise standards for hotel and residential land uses (refer to Figure 2 and Table 2). Traffic noise modeling is included in Appendix B.

1 Orosz Engineering Group. 2018. *Traffic Impact Analysis for 1598 El Camino Real Development*.

2 City of Pismo Beach. 2018. *Pismo Beach General Plan Circulation Element Update. Draft Initial Study of Environmental Impact.*

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Short-Term Construction Noise

Short-term noise impacts associated with construction activities were analyzed based on typical construction equipment noise levels and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on an average noise-attenuation rate of 6 dB per doubling of distance from the source.

It is important to note that no standardized criteria have been developed by the State of California or the City of Grover Beach for assessing construction noise impacts. However, the Federal Transit Administration (FTA) has identified criteria for the assessment of construction-generated noise levels. For noise-sensitive land uses, such as residential land uses, the FTA criteria identify daytime and nighttime average-hourly noise limits of 90 and 80 dBA L_{eq}, respectively.[3] These criteria were relied upon, in part, for evaluation of construction noise levels.

Traffic Noise

Traffic noise levels were calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and data obtained from the traffic analysis prepared for this project.[1] Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. Traffic noise modeling is included in Appendix B.

As noted in Appendix A of this report, a 3-dB change in noise levels is the minimum audible difference perceptible to the average person. For purposes of this analysis, increases in ambient noise levels of 3 dB, or more, would be considered potentially significant.

Non-Transportation Noise

Noise levels associated with on-site vehicle parking activities were calculated in accordance with FHWA's *Transit Noise and Vibration Impact Assessment Guidelines* (2006) assuming a reference noise level of 92 dBA SEL. Parking-lot noise levels were calculated based on peak-hour traffic volumes derived from the traffic analysis prepared for this project.[1] Noise levels generated by on-site building mechanical and swimming pool equipment were assessed based on representative data derived from similar land uses and equipment.

Groundborne Vibration

Groundborne vibration levels were assessed based on representative equipment vibration levels derived from existing environmental documentation and distances to nearby existing structures. There are no federal, state, or local regulatory standards for groundborne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. Based on these criteria, short periods of ground vibration exceeding a peak-particle velocity (ppv) of 0.5 inches per second (in/sec) may have a potential for structural damage to nearby buildings. Groundborne vibration levels exceeding 0.2 in/sec ppv may also result in increased levels of annoyance to occupants of buildings considered sensitive to vibration, such as offices and residential dwellings (Caltrans 2013).[4] These criteria were relied upon for evaluation of groundborne vibration levels.

[3] Federal Transit Administration. May 2006. *Transit Noise and Vibration Impact Assessment Guidelines*.

[4] California Department of Transportation. September 2013. *Transportation and Construction Vibration Guidance Manual.*

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Impact Summary

Project-related noise and groundborne vibration impacts are summarized in Table 4.

Table 4. Summary of Project-Related Noise & Vibration Impacts

Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	■	☐	☐
B. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	■	☐	☐
C. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	■	☐	☐
D. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	■	☐
E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	■
F. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	■

Impact Discussion and Mitigation Measures

IMPACT A: ***Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or of applicable standards of other agencies.***

The City's noise criteria for determination of land use compatibility are presented in Figure 2. These criteria are used to assess whether or not proposed land uses would be compatible with projected future noise levels. For hotel land uses, an exterior noise level of 60 dBA CNEL/L_{dn}, or less, would be considered "normally acceptable." Exterior noise levels between 60 and 75 dBA CNEL/L_{dn} are considered "conditionally acceptable" and exterior levels in excess of 75 dBA CNEL/L_{dn} are considered "unacceptable." For residential land uses, an exterior noise level of 60 dBA CNEL/L_{dn}, or less, would be considered "normally acceptable." Exterior noise levels between 60 and 70 dBA CNEL/L_{dn} are considered "conditionally acceptable" and exterior levels in excess of 70 dBA CNEL/L_{dn} are considered "unacceptable." Within noise environments considered "conditionally acceptable", new development should be undertaken only after noise-reduction measures have been incorporated to ensure an acceptable noise environment (i.e., 65 dBA CNEL/L_{dn} in outdoor activity areas and an interior noise level of 45 dBA CNEL/L_{dn}). The compatibility of proposed land uses in comparison to predicted exterior and interior noise levels is discussed as follows:

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Exterior Noise Levels

Major transportation noise sources in the project vicinity include U.S. Highway 101 and El Camino Real, which are located north of the project site, and Oak Park Boulevard, which is located east of the project site. Predicted on-site traffic noise levels under future cumulative year 2035 conditions for these roadways are depicted in Figure 3 and summarized in Table 5. As shown, predicted exterior noise levels at proposed Hotel "A" would range from approximately 65 CNEL/L_{dn} at ground level to approximately 70 dBA CNEL/L_{dn} at upper-floor locations. Predicted exterior noise levels at proposed Hotel "B" would range from approximately 60 CNEL/L_{dn} at ground level to approximately 66 dBA CNEL/L_{dn} at upper-floor locations. Predicted exterior noise levels at the proposed restaurant would range from approximately 51 to 60 dBA CNEL/L_{dn}. Predicted exterior noise levels at the proposed residential lots would range from approximately 57 to 68 dBA CNEL/L_{dn}.

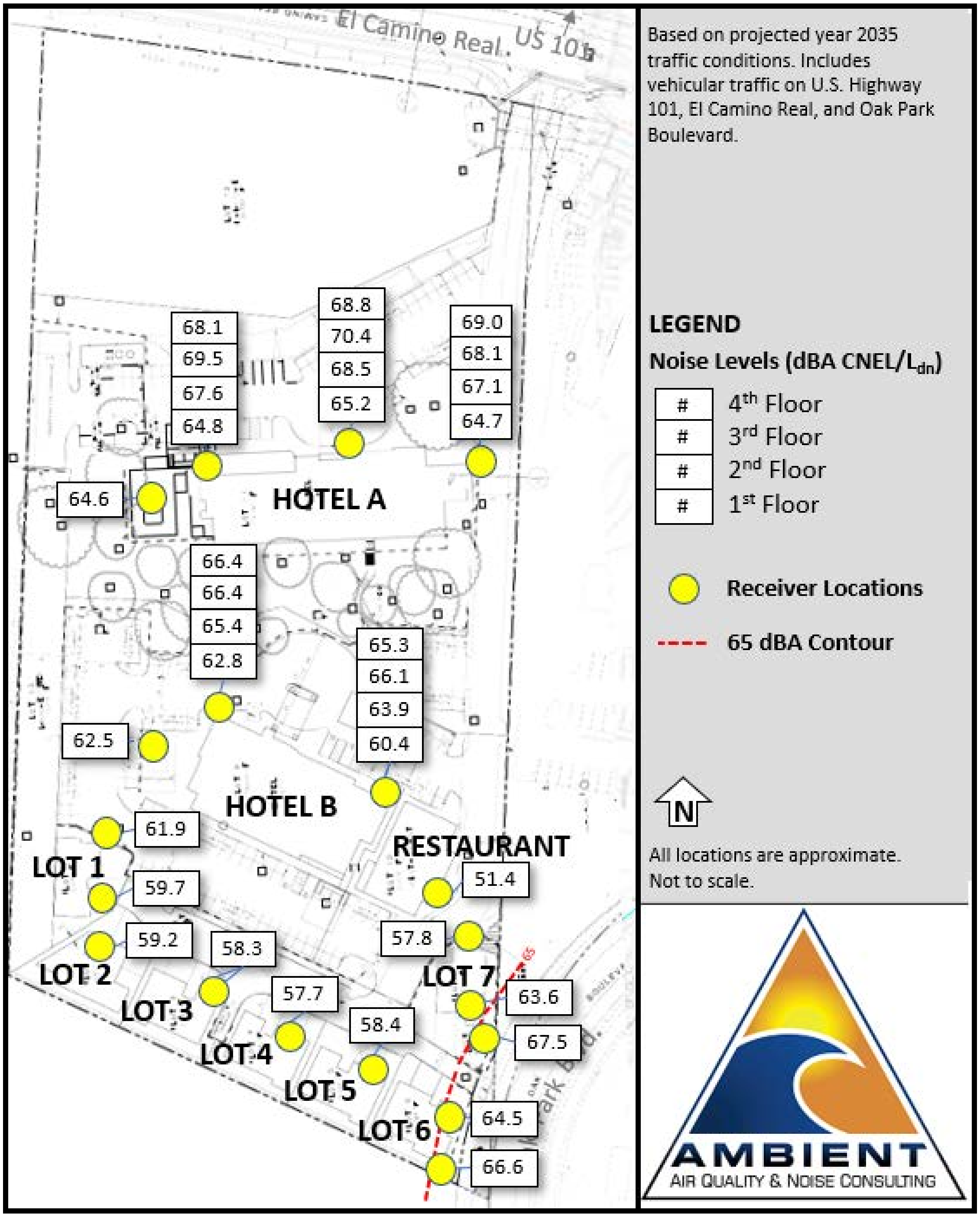
Table 5. Predicted Exterior Noise Levels at On-Site Land Uses

Noise Receiver Location[1]	Predicted Noise Levels (dBA CNEL/L_{dn})	Noise Standard[2]	Exceeds Noise Standard?	Significant Impact?
Hotel "A" – Building Façade (Ground Floor)	65	60	**Yes**	**Yes**
Hotel "A" – Building Façade (Upper Floors)	67 - 70	60	**Yes**	**Yes**
Hotel "A" – Outdoor Activity Area/Swimming Pool	65	60	**Yes**	**Yes**
Hotel "B" – Building Façade (Ground Floor)	60 - 63	60	**Yes**	**Yes**
Hotel "B" – Building Façade (Upper Floors)	64 - 66	60	**Yes**	**Yes**
Hotel "B" – Outdoor Activity Area/Swimming Pool	63	60	**Yes**	**Yes**
Restaurant – Building Facade[3]	51 - 60	N/A	N/A	N/A
Lot 1 – Residential Building Facade	60 - 62	60	**Yes**	**Yes**
Lot 1 – Residential Outdoor Activity Area	62	60	**Yes**	**Yes**
Lot 2 – Residential Building Façade/Outdoor Activity Area	59	60	No	No
Lot 3 – Residential Building Façade/Outdoor Activity Area	58	60	No	No
Lot 4 – Residential Building Façade/Outdoor Activity Area	57	60	No	No
Lot 5 – Residential Building Façade/Outdoor Activity Area	58	60	No	No
Lot 6 – Residential Building Façade	65	60	**Yes**	**Yes**
Lot 6 – Residential Outdoor Activity Area	67	60	**Yes**	**Yes**
Lot 7 – Residential Building Façade	64	60	**Yes**	**Yes**
Lot 7 – Residential Outdoor Activity Area	58 - 68	60	**Yes**	**Yes**

1. *Refer to Figure 3 for receiver locations.*
2. *Based on the City's **General Plan** exterior "acceptable" noise standard.*
3. *Restaurant uses are not considered "noise-sensitive" land uses. No applicable noise standard. Noise levels are presented for informational purposes.*

Predicted exterior noise levels at the façade of proposed residential land uses located on Lot 1, Lot 6, and Lot 7, as well as, at the proposed hotels would exceed the City's "acceptable" exterior noise standard of 60 dBA CNEL/L_{dn}. In addition, predicted exterior noise levels at the hotel swimming pools and portions of the outdoor activity areas of residential Lots 6 and 7, which are located along Oak Park Boulevard, would also be predicted to exceed the City's "acceptable" exterior noise standard of 60 dBA CNEL/L_{dn}. It is important to note the modeled receiver locations for Lots 6 and 7 were conservatively placed at the property line located nearest Oak Park Boulevard. Depending on final site design, actual noise levels at the outdoor activity areas of Lots 6 and 7 could be less.

Figure 3. Predicted On-Site Average-Daily Exterior Noise Levels



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Interior Noise Levels

Predicted interior noise levels are summarized in Table 6. Predicted exterior-to-interior noise levels for newer building construction subject to current building standards ranges from approximately 15 dBA with windows open to 25 dBA, or more, with windows closed. Based on the exterior noise levels noted above and assuming a minimum exterior-to-interior noise reduction of 15 dBA, with windows open, predicted interior noise levels at proposed Hotel "A" would range from approximately 50 CNEL/L_{dn} at ground level to approximately 55 dBA CNEL/L_{dn} at upper-floor locations. Predicted interior noise levels at proposed Hotel "B" would range from approximately 45 CNEL/L_{dn} at ground level to approximately 51 dBA CNEL/L_{dn} at upper-floor locations. Predicted interior noise levels at the proposed restaurant would range from approximately 36 to 45 dBA CNEL/L_{dn}. Predicted interior noise levels at the proposed residential lots would range from approximately 42 to 47 dBA CNEL/L_{dn}. With windows open, predicted interior noise levels of the proposed hotels and residential units located on lots 1, 6 and 7 could potentially exceed the City's interior noise standard of 45 dBA CNEL/L_{dn}.

Table 6. Predicted Interior Noise Levels at On-Site Land Uses

Noise Receiver Location[1]	Predicted Noise Levels (dBA CNEL/L_{dn})[4]	Noise Standard[2]	Exceeds Noise Standard?	Significant Impact?
Hotel "A" – Ground Floor	50	45	**Yes**	**Yes**
Hotel "A" – Upper Floors	52 - 55	45	**Yes**	**Yes**
Hotel "B" – Ground Floor	45 - 48	45	**Yes**	**Yes**
Hotel "B" – Upper Floors	49 - 51	45	**Yes**	**Yes**
Restaurant	36 - 45	N/A	N/A	N/A
Lot 1 – Residence	45 - 47	45	**Yes**	**Yes**
Lot 2 – Residence	44	45	No	No
Lot 3 – Residence	43	45	No	No
Lot 4 – Residence	42	45	No	No
Lot 5 – Residence	43	45	No	No
Lot 6 – Residence	50	45	**Yes**	**Yes**
Lot 7 – Residence	49	45	**Yes**	**Yes**

1. *Refer to Figure 3 for receiver locations.*
2. *Based on the City's General Plan interior noise standard.*
3. *Restaurant uses are not considered "noise-sensitive" land uses. No applicable noise standard. Noise levels are presented for informational purposes.*
4. *Assumes a minimum exterior-to-interior noise reduction of 15 dB, with windows open.*

Impact Summary

Predicted noise levels at the façade of proposed residential land uses located on Lot 1, Lot 6, and Lot 7, as well as, at the proposed hotels would exceed the City's "acceptable" exterior noise standard of 60 dBA CNEL/L_{dn}. In addition, predicted exterior noise levels at the hotel swimming pools and portions of the outdoor activity areas of residential Lots 6 and 7, which are located along Oak Park Boulevard, would also be predicted to exceed the City's "acceptable" exterior noise standard of 60 dBA CNEL/L_{dn}. It is important to note the modeled receiver locations for Lots 6 and 7 were conservatively placed at the property line located nearest Oak Park Boulevard. Depending on final site design, actual noise levels at the outdoor activity areas of Lots 6 and 7 could be less. With windows open, predicted interior noise levels of the proposed hotels and residential units located on lots 1, 6 and 7 could potentially exceed the City's interior noise standard of 45 dBA CNEL/L_{dn}. This impact is considered *potentially significant*.

Mitigation Measure A:

1. Mechanical air ventilation systems (e.g., HVACs, PTACs) shall be installed for proposed land uses that will provide the minimum air circulation and fresh-air supply requirements for occupied rooms without the need to open any windows, doors, or other openings to the exterior. At a minimum, mechanical air ventilation systems shall be installed for rooms located on the northern sides of Hotels “A” and “B”, as well as, residential lots 1, 6, and 7.
2. Residential lots 6 and 7 should be designed so that the outdoor activity areas of these dwellings are not located within the 65 dBA CNEL contour of Oak Park Boulevard. The projected 65 dBA CNEL contour of Oak Park Boulevard is depicted in Figure 3. If outdoor activity areas of lots 6 and 7 are located within the 65 dBA CNEL contour of Oak Park Boulevard sound barriers shall be constructed along the eastern boundary of the project site sufficient to shield line-of-sight between the outdoor activity area and vehicular traffic on the roadway. If sound barriers are required, it is recommended that the barriers connect to the existing barrier along Oak Park Drive and extend southward. The sound barriers should be constructed to a minimum height of 4.5 feet above roadway grade. It is recommended that the barriers be constructed of concrete masonry block, or material of similar density and usage, with no gaps between construction materials or at the base of the barriers. Refer to Figure 4 for recommended barrier locations.
3. Outdoor activity areas/swimming pool areas at the proposed hotels shall be shielded from direct line-of-sight of U.S. Highway 101 by installation of sound barriers along the northern boundaries of the outdoor activity areas. The sound barriers should be constructed to a minimum height of 6 feet above ground level. It is recommended that the barriers be constructed of wood or masonry block, with no gaps between construction materials or at the base of the barriers. Refer to Figure 4 for recommended barrier locations.
4. A sound barrier shall be constructed along the northern boundary of Lot 1. The sound barrier should be constructed to a minimum height of 6 feet above ground level. It is recommended that the barrier be constructed of wood or masonry block, with no gaps between construction materials or at the base of the barrier. Refer to Figure 4 for recommended barrier locations.

Significance after Mitigation

Mitigated on-site average-daily noise levels are depicted in Figure 4. With implementation of the recommended sound barriers, predicted future average-daily noise levels within the outdoor activity areas of residential Lot 6 and Lot 7 would be reduced 65 dBA CNEL/L_{dn}, or less. Predicted future average-daily noise levels within the outdoor activity areas of the hotels and residential Lot 1 would be reduced to 60 dBA CNEL/L_{dn}, or less. Predicted exterior noise levels at outdoor activity areas would not exceed the City’s “conditionally acceptable” noise standard of 65 dBA CNEL/L_{dn} for hotels or residential land uses.

The installation of mechanical air ventilation systems (e.g., HVAC systems, PTAC systems) for proposed land uses would allow windows to remain closed. Assuming an average exterior-to-interior noise-reduction of 25 dBA, which is typical for new building construction with windows closed, predicted interior noise levels for the proposed hotels and residential land uses would be reduced to below the City’s interior noise standard of 45 dBA CNEL/L_{dn} (refer to Table 7). With mitigation, this impact would be considered ***less than significant***.

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Figure 4. Predicted On-Site Average-Daily Exterior Noise Levels with Mitigation

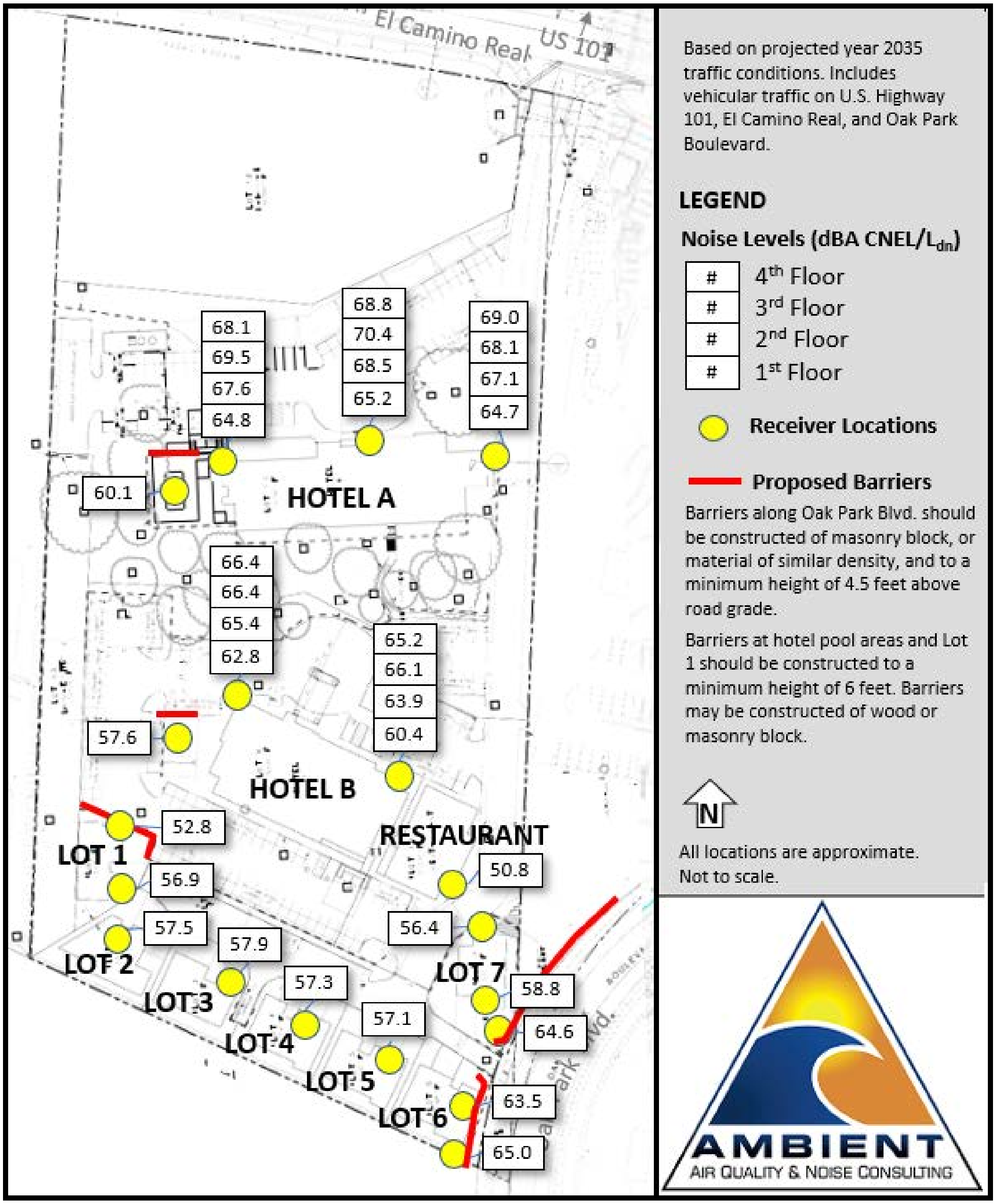

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Table 7. Predicted Interior Noise Levels at On-Site Land Uses with Mitigation

Noise Receiver Location[1]	Predicted Noise Levels (dBA CNEL/L_{dn})[4]	Noise Standard[2]	Exceeds Noise Standard?	Significant Impact?
Hotel "A" – Ground Floor	40	45	No	No
Hotel "A" – Upper Floors	42 - 45	45	No	No
Hotel "B" – Ground Floor	35 - 38	45	No	No
Hotel "B" – Upper Floors	39 - 41	45	No	No
Restaurant	26 - 35	N/A	N/A	N/A
Lot 1 – Residence	35 - 37	45	No	No
Lot 2 – Residence	34	45	No	No
Lot 3 – Residence	33	45	No	No
Lot 4 – Residence	32	45	No	No
Lot 5 – Residence	33	45	No	No
Lot 6 – Residence	40	45	No	No
Lot 7 – Residence	39	45	No	No

1. *Refer to Figure 4 for receiver locations.*
2. *Based on the City's General Plan interior noise standard.*
3. *Restaurant uses are not considered "noise-sensitive" land uses. No applicable noise standard. Noise levels are presented for informational purposes.*
4. *Assumes a minimum exterior-to-interior noise reduction of 25 dB, with windows closed.*

IMPACT B: ***A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.***

Noise associated with demolition and construction activities typically occurs intermittently and varies depending upon the nature or phase of construction (e.g., land clearing, grading, excavation, and paving). Noise generated by off-road equipment, including earth movers, material handlers, and portable generators, can reach high levels. Although noise ranges are generally similar for all construction phases, the initial demolition and site preparation phases tends to involve the most heavy-duty equipment having a higher noise-generation potential.

Noise levels associated with off-road construction equipment are summarized in Table 8. As depicted, noise levels generated by individual pieces of construction equipment typically range from approximately 74 to 89 dBA L_{max} at 50 feet (FTA 2006). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average-hourly noise levels at construction sites typically range from approximately 65 to 87 dBA L_{eq} at 50 feet, depending on the activities performed.

Predicted construction noise levels at nearby existing residential land uses could reach levels of approximately 87 dBA L_{eq} when construction occurs within approximately 50 feet of the site boundary. Predicted construction noise levels would not exceed the commonly applied daytime noise criteria of 90 dBA L_{eq}. However, predicted noise levels would exceed the commonly applied nighttime noise criteria of 80 dBA L_{eq}. With regard to residential land uses, construction noise occurring during the more noise-sensitive nighttime hours (i.e., 10 p.m. to 7 a.m.) is typically of increased concern. Because exterior ambient noise levels typically decrease during the

Table 8. Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA Lmax) 50 feet from Source
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Vibrator	76
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Truck	88
Paver	89
Pneumatic Tool	85
Roller	74
Saw	76

Sources: FTA 2006

nighttime hours as community activities (e.g., commercial activities, vehicle traffic) decrease, construction activities performed during these more noise-sensitive periods of the day can result in increases in ambient noise levels. Increases in ambient noise levels may contribute to increased levels of annoyance and potential sleep disruption for occupants of nearby residential dwellings. The proposed project does not include restrictions on the hours during which construction activities would occur. As a result, this impact would be considered ***potentially significant***.

Mitigation Measure B:

1. Unless otherwise provided for in a validly issued permit or approval, noise-generating construction activities shall be limited to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 8:00 a.m. through 5:00 p.m. on Saturdays and Sundays. Noise-generating construction activities shall be prohibited on City-recognized holidays, unless otherwise approved by the City.

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2. All construction equipment shall have properly maintained sound-control devices (e.g., mufflers). Unmuffled exhaust systems for off-road equipment shall be prohibited.

Significance after Mitigation

With mitigation, construction activities would be limited to the daytime hours. The proper maintenance of construction equipment and use of mufflers would reduce equipment noise levels by approximately 10 dB. With mitigation, this impact would be considered ***less than significant***.

IMPACT C: A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Long-term increases in ambient noise levels associated with the proposed project would be associated with increases in vehicle traffic along area roadways. On-site non-transportation noise sources would also contribute to potential increases in ambient noise levels. Noise levels associated with project-generated traffic and non-transportation sources are discussed as follows:

Increased Traffic Noise

The FHWA roadway noise prediction model was used to predict traffic noise levels along primarily affected roadway segments, with and without implementation of the proposed project. Modeling was conducted based on predicted traffic volumes obtained from the traffic analysis prepared for this project. Traffic noise levels were evaluated for existing and future cumulative year conditions, with and without project implementation. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. Predicted changes in traffic noise levels for existing and future cumulative conditions, with project implementation, are depicted in Table 9 and discussed separately, as follows:

Table 9. Predicted Increases in Traffic Noise Levels

Roadway	Predicted CNEL, 50 Feet from Near-Travel Lane Centerline(1)		Predicted Increase	Significant Increase?(2)
	Without Project	With Project		
Existing Conditions				
El Camino Real, West of Oak Park Boulevard	65.6	65.7	0.1	No
Oak Park Boulevard, South of El Camino Real	64.1	64.2	0.1	No
Future Cumulative Conditions				
El Camino Real, West of Oak Park Boulevard	66.3	66.6	0,3	No
Oak Park Boulevard, South of El Camino Real	65.0	65.0	0.0	No

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on data obtained from the traffic analysis prepared for this project. Assumes peak-hour volumes represent an average of 10 percent of average-daily vehicle traffic.*
2. *Significant increase is defined as an increase of 3 dB, or greater.*

As depicted in Table 9, implementation of the proposed project would result in predicted increases in existing and future cumulative traffic noise levels of approximately 0.3 dBA, or less, along primarily affected area roadway segments. Implementation of the proposed project would not result in a perceptible change in traffic noise levels (i.e., 3 dBA, or greater). As a result, predicted increases in traffic noise levels associated with implementation of the proposed project would be considered ***less than significant***.

Increase Non-Transportation Noise

Noise sources commonly associated with hotels can include occasional parking lot activities (e.g., opening and closing of vehicle doors, people talking), and use of on-site building equipment, such as heating, ventilation, and air conditioning (HVAC) systems, and swimming pool equipment. The nearest noise-sensitive receptors include existing residential dwellings located adjacent to and west of the project site, proposed on-site hotels, as well as, proposed residential land uses located within the southern portion of the project site. Operational noise levels associated with these noise sources at these nearest noise-sensitive land uses are discussed separately, as follows:

Parking Lots

Based on the traffic analysis prepared for this project, the proposed hotel would generate a total of approximately 139 inbound and outbound vehicle trips during the p.m. peak-hour. Based on this trip-generation rate and assuming that all vehicles would access on-site parking spaces within a localized area, predicted peak-hour noise levels would be less than 30 dBA L_{eq} at 50 feet. Predicted noise levels at on-site and off-site noise-sensitive land uses would not exceed the City's daytime or nighttime noise standards of 50 and 45 dBA L_{eq}, respectively, and would be largely masked by ambient noise levels which generally range from the mid 50's to upper 60's. As a result, this impact would be considered ***less than significant***.

Building Mechanical Equipment

Building mechanical equipment associated with commercial uses, such as boilers and HVAC systems, are typically enclosed or located on rooftop areas away from direct public exposure. For hotels, HVAC systems are typically direct vent individual systems, commonly referred to as packaged terminal air conditioning (PTAC) systems. Depending on the operational mode of the unit (e.g., fan, air conditioner, heater), PTAC units typically generate noise levels ranging from the mid-40's to the low 60's at approximately 10 feet. For restaurants, noise levels associated with exhaust fans and exterior HVAC units typically range from approximately 55 to 66 dBA L_{eq} at 5 feet.

Assuming a maximum average-hourly operational noise level of 65 dBA L_{eq}, predicted noise levels associated with hotel HVAC systems would range from 37 to 41 dBA L_{eq} at the proposed on-site residential land uses. Predicted operational noise levels at the nearest off-site residential land uses would be less and would be largely masked by ambient noise levels. Predicted operational noise levels for hotel HVAC systems would not exceed the City's daytime or nighttime noise standards of 50 and 45 dBA L_{eq}, respectively.

Assuming that restaurant exhaust fans and HVAC units were located at the rooftop edge of the nearest building facade and a maximum operational noise level of 66 dBA L_{eq} at 5 feet, predicted operational noise levels at the façade of Hotel "B" could reach levels of approximately 60 dBA L_{eq}. No outdoor activity areas are located along the eastern façade of Hotel "B". In addition, assuming a minimum exterior-to-interior noise reduction of 15 dBA, with windows open, predicted interior noise levels at Hotel "B" would not exceed the City's interior noise standard of 45 dBA L_{eq}. Based on these same assumptions, predicted exterior operational noise levels at the

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property line of the nearest on-site residential land use (i.e., Lot 7) would be approximately 49 dBA L_{eq}. Predicted operational noise levels associated with restaurant exhaust fans could potentially exceed the City's exterior nighttime noise standard of 45 dBA L_{eq} at the property line of residential Lot 7. As a result, this impact is considered ***potentially significant***.

Swimming Pool Equipment

Swimming pool equipment, such as water pumps and heat pumps, can generate average-hourly noise levels of approximately 55 to 75 dBA L_{eq} at three feet. For commercial facilities, swimming pool equipment is typically enclosed or removed from direct public exposure. Assuming a maximum noise level of 75 dBA L_{eq} at three feet and that swimming pool equipment were not enclosed, predicted operational noise levels would be approximately 45 - 47 dBA L_{eq} at the nearest existing residential land uses located adjacent to and west of the project site. Predicted operational noise levels would be approximately 58 dBA L_{eq} at the hotels and approximately 51 dBA L_{eq} at the nearest proposed residential land use (i.e., Lot 1). Predicted operational noise levels at the nearest existing residential land uses could potentially exceed the City's nighttime noise standard of 45 dBA L_{eq}. Predicted operational noise levels at the nearest on-site residential use could potentially exceed the City's daytime and nighttime noise standards of 50 and 45 dBA L_{eq}. As a result, this impact is considered ***potentially significant***.

Mitigation Measure C:

1. Exhaust fans and exterior HVAC units for the proposed restaurant shall be mounted on the rooftop and shielded from direct line-of-sight of the nearest proposed residential land use (i.e., Lot 7). Shielding may include centrally locating fans on rooftop areas and/or construction of a parapet around the building perimeter.
2. Operational hours for the proposed hotel swimming pools shall be limited to between the daytime/early evening hours of 7:00 a.m. and 10:00 p.m.
3. Swimming pool equipment motors (e.g., water pumps, heat pumps, and blowers) shall be located within an enclosure.

Significance After Mitigation

With implementation of the above mitigation measures, predicted building mechanical equipment at the property line of the nearest on-site residential land use (i.e., Lot 7) would be reduced to approximately 44 dBA L_{eq}, or less. The enclosure of swimming pool equipment would reduce operational noise levels by approximately 10 dB, or more. With mitigation, predicted operational noise levels for swimming pool equipment would be reduced to approximately 41 dBA L_{eq}, or less, at the nearest on-site residential land use (i.e., Lot 1). Predicted operational noise levels at the nearest off-site residential land use would be reduced to approximately 37 dBA L_{eq}, or less. In addition, with implementation of Mitigation Measure C,2., swimming pool hours would be limited to between the daytime hours of 7:00 a.m. and 10:00 p.m. With mitigation, predicted operational noise levels associated with on-site equipment would not exceed the City's daytime exterior noise standard of 50 dBA L_{eq}. With mitigation, this impact is considered ***less than significant***.

IMPACT D: Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term demolition and construction-related activities. These activities would likely require the use of various off-road equipment, such as tractors, concrete mixers, and haul trucks. The use of major groundborne vibration-generating construction equipment, such as pile drivers, would not be required for this project.

There are no federal, state, or local regulatory standards for groundborne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. Based on these criteria, short periods of ground vibration exceeding an exterior peak-particle velocity (ppv) of 0.5 inches per second (in/sec) may have a potential for structural damage to nearby structures. Groundborne vibration levels exceeding 0.2 in/sec ppv may also result in increased levels of annoyance to occupants of buildings considered sensitive to vibration, such as offices and residential dwellings.[5]

Groundborne vibration levels associated with representative construction equipment are summarized in Table 10. Based on the vibration levels presented in Table 10, the highest ground vibration generated by construction equipment would be approximately 0.21 in/sec ppv at 25 feet. Predicted vibration levels at the nearest off-site structures, would not exceed 0.5 in/sec ppv. Groundborne vibration levels associated with on-site demolition and construction activities would be short-term and would not exceed the minimum recommended criteria for structural damage or human annoyance. As a result, this impact would be considered ***less than significant***.

Table 10. Representative Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 Feet (In/Sec)
Loaded Trucks	0.076
Jackhammer	0.035
Vibration Roller	0.210
Large Bulldozers	0.089
Small Bulldozers/Tractors	0.003
Source: Caltrans 2013	

[5] *California Department of Transportation. 2013. Transportation and Construction Vibration Guidance Manual.*

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IMPACTS E & F:	***For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels; AND*** ***For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?***

The nearest public-use airport is the Oceano County Airport, which is located approximately 1.9 miles southwest of the project site. No private airstrips are located within the vicinity of the project site. The project site is not located within the projected 65 dBA CNEL/L_{dn} contours of the Oceano County Airport.[6] As a result, the project site is not subject to high levels of aircraft noise. ***No impact***.

[6] *County of San Luis Obispo. May 5, 1992. County of San Luis Obispo General Plan, Noise Element.*

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Appendix A

Summary of Acoustic Fundamentals, Terms & Descriptors

Acoustic Fundamentals

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave because of a disturbance or vibration.

Amplitude is the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65-dB source of sound, such as a truck, when joined by another 65-dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3-dB change in amplitude as the minimum audible difference perceptible to the average person.

Frequency is the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. Sound waves below 16 Hz or above 20,000 Hz cannot be heard at all, and the ear is more sensitive to sound in the higher portion of this range than in the lower. To approximate this sensitivity, environmental sound is usually measured in A-weighted decibels (dBA). On this scale, the normal range of human hearing extends from about 10 to 140 dBA. Common community noise sources and associated noise levels, in dBA, are depicted in Figure 3.

Addition of Decibels

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation & Attenuation

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 decibels for each doubling of distance from a line source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the

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receiver, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between a line source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 decibels per doubling of distance from a line source.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in an approximate 5 dB of noise reduction. Taller barriers provide increased noise reduction.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the “A-weighted” sound level (expressed in units of dBA). The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-weighted noise scale. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are L_{eq}, L_{dn}, and CNEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10-dBA “penalty” added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional 5-dBA penalty for evening noise (7 p.m. to 10 p.m.) For environmental assessment purposes, CNEL and L_{dn} are often used interchangeably. Common noise descriptors are summarized in Table A-1.

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Table A-1
Common Acoustical Terms and Descriptors

Descriptor	Definition
Decibel (dB)	A unit-less measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to referenced sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The 24-hour L_{eq} with a 10 dBA “penalty” for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is “added” to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA “penalty” added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.

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Appendix B

Noise Modeling

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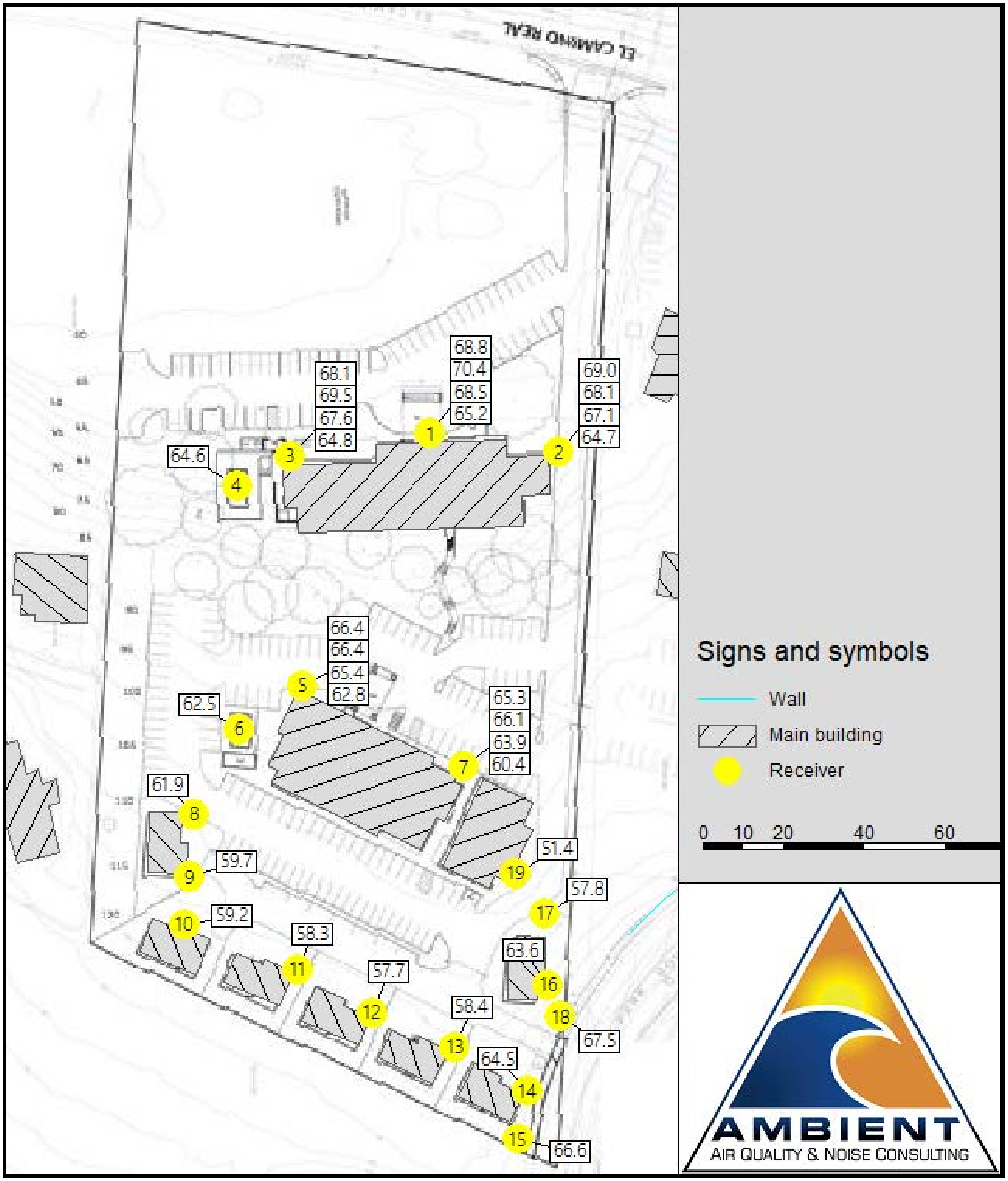
PREDICTED FUTURE YR 2035 ON-SITE NOISE LEVELS

WITHOUT BARRIERS



Assumes pad elevations of 123 feet for lot 6 and 120 feet for lot 7

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WITHOUT BARRIERS

No.	Receiver name	Building side	Floor	Limit Day dB(A)	Level Day dB(A)
1	HOTEL A CENTER FACADE		GF	-	65.2
			1.Fl	-	68.5
			2.Fl	-	70.4
			3.Fl	-	68.8
2	HOTEL A NE FACADE		GF	-	64.7
			1.Fl	-	67.1
			2.Fl	-	68.1
			3.Fl	-	69.0
3	HOTEL A NW FACADE1		GF	-	64.8
			1.Fl	-	67.6
			2.Fl	-	69.5
			3.Fl	-	68.1
4	HOTEL A POOL		GF	-	64.6
5	HOTEL B NW FACADE1		GF	-	62.8
			1.Fl	-	65.4
			2.Fl	-	66.4
			3.Fl	-	66.4
6	HOTEL B POOL		GF	-	62.5
7	HOTEL B/REST NE FACADE1		GF	-	60.4
			1.Fl	-	63.9
			2.Fl	-	66.1
			3.Fl	-	65.3
8	LOT 1 N FACADE1		GF	-	61.9
9	LOT 1 SE FACADE1		GF	-	59.7
10	LOT 2		GF	-	59.2
11	LOT 3		GF	-	58.3
12	LOT 4 NE FACADE		GF	-	57.7
13	LOT 5 NE FACADE		GF	-	58.4
14	LOT 6 NE FACADE		GF	-	64.5
15	LOT 6 OAA2		GF	-	66.6
16	LOT 7 E FACADE		GF	-	63.6
17	LOT 7 N OAA		GF	-	57.8
18	LOT 7 OAA 3		GF	-	67.5
19	REST E FACADE1		GF	-	51.4

Assumes pad elevations of 123 feet for lot 6 and 120 feet for lot 7

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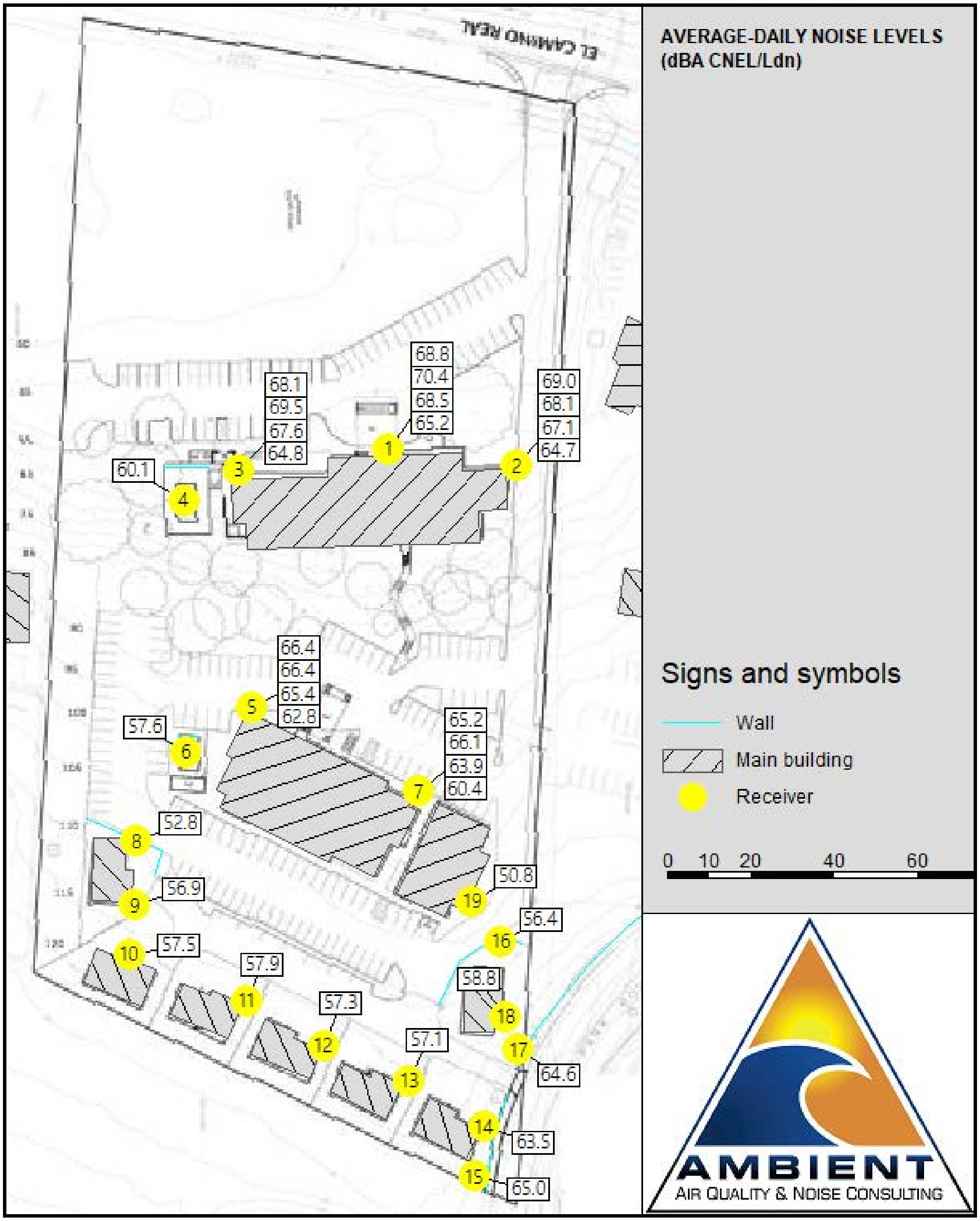
WITH 4.5-FT MBU BARRIER ON OAK PARK DR., 6-FT WOOD BARRIER AT OUTDOOR ACTIVITY AREAS



Assumes pad elevations of 123 feet for lot 6 and 120 feet for lot 7

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WITH 4.5-FT MBU BARRIER ON OAK PARK DR., 6-FT WOOD BARRIER AT OUTDOOR ACTIVITY AREAS

No.	Receiver name	Building side	Floor	Limit Day dB(A)	Level Day dB(A)
1	HOTEL A CENTER FACADE		GF	-	65.2
			1.Fl	-	68.5
			2.Fl	-	70.4
			3.Fl	-	68.8
2	HOTEL A NE FACADE		GF	-	64.7
			1.Fl	-	67.1
			2.Fl	-	68.1
			3.Fl	-	69.0
3	HOTEL A NW FACADE1		GF	-	64.8
			1.Fl	-	67.6
			2.Fl	-	69.5
			3.Fl	-	68.1
4	HOTEL A POOL		GF	-	60.1
5	HOTEL B NW FACADE1		GF	-	62.8
			1.Fl	-	65.4
			2.Fl	-	66.4
			3.Fl	-	66.4
6	HOTEL B POOL		GF	-	57.6
7	HOTEL B/REST NE FACADE1		GF	-	60.4
			1.Fl	-	63.9
			2.Fl	-	66.1
			3.Fl	-	65.2
8	LOT 1 N FACADE1		GF	-	52.8
9	LOT 1 SE FACADE1		GF	-	56.9
10	LOT 2		GF	-	57.5
11	LOT 3		GF	-	57.9
12	LOT 4 NE FACADE		GF	-	57.3
13	LOT 5 NE FACADE		GF	-	57.1
14	LOT 6 NE FACADE		GF	-	63.5
15	LOT 6 OAA2		GF	-	65.0
16	LOT 7 N OAA		GF	-	56.4
17	LOT 7 OAA 3		GF	-	64.6
18	LOT 7 OAA 19		GF	-	58.8
19	REST E FACADE1		GF	-	50.8

Assumes pad elevations of 123 feet for lot 6 and 120 feet for lot 7

Model Calibration

Location	Measured	Modeled	Difference	Acceptable?
US 101	65	64.6	0.4	Yes
US 101	72.7	72.3	0.4	Yes
Oak Park Blvd.	68.6	68.3	0.3	Yes
Oak Park Blvd.	60	60.0	0.0	Yes
Oak Park Blvd.	65	65.6	0.6	Yes

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PREDICTED TRAFFIC NOISE LEVELS ON ADJACENT ROADWAYS

SCENARIO/ROADWAY SEGMENT	VOLUME (ADT)[1]	CNEL AT 50 FT FROM NTLCL	CNEL CONTOUR DISTANCES (FT) FROM ROAD CENTERLINE		
			70 dBA	65 dBA	60 dBA
EXISTING					
El Camino Real, West of Oak Park Boulevard	11,950	65.6	WRR	70	149
Oak Park Boulevard, South of El Camino Real	18,280	64.1	WRR	60	125
EXISTING PLUS PROJECT					
El Camino Real, West of Oak Park Boulevard	12,700	65.7	WRR	73	155
Oak Park Boulevard, South of El Camino Real	18,490	64.2	WRR	61	126
CUMULATIVE					
El Camino Real, West of Oak Park Boulevard	14,350	66.3	WRR	79	168
Oak Park Boulevard, South of El Camino Real	22,100	65.0	WRR	68	141
CUMULATIVE PLUS PROJECT					
El Camino Real, West of Oak Park Boulevard	15,100	66.6	WRR	82	174
Oak Park Boulevard, South of El Camino Real	22,310	65.0	WRR	68	142
U.S. Highway 101, Oak Park Boulevard to Fourth Street[2]	71,070	77.0	257	548	1,178

1. ADT calculated based on p.m. pk-hr volumes and assuming a k-factor of 0.1.
2. City of Pismo Beach. 2018. Pismo Beach General Plan Circulation Element Update. Draft Initial Study of Environmental Impact.
NTLCL=Near Travel Lane Centerline

ROADWAY SEGMENT	CNEL AT 50 FT FROM NTLCL					
	EXISTING	EXISTING PLUS PROJECT	INCREASE	CUMULATIVE	CUMULATIVE PLUS PROJECT	INCREASE
El Camino Real, West of Oak Park Boulevard	65.6	65.7	0.1	66.3	66.6	0.3
Oak Park Boulevard, South of El Camino Real	64.1	64.2	0.1	65.0	65.0	0.0

NTLCL=Near Travel Lane Centerline

APPENDIX G - TRAFFIC REPORT

Traffic Study Report
1598 El Camino Real Development
City of Grover Beach

Prepared For:
Ram Krupa Real Estate LLC

OEG

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OEG Ref 18-101

October 2018

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TABLE OF CONTENTS

List of Tables

List of Exhibits

Appendices

INTRODUCTION

Orosz Engineering Group, Inc. (OEG) has prepared this traffic impact analysis for the proposed 1598 El Camino Real Development. The City of Grover Beach prepared a scope of work for the project including existing, cumulative and buildout evaluations for the two study area intersections. The intersections include two locations on El Camino Real at the Southbound US Highway 101 ramps just north of the project and the Oak Park Boulevard intersection just south of the project. The City also requested analysis of project access relative to queuing for eastbound traffic on El Camino real toward Oak Park Boulevard.

This traffic engineering report provides a summary of the proposed project, existing peak hour traffic operating conditions, project trip generation, existing plus project impact analysis, cumulative traffic impacts, cumulative plus project traffic impacts, buildout traffic impacts, parking demand analysis and site access and circulation evaluation. Mitigation measures to reduce potential impacts are recommended as needed.

PROJECT DESCRIPTION AND LOCATION

The proposed project consists of the phased development of two hotels (91 rooms and 60 rooms), 4,000 Square Foot High Turnover Sit-Down Restaurant and a total parking supply of 179 spaces. Seven additional single family residential lots are also included on the project site with separate on-street and garage parking. Phase 1 of the project development consists of both hotels and the single family residential lots. Phase 2 would include the restaurant.

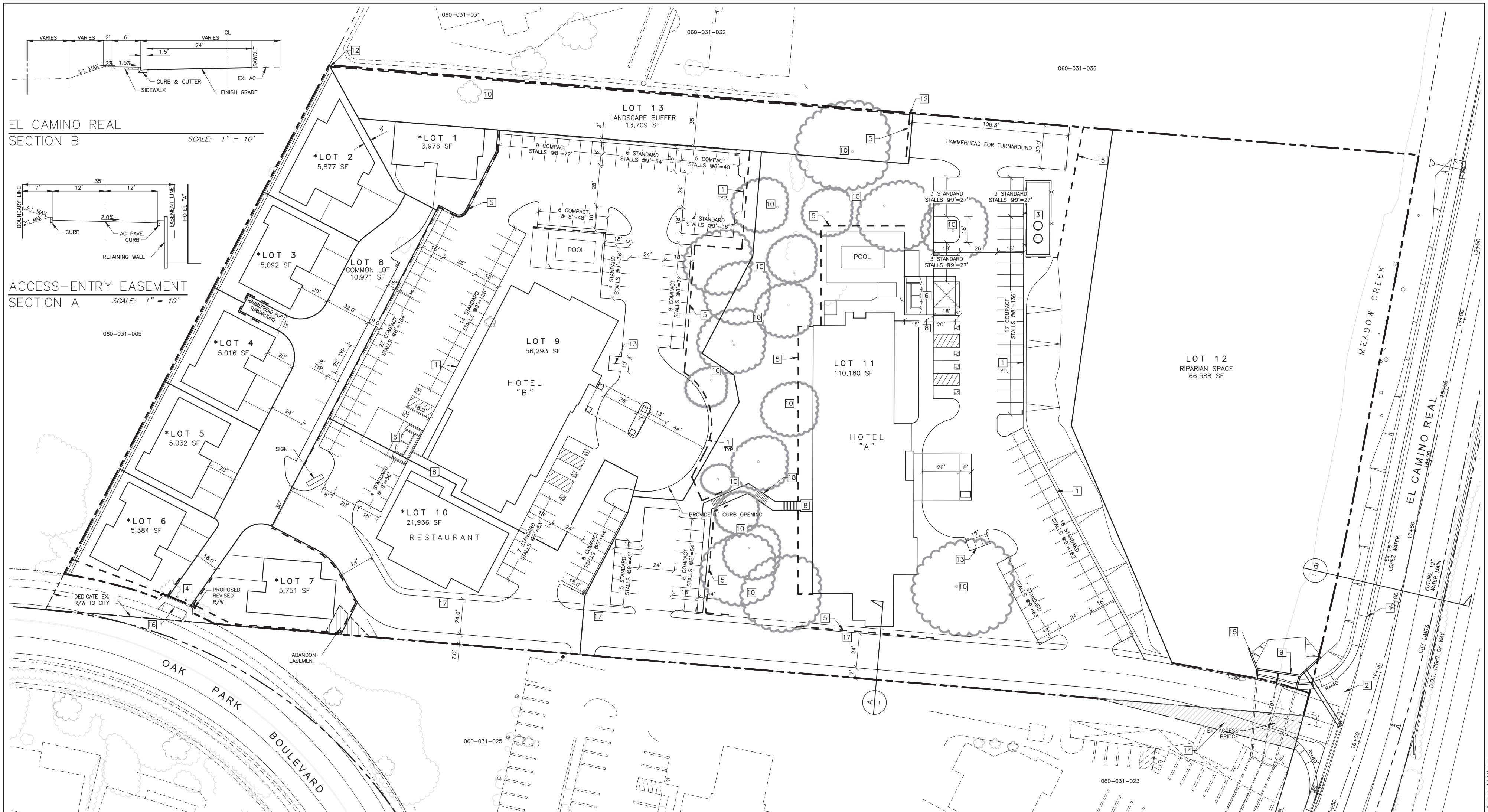
The project is located at 1598 El Camino Real in the City of Grover Beach. Access to the project site is proposed through a new two-lane 30 foot wide driveway access to El Camino Real approximately 100 feet northwesterly of the closest adjacent shopping center driveway. Emergency access is proposed to the adjacent commercial center and directly to Oak Park Boulevard. The proposed site plan is provided in Exhibit 1 (Site Plan PC 1.1).

EXISTING CONDITIONS

In the vicinity of the project site, US Highway 101 provides regional access throughout San Luis Obispo County. Highway 101 is currently constructed as a four lane divided freeway with controlled access. Access to US Highway 101 is provided southbound just northerly of the project site to El Camino Real. Northbound access to US Highway 101 is provided via ramps at Oak Park Boulevard (just south of the project site) or at 4th Street (northerly of the project site).

The project is located southwesterly of El Camino Real approximately 516 feet northwesterly of Oak Park Boulevard. El Camino Real is constructed as a minor arterial with two eastbound travel lanes between the southbound US Highway 101 ramps and Oak Park Boulevard on El Camino Real fronting the project site. In the westbound direction on El Camino Real there is one travel lane. Along the adjacent shopping center between the project site and Oak Park Boulevard, there is a center left turn lane for beginning and ending left turn movements to/from El Camino Real. There is no on-street parking on El Camino Real and the posted speed limit is 30 MPH eastbound/40 MPH westbound. To the north and south of the project site on the project side of El Camino Real, there is a pedestrian sidewalk. Currently, there is no sidewalk along the project frontage.

On May 16, 2018, intersection turning movement counts for the two study area intersections during the AM and PM peak periods. Queuing data for the eastbound approach to Oak Park Boulevard on El Camino Real were also collected to address a concern expressed by the City. The existing conditions AM and PM Peak Hour intersection turning movement volumes are summarized in Exhibit 2 and the raw data is attached in Appendix A.



* RESIDENTIAL & RESTAURANT ENVELOPES SPECULATIVE, PENDING SALE OF RESIDENTIAL LOTS & SALE OR LEASE OF RESTAURANT LOT.

SITE PLAN - TRACT No. 3122

SCALE: 1" = 30'

ACCESS/PARKING EASEMENT

PARKING SUMMARY

STANDARD	79
COMPACT	86
ADA ACCESSIBLE	9
MOTORCYCLE	5
TOTAL	179

CONSTRUCTION NOTES

1. CONSTRUCT CURB & GUTTER PER COGB STD DWG A.1
2. CONSTRUCT SPANDREL PER COGB STD DWG A.3
3. CONSTRUCT SS LIFT STATION.
4. CONSTRUCT EMERGENCY ACCESS/EGRESS IN COORDINATION WITH 5 CITIES FIRE.
5. CONSTRUCT SITE RETAINING WALLS.
6. CONSTRUCT TRASH ENCLOSURE PER CITY OF SLO STD DWG 9110 DIAGRAM 8.04-D-3
7. LOADING SERVICE AREA.
8. CONSTRUCT CONCRETE SIDEWALK PER COGB STD DWG B.1
9. CONSTRUCT DOUBLE CULVERT.
10. EXISTING TREES TO REMAIN
11. ALL STALLS 18' DEEP UNO.
12. CONSTRUCT PRIVACY WALL (WALL SHOWN OFFSET FOR CLARITY)
13. STANDARD MOTORCYCLE PARKING 8.5'X5'
14. EASEMENT TO PATEL FROM NICHOLLS
15. GUARDRAIL PER CALTRANS STANDARD RSP A77L1.
16. CONSTRUCT DRIVEWAY RAMP PER COGB STD DWG B.6
17. CONSTRUCT CURB PER COGB STD DWG A.1
18. CONSTRUCT STAIRWAY & PATH TO PARKING LOT

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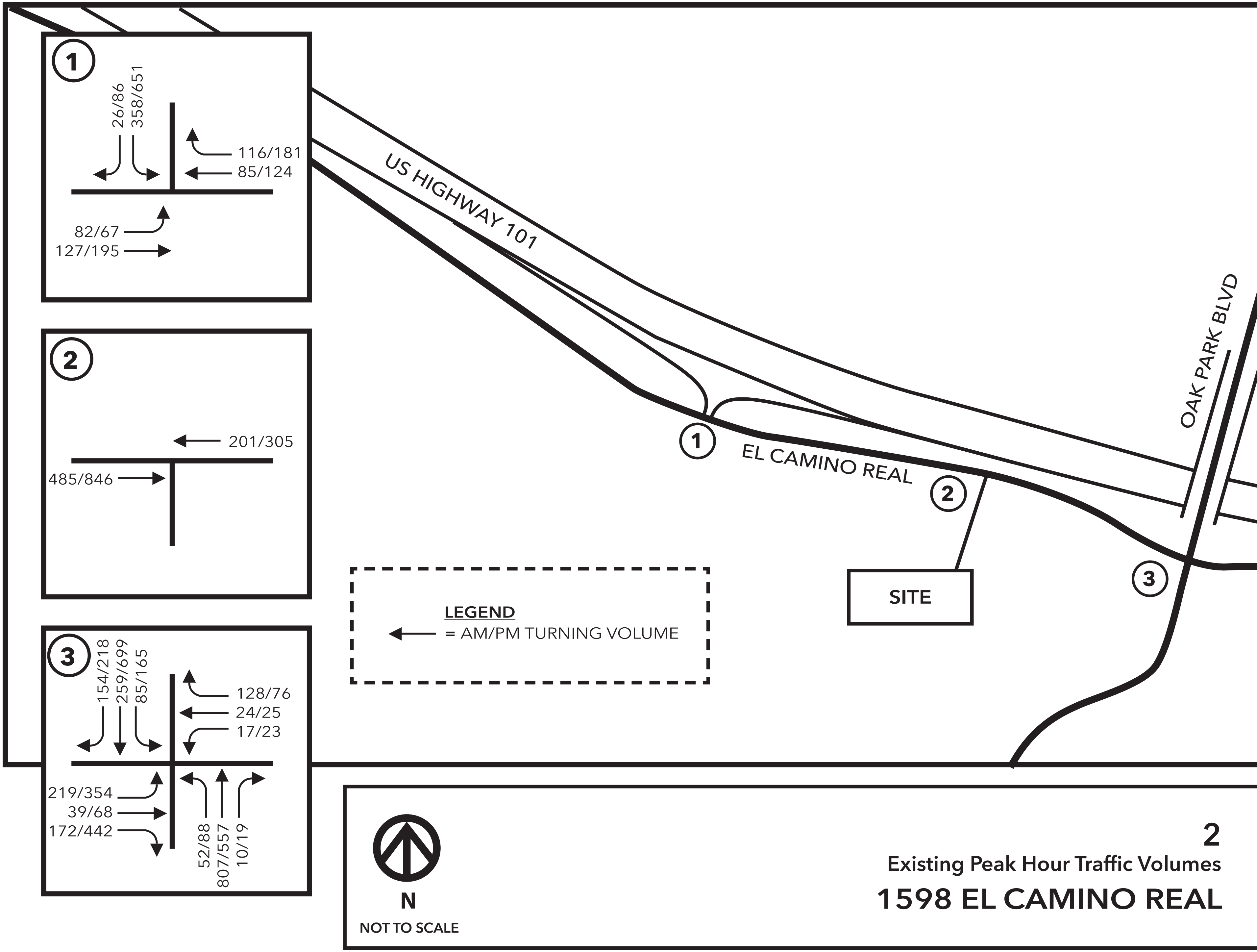
CIVIL ENGINEERS SURVEYORS PLANNERS
141 SOUTH ELM STREET · ARROYO GRANDE, CA 93420 · (805) 489-1321
GTA PROJECT No. 17.660.003

PLEINAIRE
DESIGN GROUP
3203 LIGHTNING STREET, SUITE 201
SANTA MARIA, CALIFORNIA 93455-1805
805.349.9695 PLEINAIREDG.COM

PROJECT: TRACT NO. 3122
EL CAMINO REAL DEVELOPMENT
1598 El Camino Real, Grover Beach, Ca., 93433
RAM KRUPA REAL ESTATE LLC

SHEET Nº
PC 1.1



2

Existing Peak Hour Traffic Volumes

1598 EL CAMINO REAL

To determine the operation of the intersections during the peak hours, the Highway Capacity Manual (HCM 2010) procedures were used. The operation of traffic flow through intersections is rated from Level of Service (LOS) A – free flowing conditions, to LOS F – over capacity. The City has identified Level of Service C as a standard for intersections during peak hours.

The levels of service for the study intersections are summarized in Table 1 for the AM and PM peak hours. The detailed intersection level of service worksheets can be found in Appendix B. As seen in this table, the intersections currently operate within acceptable levels.

Table 1
Existing Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	PM Peak Hour
El Camino Real at			
SB US Highway 101 Ramps	All-Way STOP	11.6 sec/veh – LOS B	23.6 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	20.6 sec/veh – LOS C	21.6 sec/veh – LOS C

PROJECT TRIP GENERATION

To estimate the potential trips generated by the project, the Institute of Transportation Engineers (ITE) reference, Trip Generation - 10th Edition, was used. The daily and peak hour trip rates in the ITE publication were applied to the proposed land uses and a trip estimate for the project was found.

Due to the location of the restaurant on the project site and the potential of 227 people on-site from the hotels (assuming 1.5 people per room); a reduction of the restaurant trips of 70% could be made. In other words, 70% of the restaurant trips could be internal to the site, with 30% of the trips being new or added to the adjacent street system. However, to provide for a conservative trip generation evaluation, <u>no reduction in restaurant t</u>rips was taken.

The annual average hotel occupancy in the region is approximately 75%, based on published data[1] and confirmed by hotel operator data. Hotels are rarely occupied 100%. The referenced data indicated about 20 nights or 5% of the year hotels are booked 100%. Based on this information, the hotel trip generation was reduced by 25% for distribution and analysis purposes.

The project trip generation is summarized in Table 2 on the following page. In summary, the proposed project could generate a total of 992 average daily trips (ADT), 82 AM Peak Hour Trips (PHT) and 81 PM PHT. The actual traffic generation at buildout of the project is very likely to be less than these values due to the restaurant trip reductions that will occur. The trip generation supporting documents are contained in Appendix C.

PROJECT TRIP DISTRIBUTION

The distribution of project traffic was estimated based on knowledge of potential origins and destinations for shopping, commercial and recreational uses in South San Luis Obispo County and the rest of the state.

Highway oriented hotel traffic distribution is based on hotel operator experience that 67 percent of the guests travel northbound on US 101 while 33 percent of the guests travel south. This distribution is also supported two-fold when population distributions and major airport distributions are considered.

[1] October 25, 2015 The Tribune article (Appendix C), SLO TBID Annual Report 2015-2016, and May 08, 2017 The Tribune article (Appendix C).

Table 2
Project Trip Generation Summary
1598 El Camino Real Development

Trip Rates	Size	Land Use Code	ADT	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Hotel (rooms)	60	310	4.17	0.25	0.17	0.42	0.16	0.16	0.32
Hotel (suites)	91	311	3.89	0.10	0.09	0.19	0.14	0.16	0.30
	(Rooms)								
Restaurant									
Hi Turnover (KSF)	4.0	932	112.25	5.50	4.50	10.00	6.05	3.70	9.75
	(KSF)								
Single Family Residential (SFR)	7	210	12.86	0.29	1.14	1.43	0.71	0.43	1.14
	(DU)								
Trip Generation[2]				AM Peak Hour			PM Peak Hour		
	Size		ADT	In	Out	Total	In	Out	Total
Hotel (rooms)	60		250	15	10	25	10	9	19
Hotel (suites)	91		354	9	8	17	13	14	27
Subtotal			604	24	18	42	23	23	46
75% Occupancy			453	18	14	32	17	17	34
Residential (SFR)	7		90	2	8	10	5	3	8
Phase 1 Total			543	20	22	42	22	20	42
Restaurant (KSF)	4.0		449	22	18	40	24	15	39
Project Total	Trips		**992**	**42**	**40**	**82**	**46**	**35**	**81**

According to the latest US Census data[3], the population density of Northern California is approximately 14.87 million, whereas the Southern California population density is approximately 23.13 million. This exemplifies that there will be predominant northbound traffic among interstate travelers.

In addition, major airports in the northern region are located in San Francisco, Oakland, and Sacramento, whereas there are major airports in the southern region located in Los Angeles, Orange County, Ontario, and San Diego. Among the airport distribution, of most important note is that only one of the three international airports is located in San Francisco, but two are located in the South, San Diego and Los Angeles, representing a 33 percent and 67 percent split for predominant tourist travel heading northbound. According to data collected by the California Travel and Tourism Commission Visit California[4], the predominant hubs for air travel are located in Southern California. The central coast is a heavy tourist location which leads to analysis of international travelers. Based on the data, over 62% of international travelers land in the southern region when compared to the total northern and southern

[2] ITE Trip Generation 10th Edition
[3] US Census data northern and southern California populations – Appendix C.
[4] California Travel and Tourism Commission Visit California air travel data – Appendix C.

international airport traffic, which supports predominant northbound traffic. The rapid growth of San Diego International Airport is expected to further increase the distribution of northbound traffic as well. As such, the distribution of highway-travelling hotel guests was split 40% northbound and 20% southbound, with the remaining 40% of guests, local restaurant patrons and local residents accessing the site via local roads as outlined below.

Residential, restaurant and local hotel traffic was assigned to local commercial and recreational destinations within Grover Beach and along Oak Park Boulevard. The Oak Park Boulevard and El Camino Real traffic distributions represent local traffic orientations regarding the restaurant, commercial and other tourist destinations. The general distribution of project traffic accessing the subject site is as follows:

	Hotel	Residential	Restaurant
US Highway 101	(Regional)	(Local)	(Local)
North	40%	30%	30%
South	20%	30%	30%
Oak Park Boulevard		(All Local)	
North of US 101	15%	15%	10%
South of El Camino Real	15%	15%	15%
El Camino Real		(All Local)	
North toward 4th Street	5%	5%	5%
South toward N. 12th Street	5%	5%	5%
East of Oak Park Boulevard	0%	0%	5%

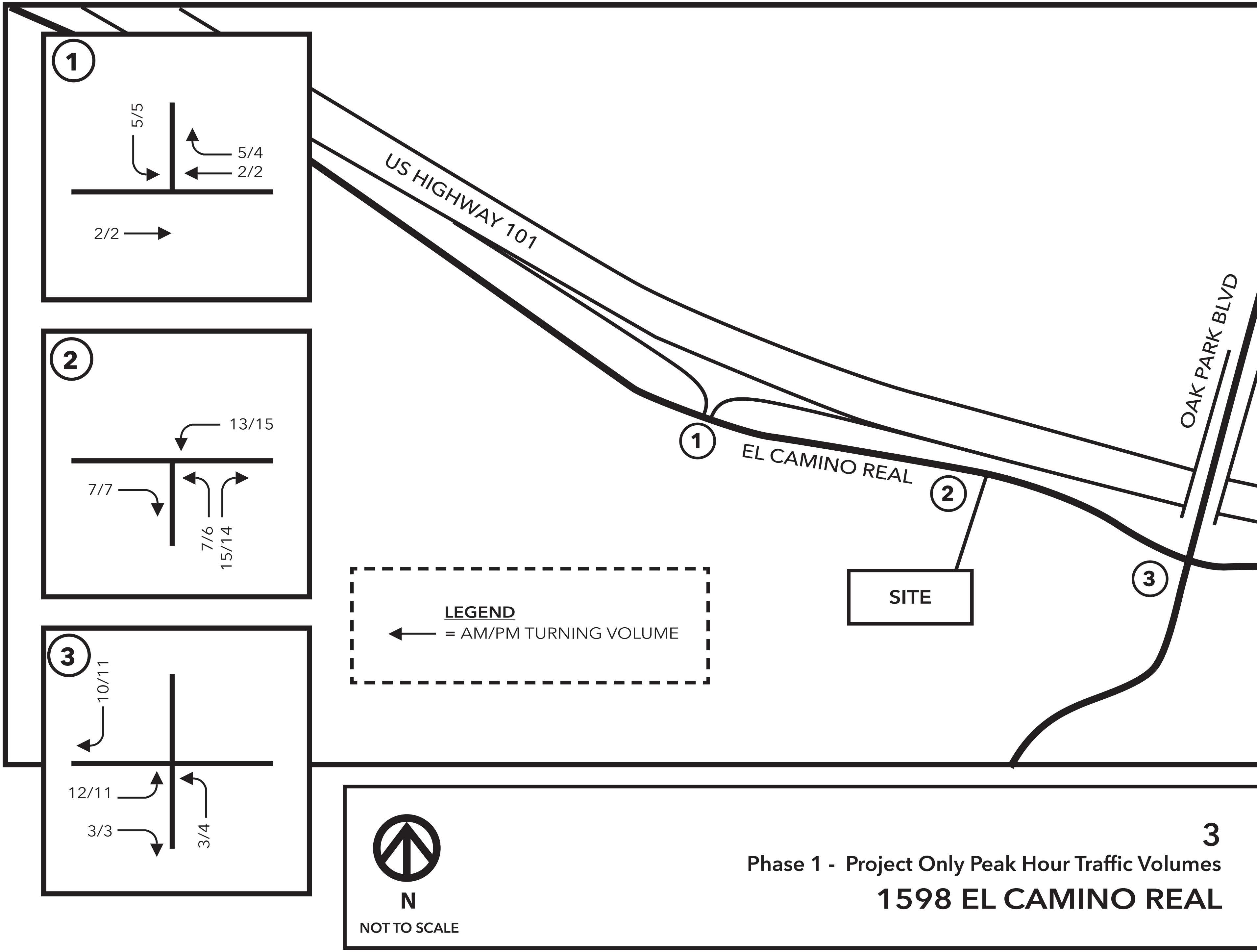
The trip distribution patterns for each of these uses was assigned separately and is graphically depicted in Figures A, B and C in Appendix D. The distribution of project traffic for Phase 1 is graphically depicted on Exhibit 3, while the entire project traffic distribution is summarized in Exhibit 5.

EXISTING PLUS PROJECT PHASE 1 CONDITIONS ANALYSIS

The existing plus project conditions analysis was conducted for Phase 1 traffic only. To evaluate the potential project impacts on existing conditions, the Phase 1 project traffic volumes were superimposed on existing volumes and the intersection levels of service recalculated. The results of that analysis are summarized in Exhibit 4 and Table 3 below. As seen in the table, all intersections continue to operate within acceptable limits. The level of service worksheets can be found in Appendix B.

Table 3
Existing Plus Phase 1 Project Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	
El Camino Real at		Existing Conditions	Plus Phase 1
SB US Highway 101 Ramps	All-Way STOP	11.6 sec/veh – LOS B	11.7 sec/veh – LOS B
Project Site	One-Way STOP	NA	12.9 sec/veh – LOS B
Oak Park Boulevard	Traffic Signal	20.6 sec/veh – LOS C	20.9 sec/veh – LOS C
El Camino Real at		PM Peak Hour	
SB US Highway 101 Ramps	All-Way STOP	23.6 sec/veh – LOS C	24.3 sec/veh – LOS C
Project Site	One-Way STOP	NA	18.5 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	21.6 sec/veh – LOS C	22.0 sec/veh – LOS C



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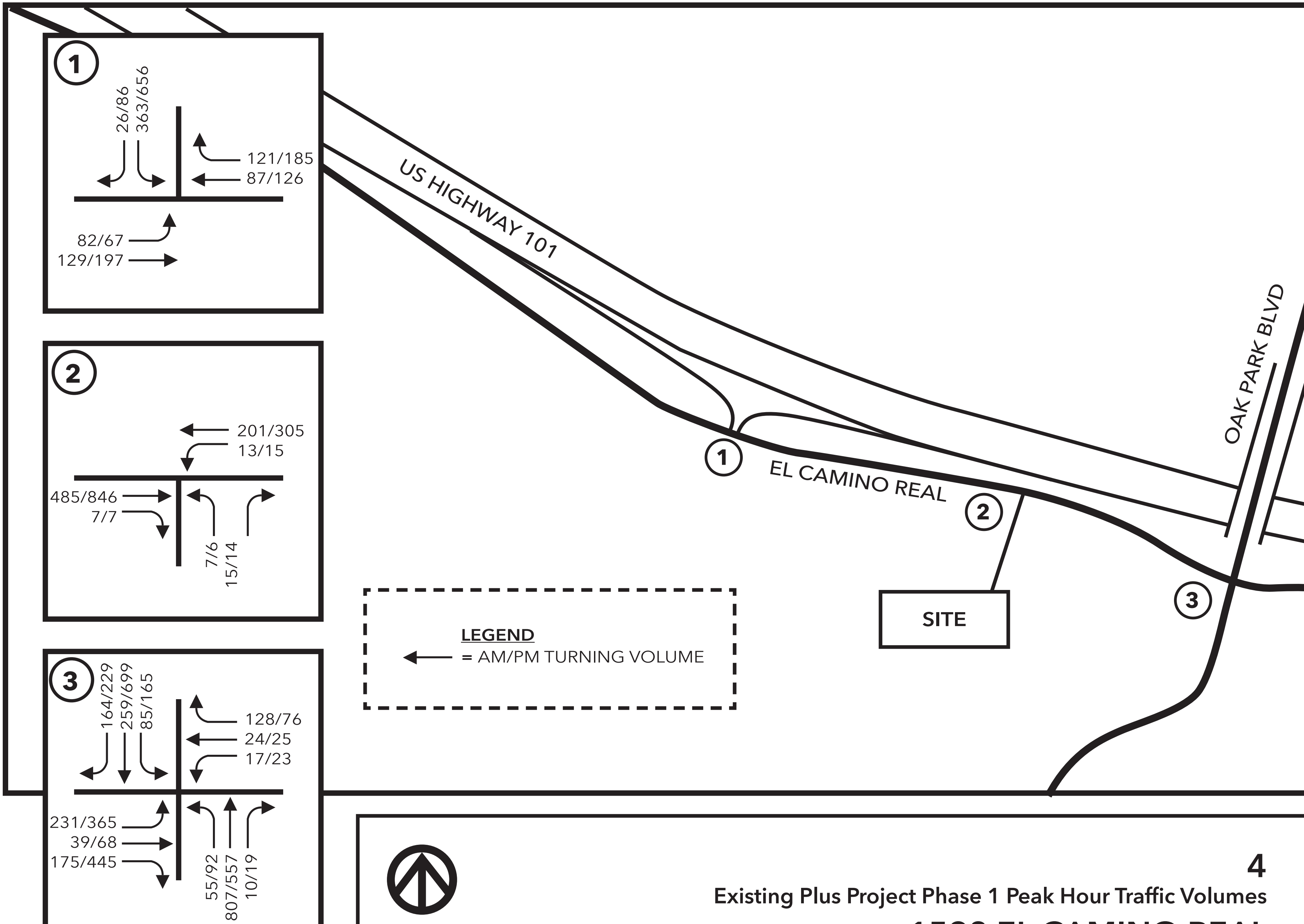
Phase 1 - Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL



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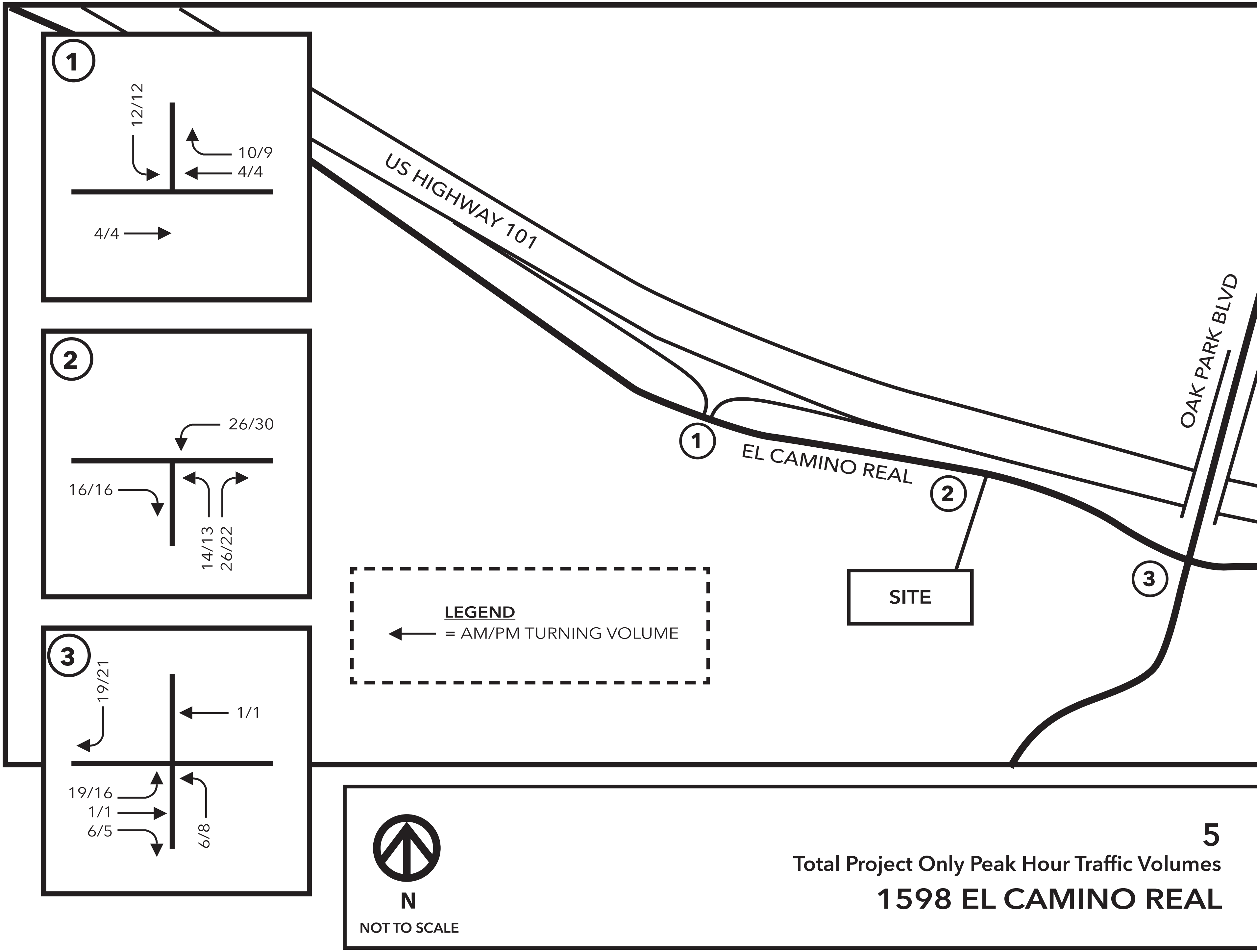
Existing Plus Project Phase 1 Peak Hour Traffic Volumes

1598 EL CAMINO REAL



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Total Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL

CUMULATIVE DEVELOPMENT ANALYSIS (Approved/Pending Projects)
A comprehensive evaluation of the projects that have already been approved or are under review by the three cities that may have an impact on the study area intersections was conducted. The City of Grover Beach has identified a list of 20 potential development projects (two completed, two under construction, 15 approved and one pending) for use in evaluating the near term potential impacts of the project. The City of Pismo Beach has identified three projects that have been approved or are currently under review. Also, the City of Arroyo Grande has identified 28 projects that may contribute to traffic volumes through the study area intersections. The list of projects can be found in Appendix E.

Similarly to the project trip generation, the cumulative list of projects trip generation estimates were calculated using the same ITE Trip Generation factors. In total, when all of the completed, approved, under construction or pending projects are fully occupied, 11,625 new Average Daily Traffic (ADT) would be added to roadways throughout Grover Beach and the tri-city surrounding areas. During the AM Peak Hour, 833 trips would be added as well as 1,050 PM Peak Hour trips. As these projects are located throughout the City not all of the traffic generated by these developments would impact the two study area intersection 100 percent. The cumulative project volumes were added to the existing traffic volumes and the resultant volumes are summarized in Exhibit 6.

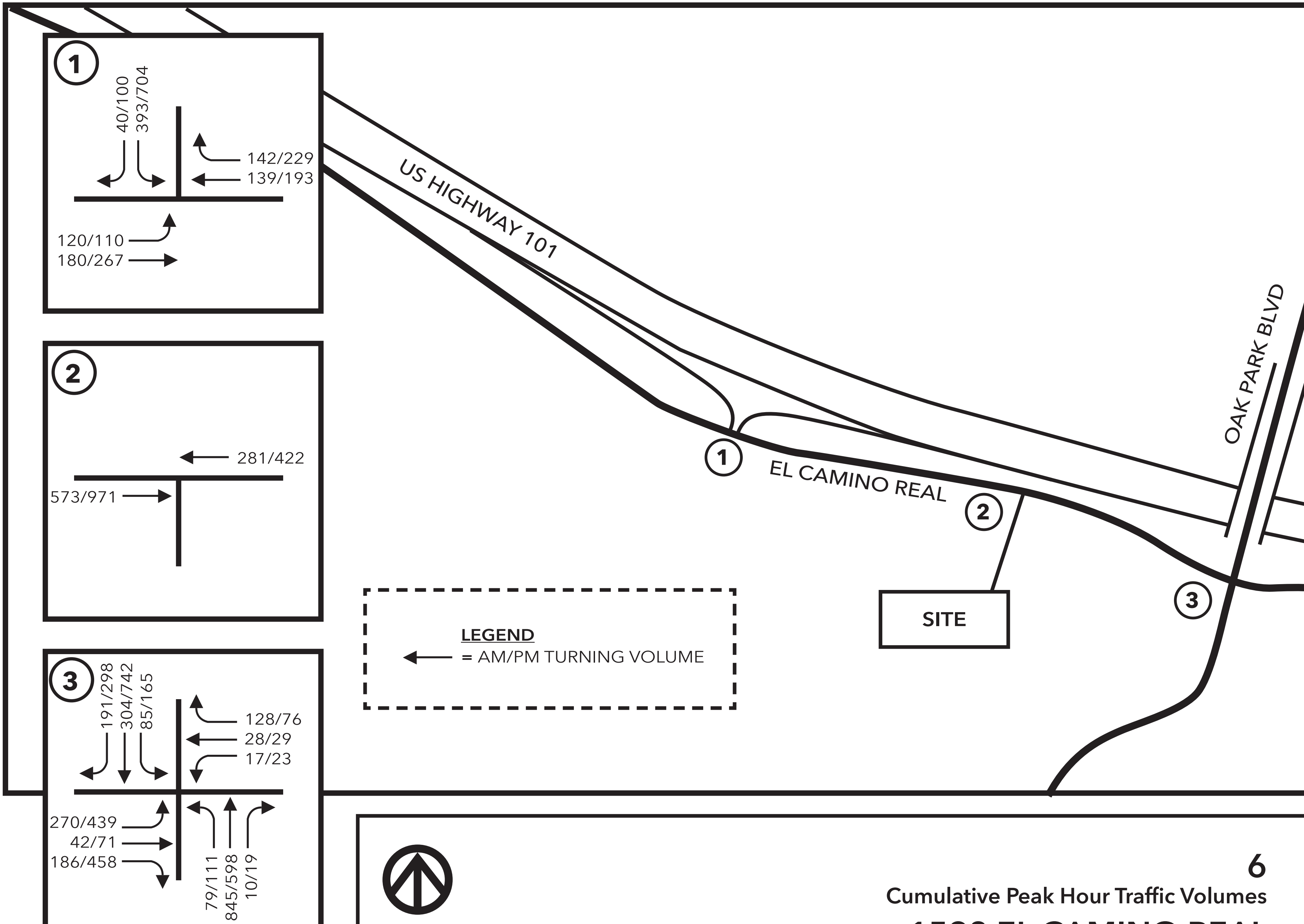
To determine the base to evaluate the project's impact on the cumulative development conditions, the cumulative development intersection levels of service were calculated for the study area intersections. The resulting intersection levels of service are summarized in Table 4.

Table 4
Cumulative Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	PM Peak Hour
El Camino Real at			
SB US Highway 101 Ramps	All-Way STOP	14.9 sec/veh – LOS B	**35.9 sec/veh – LOS E**
Oak Park Boulevard	Traffic Signal	21.9 sec/veh – LOS C	25.2 sec/veh – LOS C

With the addition of currently approved and pending projects within Grover Beach, Pismo Beach and Arroyo Grande, the intersection of El Camino Real at SB US Highway 101 Ramps is expected to operate at LOS E during the PM Peak Hour. The Oak Park Boulevard intersection and both intersections during the AM Peak Hour operate at LOS C or better. The level of service worksheets are found in Appendix B.

<u>Cumulative Conditions Mitigation</u>
Due to the poor intersection operation expected to occur with only the currently approved/pending projects being considered by the Cities of Grover Beach, Pismo Beach and Arroyo Grande improvements should be considered to improve the operation of this intersection. Currently the intersection of El Camino Real and the SB 101 ramps is forecast to operate at an unacceptable level of service of E under cumulative base conditions (pre-project). To improve the operation of the intersection a traffic signal installation should be considered to improve the operation of the intersection and reduce the potential queuing of vehicles on the SB off Ramp toward the mainline of Highway 101. With the installation of a traffic signal, the cumulative operation of the intersection would be improved to LOS B during the AM and PM peak hours. Caltrans has been contacted regarding consideration of installation of a traffic signal, but the installation of the traffic signal would include coordination between multiple jurisdictions.



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Cumulative Peak Hour Traffic Volumes

1598 EL CAMINO REAL

The cost of the installation of a traffic signal should be shared by all agencies that contribute to the reduced level of service. An intergovernmental agreement to share in the cost to improve the operation of the access to the regional highway network may need to be considered, as this intersection provides regional access to the three cities and County area. Based on the amount of projected cumulative project traffic volumes during the PM peak hour by each agency's projects, the following percentage contributions of each agency projects:

- Grover Beach 46%
- Arroyo Grande 43%
- Pismo Beach 11 %

Cumulative Plus Project Conditions Analysis

To evaluate the potential project impacts on cumulative conditions, the project traffic volumes were superimposed on cumulative volumes and the intersection levels of service recalculated. The results of that analysis are summarized in Exhibit 7 and Table 5 below. As seen in the table, the additional traffic associated with the project does not change the existing intersection levels of service. The PM Peak Hour intersection operation at El Camino Real at SB US Highway 101 Ramps would continue to operate at LOS E. All other intersections continue to operate within acceptable limits (LOS C). The level of service worksheets are found in Appendix B.

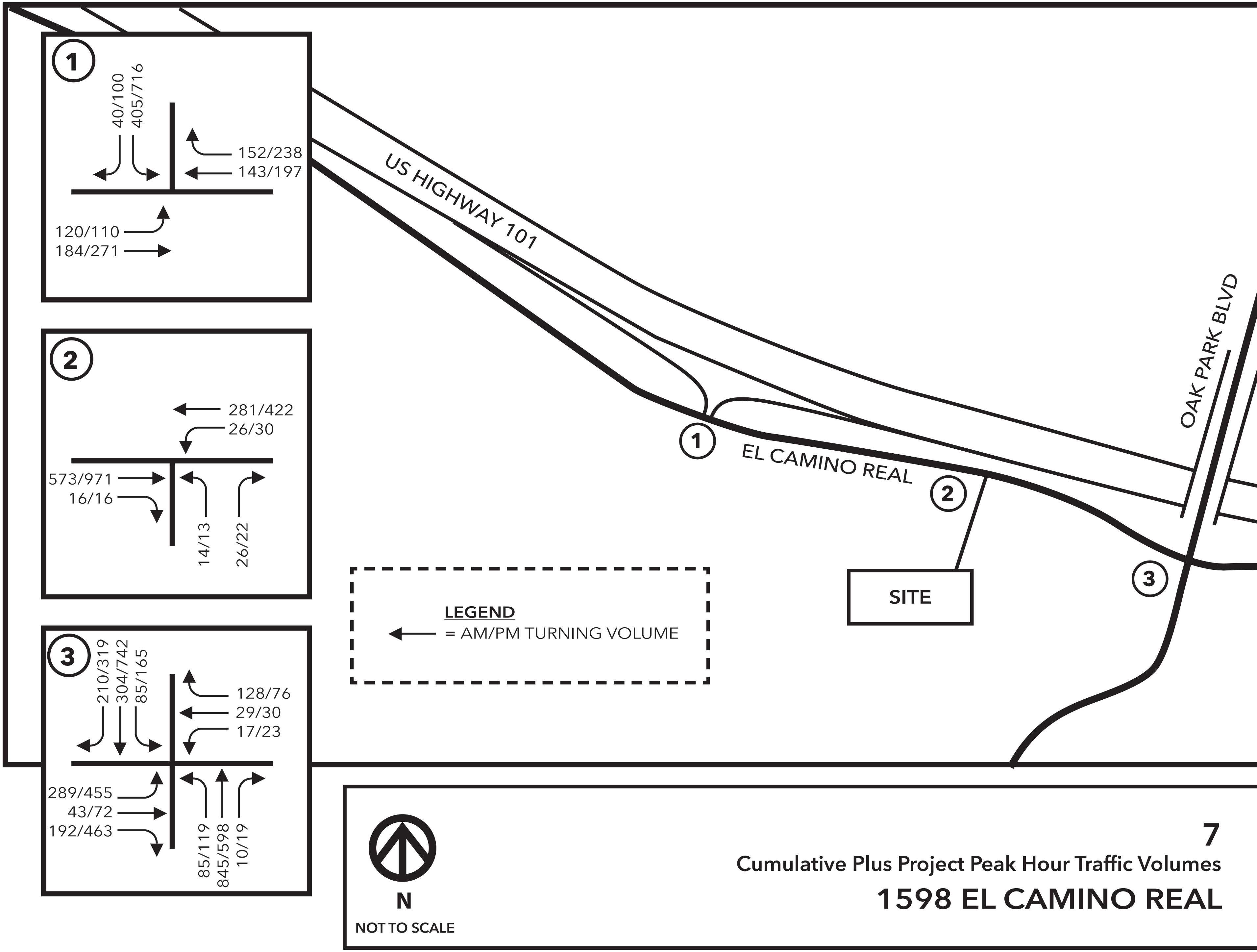
Table 5
Cumulative Plus Project Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	
El Camino Real at		Base	Plus Project
SB US Highway 101 Ramps	All-Way STOP	14.9 sec/veh – LOS B	15.5 sec/veh – LOS C
Project Site	One-Way STOP	NA	14.6 sec/veh – LOS B
Oak Park Boulevard	Traffic Signal	21.9 sec/veh – LOS C	22.6 sec/veh – LOS C
El Camino Real at		PM Peak Hour	
SB US Highway 101 Ramps	All-Way STOP	**35.9 sec/veh – LOS E**	**38.8 sec/veh – LOS E**
Project Site	One-Way STOP	NA	22.7 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	25.2 sec/veh – LOS C	26.2 sec/veh – LOS C

Cumulative Plus Project Conditions Mitigation

Due to the poor intersection operation expected to occur with project traffic and the currently approved/pending projects being considered by the Cities of Grover Beach, Pismo Beach and Arroyo Grande improvements should be considered to improve the operation of this intersection. Currently the intersection of El Camino Real and the SB 101 ramps is forecast to operate at an unacceptable level of service of E under cumulative base conditions (pre-project). The addition of project traffic would contribute further to the poor Level of Service E forecast intersection operation.

To improve the operation of the intersection a traffic signal installation should be considered and to reduce the potential queuing of vehicles on the SB off Ramp toward the mainline of Highway 101. With the installation of a traffic signal, the cumulative operation of the intersection would be improved to LOS B during the AM and PM peak hours. The level of service worksheets are found in Appendix B. Caltrans has been contacted regarding consideration of installation of a traffic signal, but not comments have been received.



7

Cumulative Plus Project Peak Hour Traffic Volumes

1598 EL CAMINO REAL

The cost of the installation of a traffic signal would be shared by the three local agencies and the project that contribute to the reduced level of service. An intergovernmental agreement to share in the cost to improve the operation of the access to the regional highway network may need to be considered, as this intersection provides regional access to the three cities. Based on the amount of projected cumulative project traffic volumes during the PM peak hour by each agency's projects and the proposed project, the following percentage contributions of each agency projects:

- Grover Beach 38.5%
- Arroyo Grande 36.0%
- Proposed Project 16.0%
- Pismo Beach 9.5 %

BUILDOUT 2035 ANALYSIS

The City of Grover Beach identified a list of 3 major development areas (Green Park, Strawberry Fields and the Grover Beach Lodge and Conference Center) that would have the potential to be developed by buildout in 2035. The list of projects can be found in Appendix F. The proposed project (1598 El Camion Real) is consistent with the General Plan and the land uses are included in the buildout of the City.

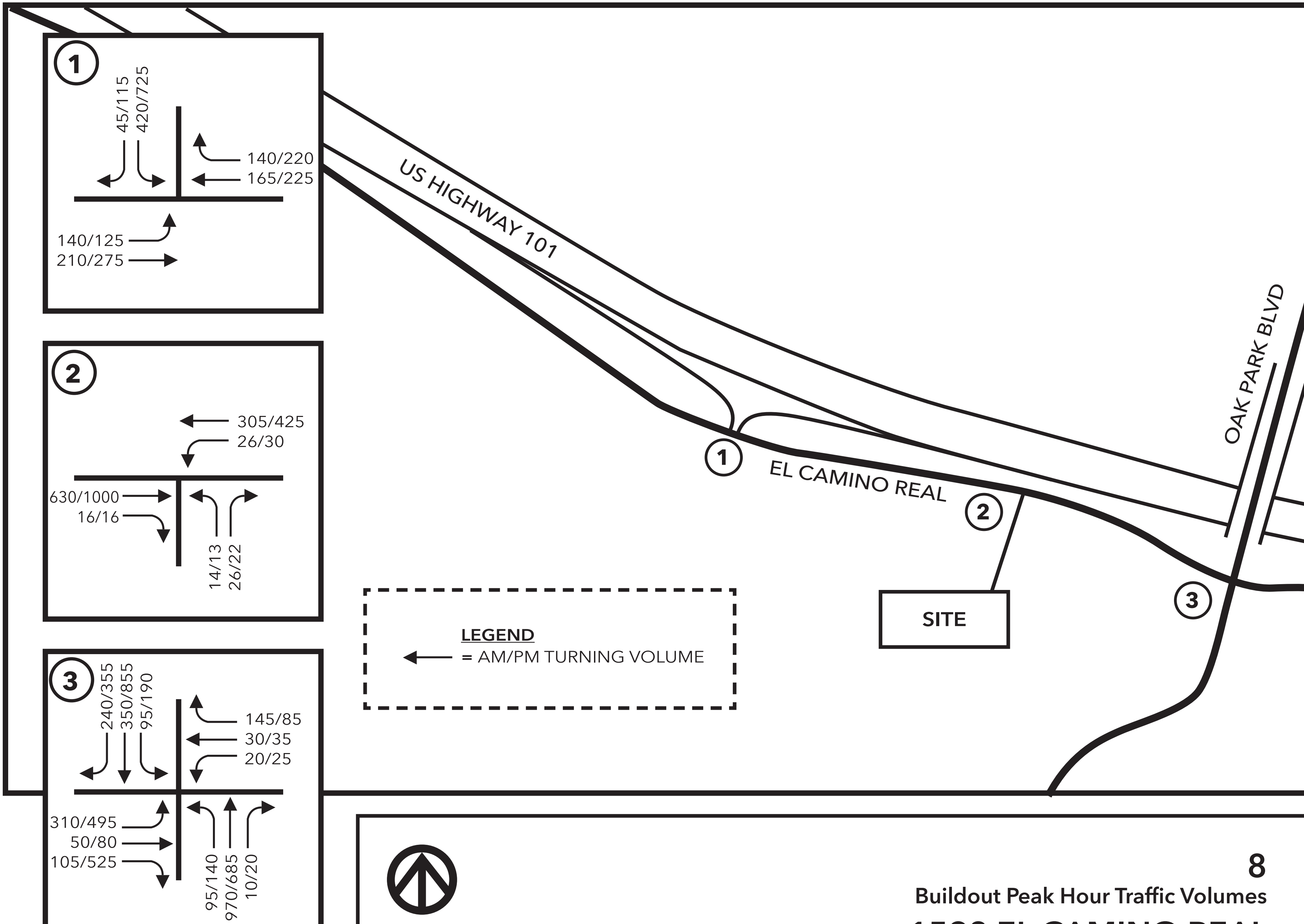
To account traffic generated between 2018 and 2035, the cumulative traffic volumes shown in Exhibit 6 were increased by 15% (one percent per year from 2020 plus the specific project traffic volumes for 2018-2020) to develop the potential traffic conditions anticipated in 2035. The buildout volumes (including project related traffic) are summarized in Exhibit 6.

Under buildout development conditions, the intersection levels of service were calculated for the study area intersections. The resulting intersection levels of service are summarized in Table 6.

Table 6
Buildout Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	PM Peak Hour
El Camino Real at			
SB US Highway 101 Ramps	All-Way STOP	17.8 sec/veh – LOS C	**42.2 sec/veh – LOS E**
SB US Highway 101 Ramps	Traffic Signal	15.0 sec/veh – LOS B	11.7 sec/veh – LOS B
Project Site	One-Way STOP	14.8 sec/veh – LOS B	23.6 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	24.3 sec/veh – LOS C	29.8 sec/veh – LOS C

As seen in this table, the PM Peak Hour intersection level of service for El Camino Real at SB US Highway 101 Ramps would be LOS E at Buildout without the addition of a traffic signal. By Buildout, a traffic signal would be installed at the intersection of SB US Highway 101 ramps at El Camino Real and the resulting intersection level of service would be within acceptable limits.



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Buildout Peak Hour Traffic Volumes

1598 EL CAMINO REAL

PARKING DEMAND ANALYSIS

The proposed project has 174 parking spaces (plus 5 motorcycle spaces) for the hotel and restaurant uses. Separate parking both on-street and off street is provided for the residential uses. Based on the City's parking requirements, a total of 173 spaces are required (the hotel would require 159 spaces plus 33 spaces for the restaurant uses less 10% (or 19 spaces)). This analysis focuses on the operation and adequacy of the hotel and restaurant uses.

The Urban Land Institute (ULI) has time of day and month of year parking factors for a variety of uses. ULI has gathered field data over many years and has developed time of day, day of week and month of year actual parking demand factors for a variety of land uses. The ULI data is used nationally by design professionals, municipal planners, developers and shopping center operators as a reliable resource for right-sizing parking supplies for commercial developments. The ULI data shows monthly variations of peak parking demands and shared parking concepts between land uses throughout the year as well as time of day variations. The following parking analysis is conservative, as no reductions were used that normally are expected between restaurants patrons and hotel uses. Typically, a 10-30% reduction in restaurant parking is found when an office building or hotel use is immediately adjacent to the restaurant.

Based on the proposed uses, the peak parking demand would occur on a Saturday night in August with 178 spaces occupied at 8 PM. During the remainder of the peak day, additional parking would be available on site as the parking demand ranges from 133-173 spaces per hour throughout the day. Attached to the rear of this report are the hourly variation of the parking demands on the peak day of the peak month and the monthly variation throughout the year.

On a typical weekday, the peak parking demand 158 spaces would occur during July and August. During the remainder of the year, the peak weekday parking demands are less. On any given weekday throughout the year, there would be a minimum of 18 parking spaces or more would be vacant. The parking demands by month are attached to the rear of this report. Based on the proposed parking supply of 176 parking spaces (plus 5 motorcycle spaces), an adequate on-site parking supply is provided. A summary of the peak parking demands for the project are shown below. The detailed parking demand worksheets are in Appendix G.

Table 7
Monthly Peak One Hour Parking Demand Variation

	Supply	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Late Dec
Weekday Peak	179	141	155	157	157	144	143	158	158	124	126	125	96	157
Weekend Peak	179	158	172	176	176	163	163	177	178	141	143	142	110	176

Based on the allowable reduction in total parking by the City and the ULI operational analysis, the proposed project parking supply of 174 spaces (plus 5 motorcycle spaces) would be adequate. No off-site parking impacts would be expected.

SITE ACCESS AND CIRCULATION

Access to the project site is proposed via a 30-foot driveway from El Camino Real. Exiting the project site, there is a separate left and right turn lane. Once on-site, one travel lane in each direction (24') is provided at the entrance connecting the hotels and restaurant. Based on the project trip generation of

42 and 46 vehicles inbound during the peak AM and PM hours (less than one vehicle per minute), respectively, and 40 and 35 vehicles outbound during the peak AM and PM hours (less than one vehicle per minute), respectively, the access and on-site circulation would be acceptable. An emergency access connection to the shopping center to the south of the site is proposed, as well as to Oak Park Boulevard. No significant queuing of vehicles on-site would be expected.

Queuing Impacts Oak Park Boulevard Intersection
The City identified a concern with the location of the project driveway along El Camino Real being potentially impacted by the queue of eastbound traffic on El Camino Real. The distance between the limit line on El Camino Real at Oak Park Boulevard to the proposed project driveway is 516 feet. The distance to the first adjacent shopping center driveway is 247 feet and 415 to the second shopping Center driveway. During the existing traffic count data collection, the number of vehicles queue or backed up along this approach to the intersection was observed. During the AM peak hour, the queue length was 154 feet while during the PM peak hour the queue length was 308 feet. For this analysis, the queuing impacts during the PM peak hour were evaluated as a worst case. The Highway Capacity Manual simulation model, calculated queue lengths (found in Appendix B) as well as the intersection levels of service. The existing observed queue length was compared to the calculated queue length. The resulting factor was applied to the various analysis scenario queue lengths to calibrate the model queue lengths to actual queue lengths. The various queue lengths for each analysis scenario are summarized in Table 8 below.

Table 8
Vehicle Queuing on El Camino Real West of Oak Park Boulevard Traffic Signal

	Queuing Distance Available	Existing PM	Existing Plus Project Phase 1 PM	Cumulative PM	Cumulative Plus Project PM	Buildout PM
Queue Length (Actual)	516 feet	308 feet				
Calculated		278 feet	291+ feet	370+ feet	392+ feet	427+ feet
Adjusted (Actual/Calculated)		308 feet	322 feet	410 feet	435 feet	474 feet
Clear Distance to Project Driveway		208 feet	194 feet	106 feet	81 feet	42 feet

As seen in this table, the queue of traffic under each analysis scenario is not anticipated to block or impact the proposed project driveway access, even at Buildout. No project impacts are expected.

Frontage Improvements
Adjacent to the project site, El Camino Real has a two-way left turn lane for storage for left turning vehicles entering the project site from the south. The project proposes to improve the frontage of the project site along El Camino Real to install curb, gutter and sidewalk connecting existing sidewalks to the north and south of the project site. The resultant roadway pavement width would allow for a two southbound curb lanes, a center turn lane that is full width at the project driveway and tapering to the north and through lane in the opposite direction, matching the existing roadway cross section at the southern property line of the project. Based on the proposed improvements to El Camino Real, adequate sight distance is provided for the site access and left turn queuing is not anticipated to impact the operation of the existing driveway to the shopping center to the south of the project site based on the potential for 26-30 left turning vehicles during the peak hours (less than one per minute).

MITIGATION MEASURES

This traffic impact analysis evaluated various potential traffic related impacts for intersection operation, on-site parking, access, queuing and frontage improvements that would be anticipated with the addition of the project traffic volumes, approved/pending projects and at buildout.

As summarized in this report, the on-site parking proposed is adequate to meet the City parking requirements and demand volumes, the proposed site access and emergency access points have been designed to meet the city's requirements, and frontage improvements to improve pedestrian circulation have been planned. No queuing impacts would be expected due to more than 42 feet (at Buildout) of clear distance between the back of a potential vehicle queue from the Oak Park Boulevard intersection to the project driveway location. No additional project impacts would be expected.

The intersection operation at the El Camino Real intersection with the SB US Highway 101 ramps is forecast not to meet the City's required Level of Service (LOS) C under the base cumulative (LOS E) and buildout (LOS E) scenarios without project traffic. The project traffic does contribute to the future poor intersection level of service. To mitigate the potential cumulative and project impacts, the installation of a traffic signal should be considered at this intersection. Coordination with Caltrans, the City of Grover Beach, Pismo Beach, Arroyo Grande and or County of San Luis Obispo should be considered. Currently, the intersection operates at LOS B during the AM peak hour and LOS C during the PM Peak Hour, while cumulatively without the project the intersection operation fails to meet the City of Grover Beach level of service standards. The cumulative and buildout signalized intersection levels of service with and without the proposed project are summarized in Table 9. The level of service worksheets are found in Appendix B.

Table 9
Signalized Intersection Operation El Camino Real at SB US Highway 101 Ramps

		AM Peak Hour	
El Camino Real at		Base	Plus Project
SB US Highway 101 Ramps	Cumulative	10.6 sec/veh – LOS B	11.5 sec/veh – LOS B
	Buildout	NA	15.0 sec/veh – LOS B
		PM Peak Hour	
		Base	Plus Project
	Cumulative	10.3 sec/veh – LOS B	10.7 sec/veh – LOS B
	Buildout	NA	11.7 sec/veh – LOS B

LEGEND

1 - Existing Conditions -- 308 feet
2 - Cumulative Conditions -- 410 feet
3 - Cumulative Plus Project Conditions -- 435 feet
4 - Buildout Plus Project Conditions -- 474 feet
5 - Driveway -- 516 feet

N
NOT TO SCALE

9

PM Peak Hour Queuing Distance

1598 EL CAMINO REAL

APPENDICIES

APPENDIX A

EXISTING TRAFFIC COUNT DATA

Arroyo Grande 7:00-9:00AM & 4:00-6:00PM **CARS **

CITYTRAFFIC COUNTERS

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PO Box 1313
Glendora, CA 91740
info@ctcounters.com

INTERSECTION WORKSHEET

INTERSECTION: 101 Southbound On/Off Ramps/El Camino Real

DATE: WED 5/16/2018

COUNTER NAME: Erica

WEATHER: SUNNY

COUNTER #: 2625

SIGNALIZED: NO

N/S STREET: 101 SB ON-OFF RAMPS

101 SB OFF-RAMP

101 SB ON-RAMP

STOP STOP

E/W STREET: EL CAMINO REAL

COMMENTS:

Any areas that traffic is diverted: (i.e. Gas station, shopping center?):

Left turn signal: North leg ___ South leg ___ East leg ___ West leg ___

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File Name : 101SBRamps_ElCaminoReal
Site Code : 00000000
Start Date : 5/16/2018
Page No : 1

Groups Printed- Vehicles

	101 SB On/Off Ramps Southbound			El Camino Real Westbound			Northbound			El Camino Real Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	32	0	5	0	5	29	0	0	0	32	10	0	113
07:15 AM	46	0	3	0	14	31	0	0	0	27	15	0	136
07:30 AM	62	0	8	0	20	44	0	0	0	34	19	0	187
07:45 AM	83	0	7	0	30	36	0	0	0	23	20	0	199
Total	223	0	23	0	69	140	0	0	0	116	64	0	635
08:00 AM	92	0	8	0	26	35	0	0	0	27	33	0	221
08:15 AM	76	0	10	0	14	26	0	0	0	21	31	0	178
08:30 AM	94	0	5	0	23	22	0	0	0	21	23	0	188
08:45 AM	96	0	3	0	22	33	0	0	0	13	40	0	207
Total	358	0	26	0	85	116	0	0	0	82	127	0	794
04:00 PM	167	0	16	0	22	45	0	0	0	4	45	0	299
04:15 PM	182	0	15	0	25	38	0	0	0	17	49	0	326
04:30 PM	150	0	18	0	33	37	0	0	0	16	46	0	300
04:45 PM	169	0	24	0	30	47	0	0	0	19	53	0	342
Total	668	0	73	0	110	167	0	0	0	56	193	0	1267
05:00 PM	164	0	17	0	34	46	0	0	0	16	49	0	326
05:15 PM	168	0	27	0	27	51	0	0	0	16	47	0	336
05:30 PM	152	0	17	0	20	39	0	0	0	16	49	0	293
05:45 PM	155	0	28	0	29	40	0	0	0	16	37	0	305
Total	639	0	89	0	110	176	0	0	0	64	182	0	1260
Grand Total	1888	0	211	0	374	599	0	0	0	318	566	0	3956
Apprch %	89.9	0	10.1	0	38.4	61.6	0	0	0	36	64	0	
Total %	47.7	0	5.3	0	9.5	15.1	0	0	0	8	14.3	0	

CITY TRAFFIC COUNTERS

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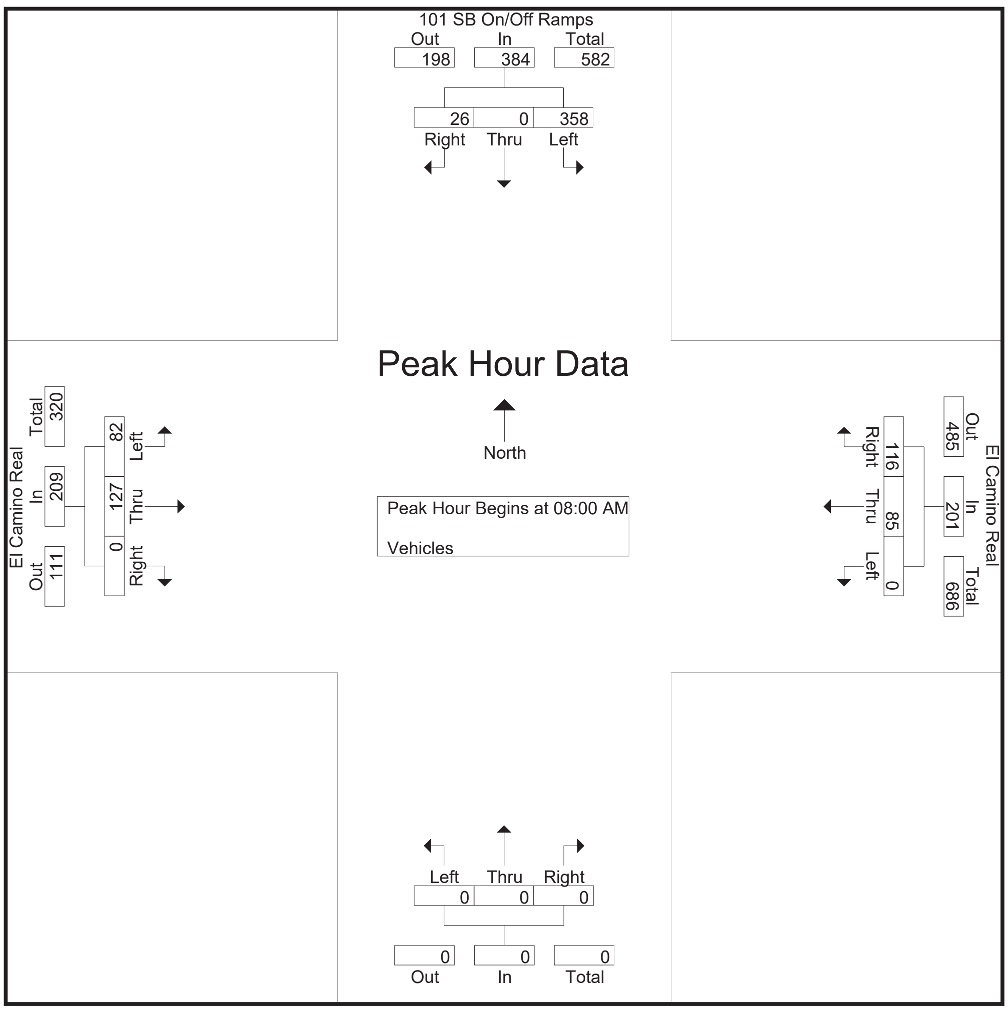
File Name : 101SBRamps_ElCaminoReal
Site Code : 00000000
Start Date : 5/16/2018
Page No : 2

	101 SB On/Off Ramps Southbound				El Camino Real Westbound				Northbound				El Camino Real 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 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	92	0	8	**100**	0	**26**	**35**	**61**	0	0	0	0	**27**	33	0	**60**	**221**
08:15 AM	76	0	**10**	86	0	14	26	40	0	0	0	0	21	31	0	52	178
08:30 AM	94	0	5	99	0	23	22	45	0	0	0	0	21	23	0	44	188
08:45 AM	**96**	0	3	99	0	22	33	55	0	0	0	0	13	**40**	0	53	207
Total Volume	358	0	26	384	0	85	116	201	0	0	0	0	82	127	0	209	794
% App. Total	93.2	0	6.8		0	42.3	57.7		0	0	0		39.2	60.8	0		
PHF	.932	.000	.650	.960	.000	.817	.829	.824	.000	.000	.000	.000	.759	.794	.000	.871	.898



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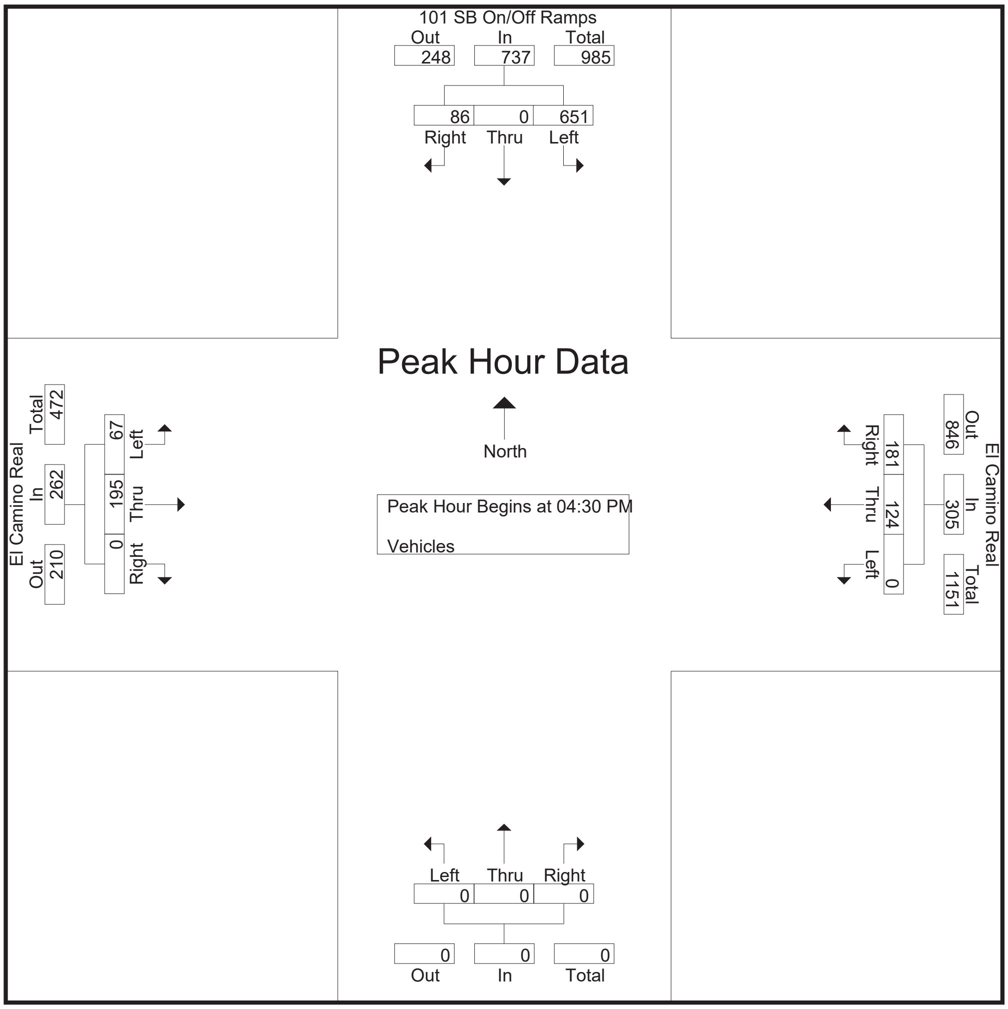
File Name : 101SBRamps_ElCaminoReal
Site Code : 00000000
Start Date : 5/16/2018
Page No : 3

	101 SB On/Off Ramps Southbound				**El Camino Real Westbound**				**Northbound**				**El Camino Real 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 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	150	0	18	168	0	33	37	70	0	0	0	0	16	46	0	62	300
04:45 PM	**169**	0	24	193	0	30	47	77	0	0	0	0	**19**	**53**	0	**72**	**342**
05:00 PM	164	0	17	181	0	**34**	46	**80**	0	0	0	0	16	49	0	65	326
05:15 PM	168	0	**27**	**195**	0	27	**51**	78	0	0	0	0	16	47	0	63	336
Total Volume	651	0	86	737	0	124	181	305	0	0	0	0	67	195	0	262	1304
% App. Total	88.3	0	11.7		0	40.7	59.3		0	0	0		25.6	74.4	0		
PHF	.963	.000	.796	.945	.000	.912	.887	.953	.000	.000	.000	.000	.882	.920	.000	.910	.953



Arroyo Grande 7:00-9:00AM & 4:00-6:00PM **CARS **

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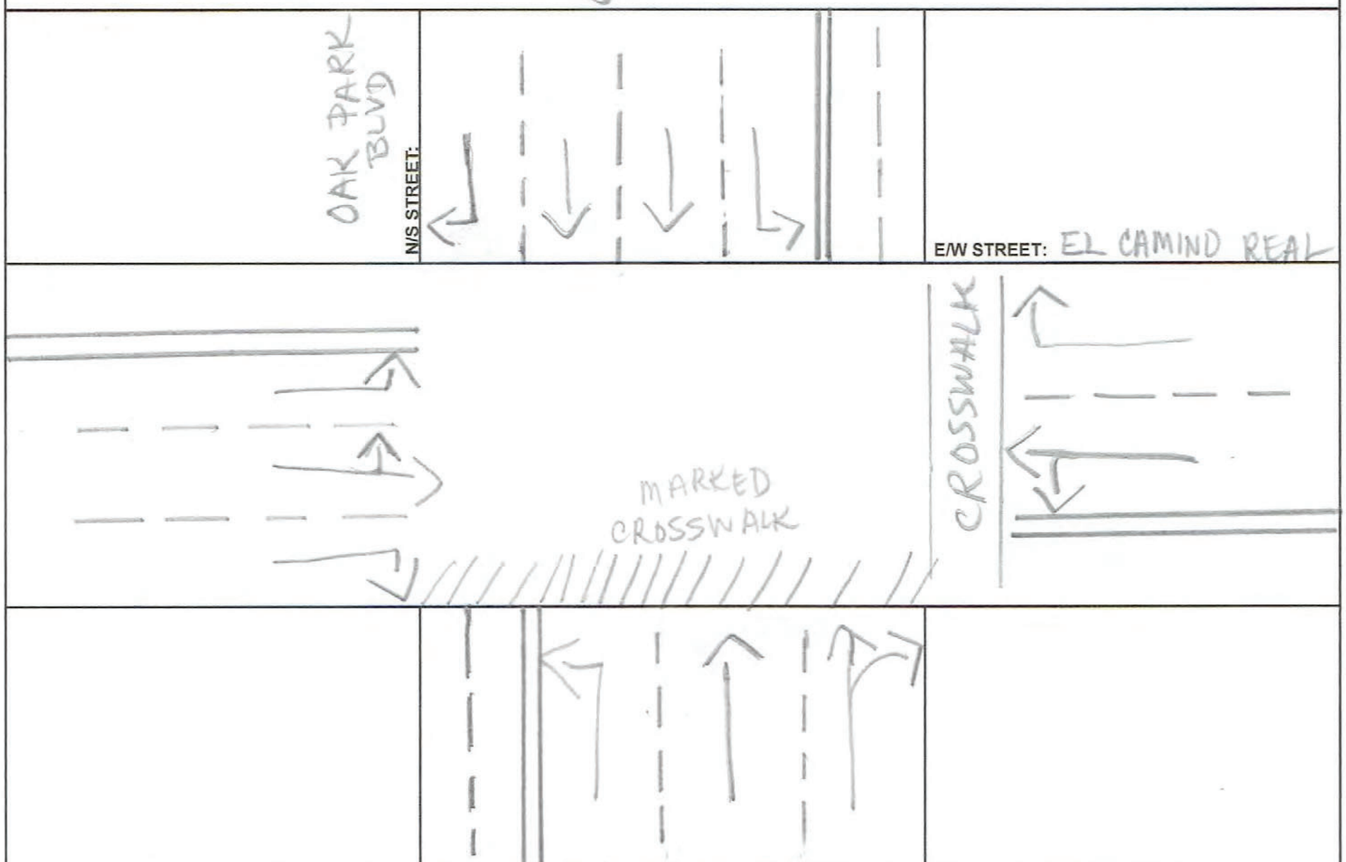
INTERSECTION WORKSHEET

INTERSECTION: Oak Park Blvd/El Camino Real DATE: WED 5/16/2018

COUNTER NAME: Mike/Justin WEATHER: SUNNY

COUNTER #: 2105/1902 SIGNALIZED: yes



COMMENTS:

Any areas that traffic is diverted: (i.e. Gas station, shopping center?):

Left turn signal: North leg ✓ South leg ✓ East leg ✓ West leg ✓

CITY TRAFFIC COUNTERS

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File Name : OakPark_ElCaminoReal
Site Code : 00000000
Start Date : 5/16/2018
Page No : 1

Groups Printed- Vehicles

	Oak Park Blvd Southbound			El Camino Real Westbound			Oak Park Blvd Northbound			El Camino Real Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	9	38	23	2	2	13	9	159	0	27	5	11	298
07:15 AM	9	49	28	3	2	20	16	173	2	35	7	24	368
07:30 AM	13	53	44	6	5	26	19	242	3	42	10	33	496
07:45 AM	26	56	41	4	11	45	11	240	3	56	9	49	551
Total	57	196	136	15	20	104	55	814	8	160	31	117	1713
08:00 AM	27	74	43	2	6	28	14	167	3	61	12	53	490
08:15 AM	19	76	26	5	2	29	8	158	1	60	8	37	429
08:30 AM	20	51	32	1	9	45	7	208	3	68	6	45	495
08:45 AM	18	73	31	5	3	24	17	186	0	79	8	47	491
Total	84	274	132	13	20	126	46	719	7	268	34	182	1905
04:00 PM	33	157	49	0	5	16	26	174	7	82	26	111	686
04:15 PM	42	134	45	4	3	29	19	142	6	91	20	123	658
04:30 PM	48	173	55	4	5	13	24	139	7	87	18	107	680
04:45 PM	33	162	50	5	7	27	30	153	2	92	14	129	704
Total	156	626	199	13	20	85	99	608	22	352	78	470	2728
05:00 PM	42	181	57	9	9	19	19	145	5	74	14	115	689
05:15 PM	42	183	56	5	4	17	15	120	5	101	22	91	661
05:30 PM	24	170	47	5	1	13	11	142	7	80	19	97	616
05:45 PM	37	159	53	4	4	6	15	133	3	86	12	94	606
Total	145	693	213	23	18	55	60	540	20	341	67	397	2572
Grand Total	442	1789	680	64	78	370	260	2681	57	1121	210	1166	8918
Apprch %	15.2	61.5	23.4	12.5	15.2	72.3	8.7	89.4	1.9	44.9	8.4	46.7	
Total %	5	20.1	7.6	0.7	0.9	4.1	2.9	30.1	0.6	12.6	2.4	13.1	

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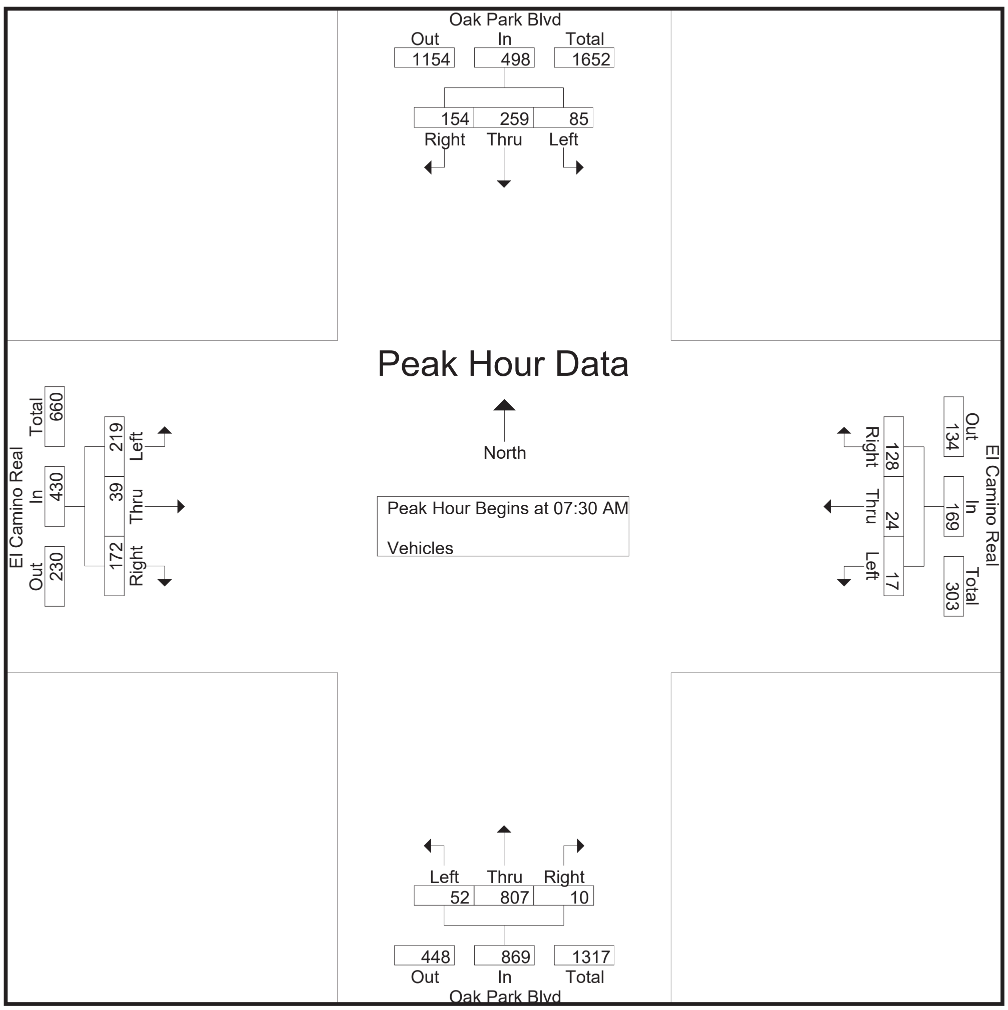
File Name : OakPark_ElCaminoReal
Site Code : 00000000
Start Date : 5/16/2018
Page No : 2

	Oak Park Blvd Southbound				El Camino Real Westbound				Oak Park Blvd Northbound				El Camino Real 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 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	13	53	**44**	110	**6**	5	26	37	**19**	**242**	**3**	**264**	42	10	33	85	496
07:45 AM	26	56	41	123	4	**11**	**45**	**60**	11	240	3	254	56	9	49	114	**551**
08:00 AM	**27**	74	43	**144**	2	6	28	36	14	167	3	184	**61**	**12**	**53**	**126**	490
08:15 AM	19	**76**	26	121	5	2	29	36	8	158	1	167	60	8	37	105	429
Total Volume	85	259	154	498	17	24	128	169	52	807	10	869	219	39	172	430	1966
% App. Total	17.1	52	30.9		10.1	14.2	75.7		6	92.9	1.2		50.9	9.1	40		
PHF	.787	.852	.875	.865	.708	.545	.711	.704	.684	.834	.833	.823	.898	.813	.811	.853	.892



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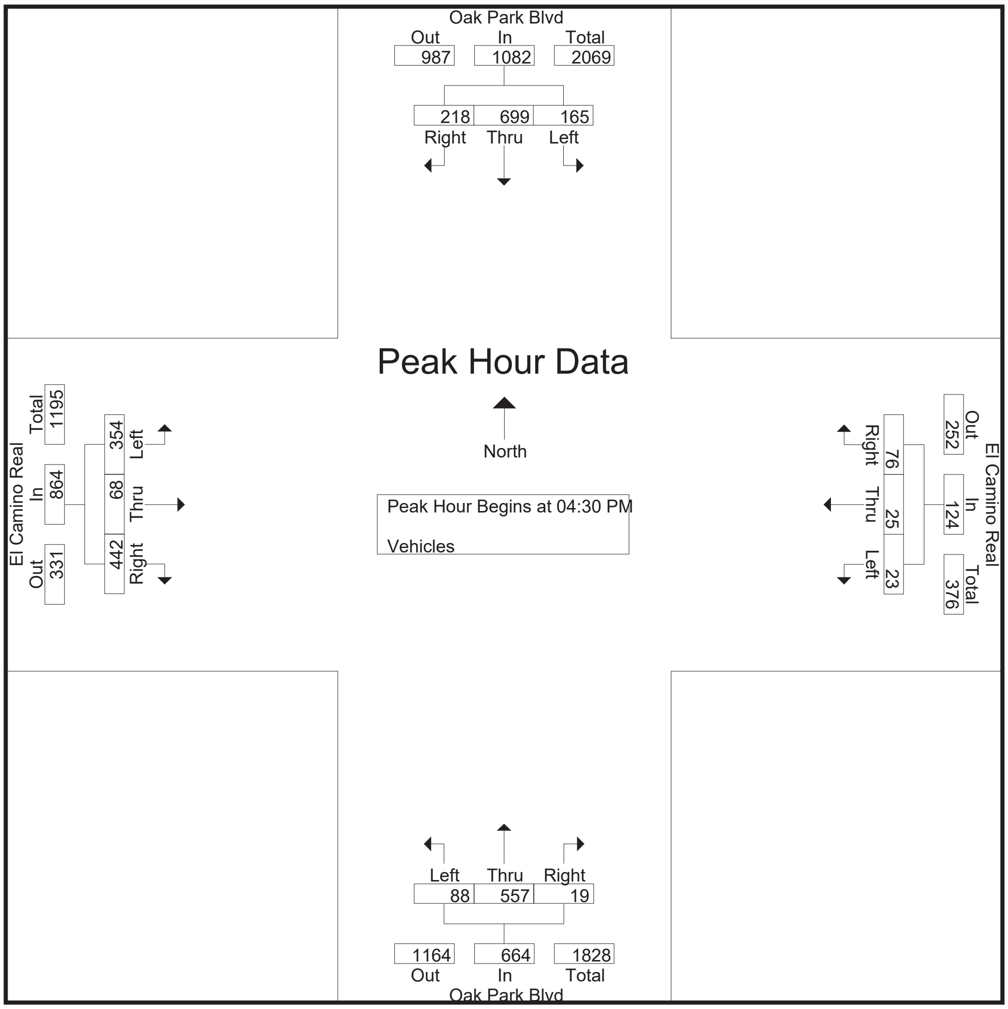
File Name : OakPark_ElCaminoReal
Site Code : 00000000
Start Date : 5/16/2018
Page No : 3

	Oak Park Blvd Southbound				El Camino Real Westbound				Oak Park Blvd Northbound				El Camino Real 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 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**48**	173	55	276	4	5	13	22	24	139	**7**	170	87	18	107	212	680
04:45 PM	33	162	50	245	5	7	**27**	**39**	**30**	**153**	2	**185**	92	14	**129**	**235**	**704**
05:00 PM	42	181	**57**	280	**9**	**9**	19	37	19	145	5	169	74	14	115	203	689
05:15 PM	42	**183**	56	**281**	5	4	17	26	15	120	5	140	**101**	**22**	91	214	661
Total Volume	165	699	218	1082	23	25	76	124	88	557	19	664	354	68	442	864	2734
% App. Total	15.2	64.6	20.1		18.5	20.2	61.3		13.3	83.9	2.9		41	7.9	51.2		
PHF	.859	.955	.956	.963	.639	.694	.704	.795	.733	.910	.679	.897	.876	.773	.857	.919	.971



CITY TRAFFIC COUNTERS
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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018
Page No : 1

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
7:01:00 AM	0	0	2	2
7:01:15 AM	0	0	0	0
7:01:30 AM	3	3	0	3
7:01:45 AM	0	1	1	2
7:02:00 AM	0	0	0	0
7:02:15 AM	0	0	0	0
7:02:30 AM	1	1	0	1
7:02:45 AM	3	2	0	2
7:03:00 AM	0	0	0	0
7:03:15 AM	0	1	0	1
7:03:30 AM	0	0	0	0
7:03:45 AM	0	0	0	0
7:04:00 AM	0	0	0	0
7:04:15 AM	0	1	0	1
7:04:30 AM	1	1	0	1
7:04:45 AM	1	0	0	0
7:05:00 AM	1	1	1	2
7:05:15 AM	4	3	0	3
7:05:30 AM	3	1	1	2
7:05:45 AM	0	0	0	0
7:06:00 AM	0	0	0	0
7:06:15 AM	0	3	0	3
7:06:30 AM	0	0	0	0
7:06:45 AM	0	0	0	0
7:07:00 AM	1	1	0	1
7:07:15 AM	1	0	0	0
7:07:30 AM	0	0	0	0
7:07:45 AM	0	0	1	1
7:08:00 AM	1	1	0	1
7:08:15 AM	0	0	1	1
7:08:30 AM	0	0	0	0
7:08:45 AM	0	0	0	0
7:09:00 AM	0	0	0	0
7:09:15 AM	0	0	0	0
7:09:30 AM	1	1	0	1
7:09:45 AM	0	1	1	2
7:10:00 AM	0	0	0	0
7:10:15 AM	0	0	0	0
7:10:30 AM	0	0	0	0
7:10:45 AM	0	0	0	0
7:11:00 AM	2	2	0	2
7:11:15 AM	0	0	0	0
7:11:30 AM	0	0	0	0
7:11:45 AM	1	1	0	1
7:12:00 AM	3	3	1	4
7:12:15 AM	2	0	0	0
7:12:30 AM	2	0	0	0
7:12:45 AM	0	0	0	0
7:13:00 AM	0	1	0	1
7:13:15 AM	0	0	2	2
7:13:30 AM	0	1	0	1
7:13:45 AM	0	0	1	1
7:14:00 AM	1	1	0	1
7:14:15 AM	0	0	0	0
7:14:30 AM	1	1	0	1
7:14:45 AM	3	2	0	2
7:15:00 AM	0	0	0	0
7:15:15 AM	1	1	0	1
7:15:30 AM	1	0	0	0
7:15:45 AM	0	1	0	1
7:16:00 AM	1	1	0	1
7:16:15 AM	0	0	1	1

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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018
Page No : 2

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
7:16:30 AM	3	3	0	3
7:16:45 AM	1	1	0	1
7:17:00 AM	2	1	0	1
7:17:15 AM	0	1	0	1
7:17:30 AM	0	0	0	0
7:17:45 AM	3	3	0	3
7:18:00 AM	0	0	3	3
7:18:15 AM	0	0	0	0
7:18:30 AM	0	0	0	0
7:18:45 AM	0	0	0	0
7:19:00 AM	0	0	0	0
7:19:15 AM	0	0	0	0
7:19:30 AM	0	0	0	0
7:19:45 AM	0	0	0	0
7:20:00 AM	1	1	0	1
7:20:15 AM	1	1	0	1
7:20:30 AM	0	1	0	1
7:20:45 AM	1	1	0	1
7:21:00 AM	2	1	0	1
7:21:15 AM	2	0	0	0
7:21:30 AM	5	3	0	3
7:21:45 AM	0	0	2	2
7:22:00 AM	0	0	0	0
7:22:15 AM	0	0	0	0
7:22:30 AM	1	1	0	1
7:22:45 AM	3	2	0	2
7:23:00 AM	2	1	0	1
7:23:15 AM	0	0	0	0
7:23:30 AM	0	0	0	0
7:23:45 AM	0	0	0	0
7:24:00 AM	0	0	0	0
7:24:15 AM	1	2	0	2
7:24:30 AM	0	0	0	0
7:24:45 AM	0	0	0	0
7:25:00 AM	0	1	0	1
7:25:15 AM	0	0	0	0
7:25:30 AM	1	2	0	2
7:25:45 AM	0	0	1	1
7:26:00 AM	0	2	0	2
7:26:15 AM	3	3	1	4
7:26:30 AM	2	0	0	0
7:26:45 AM	0	0	1	1
7:27:00 AM	2	2	0	2
7:27:15 AM	4	2	0	2
7:27:30 AM	4	1	0	1
7:27:45 AM	2	2	1	3
7:28:00 AM	3	1	0	1
7:28:15 AM	0	0	0	0
7:28:30 AM	0	0	1	1
7:28:45 AM	0	0	0	0
7:29:00 AM	1	3	0	3
7:29:15 AM	0	0	0	0
7:29:30 AM	1	1	0	1
7:29:45 AM	2	1	0	1
7:30:00 AM	0	3	1	4
7:30:15 AM	1	1	0	1
7:30:30 AM	1	0	0	0
7:30:45 AM	1	0	0	0
7:31:00 AM	2	1	0	1
7:31:15 AM	0	1	1	2
7:31:30 AM	0	1	0	1
7:31:45 AM	0	1	0	1

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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018
Page No : 3

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
7:32:00 AM	2	1	0	1
7:32:15 AM	1	1	0	1
7:32:30 AM	1	1	0	1
7:32:45 AM	0	0	1	1
7:33:00 AM	1	1	0	1
7:33:15 AM	1	0	0	0
7:33:30 AM	0	1	0	1
7:33:45 AM	0	0	0	0
7:34:00 AM	1	1	0	1
7:34:15 AM	0	0	3	3
7:34:30 AM	4	4	0	4
7:34:45 AM	4	1	0	1
7:35:00 AM	0	1	1	2
7:35:15 AM	1	1	0	1
7:35:30 AM	2	2	0	2
7:35:45 AM	1	0	0	0
7:36:00 AM	0	1	0	1
7:36:15 AM	1	1	0	1
7:36:30 AM	3	2	0	2
7:36:45 AM	0	1	0	1
7:37:00 AM	0	0	1	1
7:37:15 AM	1	1	0	1
7:37:30 AM	1	0	0	0
7:37:45 AM	3	2	0	2
7:38:00 AM	0	2	1	3
7:38:15 AM	1	1	0	1
7:38:30 AM	1	1	0	1
7:38:45 AM	0	2	1	3
7:39:00 AM	2	1	0	1
7:39:15 AM	5	3	0	3
7:39:30 AM	6	2	0	2
7:39:45 AM	7	1	0	1
7:40:00 AM	0	0	0	0
7:40:15 AM	2	2	0	2
7:40:30 AM	2	1	0	1
7:40:45 AM	3	1	0	1
7:41:00 AM	3	1	0	1
7:41:15 AM	0	3	0	3
7:41:30 AM	0	0	1	1
7:41:45 AM	3	3	0	3
7:42:00 AM	3	0	0	0
7:42:15 AM	4	2	0	2
7:42:30 AM	0	0	2	2
7:42:45 AM	4	4	2	6
7:43:00 AM	6	3	0	3
7:43:15 AM	5	0	0	0
7:43:30 AM	0	3	0	3
7:43:45 AM	7	1	0	1
7:44:00 AM	0	0	1	1
7:44:15 AM	0	0	1	1
7:44:30 AM	0	1	0	1
7:44:45 AM	1	0	0	0
7:45:00 AM	2	1	0	1
7:45:15 AM	1	1	0	1
7:45:30 AM	3	3	0	3
7:45:45 AM	3	1	0	1
7:46:00 AM	4	3	0	3
7:46:15 AM	0	1	0	1
7:46:30 AM	0	3	1	4
7:46:45 AM	4	3	0	3
7:47:00 AM	3	0	0	0
7:47:15 AM	3	1	0	1

CITY TRAFFIC COUNTERS
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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018
Page No : 4

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
7:47:30 AM	3	0	0	0
7:47:45 AM	0	0	0	0
7:48:00 AM	1	1	0	1
7:48:15 AM	1	1	0	1
7:48:30 AM	2	1	0	1
7:48:45 AM	0	1	0	1
7:49:00 AM	2	2	0	2
7:49:15 AM	2	0	0	0
7:49:30 AM	4	3	0	3
7:49:45 AM	4	2	0	2
7:50:00 AM	0	0	2	2
7:50:15 AM	1	1	0	1
7:50:30 AM	3	2	0	2
7:50:45 AM	0	0	1	1
7:51:00 AM	1	2	0	2
7:51:15 AM	4	3	0	3
7:51:30 AM	3	1	0	1
7:51:45 AM	0	2	0	2
7:52:00 AM	3	3	0	3
7:52:15 AM	2	1	0	1
7:52:30 AM	2	1	0	1
7:52:45 AM	2	0	0	0
7:53:00 AM	1	0	1	1
7:53:15 AM	5	4	0	4
7:53:30 AM	7	2	0	2
7:53:45 AM	5	1	0	1
7:54:00 AM	0	0	1	1
7:54:15 AM	2	2	0	2
7:54:30 AM	4	2	0	2
7:54:45 AM	8	4	0	4
7:55:00 AM	7	0	0	0
7:55:15 AM	0	0	1	1
7:55:30 AM	2	2	1	3
7:55:45 AM	0	0	0	0
7:56:00 AM	1	1	0	1
7:56:15 AM	2	2	0	2
7:56:30 AM	0	0	0	0
7:56:45 AM	0	1	1	2
7:57:00 AM	3	2	0	2
7:57:15 AM	8	6	0	6
7:57:30 AM	8	2	0	2
7:57:45 AM	9	1	0	1
7:58:00 AM	3	4	0	4
7:58:15 AM	1	1	1	2
7:58:30 AM	2	1	0	1
7:58:45 AM	2	0	0	0
7:59:00 AM	2	4	0	4
7:59:15 AM	6	4	0	4
7:59:30 AM	6	1	0	1
7:59:45 AM	6	0	0	0
8:00:00 AM	0	0	1	1
8:00:15 AM	0	0	4	4
8:00:30 AM	6	6	0	6
8:00:45 AM	10	5	0	5
8:01:00 AM	10	3	0	3
8:01:15 AM	0	0	0	0
8:01:30 AM	3	3	0	3
8:01:45 AM	4	2	0	2
8:02:00 AM	7	3	0	3
8:02:15 AM	0	0	4	4
8:02:30 AM	0	0	0	0
8:02:45 AM	4	4	0	4

CITY TRAFFIC COUNTERS

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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018
Page No : 5

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
8:03:00 AM	3	1	0	1
8:03:15 AM	0	0	2	2
8:03:30 AM	0	0	4	4
8:03:45 AM	7	6	0	6
8:04:00 AM	7	2	0	2
8:04:15 AM	1	1	4	5
8:04:30 AM	4	4	0	4
8:04:45 AM	5	4	0	4
8:05:00 AM	4	1	0	1
8:05:15 AM	0	0	1	1
8:05:30 AM	1	1	0	1
8:05:45 AM	2	1	0	1
8:06:00 AM	0	0	0	0
8:06:15 AM	4	4	0	4
8:06:30 AM	0	1	0	1
8:06:45 AM	2	2	1	3
8:07:00 AM	2	0	0	0
8:07:15 AM	4	2	0	2
8:07:30 AM	1	1	0	1
8:07:45 AM	1	1	0	1
8:08:00 AM	0	1	0	1
8:08:15 AM	3	3	0	3
8:08:30 AM	5	2	0	2
8:08:45 AM	0	1	2	3
8:09:00 AM	1	1	0	1
8:09:15 AM	2	2	0	2
8:09:30 AM	0	2	0	2
8:09:45 AM	1	1	1	2
8:10:00 AM	2	1	0	1
8:10:15 AM	0	3	0	3
8:10:30 AM	0	0	0	0
8:10:45 AM	0	0	0	0
8:11:00 AM	2	2	0	2
8:11:15 AM	0	2	5	7
8:11:30 AM	3	3	0	3
8:11:45 AM	0	1	0	1
8:12:00 AM	2	1	0	1
8:12:15 AM	2	0	0	0
8:12:30 AM	0	0	1	1
8:12:45 AM	0	0	0	0
8:13:00 AM	0	0	0	0
8:13:15 AM	2	2	0	2
8:13:30 AM	4	3	0	3
8:13:45 AM	0	0	1	1
8:14:00 AM	3	4	0	4
8:14:15 AM	2	0	0	0
8:14:30 AM	0	0	1	1
8:14:45 AM	1	2	0	2
8:15:00 AM	1	1	1	2
8:15:15 AM	3	2	0	2
8:15:30 AM	0	0	0	0
8:15:45 AM	3	3	0	3
8:16:00 AM	3	1	0	1
8:16:15 AM	0	0	1	1
8:16:30 AM	1	1	0	1
8:16:45 AM	0	2	0	2
8:17:00 AM	3	3	0	3
8:17:15 AM	0	2	0	2
8:17:30 AM	0	0	0	0
8:17:45 AM	2	2	0	2
8:18:00 AM	0	1	0	1
8:18:15 AM	4	6	0	6

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018
Page No : 6

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
8:18:30 AM	2	2	0	2
8:18:45 AM	4	3	0	3
8:19:00 AM	0	1	1	2
8:19:15 AM	0	0	0	0
8:19:30 AM	0	0	0	0
8:19:45 AM	4	4	0	4
8:20:00 AM	0	2	1	3
8:20:15 AM	2	2	4	6
8:20:30 AM	2	1	0	1
8:20:45 AM	0	0	0	0
8:21:00 AM	3	3	0	3
8:21:15 AM	4	2	0	2
8:21:30 AM	0	0	0	0
8:21:45 AM	2	2	0	2
8:22:00 AM	5	5	0	5
8:22:15 AM	6	1	0	1
8:22:30 AM	0	1	0	1
8:22:45 AM	4	4	1	5
8:23:00 AM	5	4	0	4
8:23:15 AM	0	1	2	3
8:23:30 AM	2	2	0	2
8:23:45 AM	0	0	0	0
8:24:00 AM	2	3	0	3
8:24:15 AM	2	0	0	0
8:24:30 AM	0	1	0	1
8:24:45 AM	0	0	2	2
8:25:00 AM	3	5	0	5
8:25:15 AM	0	2	1	3
8:25:30 AM	0	0	0	0
8:25:45 AM	2	2	0	2
8:26:00 AM	2	2	0	2
8:26:15 AM	0	1	0	1
8:26:30 AM	2	2	0	2
8:26:45 AM	2	1	0	1
8:27:00 AM	1	0	0	0
8:27:15 AM	0	0	0	0
8:27:30 AM	2	2	0	2
8:27:45 AM	2	1	0	1
8:28:00 AM	0	0	0	0
8:28:15 AM	1	1	0	1
8:28:30 AM	4	3	0	3
8:28:45 AM	5	2	0	2
8:29:00 AM	5	0	0	0
8:29:15 AM	0	0	2	2
8:29:30 AM	1	1	1	2
8:29:45 AM	4	3	0	3
8:30:00 AM	0	0	1	1
8:30:15 AM	5	4	0	4
8:30:30 AM	2	1	0	1
8:30:45 AM	2	1	0	1
8:31:00 AM	2	2	0	2
8:31:15 AM	4	3	0	3
8:31:30 AM	0	0	0	0
8:31:45 AM	1	1	0	1
8:32:00 AM	0	1	0	1
8:32:15 AM	6	3	0	3
8:32:30 AM	0	2	0	2
8:32:45 AM	0	3	1	4
8:33:00 AM	0	0	3	3
8:33:15 AM	0	1	0	1
8:33:30 AM	1	1	0	1
8:33:45 AM	2	3	0	3

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018
Page No : 7

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
8:34:00 AM	5	5	0	5
8:34:15 AM	0	1	1	2
8:34:30 AM	5	5	0	5
8:34:45 AM	4	1	0	1
8:35:00 AM	4	0	0	0
8:35:15 AM	0	1	0	1
8:35:30 AM	2	0	0	0
8:35:45 AM	5	3	0	3
8:36:00 AM	5	1	0	1
8:36:15 AM	0	3	1	4
8:36:30 AM	3	3	0	3
8:36:45 AM	6	4	0	4
8:37:00 AM	7	3	0	3
8:37:15 AM	8	2	0	2
8:37:30 AM	0	0	0	0
8:37:45 AM	1	3	0	3
8:38:00 AM	2	1	0	1
8:38:15 AM	0	0	3	3
8:38:30 AM	2	2	0	2
8:38:45 AM	2	0	0	0
8:39:00 AM	4	2	0	2
8:39:15 AM	5	2	0	2
8:39:30 AM	3	1	0	1
8:39:45 AM	2	2	0	2
8:40:00 AM	2	2	0	2
8:40:15 AM	4	2	0	2
8:40:30 AM	4	0	0	0
8:40:45 AM	0	2	0	2
8:41:00 AM	0	0	3	3
8:41:15 AM	2	3	0	3
8:41:30 AM	1	0	0	0
8:41:45 AM	2	1	0	1
8:42:00 AM	7	5	0	5
8:42:15 AM	0	0	2	2
8:42:30 AM	1	1	0	1
8:42:45 AM	1	0	0	0
8:43:00 AM	7	6	0	6
8:43:15 AM	0	0	3	3
8:43:30 AM	0	0	0	0
8:43:45 AM	0	2	0	2
8:44:00 AM	2	2	2	4
8:44:15 AM	2	0	0	0
8:44:30 AM	3	2	0	2
8:44:45 AM	0	0	2	2
8:45:00 AM	3	3	0	3
8:45:15 AM	7	4	0	4
8:45:30 AM	0	1	0	1
8:45:45 AM	1	1	1	2
8:46:00 AM	3	2	0	2
8:46:15 AM	4	2	0	2
8:46:30 AM	0	0	1	1
8:46:45 AM	0	0	1	1
8:47:00 AM	5	4	0	4
8:47:15 AM	5	1	0	1
8:47:30 AM	6	1	0	1
8:47:45 AM	0	1	2	3
8:48:00 AM	3	3	0	3
8:48:15 AM	6	3	0	3
8:48:30 AM	0	3	0	3
8:48:45 AM	0	0	3	3
8:49:00 AM	6	6	1	7
8:49:15 AM	6	1	0	1

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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_AM
Site Code : 00000001
Start Date : 5/16/2018

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
8:49:30 AM	6	0	0	0
8:49:45 AM	0	0	1	1
8:50:00 AM	2	2	0	2
8:50:15 AM	6	4	0	4
8:50:30 AM	4	1	0	1
8:50:45 AM	0	0	0	0
8:51:00 AM	7	6	0	6
8:51:15 AM	7	2	0	2
8:51:30 AM	2	1	2	3
8:51:45 AM	7	5	0	5
8:52:00 AM	10	5	0	5
8:52:15 AM	13	2	0	2
8:52:30 AM	14	2	0	2
8:52:45 AM	0	0	1	1
8:53:00 AM	0	0	3	3
8:53:15 AM	2	2	0	2
8:53:30 AM	0	0	0	0
8:53:45 AM	2	2	0	2
8:54:00 AM	7	6	0	6
8:54:15 AM	0	0	3	3
8:54:30 AM	0	0	0	0
8:54:45 AM	1	1	0	1
8:55:00 AM	0	0	1	1
8:55:15 AM	2	1	0	1
8:55:30 AM	4	3	0	3
8:55:45 AM	1	0	0	0
8:56:00 AM	3	3	0	3
8:56:15 AM	2	0	0	0
8:56:30 AM	6	4	0	4
8:56:45 AM	11	5	0	5
8:57:00 AM	0	0	2	2
8:57:15 AM	3	3	1	4
8:57:30 AM	7	5	0	5
8:57:45 AM	7	0	0	0
8:58:00 AM	1	1	3	4
8:58:15 AM	5	4	0	4
8:58:30 AM	7	2	0	2
8:58:45 AM	0	1	0	1
8:59:00 AM	0	0	0	0
Grand Total	927	640	147	787
Total %		81.3	18.7	

First Sample:	7:01:00 AM
Last Sample:	8:59:00 AM
Sample Rate:	15 Seconds
Number of Samples:	473
Elapsed Time:	1 Hours, 58 Minutes, 15 Seconds
Number Stopped:	927
Approach Volume -Stopped:	640
-Through:	147
Approach Total:	787
Total Delay:	13905 Seconds
Control Delay Multiplier:	1.3
Control Delay:	28.2 Seconds
Avg. Delay per Stopped vehicle:	21.7 Seconds
Avg. Delay per Approach vehicle:	17.7 Seconds
Percent of Vehicles Stopped:	81.3%

CITY TRAFFIC COUNTERS
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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 1

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
4:01:00 PM	1	1	7	8
4:01:15 PM	6	5	0	5
4:01:30 PM	10	4	0	4
4:01:45 PM	12	3	0	3
4:02:00 PM	3	1	0	1
4:02:15 PM	0	0	7	7
4:02:30 PM	5	6	2	8
4:02:45 PM	8	5	0	5
4:03:00 PM	0	5	0	5
4:03:15 PM	0	0	3	3
4:03:30 PM	0	0	8	8
4:03:45 PM	11	11	0	11
4:04:00 PM	15	5	0	5
4:04:15 PM	0	1	3	4
4:04:30 PM	0	1	4	5
4:04:45 PM	6	6	0	6
4:05:00 PM	9	4	0	4
4:05:15 PM	8	2	0	2
4:05:30 PM	0	0	1	1
4:05:45 PM	6	7	0	7
4:06:00 PM	8	3	0	3
4:06:15 PM	0	0	1	1
4:06:30 PM	4	4	1	5
4:06:45 PM	5	2	0	2
4:07:00 PM	8	4	0	4
4:07:15 PM	0	0	1	1
4:07:30 PM	3	3	0	3
4:07:45 PM	0	1	1	2
4:08:00 PM	5	5	0	5
4:08:15 PM	6	2	0	2
4:08:30 PM	8	3	0	3
4:08:45 PM	0	0	5	5
4:09:00 PM	0	0	6	6
4:09:15 PM	2	3	0	3
4:09:30 PM	8	6	0	6
4:09:45 PM	11	4	0	4
4:10:00 PM	0	0	1	1
4:10:15 PM	1	1	0	1
4:10:30 PM	5	3	0	3
4:10:45 PM	8	5	0	5
4:11:00 PM	13	6	0	6
4:11:15 PM	15	4	0	4
4:11:30 PM	0	0	0	0
4:11:45 PM	0	4	6	10
4:12:00 PM	5	5	0	5
4:12:15 PM	5	1	0	1
4:12:30 PM	6	2	0	2
4:12:45 PM	0	0	0	0
4:13:00 PM	5	5	0	5
4:13:15 PM	7	3	0	3
4:13:30 PM	11	3	0	3
4:13:45 PM	0	0	4	4
4:14:00 PM	0	3	3	6
4:14:15 PM	0	4	0	4
4:14:30 PM	0	0	5	5
4:14:45 PM	6	6	0	6
4:15:00 PM	8	3	0	3
4:15:15 PM	13	5	0	5
4:15:30 PM	2	1	0	1
4:15:45 PM	0	0	2	2
4:16:00 PM	2	2	0	2
4:16:15 PM	2	0	0	0

CITY TRAFFIC COUNTERS

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File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 2

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
4:16:30 PM	0	0	1	1
4:16:45 PM	2	2	0	2
4:17:00 PM	6	4	0	4
4:17:15 PM	11	6	0	6
4:17:30 PM	3	2	0	2
4:17:45 PM	1	1	4	5
4:18:00 PM	3	2	0	2
4:18:15 PM	10	6	0	6
4:18:30 PM	8	1	0	1
4:18:45 PM	0	0	7	7
4:19:00 PM	0	0	3	3
4:19:15 PM	7	8	0	8
4:19:30 PM	0	2	0	2
4:19:45 PM	30	1	9	10
4:20:00 PM	0	0	0	0
4:20:15 PM	0	8	0	8
4:20:30 PM	8	4	0	4
4:20:45 PM	7	0	0	0
4:21:00 PM	0	0	8	8
4:21:15 PM	0	0	3	3
4:21:30 PM	3	3	0	3
4:21:45 PM	7	4	0	4
4:22:00 PM	7	1	0	1
4:22:15 PM	0	0	5	5
4:22:30 PM	2	4	0	4
4:22:45 PM	5	3	0	3
4:23:00 PM	0	2	0	2
4:23:15 PM	2	1	3	4
4:23:30 PM	8	6	0	6
4:23:45 PM	11	4	0	4
4:24:00 PM	0	2	2	4
4:24:15 PM	0	0	1	1
4:24:30 PM	3	4	0	4
4:24:45 PM	0	0	2	2
4:25:00 PM	9	10	0	10
4:25:15 PM	14	3	0	3
4:25:30 PM	13	2	0	2
4:25:45 PM	9	3	0	3
4:26:00 PM	0	0	2	2
4:26:15 PM	2	2	1	3
4:26:30 PM	3	0	0	0
4:26:45 PM	6	4	0	4
4:27:00 PM	0	0	3	3
4:27:15 PM	0	0	4	4
4:27:30 PM	6	8	0	8
4:27:45 PM	10	4	0	4
4:28:00 PM	0	4	1	5
4:28:15 PM	2	3	3	6
4:28:30 PM	6	4	0	4
4:28:45 PM	7	1	0	1
4:29:00 PM	1	0	0	0
4:29:15 PM	0	0	7	7
4:29:30 PM	0	0	6	6
4:29:45 PM	9	8	0	8
4:30:00 PM	13	5	0	5
4:30:15 PM	18	5	0	5
4:30:30 PM	24	6	0	6
4:30:45 PM	6	0	0	0
4:31:00 PM	3	4	0	4
4:31:15 PM	9	5	0	5
4:31:30 PM	0	0	3	3
4:31:45 PM	5	5	3	8

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 3

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
4:32:00 PM	10	5	0	5
4:32:15 PM	11	3	0	3
4:32:30 PM	7	2	0	2
4:32:45 PM	0	0	5	5
4:33:00 PM	2	3	0	3
4:33:15 PM	8	6	0	6
4:33:30 PM	0	0	3	3
4:33:45 PM	0	0	1	1
4:34:00 PM	5	5	0	5
4:34:15 PM	0	0	0	0
4:34:30 PM	0	0	2	2
4:34:45 PM	3	3	0	3
4:35:00 PM	8	5	0	5
4:35:15 PM	10	4	0	4
4:35:30 PM	5	2	0	2
4:35:45 PM	9	4	0	4
4:36:00 PM	4	4	2	6
4:36:15 PM	8	4	0	4
4:36:30 PM	13	5	0	5
4:36:45 PM	14	1	0	1
4:37:00 PM	18	5	0	5
4:37:15 PM	17	1	0	1
4:37:30 PM	4	0	0	0
4:37:45 PM	0	0	8	8
4:38:00 PM	1	0	5	5
4:38:15 PM	2	0	0	0
4:38:30 PM	4	3	0	3
4:38:45 PM	3	5	0	5
4:39:00 PM	0	0	2	2
4:39:15 PM	0	0	5	5
4:39:30 PM	4	3	1	4
4:39:45 PM	7	3	0	3
4:40:00 PM	5	0	0	0
4:40:15 PM	0	0	1	1
4:40:30 PM	7	7	0	7
4:40:45 PM	8	3	0	3
4:41:00 PM	12	6	0	6
4:41:15 PM	0	1	1	2
4:41:30 PM	0	0	3	3
4:41:45 PM	5	5	0	5
4:42:00 PM	7	2	0	2
4:42:15 PM	10	3	0	3
4:42:30 PM	0	0	3	3
4:42:45 PM	3	5	0	5
4:43:00 PM	0	3	0	3
4:43:15 PM	2	2	2	4
4:43:30 PM	3	1	0	1
4:43:45 PM	4	1	0	1
4:44:00 PM	0	0	0	0
4:44:15 PM	3	3	0	3
4:44:30 PM	4	3	0	3
4:44:45 PM	5	2	0	2
4:45:00 PM	0	1	3	4
4:45:15 PM	1	1	3	4
4:45:30 PM	3	2	0	2
4:45:45 PM	5	4	0	4
4:46:00 PM	0	1	2	3
4:46:15 PM	4	5	0	5
4:46:30 PM	4	2	0	2
4:46:45 PM	7	3	0	3
4:47:00 PM	7	3	0	3
4:47:15 PM	0	0	5	5

CITY TRAFFIC COUNTERS
www.ctcounters.com

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 4

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
4:47:30 PM	0	0	5	5
4:47:45 PM	0	0	5	5
4:48:00 PM	8	7	0	7
4:48:15 PM	9	2	0	2
4:48:30 PM	12	3	0	3
4:48:45 PM	16	5	0	5
4:49:00 PM	6	1	0	1
4:49:15 PM	0	0	4	4
4:49:30 PM	1	1	3	4
4:49:45 PM	7	7	0	7
4:50:00 PM	9	4	0	4
4:50:15 PM	0	3	0	3
4:50:30 PM	0	0	4	4
4:50:45 PM	5	6	0	6
4:51:00 PM	7	3	0	3
4:51:15 PM	11	5	0	5
4:51:30 PM	14	4	0	4
4:51:45 PM	0	0	0	0
4:52:00 PM	0	0	5	5
4:52:15 PM	2	2	0	2
4:52:30 PM	7	5	0	5
4:52:45 PM	8	3	0	3
4:53:00 PM	0	0	4	4
4:53:15 PM	5	5	0	5
4:53:30 PM	9	3	0	3
4:53:45 PM	0	1	2	3
4:54:00 PM	0	0	2	2
4:54:15 PM	5	5	0	5
4:54:30 PM	9	4	0	4
4:54:45 PM	12	5	0	5
4:55:00 PM	0	1	0	1
4:55:15 PM	1	1	6	7
4:55:30 PM	4	4	2	6
4:55:45 PM	4	2	0	2
4:56:00 PM	0	0	1	1
4:56:15 PM	5	7	1	8
4:56:30 PM	7	3	0	3
4:56:45 PM	12	5	0	5
4:57:00 PM	0	1	2	3
4:57:15 PM	0	0	9	9
4:57:30 PM	5	5	2	7
4:57:45 PM	10	5	0	5
4:58:00 PM	11	3	0	3
4:58:15 PM	14	5	0	5
4:58:30 PM	0	0	3	3
4:58:45 PM	5	5	0	5
4:59:00 PM	7	4	0	4
4:59:15 PM	7	2	0	2
4:59:30 PM	0	3	1	4
4:59:45 PM	4	4	0	4
5:00:00 PM	7	4	0	4
5:00:15 PM	1	1	1	2
5:00:30 PM	2	1	0	1
5:00:45 PM	3	1	0	1
5:01:00 PM	3	0	0	0
5:01:15 PM	5	4	0	4
5:01:30 PM	10	6	0	6
5:01:45 PM	0	1	1	2
5:02:00 PM	4	3	1	4
5:02:15 PM	6	2	0	2
5:02:30 PM	8	3	0	3
5:02:45 PM	10	2	0	2

CITY TRAFFIC COUNTERS
www.ctcounters.com

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 5

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
5:03:00 PM	4	1	0	1
5:03:15 PM	5	6	0	6
5:03:30 PM	7	3	0	3
5:03:45 PM	7	3	0	3
5:04:00 PM	9	4	0	4
5:04:15 PM	8	1	0	1
5:04:30 PM	3	2	0	2
5:04:45 PM	0	0	6	6
5:05:00 PM	6	6	0	6
5:05:15 PM	9	5	0	5
5:05:30 PM	11	2	0	2
5:05:45 PM	0	0	1	1
5:06:00 PM	0	0	4	4
5:06:15 PM	3	2	0	2
5:06:30 PM	5	2	0	2
5:06:45 PM	8	4	0	4
5:07:00 PM	0	2	1	3
5:07:15 PM	0	0	7	7
5:07:30 PM	3	4	1	5
5:07:45 PM	5	2	0	2
5:08:00 PM	13	6	0	6
5:08:15 PM	0	0	0	0
5:08:30 PM	2	0	1	1
5:08:45 PM	4	4	0	4
5:09:00 PM	9	5	0	5
5:09:15 PM	0	1	0	1
5:09:30 PM	6	5	4	9
5:09:45 PM	10	4	0	4
5:10:00 PM	13	5	0	5
5:10:15 PM	17	4	0	4
5:10:30 PM	24	7	0	7
5:10:45 PM	10	2	0	2
5:11:00 PM	0	0	2	2
5:11:15 PM	5	0	0	0
5:11:30 PM	12	2	0	2
5:11:45 PM	12	2	0	2
5:12:00 PM	0	0	3	3
5:12:15 PM	10	10	0	10
5:12:30 PM	15	7	0	7
5:12:45 PM	1	0	0	0
5:13:00 PM	0	0	6	6
5:13:15 PM	2	1	0	1
5:13:30 PM	7	5	0	5
5:13:45 PM	0	1	0	1
5:14:00 PM	7	7	0	7
5:14:15 PM	6	1	0	1
5:14:30 PM	8	2	0	2
5:14:45 PM	0	0	4	4
5:15:00 PM	2	2	0	2
5:15:15 PM	0	4	0	4
5:15:30 PM	7	4	0	4
5:15:45 PM	0	0	3	3
5:16:00 PM	2	2	0	2
5:16:15 PM	5	4	0	4
5:16:30 PM	9	4	0	4
5:16:45 PM	0	0	3	3
5:17:00 PM	2	3	0	3
5:17:15 PM	7	5	0	5
5:17:30 PM	9	3	0	3
5:17:45 PM	13	6	0	6
5:18:00 PM	0	1	1	2
5:18:15 PM	0	0	7	7

CITY TRAFFIC COUNTERS
www.ctcounters.com

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 6

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
5:18:30 PM	9	9	0	9
5:18:45 PM	14	5	0	5
5:19:00 PM	15	2	0	2
5:19:15 PM	15	2	0	2
5:19:30 PM	0	0	2	2
5:19:45 PM	1	0	6	6
5:20:00 PM	4	3	0	3
5:20:15 PM	9	6	0	6
5:20:30 PM	14	5	0	5
5:20:45 PM	6	2	0	2
5:21:00 PM	0	0	4	4
5:21:15 PM	8	8	0	8
5:21:30 PM	9	1	0	1
5:21:45 PM	3	2	0	2
5:22:00 PM	1	1	1	2
5:22:15 PM	4	4	0	4
5:22:30 PM	11	5	0	5
5:22:45 PM	11	3	0	3
5:23:00 PM	0	0	4	4
5:23:15 PM	1	1	2	3
5:23:30 PM	4	3	0	3
5:23:45 PM	10	7	0	7
5:24:00 PM	11	3	0	3
5:24:15 PM	0	0	1	1
5:24:30 PM	0	2	2	4
5:24:45 PM	8	8	1	9
5:25:00 PM	14	6	0	6
5:25:15 PM	18	4	0	4
5:25:30 PM	6	0	0	0
5:25:45 PM	0	0	5	5
5:26:00 PM	0	0	4	4
5:26:15 PM	9	8	0	8
5:26:30 PM	8	2	0	2
5:26:45 PM	0	0	1	1
5:27:00 PM	1	1	0	1
5:27:15 PM	11	10	0	10
5:27:30 PM	5	2	0	2
5:27:45 PM	0	0	0	0
5:28:00 PM	2	1	2	3
5:28:15 PM	0	6	0	6
5:28:30 PM	0	0	3	3
5:28:45 PM	1	0	0	0
5:29:00 PM	1	1	0	1
5:29:15 PM	2	2	0	2
5:29:30 PM	6	3	0	3
5:29:45 PM	7	1	0	1
5:30:00 PM	0	3	0	3
5:30:15 PM	0	0	0	0
5:30:30 PM	4	4	0	4
5:30:45 PM	0	0	1	1
5:31:00 PM	2	2	0	2
5:31:15 PM	3	1	0	1
5:31:30 PM	0	1	1	2
5:31:45 PM	3	3	0	3
5:32:00 PM	5	2	0	2
5:32:15 PM	8	3	0	3
5:32:30 PM	1	1	0	1
5:32:45 PM	0	0	5	5
5:33:00 PM	0	2	0	2
5:33:15 PM	6	7	0	7
5:33:30 PM	7	4	0	4
5:33:45 PM	0	0	4	4

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 7

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
5:34:00 PM	5	5	0	5
5:34:15 PM	3	1	0	1
5:34:30 PM	0	0	3	3
5:34:45 PM	0	0	2	2
5:35:00 PM	4	4	0	4
5:35:15 PM	8	4	0	4
5:35:30 PM	11	4	0	4
5:35:45 PM	3	0	0	0
5:36:00 PM	2	2	5	7
5:36:15 PM	4	3	0	3
5:36:30 PM	0	0	0	0
5:36:45 PM	2	2	0	2
5:37:00 PM	5	4	0	4
5:37:15 PM	0	0	3	3
5:37:30 PM	3	3	2	5
5:37:45 PM	3	2	0	2
5:38:00 PM	0	1	0	1
5:38:15 PM	2	3	0	3
5:38:30 PM	5	3	0	3
5:38:45 PM	10	7	0	7
5:39:00 PM	2	0	0	0
5:39:15 PM	0	0	10	10
5:39:30 PM	1	1	2	3
5:39:45 PM	1	0	0	0
5:40:00 PM	3	3	0	3
5:40:15 PM	0	0	4	4
5:40:30 PM	3	0	0	0
5:40:45 PM	5	3	0	3
5:41:00 PM	10	6	0	6
5:41:15 PM	11	3	0	3
5:41:30 PM	15	6	0	6
5:41:45 PM	0	0	3	3
5:42:00 PM	0	1	0	1
5:42:15 PM	6	6	0	6
5:42:30 PM	10	5	0	5
5:42:45 PM	0	0	4	4
5:43:00 PM	2	2	1	3
5:43:15 PM	6	4	0	4
5:43:30 PM	12	8	0	8
5:43:45 PM	14	2	0	2
5:44:00 PM	0	0	2	2
5:44:15 PM	1	1	1	2
5:44:30 PM	5	4	0	4
5:44:45 PM	4	2	0	2
5:45:00 PM	0	0	1	1
5:45:15 PM	5	4	0	4
5:45:30 PM	0	1	0	1
5:45:45 PM	0	0	1	1
5:46:00 PM	11	2	0	2
5:46:15 PM	0	0	0	0
5:46:30 PM	3	3	0	3
5:46:45 PM	0	1	0	1
5:47:00 PM	0	0	7	7
5:47:15 PM	1	2	0	2
5:47:30 PM	6	5	0	5
5:47:45 PM	8	2	0	2
5:48:00 PM	0	0	0	0
5:48:15 PM	4	4	0	4
5:48:30 PM	3	1	0	1
5:48:45 PM	6	6	0	6
5:49:00 PM	9	4	0	4
5:49:15 PM	6	3	0	3

CITY TRAFFIC COUNTERS
www.ctcounters.com

File Name : IntersectionDelay_OakPark_ElCaminoReal_EB_PM
Site Code : 00000002
Start Date : 5/16/2018
Page No : 8

Direction Description

Start Time	Stopped at End of Interval	Stopped	Through	Total Volume
5:49:30 PM	0	0	4	4
5:49:45 PM	0	0	5	5
5:50:00 PM	7	8	0	8
5:50:15 PM	10	4	0	4
5:50:30 PM	9	3	0	3
5:50:45 PM	0	0	3	3
5:51:00 PM	0	0	5	5
5:51:15 PM	6	7	0	7
5:51:30 PM	8	3	0	3
5:51:45 PM	1	3	0	3
5:52:00 PM	0	0	0	0
5:52:15 PM	8	9	0	9
5:52:30 PM	9	5	0	5
5:52:45 PM	0	0	3	3
5:53:00 PM	0	0	2	2
5:53:15 PM	2	2	0	2
5:53:30 PM	8	6	0	6
5:53:45 PM	13	5	0	5
5:54:00 PM	14	2	0	2
5:54:15 PM	4	0	0	0
5:54:30 PM	0	0	4	4
5:54:45 PM	12	12	0	12
5:55:00 PM	15	4	0	4
5:55:15 PM	10	2	0	2
5:55:30 PM	0	0	0	0
5:55:45 PM	0	0	5	5
5:56:00 PM	1	0	2	2
5:56:15 PM	3	3	0	3
5:56:30 PM	8	4	0	4
5:56:45 PM	2	0	0	0
5:57:00 PM	0	0	0	0
5:57:15 PM	0	5	0	5
5:57:30 PM	4	1	0	1
5:57:45 PM	0	10	0	10
5:58:00 PM	0	0	2	2
5:58:15 PM	0	0	0	0
5:58:30 PM	0	0	3	3
5:58:45 PM	0	0	2	2
Grand Total	2241	1228	467	1695
Total %		72.4	27.6	

First Sample:	4:01:00 PM
Last Sample:	5:58:45 PM
Sample Rate:	15 Seconds
Number of Samples:	472
Elapsed Time:	1 Hours, 58 Minutes, 0 Seconds
Number Stopped:	2241
Approach Volume -Stopped:	1228
-Through:	467
Approach Total:	1695
Total Delay:	33615 Seconds
Control Delay Multiplier:	1.3
Control Delay:	35.6 Seconds
Avg. Delay per Stopped vehicle:	27.4 Seconds
Avg. Delay per Approach vehicle:	19.8 Seconds
Percent of Vehicles Stopped:	72.4%

APPENDIX B

LEVEL OF SERVICE AND QUEUING WORKSHEETS

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	127	85	116	358	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	141	94	129	398	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	232	223	265	161
Volume Left (vph)	91	0	265	133
Volume Right (vph)	0	129	0	29
Hadj (s)	0.11	-0.31	0.53	0.32
Departure Headway (s)	5.5	5.1	6.3	6.0
Degree Utilization, x	0.36	0.32	0.46	0.27
Capacity (veh/h)	619	662	556	573
Control Delay (s)	11.6	10.5	13.3	10.1
Approach Delay (s)	11.6	10.5	12.1	
Approach LOS	B	B	B	

Intersection Summary			
Delay	11.6		
HCM Level of Service	B		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1702	1583	1770	1627		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.17	1.00	1.00
Satd. Flow (perm)	1681	1702	1583	1770	1627		1069	3533		309	3539	1583
Volume (vph)	219	39	172	17	24	128	52	807	10	85	259	154
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	246	44	193	19	27	144	58	907	11	96	291	173
RTOR Reduction (vph)	0	0	157	0	128	0	0	1	0	0	0	102
Lane Group Flow (vph)	75	215	36	19	43	0	58	917	0	96	291	71
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.1	13.1	13.1	7.7	7.7		31.5	27.1		34.9	28.8	28.8
Effective Green, g (s)	13.1	13.1	13.1	7.7	7.7		31.5	27.1		34.9	28.8	28.8
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11		0.45	0.39		0.50	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	315	319	296	195	179		525	1368		281	1456	651
v/s Ratio Prot	0.04	c0.13		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.04			0.14		0.04
v/c Ratio	0.24	0.67	0.12	0.10	0.24		0.11	0.67		0.34	0.20	0.11
Uniform Delay, d1	24.2	26.5	23.7	28.0	28.5		10.9	17.8		10.9	13.2	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	5.5	0.2	0.2	0.7		0.1	2.6		0.7	0.3	0.3
Delay (s)	24.6	32.0	23.9	28.2	29.2		11.0	20.4		11.6	13.5	13.0
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		27.6			29.1			19.8			13.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	195	124	181	651	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	205	131	191	685	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	276	321	457	319
Volume Left (vph)	71	0	457	228
Volume Right (vph)	0	191	0	91
Hadj (s)	0.09	-0.32	0.53	0.19
Departure Headway (s)	6.5	6.0	6.8	6.5
Degree Utilization, x	0.50	0.54	0.87	0.58
Capacity (veh/h)	538	579	520	546
Control Delay (s)	15.7	15.7	38.8	16.8
Approach Delay (s)	15.7	15.7	29.7	
Approach LOS	C	C	D	

Intersection Summary			
Delay	23.6		
HCM Level of Service	C		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1702	1583	1770	1653		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1681	1702	1583	1770	1653		507	3521		646	3539	1583
Volume (vph)	354	68	442	23	25	76	88	557	19	165	699	218
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	365	70	456	24	26	78	91	574	20	170	721	225
RTOR Reduction (vph)	0	0	350	0	71	0	0	3	0	0	0	120
Lane Group Flow (vph)	100	335	106	24	33	0	91	591	0	170	721	105
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.2	16.2	16.2	6.1	6.1		28.6	25.4		34.8	28.5	28.5
Effective Green, g (s)	16.2	16.2	16.2	6.1	6.1		28.6	25.4		34.8	28.5	28.5
Actuated g/C Ratio	0.23	0.23	0.23	0.09	0.09		0.41	0.36		0.50	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	389	394	366	154	144		265	1278		422	1441	645
v/s Ratio Prot	0.06	c0.20		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.12			0.16		0.07
v/c Ratio	0.26	0.85	0.29	0.16	0.23		0.34	0.46		0.40	0.50	0.16
Uniform Delay, d1	22.0	25.7	22.2	29.6	29.8		19.3	17.1		14.9	15.4	13.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	15.9	0.4	0.5	0.8		0.8	1.2		0.6	1.2	0.5
Delay (s)	22.3	41.7	22.6	30.0	30.6		20.1	18.3		15.6	16.7	13.7
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		29.7			30.5			18.5			15.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	129	87	121	363	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	143	97	134	403	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	234	231	269	163
Volume Left (vph)	91	0	269	134
Volume Right (vph)	0	134	0	29
Hadj (s)	0.11	-0.32	0.53	0.32
Departure Headway (s)	5.6	5.2	6.3	6.1
Degree Utilization, x	0.36	0.33	0.47	0.28
Capacity (veh/h)	616	660	543	570
Control Delay (s)	11.7	10.7	13.6	10.2
Approach Delay (s)	11.7	10.7	12.3	
Approach LOS	B	B	B	

Intersection Summary			
Delay	11.7		
HCM Level of Service	B		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	485	7	13	201	7	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	527	8	14	218	8	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			535		778	531
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			535		778	531
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	97
cM capacity (veh/h)			1033		360	548

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	535	14	218	8	16
Volume Left	0	14	0	8	0
Volume Right	8	0	0	0	16
cSH	1700	1033	1700	360	548
Volume to Capacity	0.31	0.01	0.13	0.02	0.03
Queue Length 95th (ft)	0	1	0	2	2
Control Delay (s)	0.0	8.5	0.0	15.2	11.8
Lane LOS		A		C	B
Approach Delay (s)	0.0	0.5		12.9	
Approach LOS				B	

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1627		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1627		1069	3533		304	3539	1583
Volume (vph)	231	39	175	17	24	128	55	807	10	85	259	164
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	260	44	197	19	27	144	62	907	11	96	291	184
RTOR Reduction (vph)	0	0	159	0	128	0	0	1	0	0	0	109
Lane Group Flow (vph)	75	229	38	19	43	0	62	917	0	96	291	75
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.4	13.4	13.4	7.7	7.7		31.2	26.8		34.6	28.5	28.5
Effective Green, g (s)	13.4	13.4	13.4	7.7	7.7		31.2	26.8		34.6	28.5	28.5
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11		0.45	0.38		0.49	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	322	326	303	195	179		521	1353		278	1441	645
v/s Ratio Prot	0.04	c0.13		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.05			0.14		0.05
v/c Ratio	0.23	0.70	0.12	0.10	0.24		0.12	0.68		0.35	0.20	0.12
Uniform Delay, d1	24.0	26.4	23.4	28.0	28.5		11.1	18.0		11.0	13.4	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	6.7	0.2	0.2	0.7		0.1	2.7		0.7	0.3	0.4
Delay (s)	24.3	33.1	23.6	28.2	29.2		11.2	20.7		11.8	13.7	13.3
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		28.1			29.1			20.1			13.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	197	126	185	656	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	207	133	195	691	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	278	327	460	321
Volume Left (vph)	71	0	460	230
Volume Right (vph)	0	195	0	91
Hadj (s)	0.08	-0.32	0.53	0.20
Departure Headway (s)	6.5	6.0	6.9	6.5
Degree Utilization, x	0.50	0.55	0.88	0.58
Capacity (veh/h)	536	578	518	544
Control Delay (s)	15.8	16.1	40.4	17.0
Approach Delay (s)	15.8	16.1	30.8	
Approach LOS	C	C	D	

Intersection Summary			
Delay	24.3		
HCM Level of Service	C		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	846	7	15	305	6	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	920	8	16	332	7	15

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	613	314	348	7	15
Volume Left (vph)	0	0	16	7	0
Volume Right (vph)	0	8	0	0	15
Hadj (s)	0.03	0.02	0.04	0.53	-0.67
Departure Headway (s)	4.9	4.9	5.2	7.6	6.4
Degree Utilization, x	0.83	0.43	0.50	0.01	0.03
Capacity (veh/h)	723	731	689	446	523
Control Delay (s)	26.0	10.2	13.1	9.5	8.4
Approach Delay (s)	20.7		13.1	8.7	
Approach LOS	C		B	A	

Intersection Summary			
Delay	18.5		
HCM Level of Service	C		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1702	1583	1770	1653		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1681	1702	1583	1770	1653		506	3521		646	3539	1583
Volume (vph)	365	68	445	23	25	76	92	557	19	165	699	229
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	376	70	459	24	26	78	95	574	20	170	721	236
RTOR Reduction (vph)	0	0	352	0	71	0	0	3	0	0	0	125
Lane Group Flow (vph)	100	346	107	24	33	0	95	591	0	170	721	111
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.3	16.3	16.3	6.1	6.1		28.6	25.4		34.6	28.4	28.4
Effective Green, g (s)	16.3	16.3	16.3	6.1	6.1		28.6	25.4		34.6	28.4	28.4
Actuated g/C Ratio	0.23	0.23	0.23	0.09	0.09		0.41	0.36		0.49	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	391	396	369	154	144		265	1278		419	1436	642
v/s Ratio Prot	0.06	c0.20		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.13			0.16		0.07
v/c Ratio	0.26	0.87	0.29	0.16	0.23		0.36	0.46		0.41	0.50	0.17
Uniform Delay, d1	21.9	25.9	22.1	29.6	29.8		19.4	17.1		15.1	15.5	13.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	18.7	0.4	0.5	0.8		0.8	1.2		0.6	1.3	0.6
Delay (s)	22.2	44.6	22.5	30.0	30.6		20.3	18.3		15.7	16.8	13.9
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		30.9			30.5			18.6			16.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	120	180	139	142	393	40
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	133	200	154	158	437	44

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	333	312	291	190
Volume Left (vph)	133	0	291	146
Volume Right (vph)	0	158	0	44
Hadj (s)	0.11	-0.27	0.53	0.25
Departure Headway (s)	5.9	5.6	6.9	6.6
Degree Utilization, x	0.55	0.49	0.55	0.35
Capacity (veh/h)	585	612	502	528
Control Delay (s)	15.9	13.8	16.9	11.8
Approach Delay (s)	15.9	13.8	14.9	
Approach LOS	C	B	B	

Intersection Summary			
Delay	14.9		
HCM Level of Service	B		
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.88		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1633		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.53	1.00		0.17	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1633		979	3533		317	3539	1583
Volume (vph)	270	42	186	17	28	128	79	845	10	85	304	191
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	303	47	209	19	31	144	89	949	11	96	342	215
RTOR Reduction (vph)	0	0	169	0	129	0	0	1	0	0	0	128
Lane Group Flow (vph)	100	250	40	19	46	0	89	959	0	96	342	87
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	14.4	14.4	14.4	7.9	7.9		36.9	30.7		36.5	30.5	30.5
Effective Green, g (s)	14.4	14.4	14.4	7.9	7.9		36.9	30.7		36.5	30.5	30.5
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11		0.49	0.41		0.49	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	323	327	304	186	172		547	1446		271	1439	644
v/s Ratio Prot	0.06	c0.15		0.01	c0.03		0.01	c0.27		c0.03	0.10	
v/s Ratio Perm			0.03				0.07			0.14		0.06
v/c Ratio	0.31	0.76	0.13	0.10	0.27		0.16	0.66		0.35	0.24	0.14
Uniform Delay, d1	26.0	28.7	25.1	30.3	30.9		10.2	18.0		11.8	14.6	14.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	10.2	0.2	0.2	0.8		0.1	2.4		0.8	0.4	0.4
Delay (s)	26.6	38.9	25.3	30.6	31.7		10.3	20.4		12.6	15.0	14.4
Level of Service	C	D	C	C	C		B	C		B	B	B
Approach Delay (s)		31.6			31.6			19.5			14.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	110	267	193	229	704	100
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	110	267	193	229	704	100

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	377	422	469	335
Volume Left (vph)	110	0	469	235
Volume Right (vph)	0	229	0	100
Hadj (s)	0.09	-0.29	0.53	0.18
Departure Headway (s)	6.9	6.4	7.5	7.2
Degree Utilization, x	0.72	0.75	0.98	0.67
Capacity (veh/h)	519	552	469	491
Control Delay (s)	25.5	26.4	62.8	22.0
Approach Delay (s)	25.5	26.4	45.8	
Approach LOS	D	D	E	

Intersection Summary			
Delay	35.9		
HCM Level of Service	E		
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583	1770	1661		1770	3523		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.23	1.00		0.31	1.00	1.00
Satd. Flow (perm)	1681	1699	1583	1770	1661		433	3523		574	3539	1583
Volume (vph)	439	71	458	23	29	76	111	598	19	165	742	298
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	453	73	472	24	30	78	114	616	20	170	765	307
RTOR Reduction (vph)	0	0	344	0	71	0	0	3	0	0	0	147
Lane Group Flow (vph)	100	426	128	24	37	0	114	633	0	170	765	160
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	20.3	20.3	20.3	6.3	6.3		28.9	25.7		35.9	29.2	29.2
Effective Green, g (s)	20.3	20.3	20.3	6.3	6.3		28.9	25.7		35.9	29.2	29.2
Actuated g/C Ratio	0.27	0.27	0.27	0.08	0.08		0.39	0.34		0.48	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	455	460	428	149	140		224	1207		382	1378	616
v/s Ratio Prot	0.06	c0.25		0.01	c0.02		0.02	0.18		c0.04	c0.22	
v/s Ratio Perm			0.08				0.17			0.17		0.10
v/c Ratio	0.22	0.93	0.30	0.16	0.26		0.51	0.52		0.45	0.56	0.26
Uniform Delay, d1	21.2	26.6	21.7	31.9	32.2		24.5	19.8		18.4	17.8	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	24.6	0.4	0.5	1.0		1.8	1.6		0.8	1.6	1.0
Delay (s)	21.5	51.2	22.1	32.4	33.2		26.4	21.4		19.3	19.5	16.6
Level of Service	C	D	C	C	C		C	C		B	B	B
Approach Delay (s)		34.5			33.0			22.1			18.7	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	120	184	143	152	405	40
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	133	204	159	169	450	44

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	338	328	300	194
Volume Left (vph)	133	0	300	150
Volume Right (vph)	0	169	0	44
Hadj (s)	0.11	-0.28	0.53	0.26
Departure Headway (s)	6.0	5.7	6.9	6.6
Degree Utilization, x	0.56	0.52	0.58	0.36
Capacity (veh/h)	579	608	498	522
Control Delay (s)	16.5	14.5	17.7	12.1
Approach Delay (s)	16.5	14.5	15.5	
Approach LOS	C	B	C	

Intersection Summary			
Delay	15.5		
HCM Level of Service	C		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	573	16	26	281	14	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	637	18	29	312	16	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			654		1016	327
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			654		1016	327
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		93	96
cM capacity (veh/h)			929		227	668

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	424	230	29	312	16	29
Volume Left	0	0	29	0	16	0
Volume Right	0	18	0	0	0	29
cSH	1700	1700	929	1700	227	668
Volume to Capacity	0.25	0.14	0.03	0.18	0.07	0.04
Queue Length 95th (ft)	0	0	2	0	5	3
Control Delay (s)	0.0	0.0	9.0	0.0	22.0	10.6
Lane LOS			A		C	B
Approach Delay (s)	0.0		0.8		14.6	
Approach LOS					B	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.88		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583	1770	1635		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.52	1.00		0.17	1.00	1.00
Satd. Flow (perm)	1681	1700	1583	1770	1635		977	3533		310	3539	1583
Volume (vph)	289	43	192	17	29	128	85	845	10	85	304	210
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	325	48	216	19	33	144	96	949	11	96	342	236
RTOR Reduction (vph)	0	0	173	0	129	0	0	1	0	0	0	142
Lane Group Flow (vph)	100	273	43	19	48	0	96	959	0	96	342	94
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	14.9	14.9	14.9	7.9	7.9		36.4	30.2		36.0	30.0	30.0
Effective Green, g (s)	14.9	14.9	14.9	7.9	7.9		36.4	30.2		36.0	30.0	30.0
Actuated g/C Ratio	0.20	0.20	0.20	0.11	0.11		0.49	0.40		0.48	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	334	338	314	186	172		540	1423		266	1416	633
v/s Ratio Prot	0.06	c0.16		0.01	c0.03		0.01	c0.27		c0.03	0.10	
v/s Ratio Perm			0.03				0.07			0.14		0.06
v/c Ratio	0.30	0.81	0.14	0.10	0.28		0.18	0.67		0.36	0.24	0.15
Uniform Delay, d1	25.6	28.7	24.8	30.3	30.9		10.5	18.4		12.1	14.9	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	13.2	0.2	0.2	0.9		0.2	2.6		0.8	0.4	0.5
Delay (s)	26.1	41.9	25.0	30.6	31.8		10.7	20.9		13.0	15.3	14.9
Level of Service	C	D	C	C	C		B	C		B	B	B
Approach Delay (s)		33.0			31.7			20.0			14.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	110	271	197	238	716	100
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	110	271	197	238	716	100

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	381	435	477	339
Volume Left (vph)	110	0	477	239
Volume Right (vph)	0	238	0	100
Hadj (s)	0.09	-0.29	0.53	0.18
Departure Headway (s)	6.9	6.5	7.6	7.2
Degree Utilization, x	0.73	0.78	1.01	0.68
Capacity (veh/h)	517	552	477	488
Control Delay (s)	26.5	28.7	69.2	23.0
Approach Delay (s)	26.5	28.7	50.0	
Approach LOS	D	D	F	

Intersection Summary			
Delay	38.8		
HCM Level of Service	E		
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	971	16	30	422	13	22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	971	16	30	422	13	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			987		1461	494
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			987		1461	494
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		89	96
cM capacity (veh/h)			696		115	521

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	647	340	30	422	35
Volume Left	0	0	30	0	13
Volume Right	0	16	0	0	22
cSH	1700	1700	696	1700	308
Volume to Capacity	0.38	0.20	0.04	0.25	0.11
Queue Length 95th (ft)	0	0	3	0	9
Control Delay (s)	0.0	0.0	10.4	0.0	22.7
Lane LOS			B		C
Approach Delay (s)	0.0		0.7		22.7
Approach LOS					C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583	1770	1663		1770	3523		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.23	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1699	1583	1770	1663		420	3523		562	3539	1583
Volume (vph)	455	72	463	23	30	76	119	598	19	165	742	319
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	469	74	477	24	31	78	123	616	20	170	765	329
RTOR Reduction (vph)	0	0	340	0	72	0	0	3	0	0	0	153
Lane Group Flow (vph)	100	443	137	24	37	0	123	633	0	170	765	176
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	23.0	23.0	23.0	6.5	6.5		32.0	27.6		37.0	30.1	30.1
Effective Green, g (s)	23.0	23.0	23.0	6.5	6.5		32.0	27.6		37.0	30.1	30.1
Actuated g/C Ratio	0.29	0.29	0.29	0.08	0.08		0.40	0.35		0.46	0.38	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	483	488	455	144	135		242	1215		364	1332	596
v/s Ratio Prot	0.06	c0.26		0.01	c0.02		0.03	0.18		c0.04	c0.22	
v/s Ratio Perm			0.09				0.18			0.18		0.11
v/c Ratio	0.21	0.91	0.30	0.17	0.28		0.51	0.52		0.47	0.57	0.30
Uniform Delay, d1	21.6	27.5	22.2	34.2	34.5		26.1	20.9		20.9	19.9	17.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	20.4	0.4	0.5	1.1		1.7	1.6		0.9	1.8	1.3
Delay (s)	21.8	47.9	22.6	34.8	35.7		27.7	22.5		21.8	21.7	18.8
Level of Service	C	D	C	C	D		C	C		C	C	B
Approach Delay (s)		33.5			35.5			23.4			20.9	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	140	210	165	140	420	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	156	233	183	156	467	50

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	389	339	311	206
Volume Left (vph)	156	0	311	156
Volume Right (vph)	0	156	0	50
Hadj (s)	0.11	-0.24	0.53	0.24
Departure Headway (s)	6.1	5.9	7.1	6.8
Degree Utilization, x	0.66	0.55	0.62	0.39
Capacity (veh/h)	569	586	485	509
Control Delay (s)	20.3	16.0	19.8	13.0
Approach Delay (s)	20.3	16.0	17.1	
Approach LOS	C	C	C	

Intersection Summary			
Delay	17.8		
HCM Level of Service	C		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	630	16	26	305	14	26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	630	16	26	305	14	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			646		995	323
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			646		995	323
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		94	96
cM capacity (veh/h)			935		235	673

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	420	226	26	305	40
Volume Left	0	0	26	0	14
Volume Right	0	16	0	0	26
cSH	1700	1700	935	1700	407
Volume to Capacity	0.25	0.13	0.03	0.18	0.10
Queue Length 95th (ft)	0	0	2	0	8
Control Delay (s)	0.0	0.0	9.0	0.0	14.8
Lane LOS			A		B
Approach Delay (s)	0.0		0.7		14.8
Approach LOS					B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.88		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583	1770	1632		1770	3534		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.41	1.00		0.20	1.00	1.00
Satd. Flow (perm)	1681	1700	1583	1770	1632		767	3534		378	3539	1583
Volume (vph)	310	50	105	20	30	145	95	970	10	95	350	240
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	348	56	118	22	34	163	107	1090	11	107	393	270
RTOR Reduction (vph)	0	0	94	0	138	0	0	1	0	0	0	160
Lane Group Flow (vph)	100	304	24	22	59	0	107	1100	0	107	393	110
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.3	16.3	16.3	8.5	8.5		36.0	36.0		32.7	32.7	32.7
Effective Green, g (s)	16.3	16.3	16.3	8.5	8.5		36.0	36.0		32.7	32.7	32.7
Actuated g/C Ratio	0.20	0.20	0.20	0.11	0.11		0.45	0.45		0.41	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	343	346	323	188	173		427	1590		210	1447	647
v/s Ratio Prot	0.06	c0.18		0.01	c0.04		0.02	c0.31		c0.02	0.11	
v/s Ratio Perm			0.02				0.09			0.19		0.07
v/c Ratio	0.29	0.88	0.07	0.12	0.34		0.25	0.69		0.51	0.27	0.17
Uniform Delay, d1	27.0	30.9	25.8	32.4	33.2		13.1	17.6		23.1	15.7	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	21.4	0.1	0.3	1.2		0.3	2.5		1.9	0.5	0.6
Delay (s)	27.4	52.3	25.8	32.6	34.4		13.5	20.1		25.1	16.2	15.6
Level of Service	C	D	C	C	C		B	C		C	B	B
Approach Delay (s)		41.6			34.2			19.5			17.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	125	275	225	220	725	115
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	125	275	225	220	725	115

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	400	445	483	357
Volume Left (vph)	125	0	483	242
Volume Right (vph)	0	220	0	115
Hadj (s)	0.10	-0.26	0.53	0.15
Departure Headway (s)	6.8	6.4	7.7	7.3
Degree Utilization, x	0.76	0.80	1.03	0.72
Capacity (veh/h)	517	547	472	484
Control Delay (s)	28.3	29.9	77.1	25.9
Approach Delay (s)	28.3	29.9	55.3	
Approach LOS	D	D	F	

Intersection Summary			
Delay	42.2		
HCM Level of Service	E		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1000	16	30	425	13	22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1000	16	30	425	13	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1016		1493	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1016		1493	508
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		88	96
cM capacity (veh/h)			678		109	510

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	667	349	30	425	35
Volume Left	0	0	30	0	13
Volume Right	0	16	0	0	22
cSH	1700	1700	678	1700	293
Volume to Capacity	0.39	0.21	0.04	0.25	0.12
Queue Length 95th (ft)	0	0	3	0	10
Control Delay (s)	0.0	0.0	10.6	0.0	23.6
Lane LOS			B		C
Approach Delay (s)	0.0		0.7		23.6
Approach LOS					C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583	1770	1664		1770	3524		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.17	1.00		0.25	1.00	1.00
Satd. Flow (perm)	1681	1700	1583	1770	1664		307	3524		459	3539	1583
Volume (vph)	495	80	525	25	35	85	140	685	20	190	855	355
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	510	82	541	26	36	88	144	706	21	196	881	366
RTOR Reduction (vph)	0	0	329	0	80	0	0	2	0	0	0	136
Lane Group Flow (vph)	150	442	212	26	44	0	144	725	0	196	881	230
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	25.9	25.9	25.9	8.0	8.0		36.5	31.1		43.7	34.7	34.7
Effective Green, g (s)	25.9	25.9	25.9	8.0	8.0		36.5	31.1		43.7	34.7	34.7
Actuated g/C Ratio	0.29	0.29	0.29	0.09	0.09		0.41	0.35		0.49	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	484	489	456	157	148		212	1218		354	1364	610
v/s Ratio Prot	0.09	c0.26		0.01	c0.03		0.04	0.21		c0.06	0.25	
v/s Ratio Perm			0.13				c0.23			0.21		0.15
v/c Ratio	0.31	0.90	0.46	0.17	0.30		0.68	0.60		0.55	0.65	0.38
Uniform Delay, d1	25.1	30.9	26.4	37.9	38.4		32.5	24.3		26.1	22.6	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	19.9	0.8	0.5	1.1		8.4	2.1		1.9	2.4	1.8
Delay (s)	25.4	50.8	27.1	38.4	39.5		40.9	26.4		28.0	25.0	21.6
Level of Service	C	D	C	D	D		D	C		C	C	C
Approach Delay (s)		36.1			39.3			28.8			24.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.93		0.99	
Flt Protected		0.98	1.00		0.96	
Satd. Flow (prot)		1826	1735		3409	
Flt Permitted		0.71	1.00		0.96	
Satd. Flow (perm)		1331	1735		3409	
Volume (vph)	120	180	139	142	393	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	133	200	154	158	437	44
RTOR Reduction (vph)	0	0	106	0	19	0
Lane Group Flow (vph)	0	333	206	0	462	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		9.3	9.3		12.3	
Effective Green, g (s)		9.3	9.3		12.3	
Actuated g/C Ratio		0.31	0.31		0.42	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		418	545		1417	
v/s Ratio Prot			0.12		c0.14	
v/s Ratio Perm		c0.25				
v/c Ratio		0.80	0.38		0.33	
Uniform Delay, d1		9.3	7.9		5.8	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		10.1	0.4		0.1	
Delay (s)		19.4	8.3		6.0	
Level of Service		B	A		A	
Approach Delay (s)		19.4	8.3		6.0	
Approach LOS		B	A		A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	29.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.93		0.99	
Flt Protected		0.98	1.00		0.96	
Satd. Flow (prot)		1827	1733		3410	
Flt Permitted		0.69	1.00		0.96	
Satd. Flow (perm)		1285	1733		3410	
Volume (vph)	120	184	143	152	405	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	133	204	159	169	450	44
RTOR Reduction (vph)	0	0	109	0	18	0
Lane Group Flow (vph)	0	337	219	0	476	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		9.4	9.4		12.3	
Effective Green, g (s)		9.4	9.4		12.3	
Actuated g/C Ratio		0.32	0.32		0.41	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		407	548		1412	
v/s Ratio Prot			0.13		c0.14	
v/s Ratio Perm		c0.26				
v/c Ratio		0.83	0.40		0.34	
Uniform Delay, d1		9.4	7.9		5.9	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		13.0	0.5		0.1	
Delay (s)		22.4	8.4		6.1	
Level of Service		C	A		A	
Approach Delay (s)		22.4	8.4		6.1	
Approach LOS		C	A		A	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	29.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.93		0.98	
Flt Protected		0.99	1.00		0.96	
Satd. Flow (prot)		1836	1726		3398	
Flt Permitted		0.72	1.00		0.96	
Satd. Flow (perm)		1341	1726		3398	
Volume (vph)	110	267	193	229	704	100
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	267	193	229	704	100
RTOR Reduction (vph)	0	0	109	0	29	0
Lane Group Flow (vph)	0	377	313	0	775	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		13.6	13.6		13.6	
Effective Green, g (s)		13.6	13.6		13.6	
Actuated g/C Ratio		0.39	0.39		0.39	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		518	667		1313	
v/s Ratio Prot			0.18		c0.23	
v/s Ratio Perm		c0.28				
v/c Ratio		0.73	0.47		0.59	
Uniform Delay, d1		9.2	8.1		8.6	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		5.1	0.5		0.7	
Delay (s)		14.3	8.6		9.3	
Level of Service		B	A		A	
Approach Delay (s)		14.3	8.6		9.3	
Approach LOS		B	A		A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.93		0.98	
Flt Protected		0.99	1.00		0.96	
Satd. Flow (prot)		1836	1725		3398	
Flt Permitted		0.71	1.00		0.96	
Satd. Flow (perm)		1317	1725		3398	
Volume (vph)	110	271	197	238	716	100
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	271	197	238	716	100
RTOR Reduction (vph)	0	0	106	0	24	0
Lane Group Flow (vph)	0	381	329	0	792	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		14.5	14.5		14.4	
Effective Green, g (s)		14.5	14.5		14.4	
Actuated g/C Ratio		0.39	0.39		0.39	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		518	678		1326	
v/s Ratio Prot			0.19		c0.23	
v/s Ratio Perm		c0.29				
v/c Ratio		0.74	0.49		0.60	
Uniform Delay, d1		9.6	8.4		8.9	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		5.4	0.6		0.7	
Delay (s)		14.9	9.0		9.7	
Level of Service		B	A		A	
Approach Delay (s)		14.9	9.0		9.7	
Approach LOS		B	A		A	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.94		0.99	
Flt Protected		0.98	1.00		0.96	
Satd. Flow (prot)		1826	1747		3407	
Flt Permitted		0.67	1.00		0.96	
Satd. Flow (perm)		1245	1747		3407	
Volume (vph)	140	210	165	140	420	45
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	233	183	156	467	50
RTOR Reduction (vph)	0	0	84	0	17	0
Lane Group Flow (vph)	0	389	255	0	500	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		11.0	11.0		12.8	
Effective Green, g (s)		11.0	11.0		12.8	
Actuated g/C Ratio		0.35	0.35		0.40	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		431	604		1371	
v/s Ratio Prot			0.15		c0.15	
v/s Ratio Perm		c0.31				
v/c Ratio		0.90	0.42		0.36	
Uniform Delay, d1		9.9	8.0		6.7	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		21.7	0.5		0.2	
Delay (s)		31.6	8.4		6.8	
Level of Service		C	A		A	
Approach Delay (s)		31.6	8.4		6.8	
Approach LOS		C	A		A	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	31.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.93		0.98	
Flt Protected		0.98	1.00		0.96	
Satd. Flow (prot)		1834	1738		3393	
Flt Permitted		0.67	1.00		0.96	
Satd. Flow (perm)		1256	1738		3393	
Volume (vph)	125	275	225	220	725	115
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	125	275	225	220	725	115
RTOR Reduction (vph)	0	0	83	0	28	0
Lane Group Flow (vph)	0	400	362	0	812	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		15.8	15.8		14.7	
Effective Green, g (s)		15.8	15.8		14.7	
Actuated g/C Ratio		0.41	0.41		0.38	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		515	713		1296	
v/s Ratio Prot			0.21		c0.24	
v/s Ratio Perm		c0.32				
v/c Ratio		0.78	0.51		0.63	
Uniform Delay, d1		9.8	8.5		9.7	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		7.2	0.6		1.0	
Delay (s)		17.1	9.0		10.6	
Level of Service		B	A		B	
Approach Delay (s)		17.1	9.0		10.6	
Approach LOS		B	A		B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	38.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	*100	335	456	24	104	91	594	170	721	225
v/c Ratio	0.26	0.85	0.64	0.13	0.43	0.31	0.44	0.52	0.47	0.28
Control Delay	23.5	47.5	7.1	29.0	16.9	17.4	18.4	24.3	17.9	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	47.5	7.1	29.0	16.9	17.4	18.4	24.3	17.9	4.8
Queue Length 50th (ft)	36	143	0	10	11	20	99	39	124	6
Queue Length 95th (ft)	75	#278	67	29	50	48	157	#91	192	51
Internal Link Dist (ft)		5222			1134		1562		1798	
Turn Bay Length (ft)	125		215	230		160		260		100
Base Capacity (vph)	408	413	730	405	438	289	1363	324	1521	796
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.81	0.62	0.06	0.24	0.31	0.44	0.52	0.47	0.28

Intersection Summary

* User Entered Value

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	*100	346	459	24	104	95	594	170	721	236
v/c Ratio	0.26	0.87	0.64	0.13	0.43	0.33	0.44	0.52	0.48	0.30
Control Delay	23.5	50.4	7.1	29.0	16.9	17.8	18.4	24.4	17.9	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	50.4	7.1	29.0	16.9	17.8	18.4	24.4	17.9	4.9
Queue Length 50th (ft)	36	149	0	10	11	21	99	39	124	7
Queue Length 95th (ft)	75	#291	68	29	50	49	157	#91	192	53
Internal Link Dist (ft)		5222			1134		1562		1798	
Turn Bay Length (ft)	125		215	230		160		260		100
Base Capacity (vph)	408	413	732	405	438	288	1359	324	1517	799
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.84	0.63	0.06	0.24	0.33	0.44	0.52	0.48	0.30

Intersection Summary

* User Entered Value

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	*100	426	472	24	108	114	636	170	765	307
v/c Ratio	0.22	0.92	0.61	0.14	0.46	0.43	0.50	0.56	0.53	0.39
Control Delay	22.3	55.3	6.2	31.3	18.7	23.0	21.7	28.5	20.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	55.3	6.2	31.3	18.7	23.0	21.7	28.5	20.5	6.8
Queue Length 50th (ft)	36	200	0	11	13	29	123	44	148	20
Queue Length 95th (ft)	76	#370	66	30	55	63	188	#99	224	82
Internal Link Dist (ft)		5222			1134		1562		1798	
Turn Bay Length (ft)	125		215	230		160		260		100
Base Capacity (vph)	471	476	783	378	416	263	1278	305	1450	791
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.89	0.60	0.06	0.26	0.43	0.50	0.56	0.53	0.39

Intersection Summary

* User Entered Value

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	*100	443	477	24	109	123	636	170	765	329
v/c Ratio	0.21	0.91	0.60	0.14	0.48	0.50	0.51	0.57	0.56	0.43
Control Delay	22.4	52.1	5.9	33.8	20.2	28.4	23.1	32.0	22.6	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	52.1	5.9	33.8	20.2	28.4	23.1	32.0	22.6	8.0
Queue Length 50th (ft)	38	218	0	11	15	34	132	48	160	28
Queue Length 95th (ft)	77	#392	66	32	58	#80	200	#116	237	98
Internal Link Dist (ft)		5222			1134		1562		1798	
Turn Bay Length (ft)	125		215	230		160		260		100
Base Capacity (vph)	504	510	809	354	395	244	1259	296	1370	763
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.87	0.59	0.07	0.28	0.50	0.51	0.57	0.56	0.43

Intersection Summary

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	*150	442	541	26	124	144	727	196	881	366
v/c Ratio	0.31	0.90	0.69	0.16	0.54	0.66	0.60	0.66	0.65	0.49
Control Delay	26.7	54.3	10.0	38.8	23.1	41.8	27.3	39.3	26.1	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	54.3	10.0	38.8	23.1	41.8	27.3	39.3	26.1	11.2
Queue Length 50th (ft)	68	249	33	14	20	44	174	62	211	54
Queue Length 95th (ft)	122	#427	139	37	69	#118	253	#146	303	145
Internal Link Dist (ft)		5222			1134		1562		1798	
Turn Bay Length (ft)	125		215	230		160		260		100
Base Capacity (vph)	504	510	798	315	368	217	1219	299	1364	746
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.87	0.68	0.08	0.34	0.66	0.60	0.66	0.65	0.49

Intersection Summary

* User Entered Value

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

APPENDIX C

TRIP GENERATION/DISTRIBUTION SUPPORTING DOCUMENTS

Hotel
(310)

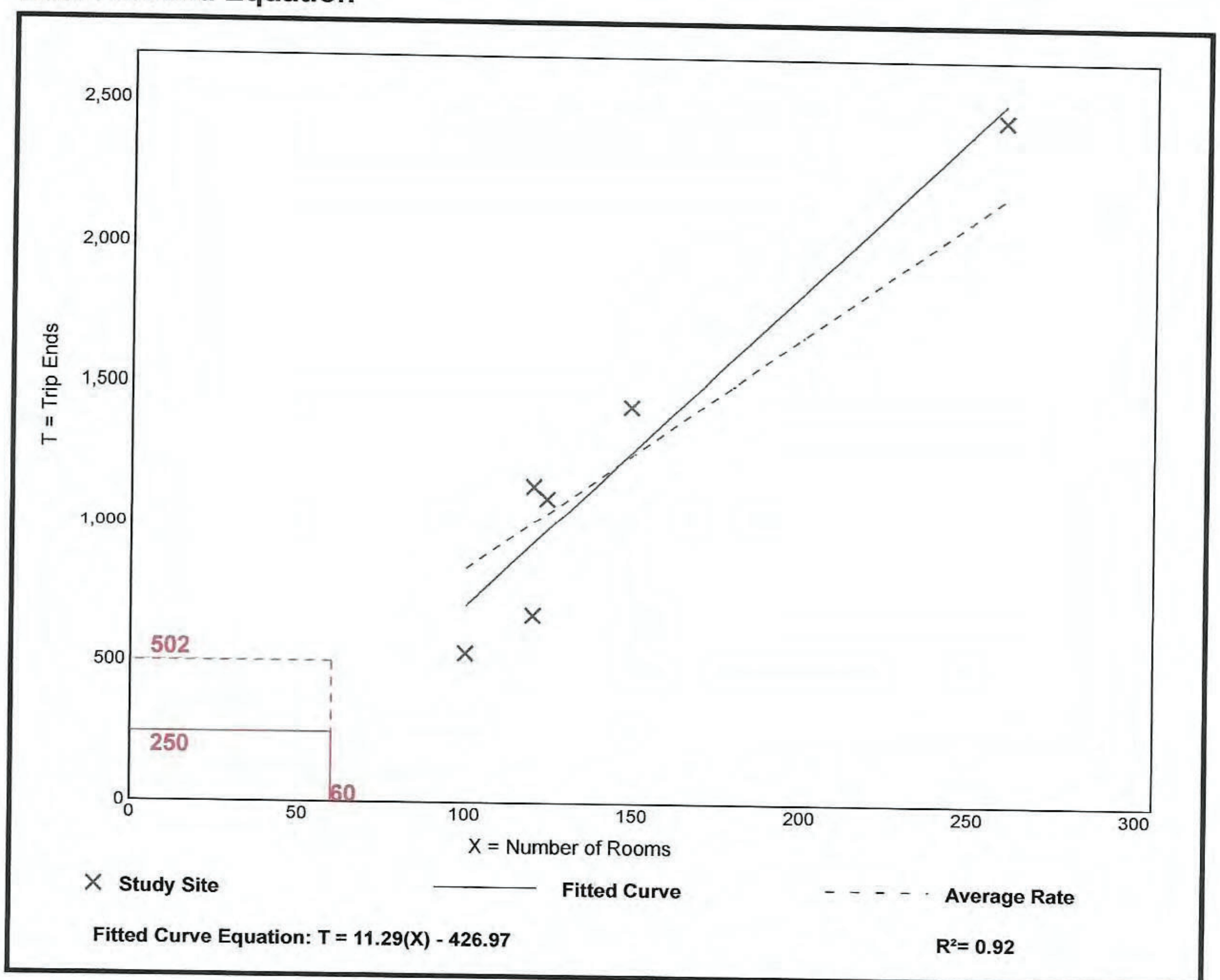
Vehicle Trip Ends vs: **Rooms**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
Avg. Num. of Rooms: 146
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
8.36	5.31 - 9.53	1.86

Data Plot and Equation



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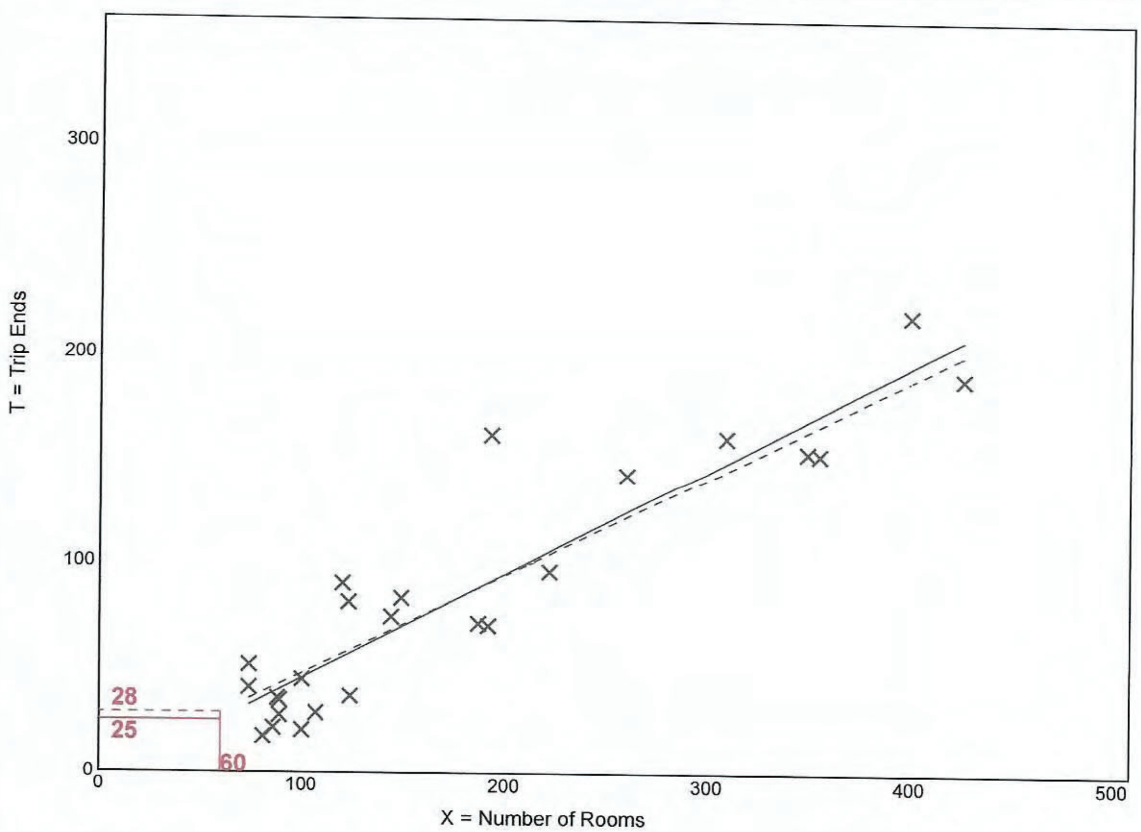
Hotel
(310)

Vehicle Trip Ends vs:	**Rooms**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	25
Avg. Num. of Rooms:	178
Directional Distribution:	59% entering, 41% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.47	0.20 - 0.84	0.14

Data Plot and Equation



× **Study Site** — **Fitted Curve** - - - - **Average Rate**

Fitted Curve Equation: T = 0.50(X) - 5.34 **R^2= 0.85**

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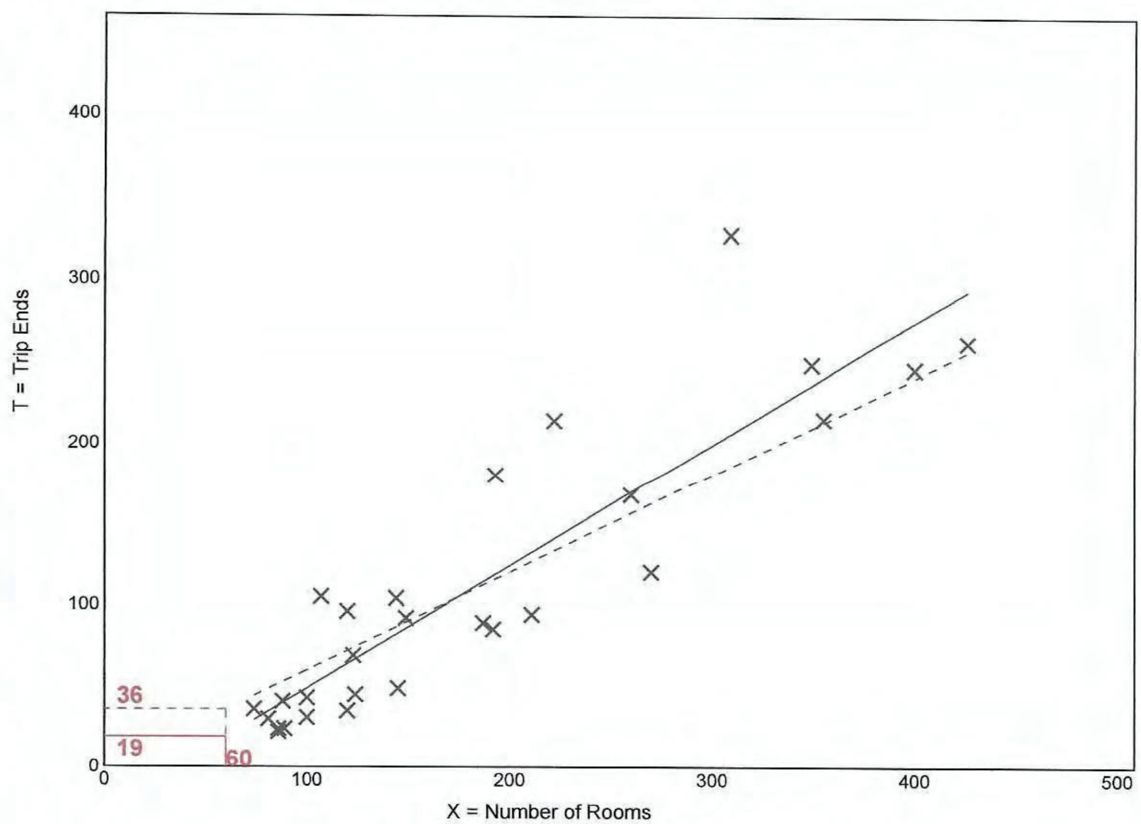
Hotel
(310)

Vehicle Trip Ends vs: **Rooms**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 28
Avg. Num. of Rooms: 183
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.60	0.26 - 1.06	0.22

Data Plot and Equation



X **Study Site** —— **Fitted Curve** - - - - **Average Rate**

Fitted Curve Equation: T = 0.75(X) - 26.02 **R^2= 0.80**

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All Suites Hotel
(311)

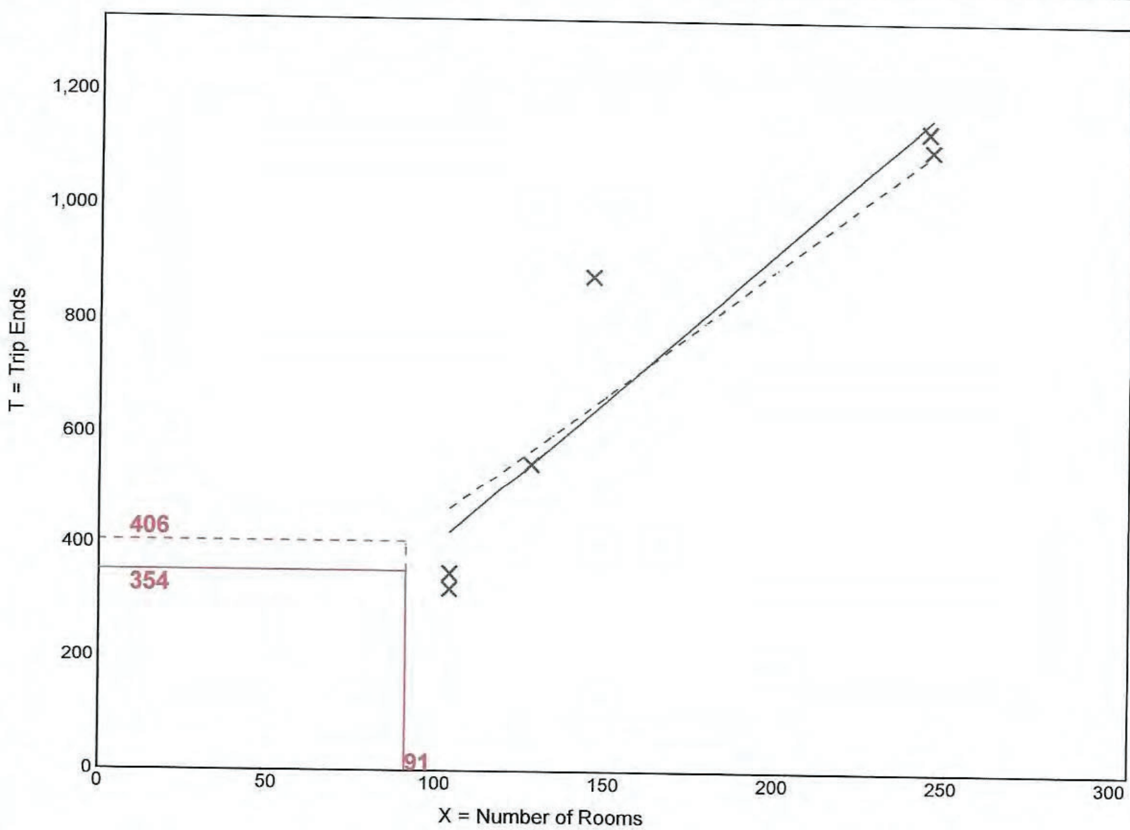
Vehicle Trip Ends vs: Rooms
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. Num. of Rooms: 162
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
4.46	3.11 - 6.02	0.92

Data Plot and Equation



Fitted Curve Equation: T = 5.20(X) - 119.26

R^2= 0.89

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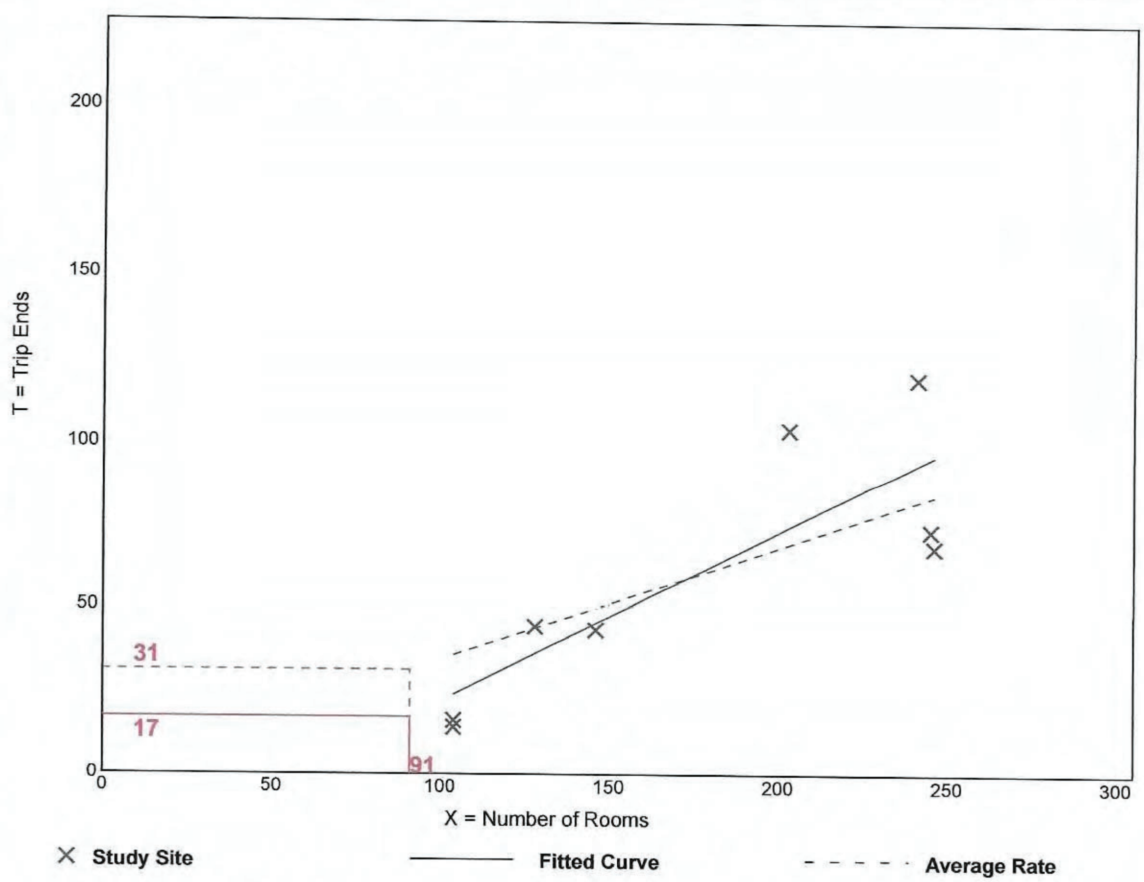
All Suites Hotel
(311)

Vehicle Trip Ends vs:	**Rooms**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	8
Avg. Num. of Rooms:	177
Directional Distribution:	53% entering, 47% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.34	0.13 - 0.51	0.13

Data Plot and Equation



Fitted Curve Equation: $T = 0.51(X) - 29.37$

$R^2 = 0.70$

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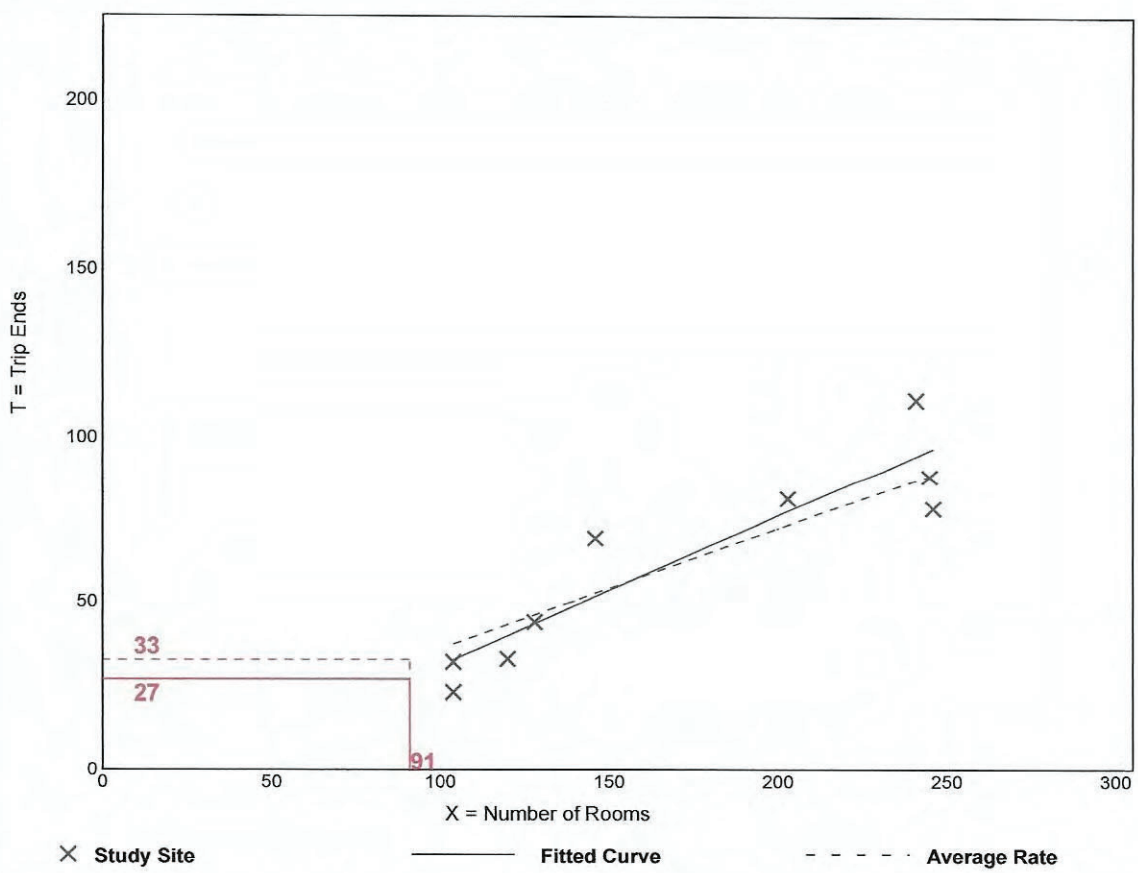
All Suites Hotel
(311)

Vehicle Trip Ends vs:	**Rooms**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	9
Avg. Num. of Rooms:	171
Directional Distribution:	48% entering, 52% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.36	0.22 - 0.47	0.08

Data Plot and Equation



Fitted Curve Equation: $T = 0.45(X) - 14.07$

$R^2 = 0.84$

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Single-Family Detached Housing
(210)

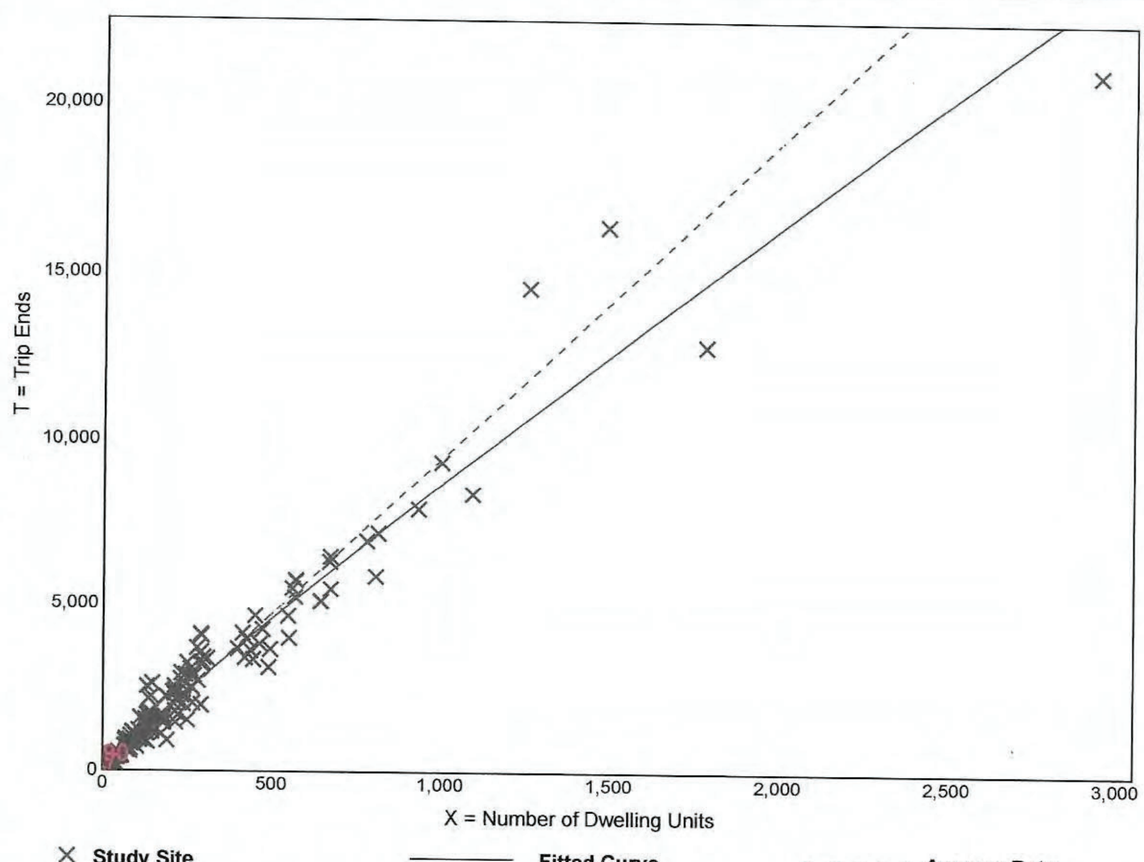
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation



Fitted Curve Equation: $Ln(T) = 0.92\ Ln(X) + 2.71$ **$R^2 = 0.95$**

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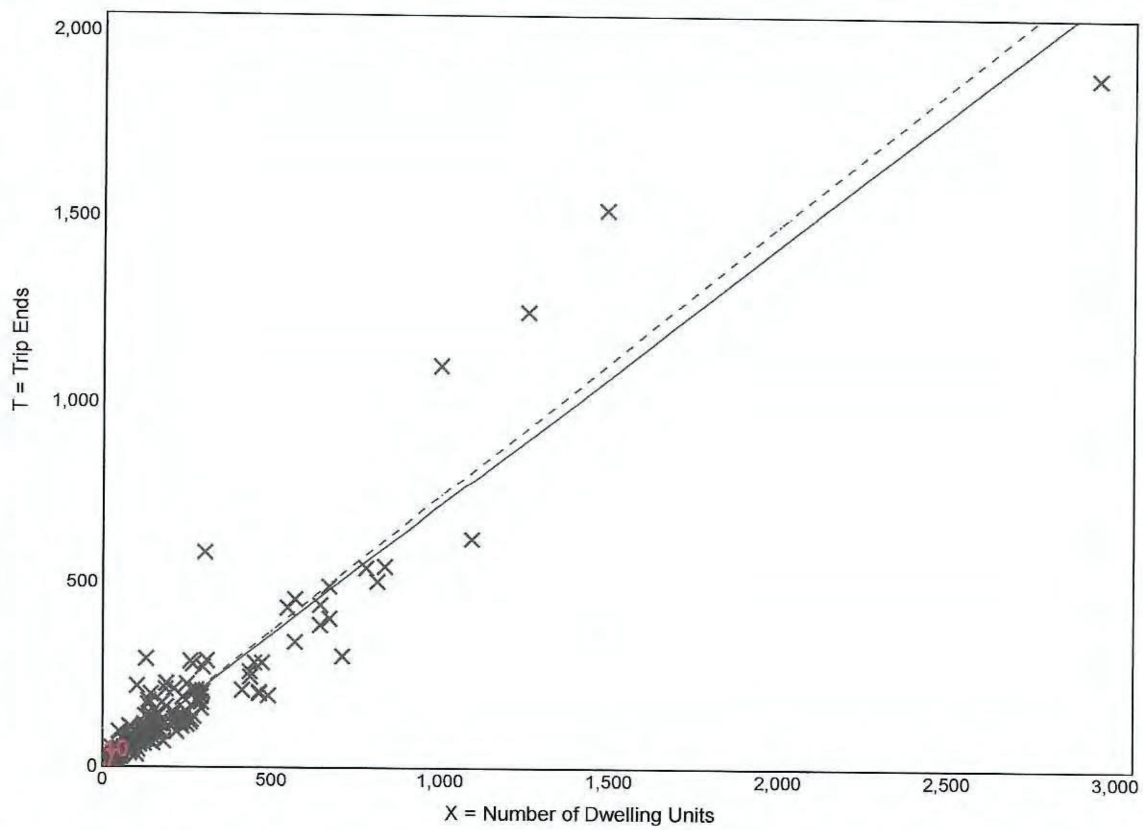
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	173
Avg. Num. of Dwelling Units:	219
Directional Distribution:	25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



× **Study Site** ——— **Fitted Curve** - - - - **Average Rate**

Fitted Curve Equation: $T = 0.71(X) + 4.80$ **$R^2 = 0.89$**

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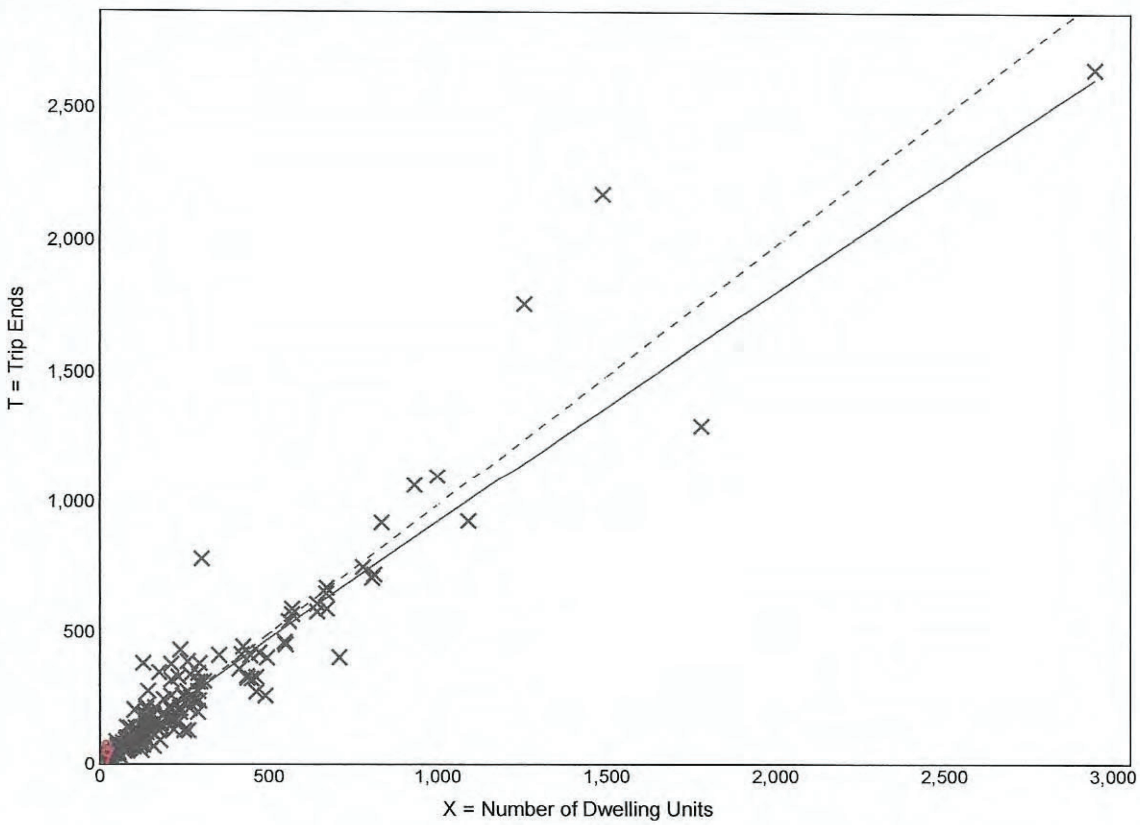
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	190
Avg. Num. of Dwelling Units:	242
Directional Distribution:	63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Fitted Curve Equation: $Ln(T) = 0.96\ Ln(X) + 0.20$ **$R^2 = 0.92$**

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High-Turnover (Sit-Down) Restaurant
(932)

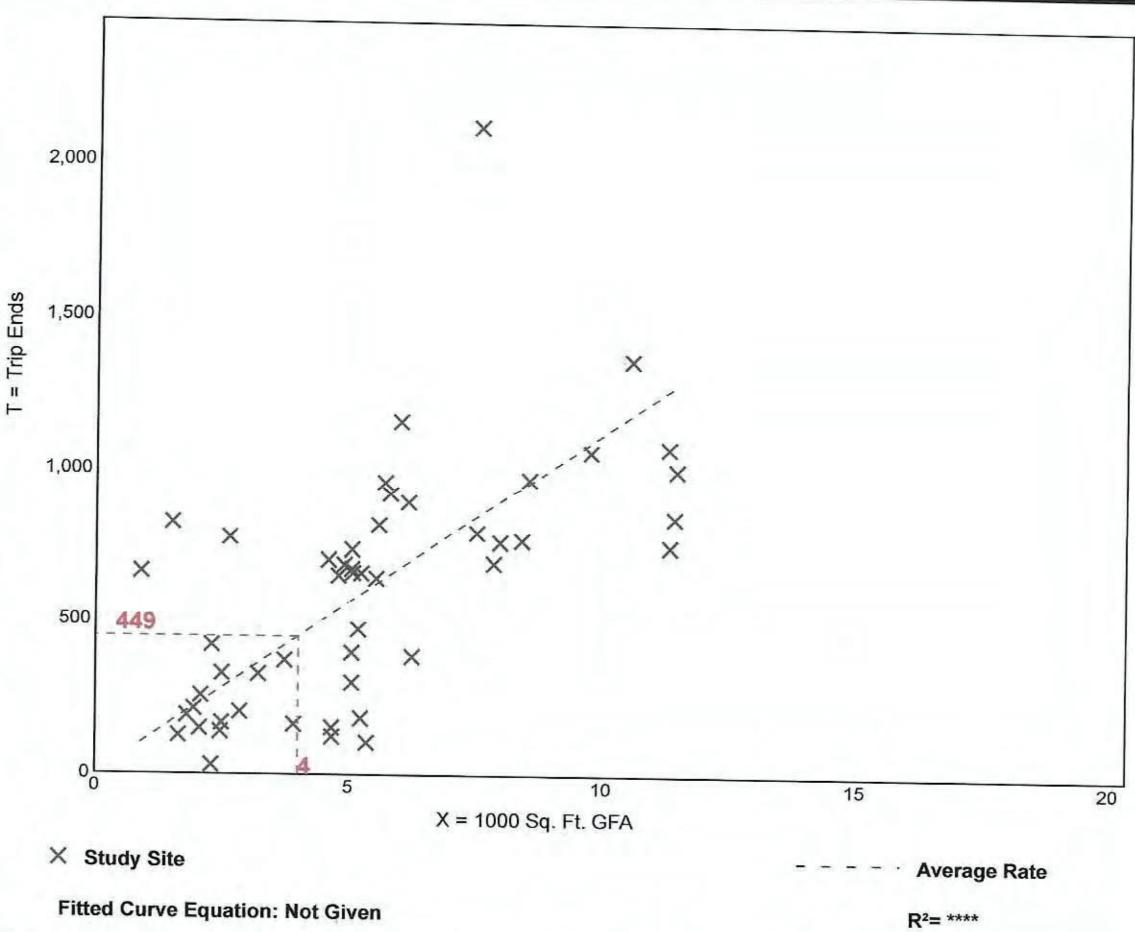
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 50
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
112.18	13.04 - 742.41	72.51

Data Plot and Equation



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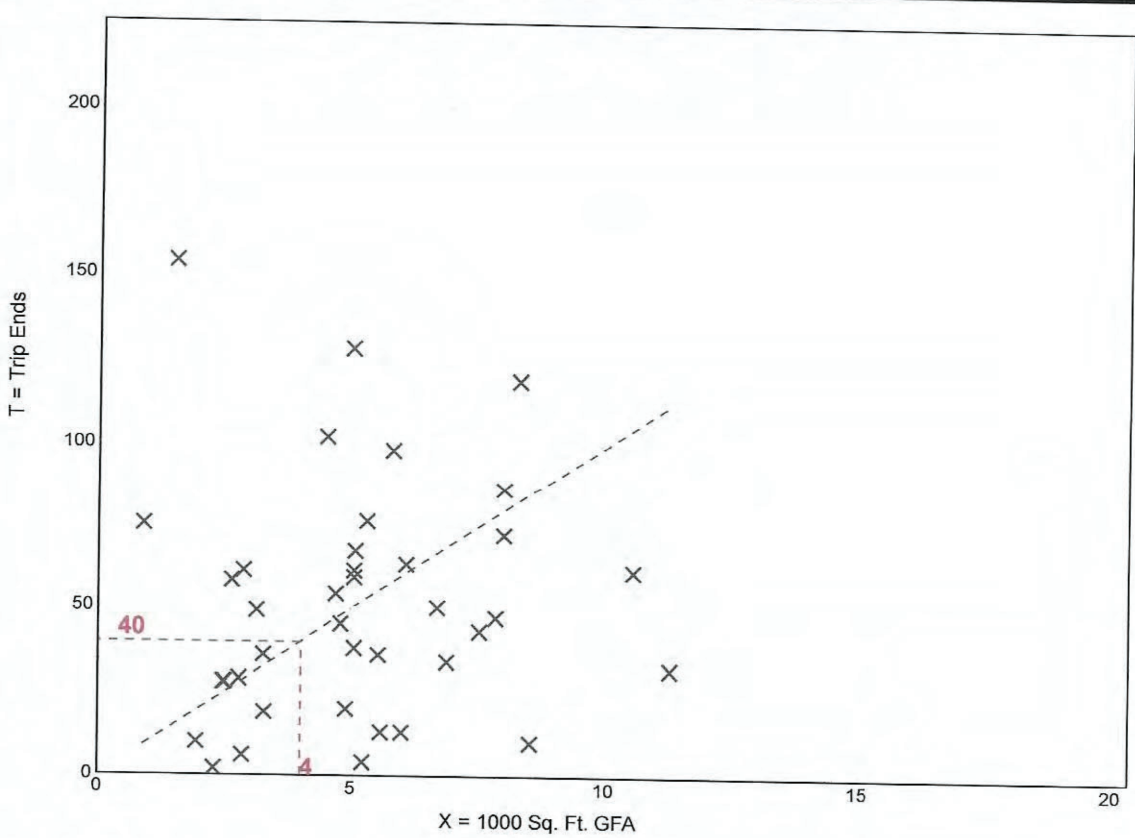
High-Turnover (Sit-Down) Restaurant
(932)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 39
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.94	0.76 - 102.39	11.33

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

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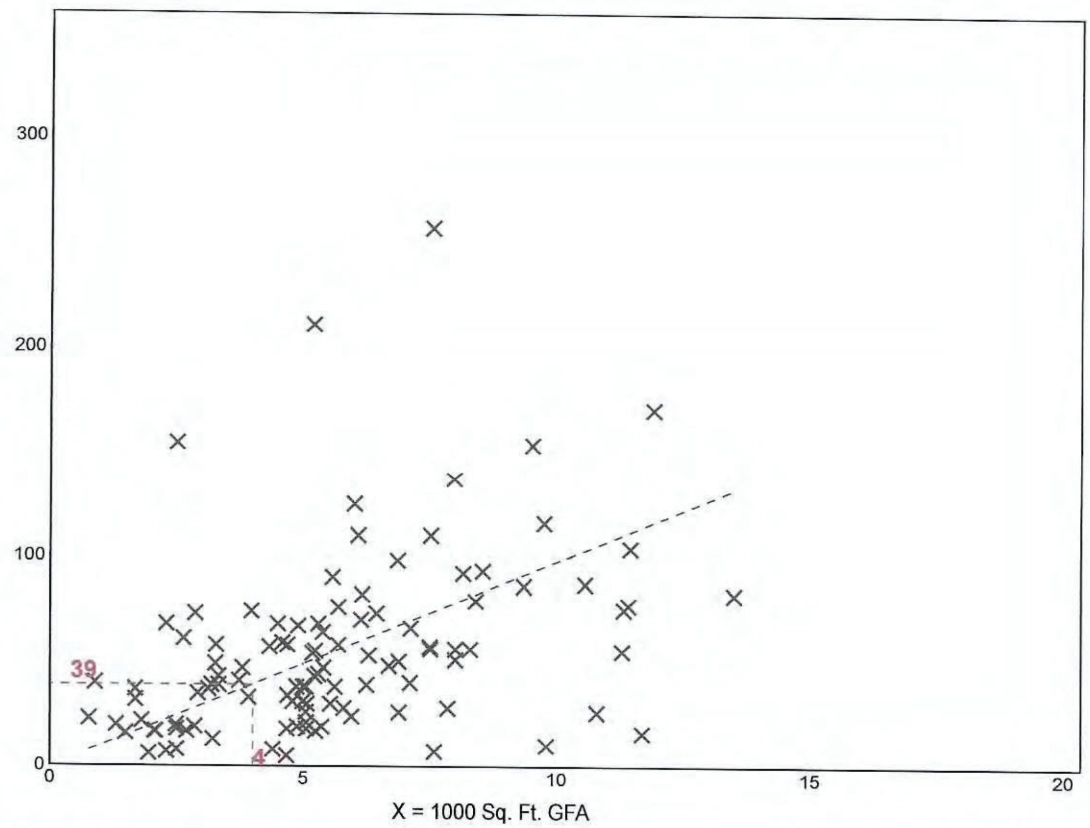
High-Turnover (Sit-Down) Restaurant
(932)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	107
Avg. 1000 Sq. Ft. GFA:	6
Directional Distribution:	62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.77	0.92 - 62.00	7.37

Data Plot and Equation



× **Study Site**

- - - - **Average Rate**

Fitted Curve Equation: Not Given

R^2= ****

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2017 California Airport Passenger Traffic

Northern California Traffic

Airport	Domestic	International
San Jose	4,183,938	321,541
San Francisco	31,442,524	10,267,335
Oakland	9,733,812	0
Sacramento	4,018,922	92,137
Total	49,379,196	10,681,013
Combined Total		60,060,209

Southern California Traffic

Airport	Domestic	International
Burbank	1,808,628	0
Los Angeles	23,311,618	16,758,660
Long Beach	1,490,704	0
Ontario	2,479,466	85,310
Santa Ana	3,997,057	93,822
San Diego	15,846,213	666,899
Total	48,933,686	17,604,691
Combined Total		66,538,377

Data Derived from Visit California Industry Research Report
https://industry.visitcalifornia.com/-/media/PDFs/Research/California-Airport-Passenger-Traffic--Sept-2017.pdf

Northern CA Population

County	Population*
Santa Clara	1,836,025
Alameda	1,553,960
Sacramento	1,448,053
Contra Costa	1,078,257
Fresno	947,581
San Francisco	827,420
San Mateo	738,681
San Joaquin	701,151
Stanislaus	521,450
Sonoma	490,596
Tulare	451,043
Monterey	426,072
Solano	420,335
Placer	361,420
Santa Cruz	266,508
Merced	261,632
Marin	255,841
Butte	221,016
Yolo	203,838
El Dorado	180,616
Shasta	178,368
Madera	152,235
Kings	151,382
Napa	138,916
Humboldt	134,584
Nevada	98,267
Sutter	94,659
Mendocino	87,373
Yuba	72,969
Lake	63,965
Tehama	63,264
San Benito	56,869
Tuolumne	54,050
Calaveras	44,731
Siskiyou	44,223
Amador	37,003
Lassen	33,657
Del Norte	28,248
Glenn	27,957
Colusa	21,355
Plumas	19,338

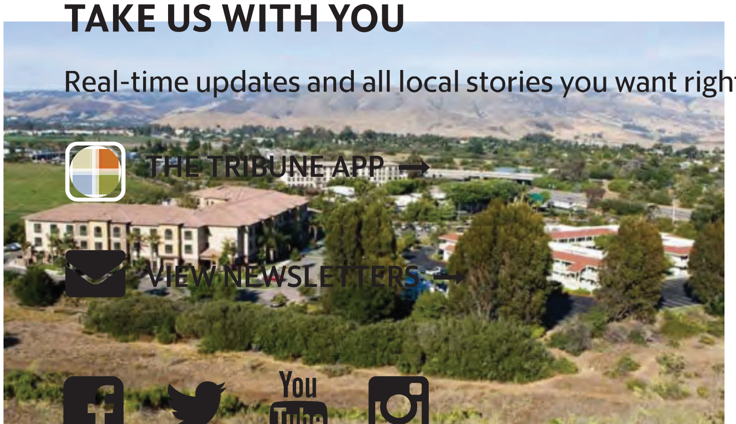
Southern CA Population

County	Population*
Imperial	176,768
San Diego	3,176,138
Riverside	2,264,879
Orange	3,085,355
San Bernardino	2,077,453
Los Angeles	9,951,690
Ventura	834,398
Kern	855,498
Santa Barbara	430,426
San Luis Obispo	274,622
Total	**23,127,227**

*Population tabulations based on most recent data available by the US Census

Inyo	18,441
Mariposa	17,888
Mono	14,349
Trinity	13,506
Modoc	9,346
Sierra	3,075
Alpine	1,138
Total	**14,872,651**

*Population tabulations based on most recent data available by the US Census



Hotels on Los Osos Valley Road in San Luis Obispo. Joe Johnston - jjohnston@thetribunenews.com

BUSINESS

San Luis Obispo collects record amount of tourism lodging revenue

BY CYNTHIA LAMBERT
clambert@thetribunenews.com

October 23, 2015 12:22 PM
Updated October 23, 2015 12:44 PM

San Luis Obispo collected more than $6.8 million in transient occupancy tax revenues last fiscal year — the highest collection of so-called bed tax in the city's history and 12 percent over the previous year.

The city's hotels, motels and other lodging properties have returned to steady occupancy rates — the average annual occupancy rate was 73.1 percent — with more than 20 sell-out weekends in 2014-15, according to city tourism officials. The average daily rate for a room increased nearly 7.5 percent to $129.17, said Nipool Patel, co-owner of the Lamplighter Inn & Suites and chairman of the city's Tourism Business Improvement District board.

"I think that's from marketing efforts and also the economy getting better, too," Patel told the San Luis Obispo City Council during a presentation of the tourism district's annual report Tuesday.

$6.8 million

Transient occupancy tax collected by the city in 2014-15

The district, established in 2008, collects a 2 percent assessment of gross receipts from city hotel rooms, with the funds going toward tourism promotion. It raised about $1.36 million in 2014-15, with revenues used for marketing, events promotion, trade shows and partnerships, including one with Cal Poly Athletics.

Separately, the city receives transient occupancy tax revenue from a 10 percent tax that's added to overnight stays at the city's hotels, motels, bed-and-breakfasts and — very recently — homestays, or temporary rentals in owner-occupied homes. There are 38 standard lodging properties in the city with a total of about 2,100 hotel rooms. There are eight permitted homestays, city tourism manager Molly Cano said.

The amount of bed tax money collected has increased every year in the past five years, according to the San Luis Obispo Chamber of Commerce, which leads public relations efforts for the tourism district. Transient occupancy tax is the city's fourth-highest revenue generator, behind general sales tax, property tax and the city's local half-percent sales tax measure.

"One of the things we're looking at is getting the homestays more involved in our marketing activities now that they're getting fully permitted," Cano said. "It's been a slow start to this point, but we're looking forward to them being more involved in what we're doing."

$129.17 Average daily rate for overnight stays

The tourism program went through a rebranding in the 2014-15 year, including its "ShareSLO" campaign, which included new logos, blog design and social media. The Tourism Business Improvement District's marketing efforts were led by a new team of Barnett Cox & Associates and StudioGood.

In addition, the chamber of commerce, which operates the Visitor Center in partnership with the city, saw a record number of visitors, with more than 80,000 walk-ins, 6,000 phone calls and nearly 2,000 emails, according to a news release.

"You're working your butts off," Councilwoman Carlyn Christianson told Cano and Patel at Tuesday's meeting. "I'm really impressed."

Mayor Jan Marx said she appreciated that tourism officials have been sensitive to neighborhood concerns and are directing trail users to other open spaces to decrease overuse of popular areas such as Bishop Peak.

The City Council adopted a resolution to continue the tourism district and levy the 2 percent assessment on hotel stays in the 2015-16 fiscal year. A public hearing on the proposed assessment was set for the council's Nov. 3 meeting.

Cynthia Lambert: 805-781-7929, @ClambertSLO

SLO County hotels shake off bumpy winter, hope for summer boom

The lodging industry in San Luis Obispo County continues to grow, but at a slower pace than in recent years.

Bed tax, or transient occupancy tax, revenue — charged to guests of lodging properties — was up 6.5 percent countywide in the first half of this fiscal year, compared with the previous year. By comparison, it grew 7.3 percent in the fiscal year ending June 30, 2016, and 15.35 percent in fiscal 2015.

Chuck Davison, president and chief executive officer of Visit SLO CAL, a county tourism marketing organization, offers one key reason for the slowdown: There are more hotel rooms on the market. Last year, for example, there was 2.1 percent more room inventory in the county than the previous year, he said.

Still, thanks to increased supply, Davison noted, 8,260 more room nights sold last year than in 2015, up 0.4 percent.

February in particular was slow. Hotel room occupancy countywide fell by 8.9 percent then, and revenue per available room was down 10.1 percent compared to last year, according to data by Tennessee-based research firm STR. Average room rates also fell in February.

Inclement weather, and the lure of the slopes, was mostly responsible for this winter’s sagging lodging numbers, especially when compared to last winter, which was far drier.

Hotel Serra5320

Hotel Serra will be on the left and the restaurant Brasserie SLO on the right in the former location of SLO Brew on Garden Street in downtown San Luis Obispo. This photo was taken in March.
David Middlecamp dmiddlecamp@thetribunenews.com

“There was the best snowfall in the California mountains in a decade, plus a very wet coastal winter, so given the choice, people are heading to the ski areas,” Davison said. “The last four years when there was no snow in the mountains, people came to the ocean. So there was a lot of pent-up demand for skiing.”

Coastal regions in particular experienced a drop in February — with occupancy falling 11.1 percent in Pismo Beach, 9.3 percent in South County and 14 percent in Morro Bay. San Luis Obispo, which also relies on coastal tourism, was down 6.8 percent.

Lori Keller, chief executive officer of Martin Resorts, said that, of the company’s three Pismo Beach hotels, one “had flat occupancy in February compared to prior year and the other two were slightly down.”

Keller blamed both the draw of ski destinations as well as the timing of rain.

“One to 2 inches fell over the Presidents Day weekend, which is our busiest weekend of the month,” she said.

Jeff Anderson, part owner of the Anderson Inn, on the Embarcadero in Morro Bay, said this winter was the first time the inn received a significant number of cancellations since opening 10 years ago. Anderson took the opportunity to perform improvements on some of his rooms in anticipation of a busy summer.

“We’re already getting a lot of those bookings,” he said.

North Coast hit with double whammy

Hotels along the North Coast suffered yet another weather-related setback with the closure of Highway 1 in February.

“A good portion of the traffic to Hearst Castle comes down Highway 1, especially when you’re talking about international business,” Davison said.

Year-over-year occupancy in February was down 19.9 percent in San Simeon and 15.4 percent in Cambria.

Matthew Ramey, assistant general manager of the Ragged Point Inn and Resort in San Simeon, confirmed that business was slower this winter, but he declined to provide numbers.

“We are no longer seeing the traffic from people traveling from Los Angeles to the Bay Area,” he said.

Paul Panchal, owner of the Sea Breeze Inn and Silver Surf Motel, both in San Simeon, said occupancy at his properties has been down 10 to 20 percent in the first quarter of this year, compared to past years. He noted that winters are almost always slow.

“I don’t know how much to pinpoint on the closure, on the winter season, or the rainy weather,” he said.

If the Highway 1 closure continues into summer, the effect could be devastating for San Simeon tourism, Panchal said. Summer is when his properties rely heavily on international travelers.

Dirk Winter, owner and president of Moonstone Hotels, said that February occupancy was down at his Cambria hotels, Cambria Pines Lodge and Sea Otter Inn, but places the blame on rain-related cancellations.

“Historically we have not seen any negative effect with long-term closings of Highway 1,” he said. He pointed out that Cambria is accessible by Highway 46, although the road closure “could have some initial effect on cancellations for those unfamiliar with alternate routes.”

In isolated San Simeon, Panchal is lowering rates and advertising more heavily within San Luis Obispo County and other parts of California.

“We’re getting the word out that there are alternate routes to get here, and we’re all open,” he said. “We’re hoping locals will support us during this hard time.”

North County is a bright spot

Hoteliers in the North County are faring better. Atascadero saw a 16.1 percent boost in occupancy in January and a 4.4 percent increase in February. Paso Robles saw a 6.4 percent increase in January, but a 1.9 percent decrease in February.

Davison attributed the North County growth to two new properties that opened in 2015, which filled new niches and introduced “North County to a new customer who wasn’t currently staying there.”

In Paso Robles, Allegretto Vineyard Resort opened in September 2015, catering to the high-end traveler. The 171-room hotel sits on 17 acres in the midst of a vineyard with amenities such as a restaurant, wine tasting, a spa and full-service cabanas. General manager Anna Olson said that it is the first destination resort for the Ayres Corp., which is based in Costa Mesa.

In Atascadero, SpringHill Suites, an all-suite Marriott property with 130 suites, opened in June 2015. According to Marriott representatives, the hotel has had an average occupancy of 75 percent. Davison noted that it fills a need for additional meeting and conference space in the North County.

Allegretto_Cello_dining_out00349[1]

Although Atascadero occupancy is up, rates have fallen this winter, including a 6 percent drop in February, compared to the previous year.

Amar Sohi, general manager of the Atascadero Holiday Inn Express & Suites, pointed out that the opening of SpringHill Suites almost doubled the number of rooms among large chain hotels in the city. The Holiday Inn Express experienced lower occupancy from October through December, compared to the previous year, he said.

It was the first time that had happened since the hotel opened in 2008. Business began to recover in January once the hotel lowered rates by about 10 percent on weekdays and eliminated its two-night minimum on weekends.

“I don’t think the lodging industry in Atascadero is doing as well as it may seem, but I am cautiously optimistic,” Sohi said. “We still need the new inventory to be fully absorbed, and that may take another year.”

In contrast, Keller said that the Paso Robles Inn, another Martin Resorts property, has remained strong this winter, despite the rain and Allegretto’s opening. She credits the rising reputation of North County as a wine tasting destination. The hotel is planning a 23-room expansion, which is expected to be complete by September 2018.

“We are very bullish on Paso Robles,” she said.

Countywide room rates fell in February

Room rates decreased 1.3 percent countywide in February, with the greatest declines in Atascadero, the Five Cities and Pismo Beach. This counters a trend where the average daily rate in the county rose 5.3 percent last year versus 2015, according to Davison.

Although winter room vacancies have played a part in rate decreases, rate setting is not always a simple supply-and-demand formula, observed Keller, noting that hotels aim for the best balance between occupancy and rate to maximize profit.

“It’s akin to washing five cars for $5 each versus washing three cars for $10 each,” she explained. “Washing fewer cars generates more revenue at a lower cost.”

Countywide, revenue per available room was up 3.5 percent year-over-year as of December.

Keller said that the lodging industry is as sophisticated in price setting as the airline industry, often adjusting rates multiple times a day based on "market conditions including weather, market demand, competitor pricing, promotions and overall economic factors."

Looking ahead

Economic forecasts suggest that the lodging market will continue to grow in San Luis Obispo County, but at a slower pace.

Davison anticipates a 5 to 6 percent annual growth rate in transient occupancy tax, or bed tax, revenue over the next two years. And several new hotel projects — which will add to the hotel room inventory as they open in the next two years — will draw more visitors, he added.

The upscale Inn at the Pier in Pismo Beach is scheduled to open in the summer. The beachfront hotel, owned by Irvine-based Pacifica Hotels, will offer 104 rooms and suites, a rooftop pool, restaurant, bar and 1,200 square feet of meeting space.

In San Luis Obispo, two hotels are opening next year in downtown San Luis Obispo, the first of their size to do so, Davison said.

Inn at the Pier049

Hotel Serra is opening in early 2018 as part of a mixed-use project on Garden Street. The hotel will have 65 rooms, a spa and restaurant.

Hotel San Luis Obispo, projected to open in late spring 2018, is in the Chinatown area. The $50 million project will feature 78 rooms, two restaurants, a bar and lounge, event spaces, pool, full-service spa and underground parking.

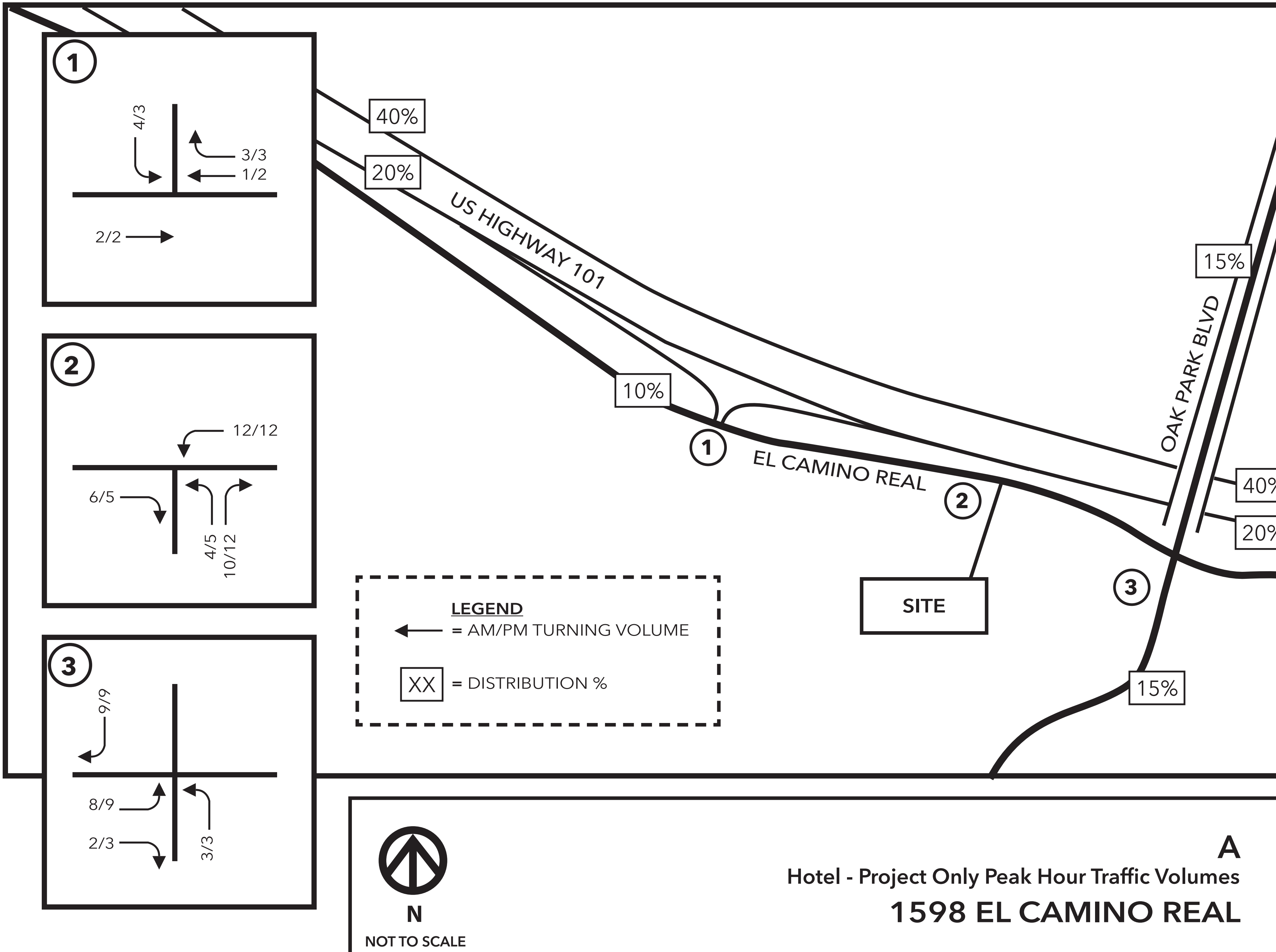
Several other projects around the county are also in the early construction, approval or planning stages.

This hotel construction momentum — coupled with the flip side of heavy rain — may be a boon to the lodging industry this spring and summer and in the coming year, Davison said.

"The lakes are filling, the hills are greening, and skiers will return to the coast," he predicted.

APPENDIX D

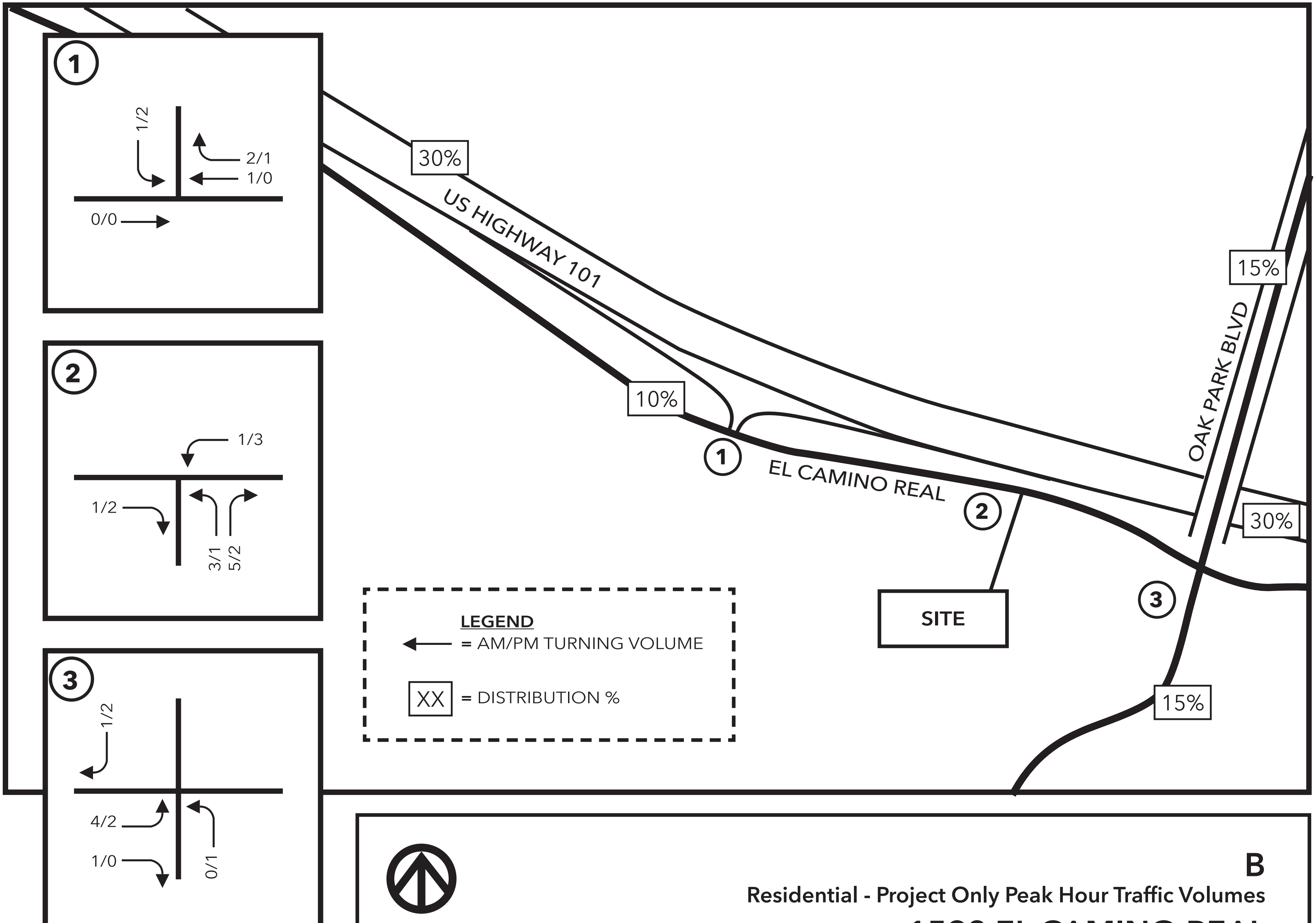
PROJECT TRIP DISTRIBUTION BY ELEMENT



A

Hotel - Project Only Peak Hour Traffic Volumes

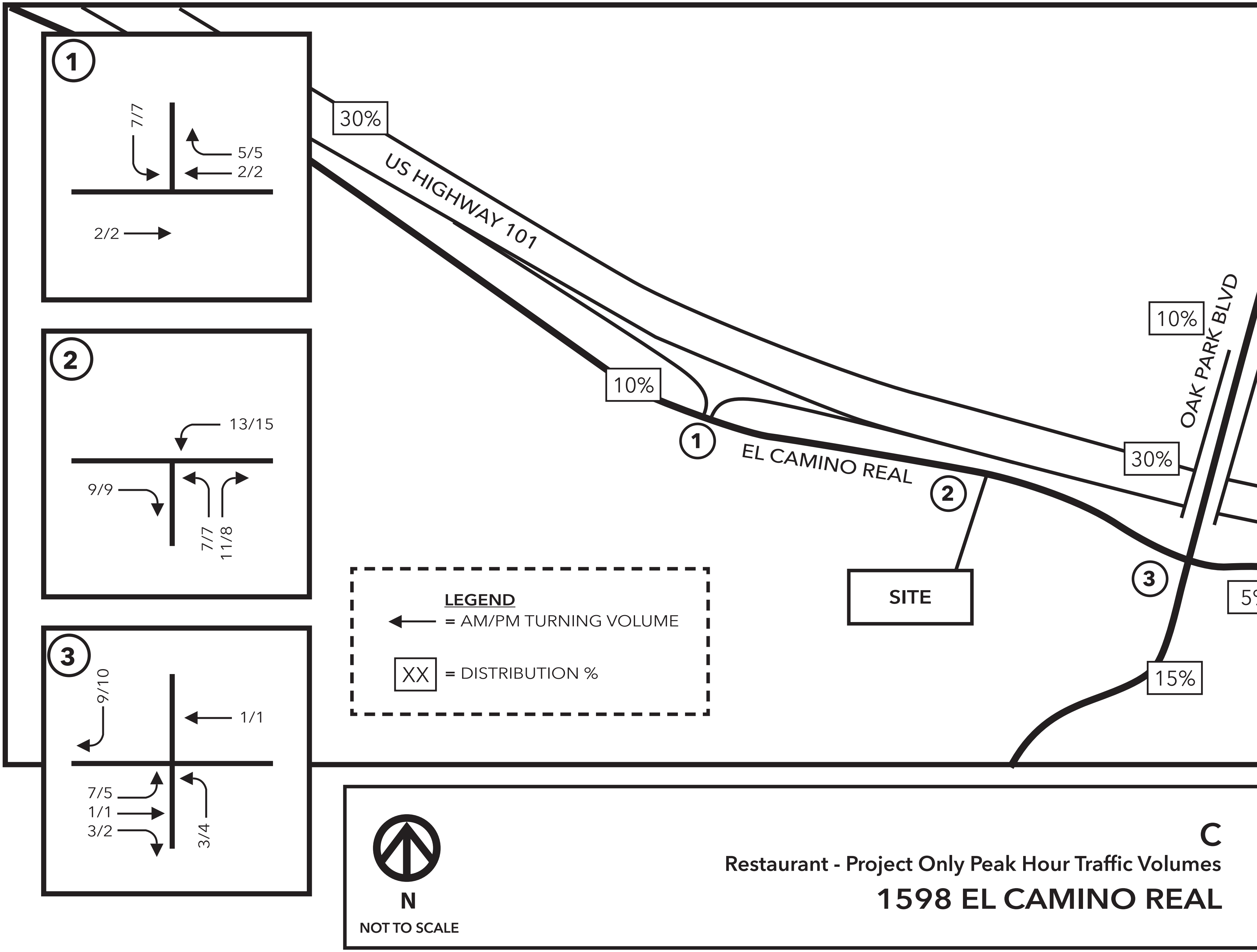
1598 EL CAMINO REAL



B

Residential - Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL



C

Restaurant - Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL

APPENDIX E

CUMULATIVE PROJECT LISTS

CITY OF GROVER BEACH CUMULATIVE PROJECT LIST

APPROVED PROJECTS	NO. OF NEW RES. UNITS	APPLICANT/ DEVELOPER	LOCATION	STATUS
Single Family Residential Tract Map (Tract 3038)	48	Green Park	S. 16th & Farroll Road	Completed
Live/Work Units & 3,052 s.f. Commercial	2	DeRosa	200 S. 4th Street	Completed
Multi-Family Residential	4	Pimental	594 Rockaway Avenue	Under Construction
150 Room Hotel, Restaurant & Conf. Center (Grover Beach Lodge)	NA	Pacifica Co.	55 W. Grand Avenue	Approved
134 Room Hotel with Restaurant	NA	Urban Commons	950 El Camino Real	Approved
12 Industrial Lots with a Maximum of 192,000 s.f. on 8.8 Acres	NA	S & S Homes	Huston Street	Approved
20 Room Hotel & 2,855 s.f. Commercial (Pacific Coast Hotel)	NA	Perkins	105 W. Grand Avenue	Approved
Mixed Use - Multi-Family Residential & 6,626 s.f. Commercial	9	Tierra Pacific	1176 Ramona Avenue	Under Construction
Multi-Family Residential	3	Ramirez	260 N. 5th Street	Approved
Multi-Family Residential	6	James	192 N. 7th Street	Approved
Mixed Use - Multi-Family Residential & 3,145 s.f. Commercial	5	10th Street Part.	158 N. 10th Street	Approved
Mixed Use - Multi-Family Residential & 2,300 s.f. Commercial	3	Vierra	152 N. 11th Street	Approved
Mixed Use - Multi-Family Residential & 1,491 s.f. Commercial	2	Halverson	172 N. 13th Street	Approved
Multi-Family Residential	5	Allshouse	267, 269 N. 14th Street	Approved
Multi-Family Residential	3	Cameron	524 Long Branch Avenue	Approved
Planned Unit Development	2	Vanderveen	495 Mentone Avenue	Approved
Multi-Family Residential	3	Briggs	1210 Nice Avenue	Approved
Planned Unit Development	2	Schmidt	745 Trouville Avenue	Approved
4-Lot Parcel Map	0	Stevens	198 Foremaster	Approved

PENDING PROJECTS	NO. OF NEW RES. UNITS	APPLICANT/ DEVELOPER	LOCATION	STATUS
Multi-Family Residential	1	Mello	290 N. 5th Street	Pending

City of Arroyo Grande - Major Projects - August 6, 2018

Project Index	Map # (if applicable)	Location	Description	APN	Applicant	Status	
CUP 12-002		880 Oak Park Blvd	New 70-bed convalescent facility and 16 unit independent living on 1.8 acres	007-771-074	Russ Sheppell 2218 Old Middlefield Way #C Mountain View, CA 94043	Approved	Nothing constructed
TTM 02-005		Grace Lane	15 single-family homes and 4 apartments on 30 arces		Don McHaney 1566 West Grand Ave Grover Beach, CA 93433	Mostly Constructed	1 lot remains
TTM/CofC 08-002		May St.	7 residential lots		Jensen	Approved	under construction
VTTM 01-001	Tract 1998	La Canada	15 single-family homes		Castlerock Development	Approved	none constructed
TTM 07-002	Tract 2968	451 Hidden Oak Road	10 single-family homes on 11 acres	007-070-017	Greg Nester	Approved	none constructed
VTTM 04-004		415 East Branch Street	24 townhouses and 13,000 SF retail/office building on 2.78 acres	007-206-004	DB & M Property, LLC	Approved	none constructed
VTTM 13-002		Corbett Canyon	11 residential lots		Pace	Approved	none constructed
VTPM 09-001 PUD 09-001		379 Alder Street	4 residential lots	077-204-008	Kornreich Architects	Approved	Under Review
VTTM 09-002		Pearwood Avenue	8 residential lots		City of Arroyo Grande and Robert Zogata 300 E. Branch Street Arroyo Grande, CA 93420	Approved	none constructed
TTM 3018	Tract 3018	Old Ranch Road	4 residential lots and 1 public facility lot	007-011-052 through 007-011-056	City of Arroyo Grande 300 E. Branch Street Arroyo Grande, CA 93420	Complete	
TTM 13-002	Tract 3054	1029 Ash Street	8 residential lots	077-192-083	Stacey Bromley 214 Whitely Street Arroyo Grande, CA 93420	Approved	under construction
SPA GPA TTM CUP	Tract 3072	SW Corner of E. Grand Avenue & Courtland Street	36 residences & 15,600 sq. ft. commercial	077-131-052 and 077-131-054	NKT Development 684 Higuera Street, Suite B San Luis Obispo, CA 93401	Approved	Residential construction nearing completion
GPA, DCA, CUP, Specific Plan		E. Cherry Avenue and Traffic Way	51 new residences, cultural center, unknown commercial dev.	007-621-076 007-621-077 007-624-078	Mangano Homes, Inc. Dorfman Homes, Inc. AG Valley Japanese Welfare Assoc.	Approved	Grading started
TPM 14-001 PUD 14-002		383 Alder Street	4 residential lots	077-204-009	PB Companies, LLC 3480 S. Higuera Street, Suite 130 San Luis Obispo, CA 93401	Pending	
GPA 14-001 DCA 14-003	Tract 3048	The Heights at Vista Del Mar	Annexation, General Plan Amendment and Prezoning for new 22 unit residential subdivision		Jason Blankenship 332 Creekview Way Arroyo Grande, CA 93420	Approved	none constructed
CUP 15-006 MER 15-002		Fair Oaks Ave and Woodland Drive	50,000 sq. ft medical office building	006-572-002 through 006-572-005	Triple P, LLC 7210 Lewis Lane San Luis Obispo, CA 93420	Approved	under construction
CUP 15-007		325 E. Branch Street	51 room boutique hotel	007-202-031	NKT Commercial 684 Higuera Street, Suite B San Luis Obispo, CA 93401	Approved	under construction
TPM 15-001 PUD 15-001		1177 Ash Street	4-1BR residential units	077-182-004	GTA - Jeff Emrick	Pending	Under review
PPR 15-013		159 Brisco Road	Construction of 4 residential units	077-051-057	Joyce Baker	Approved	Under review
TPM 15-002 PUD 15-002	PM AG 15-3093	189 Brisco Road	Construciton of 4 residential units	077-051-050	Ed Shapiro	Approved	Under review
CUP 16-007	Tract 3100	382 Halcyon	Construction of 19 residential units	077-204-031	Robert Baker	Pending	

CUP 16-008 MER 16-001		727 El Camino Real	Popeye's Louisiana Kitchen	006-151-027	ELA Foods Inc.	Denied	
CUP 17-002		345 South Halcyon	Dignity health 4,975 sq. ft. hospital expansion	006-391-046	Dignity Health	Approved	under construction
CUP 17-003		236 South Halcyon	HASLO mixed use development: 20 affordable units with existing commercial	077-201-012	Housing Authority of San Luis Obispo (HASLO)	Approved	
TTM 18-003 PUD 18-001		184 Brisco Road	Construction of 8 residential units	077-051-044	Habitat for Humanity, San Luis Obispo	Under Review	
TTM 18-004 CUP 18-002		1136 E. Grand Avenue	Construction of 22 residential units and commercial frontge	077-113-016	East Grand Village LLC	Under Review	
CUP 18-004		1570 W. Branch Street	Demising of former Kmart into retail, grocer, and fitness facility	007-771-068	Orradre Ranch - Peter Orradre	Under Review	
CUP 18-003		501 Traffic Way	Phsed development of Rugged Radios headquarters, including 26,000 sq. ft. of warehouse/retail space, and 1,600 sq. ft. café/coffee shop	007-621-076 thru 078	Rugged Radios - Greg Cottrell	Under Review	

Steve Orosz

From: Aileen Nygaard <ANygaard@PismoBeach.org>
Sent: Wednesday, August 01, 2018 9:36 AM
To: Steve Orosz
Subject: RE: Approved and Pending Project Lists

Hi Steve-
It's been a long time since I've seen your name. I believe you were in Santa Inez last time I worked with you and I was in the private sector at the time.

Here in Pismo Beach, there are a few projects that are within proximity to Grover Beach.

110 Oak Park	105 room hotel	planning entitlement with Tract Map 3049
855 N 4th St.	46 room hotel conversion from existing office	Building permit application in process
147 Stimson	128 room hotel	under construction

Let me know if you need other information.

Aileen Nygaard
Associate Planner
City of Pismo Beach
760 Mattie Road
Pismo Beach, CA 93449
Phone: 805-773-7056
Fax: 805-773-4684
Email: anygaard@pismobeach.org

From: Steve Orosz [mailto:steveoeg57@gmail.com]
Sent: Tuesday, July 31, 2018 9:50 PM
To: Aileen Nygaard <ANygaard@PismoBeach.org>
Subject: Approved and Pending Project Lists

Aileen,

Hello. I am preparing a traffic report for Grover Beach and they requested that we contact you for a list of approved and pending development projects that have not been approved.

If you can provide a list, that would be very helpful.

Thank you for your assistance.

Stephen Orosz PE
OROSZ ENGINEERING GROUP, INC.
PO BOX 2934
PRESCOTT, AZ 86302

APPENDIX F

BUILDOUT PROJECT LIST

Project Listing for Scenario Development (2035)

Jurisdiction: City of Grover Beach

Project ID	Land Use Project	Location	Est. Acreage	SF Hsg Units	MF Hsg Units	Total Hsg Units	Gross Density (du/ac)	Res Sq Ft	Commercial Sq Ft	Hotel Sq Ft	Proposed Hotel Rooms	Future Year 2020	Project Status (mid-2017)
3-1	Green Park	Farroll Rd (jso 16th St)	11.4	48	0	**48**	4.2		0	0	0	Y	
3-2	Strawberry fields (Urban Reserve)	swo Highland Wy/13th St	39.6	103	103	**206**	5.2		0	0	0	N	
	2 SFR (demolish existing sfr)	*1210 Nice Ave*				***2***		*3,358*					*under construction*
	3 SFR (demolish existing sfr)	*1773 Newport Ave*				***3***		*5,559*					*under construction*
	mixed use bulding - 3 apartments, 1000sf office (demolish existing sfr)	*83 Newport Ave*				***3***		*4,282*	*1,034*				*under construction*
	2 SFR (demolish existing sfr)	*340 Saratoga Ave*				***2***		*3,607*					*under construction*
	3 apartments (demolish existing sfr)	*1258 Ramona Ave*				***3***		*2,179*					*in plan review*
	2 SFR (demolish existing sfr)	*441 S 5th St*				***2***		*3,711*					*in plan review*
	19 apartments (demolish existing sfr)	*1176 Ramona Ave*				***19***		*16,211*					*in plan review*
	13 apartments, 2 live work (vacant lot)	*1400 Ramona Ave*				***15***		*13,754*	*536*				*in plan review*
	2 SFR (remodel & add to existing sfr)	*165 Saratoga Ave*				***2***		*3,181*					*in plan review*
	2 SFR (demolish existing sfr)	*410 S 9th St*				***2***		*3,524*					*in plan review*
	1 SFR (vacant lot)	*1125 Ritchie Rd*				***1***		*2,083*					*in plan review*
	2 SFR (vacant lot)	*344 N 5th St*				***2***		*3,607*					*in plan review*
	7 apartments (demolish existing sfr)	*461 S 13th St*				***7***		*6,125*					
	1 SFR (vacant lot)	*858 N 5th St*				***1***		*2,788*					
	2 SFR (remodel & add to existing sfr)	*557 S 10th St*				***2***		*3,307*					
Subtotal: Residential			**51.0**	**151**	**103**	**254**	**5.0**	**0**	**0**	**0**	**0**		
3-3	Grover Beach Lodge and Conference Center	Grand Ave (jwo SR 1)	9.7	0	0	**0**	0.0		4,000	0	144	N	
	hotel	*950 El Camino Real*				***0***			*78,124*		*134*		
	commercial builiding with 3000 sf of commercial and two live work units(unit 1: 175 sf commercial + 1239 sf residential; unit 2: 164 sf commercial + 853 sf residential)	*200 South 4th St*				***2***		*2,100*	*3,340*				*under construction*
	1 live work unit	*266 Front St*				***1***		*1,239*	*1,148*				
Subtotal: Non-Residential			**9.7**	**0**	**0**	**0**	**--**	**0**	**4,000**	**0**	**144**		
Grover Beach Total:			**60.7**	**151**	**103**	**254**	**4.2**	**0**	**4,000**	**0**	**144**		

Project Listing for Scenario Development (2035)

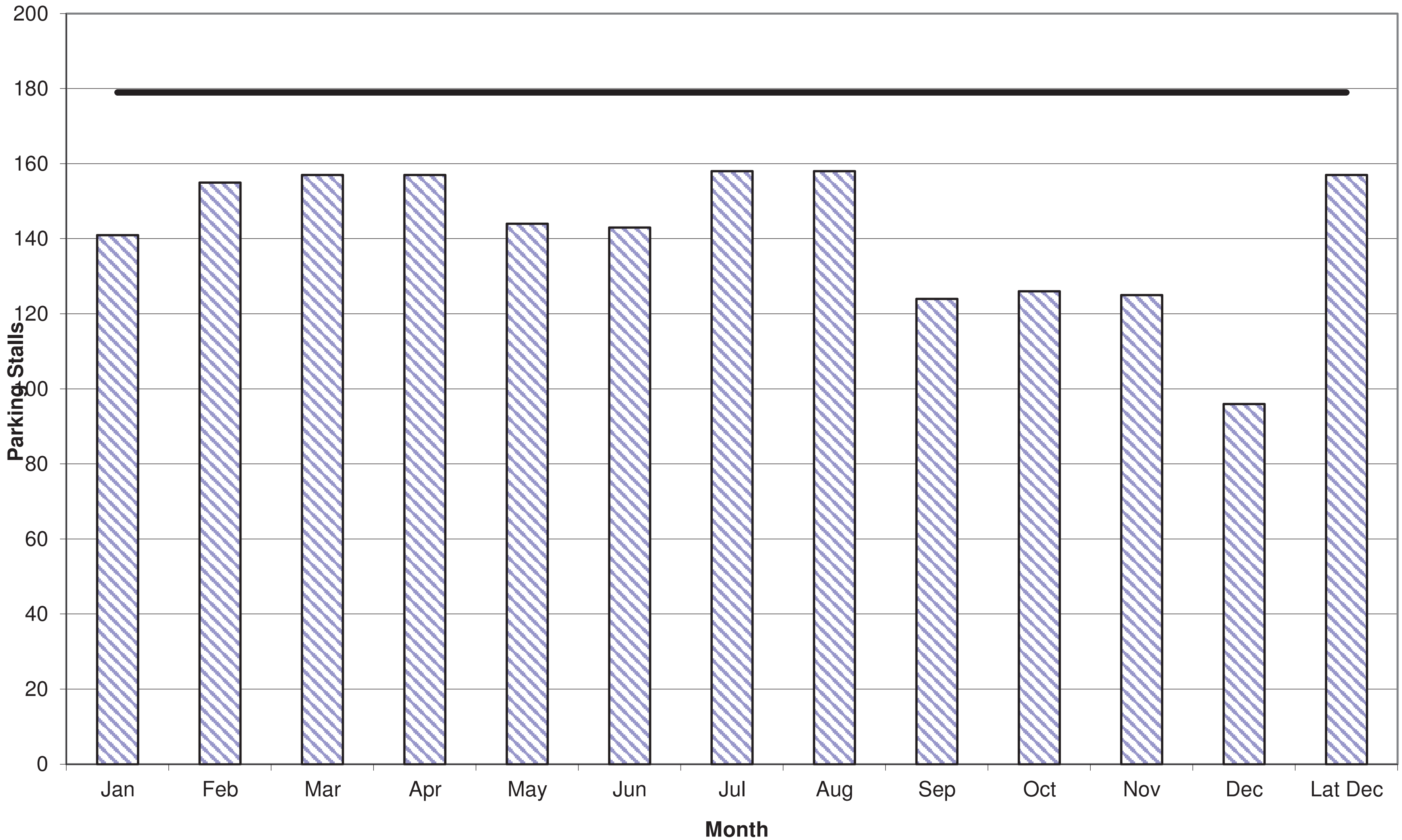
Jurisdiction: City of Grover Beach

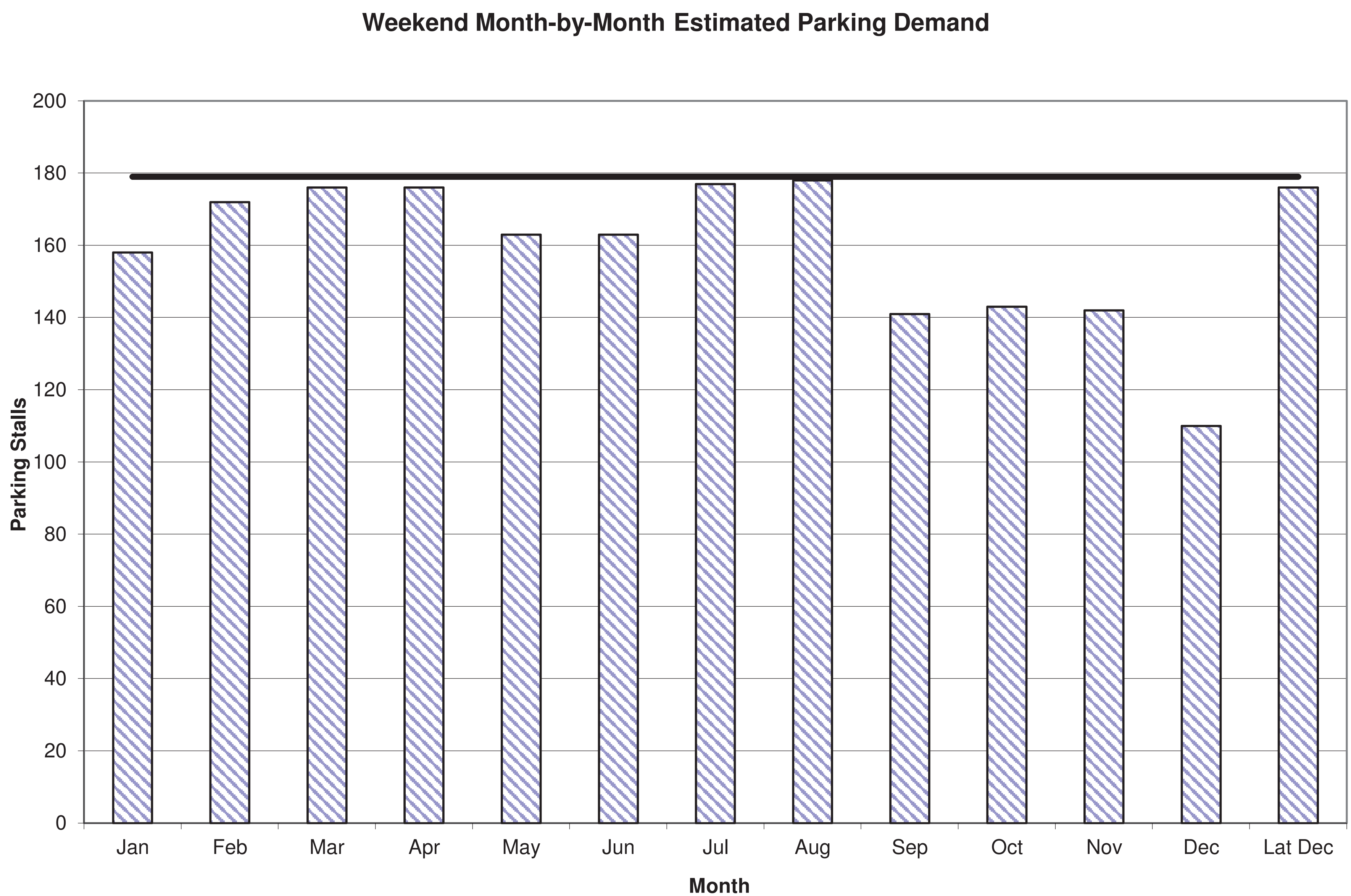
Land Use Project	Related RTP Project(s) or potential necessary transportation improvement
Green Park	
Strawberry fields (Urban Reserve)	
2 SFR (demolish existing sfr)	
3 SFR (demolish existing sfr)	
mixed use bulding - 3 apartments, 1000sf office (demolish existing sfr)	
2 SFR (demolish existing sfr)	
3 apartments (demolish existing sfr)	
2 SFR (demolish existing sfr)	
19 apartments (demolish existing sfr)	
13 apartments, 2 live work (vacant lot)	
2 SFR (remodel & add to existing sfr)	
2 SFR (demolish existing sfr)	
1 SFR (vacant lot)	
2 SFR (vacant lot)	
7 apartments (demolish existing sfr)	
1 SFR (vacant lot)	
2 SFR (remodel & add to existing sfr)	
esidential	
Grover Beach Lodge and Conference Center	
hotel	
commercial builiding with 3000 sf of commercial and two live work units(unit 1: 175 sf commercial + 1239 sf residential; unit 2: 164 sf commercial + 853 sf residential)	
1 live work unit	
on-Residential	
each Total:	

APPENDIX G

PARKING DEMAND WORKSHEETS

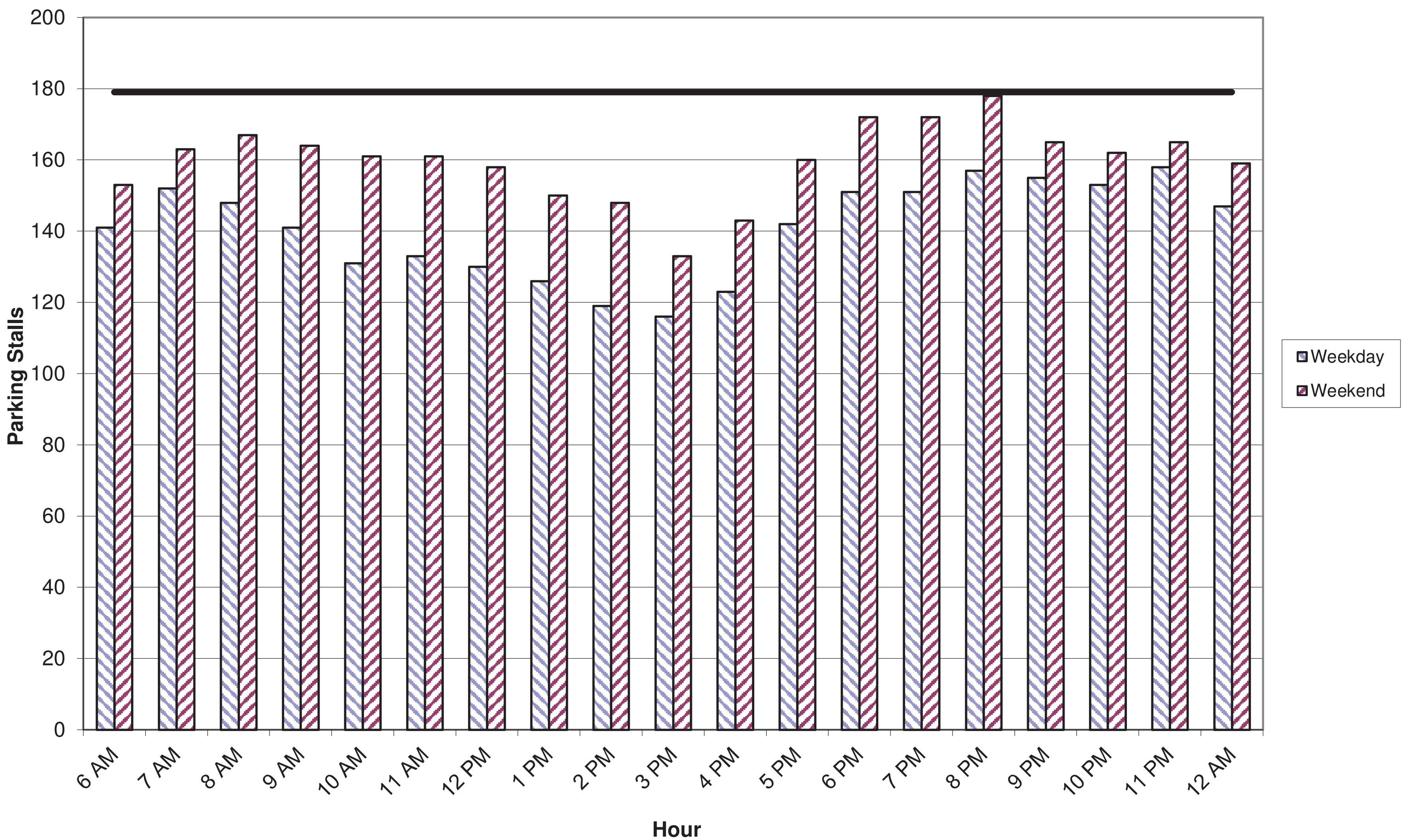
Weekday Month-by-Month Estimated Parking Demand





Weekend Month-by-Month Estimated Parking Demand
Parking Stalls
200
180
160
140
120
100
80
60
40
20
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Lat Dec
Month

Peak Month Daily Parking Demand by Hour



Orosz Engineering Group, Inc.

TO:	A. Rafael Castillo, AICP Senior Planner, City of Grover Beach Gregory A. Ray, PE, Public Works, City of Grover Beach
FROM:	Stephen A Orosz, PE, TE, PTOE, Orosz Engineering Group, Inc.
DATE:	December 21, 2018
SUBJECT:	Response to Comments - 1598 El Camino Real Development Traffic Study Report City of Grover Beach Comments Dated November 21, 2018

LICENSED PROFESSIONAL ENGINEER STEPHEN A OROSZ TR 1209 TRAFFIC STATE OF CALIFORNIA

We have reviewed the City of Grover Beach comments for the above referenced traffic study report dated November 21, 2018 and have prepared the following **responses to the comments.**

1. **Update Analysis to include the evaluation of the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp.**

EXISTING CONDITIONS

Existing traffic counts were collected for the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp on December 12, 2018 specifically for this project. The existing intersection level of service was determined and the results are summarized in Table 1.

Table 1
Existing Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	PM Peak Hour
El Camino Real at			
SB US Highway 101 Ramps	All-Way STOP	11.6 sec/veh – LOS B	23.6 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	20.6 sec/veh – LOS C	21.6 sec/veh – LOS C
Oak Park Boulevard at			
W. Branch St/NB 101 on-ramp	Traffic Signal	17.2 sec/veh – LOS B	19.5 sec/veh – LOS B

As seen in this table, all of the study area intersections operate within acceptable levels of service (LOS C or better) during both AM and PM peak hours.

EXISTING PLUS PROJECT PHASE 1 CONDITIONS ANALYSIS

Consistent with the main traffic report, the Phase 1 project traffic conditions were evaluated for the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp. The results of the intersection operation evaluation are summarized in Table 3.

Table 3
Existing Plus Phase 1 Project Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	
El Camino Real at		Existing Conditions	Plus Phase 1
SB US Highway 101 Ramps	All-Way STOP	11.6 sec/veh – LOS B	11.7 sec/veh – LOS B
Project Site	One-Way STOP	NA	12.9 sec/veh – LOS B
Oak Park Boulevard	Traffic Signal	20.6 sec/veh – LOS C	20.9 sec/veh – LOS C
Oak Park Boulevard at			
W. Branch St/NB 101 on-ramp	Traffic Signal	17.2 sec/veh – LOS B	17.2 sec/veh – LOS B
El Camino Real at		PM Peak Hour	
SB US Highway 101 Ramps	All-Way STOP	23.6 sec/veh – LOS C	24.3 sec/veh – LOS C
Project Site	One-Way STOP	NA	18.5 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	21.6 sec/veh – LOS C	22.0 sec/veh – LOS C
Oak Park Boulevard at			
W. Branch St/NB 101 on-ramp	Traffic Signal	19.5 sec/veh – LOS B	19.6 sec/veh – LOS B

Based on the levels of service shown in this table, all of the study area intersections will continue to operate within acceptable levels of service (LOS C or better) during both AM and PM peak hours with the addition of Phase 1 of the project.

CUMULATIVE DEVELOPMENT ANALYSIS (Approved/Pending Projects)
Consistent with the main traffic report, the short term (3-5 year) cumulative approved and pending project traffic volume conditions were evaluated for the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp. The results of the intersection operation evaluation are summarized in Table 4.

Table 4
Cumulative Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	PM Peak Hour
El Camino Real at			
SB US Highway 101 Ramps	All-Way STOP	14.9 sec/veh – LOS B	**35.9 sec/veh – LOS E**
Oak Park Boulevard	Traffic Signal	21.9 sec/veh – LOS C	25.2 sec/veh – LOS C
Oak Park Boulevard at			
W. Branch St/NB 101 on-ramp	Traffic Signal	19.4 sec/veh – LOS B	26.3 sec/veh – LOS C

With the addition of currently approved and pending projects within Grover Beach, Pismo Beach and Arroyo Grande, the intersection of El Camino Real at SB US Highway 101 Ramps is expected to operate at LOS E during the PM Peak Hour. By this time (approximately 3-5 years), a traffic signal, or other traffic control system, would be installed at the intersection of SB US Highway 101 ramps at El Camino Real to improve the intersection level of service to be within acceptable limits.

During the AM and PM peak hours, the remaining intersections and during the AM peak hour at the El Camino Real and SB US Highway 101 Ramps the resultant delays and intersection levels of service are expected to operate at LOS C or better.

CUMULATIVE PLUS PROJECT CONDITIONS ANALYSIS

Consistent with the main traffic report, the cumulative plus project traffic conditions were evaluated for the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp. The results of the intersection operation evaluation are summarized in Table 5.

Table 5
Cumulative Plus Project Conditions Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	
El Camino Real at		Base	Plus Project
SB US Highway 101 Ramps	All-Way STOP	14.9 sec/veh – LOS B	15.5 sec/veh – LOS C
Project Site	One-Way STOP	NA	14.6 sec/veh – LOS B
Oak Park Boulevard	Traffic Signal	21.9 sec/veh – LOS C	22.6 sec/veh – LOS C
Oak Park Boulevard at			
W. Branch St/NB 101 on-ramp	Traffic Signal	19.9 sec/veh – LOS B	20.3 sec/veh – LOS C
El Camino Real at		PM Peak Hour	
SB US Highway 101 Ramps	All-Way STOP	**35.9 sec/veh – LOS E**	**38.8 sec/veh – LOS E**
Project Site	One-Way STOP	NA	22.7 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	25.2 sec/veh – LOS C	26.2 sec/veh – LOS C
Oak Park Boulevard at			
W. Branch St/NB 101 on-ramp	Traffic Signal	26.3 sec/veh – LOS C	26.7 sec/veh – LOS C

With the addition of the project traffic to the currently approved and pending project traffic volumes within Grover Beach, Pismo Beach and Arroyo Grande, the intersection of El Camino Real at SB US Highway 101 Ramps is expected to operate at LOS E during the PM Peak Hour. By this time (approximately 3-5 years), a traffic signal, or other traffic control system, would be installed at the intersection of SB US Highway 101 ramps at El Camino Real to improve the intersection level of service to be within acceptable limits.

During the AM and PM peak hours, the remaining intersections and during the AM peak hour at the El Camino Real and SB US Highway 101 Ramps the resultant delays and intersection levels of service will continue to operate at LOS C or better with the addition of project traffic.

BUILDOUT 2035 ANALYSIS

Consistent with the main traffic report, the Buildout traffic conditions were evaluated for the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp. As the project is consistent with permitted uses in the General Plan, the project traffic is already included in the buildout volumes. The results of the intersection operation evaluation are summarized in Table 6.

Table 6
Buildout Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour	PM Peak Hour
El Camino Real at			
SB US Highway 101 Ramps	All-Way STOP	17.8 sec/veh – LOS C	**42.2 sec/veh – LOS E**
SB US Highway 101 Ramps	Traffic Signal	15.0 sec/veh – LOS B	11.7 sec/veh – LOS B
Project Site	One-Way STOP	14.8 sec/veh – LOS B	23.6 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	24.3 sec/veh – LOS C	29.8 sec/veh – LOS C
Oak Park Boulevard at			
W. Branch St/NB 101 on-ramp	Traffic Signal	23.2 sec/veh – LOS C	34.1 sec/veh – LOS C

As seen in this table, the PM Peak Hour intersection level of service for El Camino Real at SB US Highway 101 Ramps would be LOS E at Buildout without the addition of a traffic signal or other traffic control system. By Buildout, a traffic signal would be installed at the intersection of SB US Highway 101 ramps at El Camino Real and the resulting intersection level of service would be within acceptable limits.

2. Prepare an Intersection Control Evaluation (ICE) per Caltrans requirements.

An ICE report has been coordinated with and submitted to Caltrans – Roger D. Barnes, District 5 ICE coordinator. A copy of the ICE report is attached to the Appendix to this memorandum.

3. Update Exhibits to include the data for the intersection of Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp.

Exhibits 2-8 and Appendix D Exhibits A-C have been updated and are attached as an appendix to this memorandum.

Appendix

A. Intersection Level of Service Worksheets for the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp.
B. ICE Report
C. Updated Exhibits 2-8 and Appendix D Exhibits A-C

Appendix - A

- AM/PM Peak Hour Traffic Counts - Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp
- Intersection Level of Service Worksheets for the Oak Park Boulevard intersection with W. Branch Street and the Northbound US Highway 101 on-ramp.

CITY TRAFFIC COUNTERS
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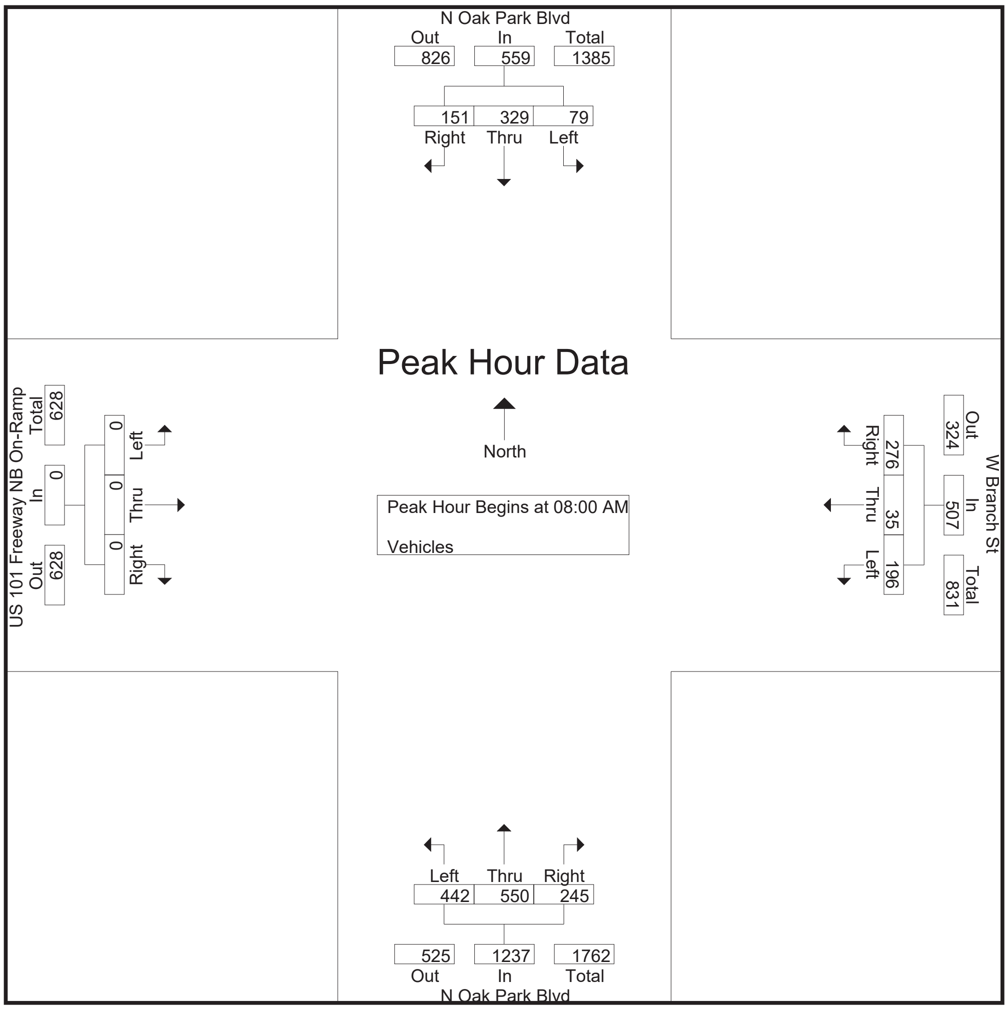
File Name : OakPark_US101NBFrwyOn-Ramp-Branch
Site Code : 00000000
Start Date : 12/12/2018
Page No : 1

Groups Printed- Vehicles

	N Oak Park Blvd Southbound			**W Branch St Westbound**			**N Oak Park Blvd Northbound**			**US 101 Freeway NB On-Ramp Eastbound**			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	7	71	29	15	5	28	89	77	22	0	0	0	343
07:15 AM	9	62	29	20	2	36	115	86	27	0	0	0	386
07:30 AM	12	68	35	22	7	61	127	142	29	0	0	0	503
07:45 AM	20	97	38	21	5	81	118	162	55	0	0	0	597
Total	48	298	131	78	19	206	449	467	133	0	0	0	1829
08:00 AM	22	93	46	56	4	74	106	137	53	0	0	0	591
08:15 AM	15	76	42	42	11	69	107	132	54	0	0	0	548
08:30 AM	19	67	29	47	13	63	120	136	67	0	0	0	561
08:45 AM	23	93	34	51	7	70	109	145	71	0	0	0	603
Total	79	329	151	196	35	276	442	550	245	0	0	0	2303
04:00 PM	46	169	46	83	8	62	67	115	87	0	0	0	683
04:15 PM	54	143	48	84	10	64	74	108	103	0	0	0	688
04:30 PM	42	199	30	96	13	63	67	117	95	0	0	0	722
04:45 PM	43	180	33	118	19	69	63	127	99	0	0	0	751
Total	185	691	157	381	50	258	271	467	384	0	0	0	2844
05:00 PM	42	208	29	107	19	62	69	124	82	0	0	0	742
05:15 PM	32	161	36	96	17	85	72	117	87	0	0	0	703
05:30 PM	33	153	45	94	9	72	57	118	105	0	0	0	686
05:45 PM	31	147	37	89	18	62	61	99	99	0	0	0	643
Total	138	669	147	386	63	281	259	458	373	0	0	0	2774
Grand Total	450	1987	586	1041	167	1021	1421	1942	1135	0	0	0	9750
Apprch %	14.9	65.7	19.4	46.7	7.5	45.8	31.6	43.2	25.2	0	0	0	
Total %	4.6	20.4	6	10.7	1.7	10.5	14.6	19.9	11.6	0	0	0	

File Name : OakPark_US101NBFrwyOn-Ramp-Branch
Site Code : 00000000
Start Date : 12/12/2018
Page No : 2

	N Oak Park Blvd Southbound				W Branch St Westbound				N Oak Park Blvd Northbound				US 101 Freeway NB On-Ramp 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 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	22	**93**	**46**	**161**	**56**	4	**74**	**134**	106	137	53	296	0	0	0	0	591
08:15 AM	15	76	42	133	42	11	69	122	107	132	54	293	0	0	0	0	548
08:30 AM	19	67	29	115	47	**13**	63	123	**120**	136	67	323	0	0	0	0	561
08:45 AM	**23**	93	34	150	51	7	70	128	109	**145**	**71**	**325**	0	0	0	0	**603**
Total Volume	79	329	151	559	196	35	276	507	442	550	245	1237	0	0	0	0	2303
% App. Total	14.1	58.9	27		38.7	6.9	54.4		35.7	44.5	19.8		0	0	0		
PHF	.859	.884	.821	.868	.875	.673	.932	.946	.921	.948	.863	.952	.000	.000	.000	.000	.955



CITY TRAFFIC COUNTERS

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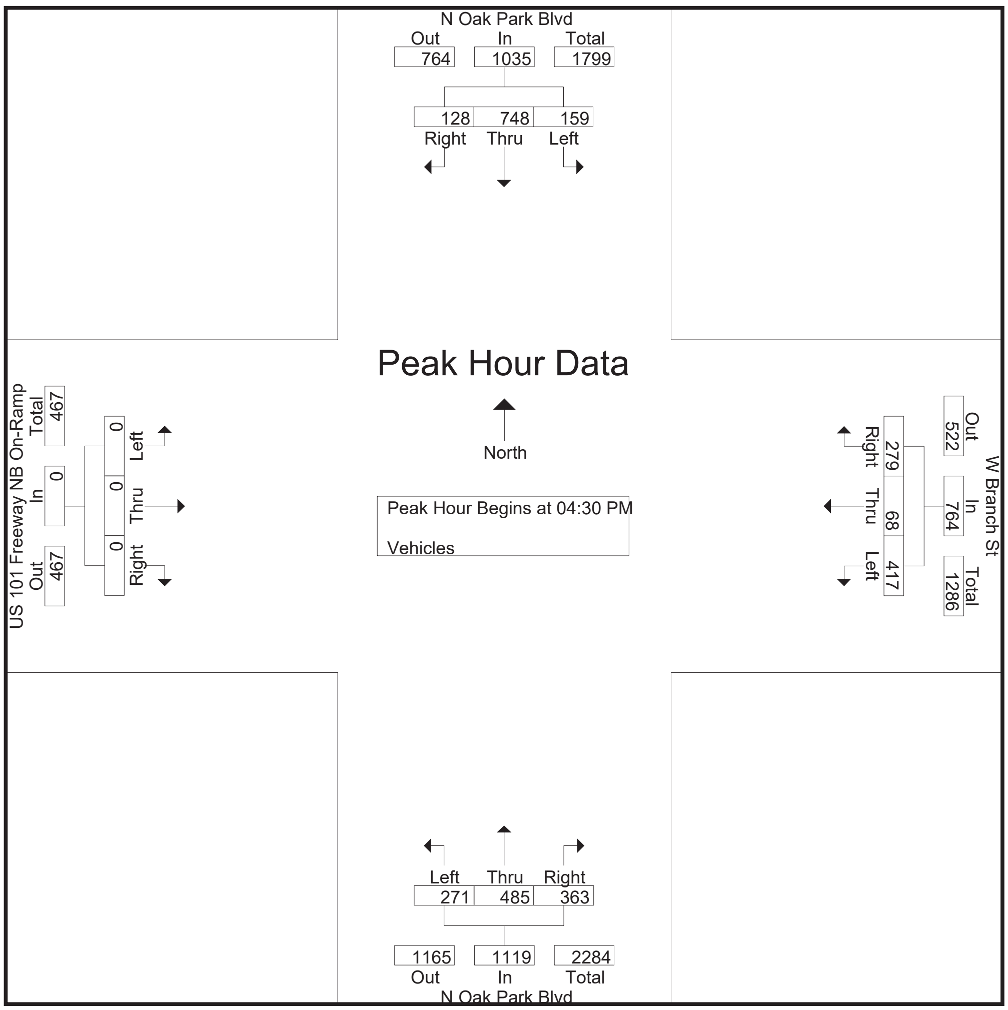
File Name : OakPark_US101NBFrwyOn-Ramp-Branch
Site Code : 00000000
Start Date : 12/12/2018
Page No : 3

	N Oak Park Blvd Southbound				**W Branch St Westbound**				**N Oak Park Blvd Northbound**				**US 101 Freeway NB On-Ramp 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 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	42	199	30	271	96	13	63	172	67	117	95	279	0	0	0	0	722
04:45 PM	**43**	180	33	256	**118**	**19**	69	**206**	63	**127**	**99**	**289**	0	0	0	0	**751**
05:00 PM	42	**208**	29	**279**	107	19	62	188	69	124	82	275	0	0	0	0	742
05:15 PM	32	161	**36**	229	96	17	**85**	198	**72**	117	87	276	0	0	0	0	703
Total Volume	159	748	128	1035	417	68	279	764	271	485	363	1119	0	0	0	0	2918
% App. Total	15.4	72.3	12.4		54.6	8.9	36.5		24.2	43.3	32.4		0	0	0		
PHF	.924	.899	.889	.927	.883	.895	.821	.927	.941	.955	.917	.968	.000	.000	.000	.000	.971



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1709	1794	1770	3601		1770	3597	
Flt Permitted				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1709	1794	1770	3601		1770	3597	
Volume (vph)	0	0	0	196	35	276	442	550	245	79	329	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	204	36	288	460	573	255	82	343	157
RTOR Reduction (vph)	0	0	0	0	0	240	0	63	0	0	86	0
Lane Group Flow (vph)	0	0	0	117	123	48	460	765	0	82	414	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				9.9	9.9	9.9	20.6	33.9		4.2	17.5	
Effective Green, g (s)				9.9	9.9	9.9	20.6	33.9		4.2	17.5	
Actuated g/C Ratio				0.17	0.17	0.17	0.34	0.56		0.07	0.29	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				277	282	296	608	2035		124	1049	
v/s Ratio Prot							c0.26	c0.21		c0.05	0.12	
v/s Ratio Perm				0.07	0.07	0.03						
v/c Ratio				0.42	0.44	0.16	0.76	0.38		0.66	0.39	
Uniform Delay, d1				22.5	22.5	21.5	17.5	7.2		27.2	17.0	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.0	1.1	0.3	5.4	0.5		12.5	1.1	
Delay (s)				23.5	23.6	21.7	22.8	7.7		39.7	18.1	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.6			13.1			21.2	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1708	1794	1770	3533		1770	3692	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1708	1794	1770	3533		1770	3692	
Volume (vph)	0	0	0	417	68	279	271	485	363	159	748	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	430	70	288	279	500	374	164	771	132
RTOR Reduction (vph)	0	0	0	0	0	220	0	213	0	0	24	0
Lane Group Flow (vph)	0	0	0	244	256	68	279	661	0	164	879	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				12.9	12.9	12.9	11.5	23.7		6.4	18.6	
Effective Green, g (s)				12.9	12.9	12.9	11.5	23.7		6.4	18.6	
Actuated g/C Ratio				0.23	0.23	0.23	0.21	0.43		0.12	0.34	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				394	401	421	370	1522		206	1249	
v/s Ratio Prot							c0.16	0.19		0.09	c0.24	
v/s Ratio Perm				0.15	0.15	0.04						
v/c Ratio				0.62	0.64	0.16	0.75	0.43		0.80	0.70	
Uniform Delay, d1				18.9	19.0	16.7	20.4	11.0		23.7	15.8	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				2.9	3.3	0.2	8.5	0.9		18.9	3.3	
Delay (s)				21.7	22.3	16.9	28.9	11.9		42.5	19.2	
Level of Service				C	C	B	C	B		D	B	
Approach Delay (s)		0.0			20.2			16.0			22.7	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1709	1794	1770	3600		1770	3599	
Flt Permitted				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1709	1794	1770	3600		1770	3599	
Volume (vph)	0	0	0	200	35	276	450	552	247	79	335	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	208	36	288	469	575	257	82	349	157
RTOR Reduction (vph)	0	0	0	0	0	240	0	64	0	0	85	0
Lane Group Flow (vph)	0	0	0	119	125	48	469	768	0	82	421	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				10.0	10.0	10.0	21.1	33.8		4.2	16.9	
Effective Green, g (s)				10.0	10.0	10.0	21.1	33.8		4.2	16.9	
Actuated g/C Ratio				0.17	0.17	0.17	0.35	0.56		0.07	0.28	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				280	285	299	622	2028		124	1014	
v/s Ratio Prot							c0.27	c0.21		0.05	c0.12	
v/s Ratio Perm				0.07	0.07	0.03						
v/c Ratio				0.42	0.44	0.16	0.75	0.38		0.66	0.42	
Uniform Delay, d1				22.4	22.5	21.4	17.2	7.3		27.2	17.5	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.0	1.1	0.3	5.2	0.5		12.5	1.3	
Delay (s)				23.5	23.6	21.7	22.3	7.8		39.7	18.8	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.5			13.0			21.7	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	16	12	12	16	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1766	1794	1770	3754		1770	3924	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1766	1794	1770	3754		1770	3924	
Volume (vph)	0	0	0	250	240	279	278	488	364	159	754	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	258	247	288	287	503	375	164	777	132
RTOR Reduction (vph)	0	0	0	0	0	224	0	192	0	0	22	0
Lane Group Flow (vph)	0	0	0	246	259	64	287	686	0	164	887	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				13.3	13.3	13.3	14.8	26.0		8.7	19.9	
Effective Green, g (s)				13.3	13.3	13.3	14.8	26.0		8.7	19.9	
Actuated g/C Ratio				0.22	0.22	0.22	0.25	0.43		0.14	0.33	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				373	391	398	437	1627		257	1301	
v/s Ratio Prot							c0.16	0.18		0.09	c0.23	
v/s Ratio Perm				0.15	0.15	0.04						
v/c Ratio				0.66	0.66	0.16	0.66	0.42		0.64	0.68	
Uniform Delay, d1				21.3	21.3	18.8	20.3	11.8		24.2	17.3	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				4.2	4.2	0.2	3.5	0.8		5.1	2.9	
Delay (s)				25.5	25.5	19.0	23.9	12.6		29.3	20.2	
Level of Service				C	C	B	C	B		C	C	
Approach Delay (s)		0.0			23.1			15.4			21.6	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1766	1794	1770	3598		1770	3588	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1766	1794	1770	3598		1770	3588	
Volume (vph)	0	0	0	153	150	296	472	561	255	99	369	181
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	159	156	308	492	584	266	103	384	189
RTOR Reduction (vph)	0	0	0	0	0	254	0	68	0	0	85	0
Lane Group Flow (vph)	0	0	0	153	162	54	492	782	0	103	488	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				11.5	11.5	11.5	21.6	34.3		7.2	19.9	
Effective Green, g (s)				11.5	11.5	11.5	21.6	34.3		7.2	19.9	
Actuated g/C Ratio				0.18	0.18	0.18	0.33	0.53		0.11	0.31	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				297	312	317	588	1899		196	1098	
v/s Ratio Prot							c0.28	c0.22		0.06	c0.14	
v/s Ratio Perm				0.09	0.09	0.03						
v/c Ratio				0.52	0.52	0.17	0.84	0.41		0.53	0.44	
Uniform Delay, d1				24.2	24.2	22.7	20.1	9.3		27.3	18.1	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.5	1.5	0.3	10.0	0.7		2.5	1.3	
Delay (s)				25.7	25.7	23.0	30.1	9.9		29.8	19.4	
Level of Service				C	C	C	C	A		C	B	
Approach Delay (s)		0.0			24.4			17.3			21.0	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1767	1794	1770	3527		1770	3672	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1767	1794	1770	3527		1770	3672	
Volume (vph)	0	0	0	320	316	309	321	515	403	189	798	178
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	330	326	319	331	531	415	195	823	184
RTOR Reduction (vph)	0	0	0	0	0	241	0	235	0	0	31	0
Lane Group Flow (vph)	0	0	0	319	337	78	331	711	0	195	976	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				14.7	14.7	14.7	12.5	16.0		17.3	20.8	
Effective Green, g (s)				14.7	14.7	14.7	12.5	16.0		17.3	20.8	
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.27		0.29	0.35	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				412	433	440	369	941		510	1273	
v/s Ratio Prot							c0.19	0.20		0.11	c0.27	
v/s Ratio Perm				0.19	0.19	0.04						
v/c Ratio				0.77	0.78	0.18	0.90	0.76		0.38	0.77	
Uniform Delay, d1				21.1	21.1	17.9	23.1	20.2		17.1	17.4	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				8.8	8.6	0.2	23.3	5.6		2.2	4.5	
Delay (s)				29.9	29.7	18.1	46.4	25.8		19.2	21.9	
Level of Service				C	C	B	D	C		B	C	
Approach Delay (s)		0.0			26.0			31.2			21.5	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1765	1794	1770	3597		1770	3592	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1765	1794	1770	3597		1770	3592	
Volume (vph)	0	0	0	160	151	296	485	564	258	99	380	181
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	167	157	308	505	588	269	103	396	189
RTOR Reduction (vph)	0	0	0	0	0	253	0	68	0	0	82	0
Lane Group Flow (vph)	0	0	0	158	166	55	505	789	0	103	503	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				11.6	11.6	11.6	21.8	34.2		7.2	19.6	
Effective Green, g (s)				11.6	11.6	11.6	21.8	34.2		7.2	19.6	
Actuated g/C Ratio				0.18	0.18	0.18	0.34	0.53		0.11	0.30	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				300	315	320	594	1893		196	1083	
v/s Ratio Prot							c0.29	0.22		0.06	c0.14	
v/s Ratio Perm				0.09	0.09	0.03						
v/c Ratio				0.53	0.53	0.17	0.85	0.42		0.53	0.46	
Uniform Delay, d1				24.2	24.2	22.6	20.1	9.3		27.3	18.4	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.7	1.6	0.3	11.2	0.7		2.5	1.4	
Delay (s)				25.9	25.8	22.9	31.3	10.0		29.8	19.9	
Level of Service				C	C	C	C	B		C	B	
Approach Delay (s)		0.0			24.4			17.9			21.4	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	12	12	11	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1767	1583	1770	3197		1770	3328	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1767	1583	1770	3197		1770	3328	
Volume (vph)	0	0	0	325	321	309	333	518	404	189	809	178
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	335	331	319	343	534	416	195	834	184
RTOR Reduction (vph)	0	0	0	0	0	244	0	211	0	0	28	0
Lane Group Flow (vph)	0	0	0	324	342	75	343	739	0	195	990	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				15.2	15.2	15.2	14.5	28.2		9.6	23.3	
Effective Green, g (s)				15.2	15.2	15.2	14.5	28.2		9.6	23.3	
Actuated g/C Ratio				0.23	0.23	0.23	0.22	0.43		0.15	0.36	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				393	413	370	395	1387		261	1193	
v/s Ratio Prot							c0.19	0.23		0.11	c0.30	
v/s Ratio Perm				0.19	0.19	0.05						
v/c Ratio				0.82	0.83	0.20	0.87	0.53		0.75	0.83	
Uniform Delay, d1				23.6	23.7	20.0	24.3	13.6		26.5	19.0	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				13.1	12.8	0.3	17.9	1.5		11.1	6.8	
Delay (s)				36.8	36.5	20.3	42.2	15.0		37.6	25.8	
Level of Service				D	D	C	D	B		D	C	
Approach Delay (s)		0.0			31.3			22.2			27.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.91	0.91	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1610	3284	1794	1770	3597		1770	3593	
Flt Permitted				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1610	3284	1794	1770	3597		1770	3593	
Volume (vph)	0	0	0	295	80	355	580	675	310	120	455	215
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	307	83	370	604	703	323	125	474	224
RTOR Reduction (vph)	0	0	0	0	0	306	0	65	0	0	75	0
Lane Group Flow (vph)	0	0	0	154	236	64	604	961	0	125	623	0
Turn Type				Split		Perm	Prot			Prot		
Protected Phases				8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)				12.2	12.2	12.2	26.6	37.8		8.0	19.2	
Effective Green, g (s)				12.2	12.2	12.2	26.6	37.8		8.0	19.2	
Actuated g/C Ratio				0.17	0.17	0.17	0.38	0.54		0.11	0.27	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				281	572	313	673	1942		202	986	
v/s Ratio Prot				c0.10	0.07		c0.34	0.27		0.07	c0.17	
v/s Ratio Perm						0.04						
v/c Ratio				0.55	0.41	0.21	0.90	0.49		0.62	0.63	
Uniform Delay, d1				26.4	25.7	24.8	20.4	10.1		29.5	22.3	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				2.2	0.5	0.3	14.6	0.9		5.5	3.1	
Delay (s)				28.6	26.2	25.1	35.1	11.0		35.1	25.4	
Level of Service				C	C	C	D	B		D	C	
Approach Delay (s)		0.0			26.1			19.9			26.8	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				*0.95	*0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1767	1794	1770	3527		1770	3672	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1767	1794	1770	3527		1770	3672	
Volume (vph)	0	0	0	390	385	370	400	620	485	225	970	215
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	390	385	370	400	620	485	225	970	215
RTOR Reduction (vph)	0	0	0	0	0	280	0	198	0	0	27	0
Lane Group Flow (vph)	0	0	0	377	398	90	400	907	0	225	1158	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				17.0	17.0	17.0	17.0	29.3		11.7	24.0	
Effective Green, g (s)				17.0	17.0	17.0	17.0	29.3		11.7	24.0	
Actuated g/C Ratio				0.24	0.24	0.24	0.24	0.42		0.17	0.34	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				408	429	436	430	1476		296	1259	
v/s Ratio Prot							c0.23	0.26		0.13	c0.32	
v/s Ratio Perm				0.22	0.23	0.05						
v/c Ratio				0.92	0.93	0.21	0.93	0.61		0.76	0.92	
Uniform Delay, d1				25.9	25.9	21.1	25.9	15.9		27.8	22.1	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				26.4	26.1	0.2	26.8	1.9		10.9	12.2	
Delay (s)				52.3	52.0	21.4	52.7	17.9		38.7	34.3	
Level of Service				D	D	C	D	B		D	C	
Approach Delay (s)		0.0			42.2			27.1			35.0	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM Average Control Delay	34.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Appendix - B

- ICE Report

INTERSECTION CONTROL EVALUATION (ICE)
US HIGHWAY 101 SB OFF-RAMP AT EL CAMINO REAL INTERSECTION

INTRODUCTION

To determine the most efficient and effective right-of-way control at an intersection, Caltrans has published a Traffic Operations Policy Directive 13-02 entitled Intersection Control Evaluation (ICE). This policy was implemented to rationally compare the various forms for right-of-way controls for a specific installation. Stop Signs, Traffic Signals and Roundabout designs are all compared and contrasted to determine the most effective right-of-way control at the intersection. This evaluation is intended to meet the criteria for **Step One: Access Strategy and Configuration Assessment/Screening and Step Two: Engineering Analysis**

LOCATION

The intersection to be evaluated is located along southbound US Highway 101 at approximately PM 14.9 (El Camino Real On/Off Ramps) in the City of Grover Beach, San Luis Obispo County. The land use surrounding the intersection is residential to the north and west. To the south, the land use is commercial. To the east of the intersection lies the mainline for US Highway 101. El Camino Real is currently constructed with two travel lanes southbound south of the intersection and one lane northbound south of the intersection with no center median. Northerly of the intersection, El Camino Real has one travel lane in each direction. At the intersection, the off-ramp has two travel lanes at the intersection with one on-ramp travel lane. The posted speed limit along this segment of El Camino Real is 40 MPH south of the intersection and 45 MPH to the north of the intersection. Currently the intersection has all-way STOP controls. The study area is graphically depicted on the aerial map shown in Exhibit 1.

Approximately 200 feet (centerline to centerline) to the north of the Southbound US Highway 101 ramp intersection is a local street intersection of 12th Street. There is also a waterway and riparian habitat immediately to the west of El Camino Real at the right of way. The riparian area starts at the back of sidewalk with the center of the creek is approximately 90 feet from the centerline of El Camino Real at the Southbound 101 ramp intersection.

During the preparation of the traffic report for the 1598 El Camino Real commercial development (located approximately 900 feet to the southeast toward Oak Park Boulevard) it was determined that with the short-term build out of already approved development tentatively planned to occur within the next 3-5 years within the local area (Grover Beach, Pismo Beach and Arroyo Grande), the peak hour intersection level of service for the existing all-way STOP controls will reach unacceptable levels (LOS E).

INTERSECTION CONTROL EVALUATION

The Intersection Control Evaluation (ICE) process consists of two parts: Access Strategy and Configuration Assessment/Screening and Engineering Analysis. During discussions with the Caltrans District 5 ICE coordinator[1] regarding the scope of the ICE analysis, it was determined that based on the projected poor future intersection operations, that a traffic signal installation or roundabout installation

[1] Phone Conference with Roger D. Barnes, November 28, 2018.

should be considered. To evaluate the conceptual feasibility of the installation of a roundabout at this location, a 130-foot diameter inscribed circle for a single lane roundabout to represent the basic footprint of the roundabout was identified. This is graphically shown in Exhibit 2.

Step One: Access Strategy and Configuration Assessment/Screening

The subject intersection is currently configured as a “T” intersection. The existing on-off Ramp configuration is currently a hook-type ramp system and there are no plans to change ramp configuration due to the location of the mainline Highway and parallel frontage road (El Camino Real).

El Camino Real is currently constructed with two travel lanes southbound south of the intersection and one lane northbound south of the intersection with no center median. To the north of the intersection, El Camino Real has one lane in each direction. To the north of the ramp intersection, El Camino Real has one lane in each direction. One additional northbound travel lane could be added within the existing right-of-way, if needed, but would require minor grading and restriping.

Based on the Highway Capacity Manual intersection operation methodologies, the existing AM and PM intersection level of service and queue length for the off-ramp were calculated. A short-term intersection operational analysis was performed next for a 3-5 year time frame to 2022-2024 based on known approved and pending projects within the Cities of Grover Beach, Pismo Beach and Arroyo Grande. The last scenario evaluated was a build out time frame (20 years) based on a 1% annual growth rate from the Short Term traffic volume scenario. The peak hour intersection turning volumes are summarized in Exhibit 3[2]. Based on these analysis scenarios, the intersection operations, levels of service and queue lengths are summarized in Table 1 for the existing intersection controls (all-way STOP). The level of service worksheets and queue length calculations for these scenarios are provided in the appendix.

Table 1
US Highway 101 SB Ramps Intersection with El Camino Real
Intersection Operation Summary[3]

Scenario	AM Peak Hour	PM Peak Hour	
	Delay - LOS	Delay - LOS	Off-Ramp 95% Queue
Existing Conditions **(worst movement)**	11.6 sec/veh – LOS B 12.1 sec/veh – LOS B Off-Ramp Approach	21.6 sec/veh – LOS C 29.7 sec/veh – LOS D Off-Ramp Approach	375 feet
Short term (5-10 years) **(worst movement)**	15.5 sec/veh – LOS C 16.5 sec/veh – LOS C EB Left Turn	**38.8 sec/veh – LOS E** **50.0 sec/veh – LOS F** **Off-ramp Approach**	**675 feet**
Build Out (20 years) **(worst movement)**	17.8 sec/veh – LOS C 20.3 sec/veh – LOS C EB Left Turn	**42.2 sec/veh – LOS E** **55.3 sec/veh – LOS F** **Off-ramp Approach**	**3125 feet**

[2] AM/PM peak hour traffic volumes were obtained from the 1598 El Camino Real Traffic Study, 2018 prepared by Orosz Engineering Group, Inc. for the City of Grover Beach.

[3] Maintaining existing lane configuration.

As seen in this table, the existing all-way stop controls will cause the operation of the intersection to fail in both level of service, delay and queue back-up onto the mainline within 3-5 years. Based on this information, changes to the intersection controls would be required.

Step Two: Engineering Analysis

The engineering analysis began with a concept level geometric design of the roundabout and traffic signal. Various design guidelines were utilized in the development of the conceptual designs for the intersection control system, including: Caltrans Highway Design Manual, and the MUTCD.

Roundabout Conceptual Design Study

To determine the approximately right of way needs for a single lane or double lane roundabout and whether by-pass right turn lanes are necessary, the level of service for the smallest roundabout configuration was determined for each land use scenario. The HCM software uses the intersection capacity utilization or ICU methodology to provide the measure of intersection operation. The results of this analysis are summarized below with the level of service worksheets provided in the appendix.

Table 2
US Highway 101 SB Ramps Intersection with El Camino Real
Intersection Operation Summary[4]

Scenario	PM Peak Hour Single Lane ICU - LOS	PM Peak Hour Double Lane Delay - LOS
Existing Conditions	0.67 – LOS C	NA
Short term (3-5 years)	**0.79 – LOS D**	0.60 – LOS B
Build Out (20 years)	NA	0.64 – LOS B

Based on the intersection operations, a double lane roundabout (200' inscribed circle diameter) should be considered with a roundabout intersection control strategy. To determine the extent of the right of way required for this double lane roundabout, a 200' diameter circle was superimposed on the aerial of the study intersection. As seen in Exhibit 4, the double lane roundabout would significantly impact the adjacent wetland and riparian habitat, the operation of the existing 12th Street local street intersection and the operation of the Southbound on and off ramp system.

Therefore, due to the close proximity of the 12th Street intersection to the ramp intersection (approximately 150 feet), the limited right-of-way at the intersection and the presence of a creek with wetland riparian habitat just west of El Camino Real and the impacts to the Southbound 101 Ramp system, the further consideration of a roundabout intersection control was determined not to be carried forward.

[4] Roundabout configuration.

Traffic Signal- Warrant Study

The CA MUTCD Traffic Signal Warrants Worksheet based on Average Traffic Estimates was used to evaluate existing, short term and build out traffic volume conditions to determine when traffic signal warrants would be met. Based on the traffic volumes depicted in Exhibit 3, the traffic signal warrant worksheet was utilized to provide the following information concerning the potential for the traffic volumes meeting traffic signal warrants. The warrant analysis is summarized in Table 2.

Table 2
Traffic Signal Warrant Evaluation
(Average Traffic Volume Estimates)

Scenario Major St Volume/ Minor Street Volume	Warrant A Minimum Major St Volume/ Minor St Volume	Warrant B Minimum Major St Volume/ Minor St Volume	80% Warrants A and B Minimum Major St Volume/ Minor St Volume
Rural Conditions (45 MPH)	**5,600 ADT/2,240 ADT**	**8,400 ADT/1,120 ADT**	**6,720 ADT/896 ADT**
Existing Conditions **5,400 ADT/6,085 ADT**	No	No	No
Short Term Conditions **7,820 ADT/6,860 ADT**	**Yes**	No	Yes
Build Out Conditions **8,320 ADT/7,100 ADT**	**Yes**	No	**Yes**

Based on the nearly equal traffic volumes on all approaches and with the Traffic Signal Warrant being met at Short Term Conditions, a traffic signal installation should be considered within the next 3-5 years. To determine when the intersection does meet the warrants for signalization, it is recommended that the detailed traffic signal warrant evaluation be conducted annually until traffic signal warrants are met. When the traffic signal warrants are close to being met, the detailed traffic signal design and encroachment permit process should be started to ensure that the traffic signal can be installed as soon as the warrants are demonstrated to be met.

Traffic Signal- Conceptual Design and Operation

A traffic signal installation conceptual design was prepared for the intersection. Due to the right of way constraints, a separate channelized southbound El Camino Real left turn lane was assumed to be striped. Minor pavement widening of 9-10 feet would be required northerly of the ramp intersection on El Camino Real to just north of the 12th Street intersection (a distance of 200 feet). The extent of the road widening is shown graphically on Exhibit 5, while the conceptual traffic signal pole and vehicle head layout is depicted graphically on Exhibit 6.

The level of service (LOS) and intersection operation (delays) were calculated using the Highway Capacity Manual (HCM) procedures as required by Caltrans, using current traffic volumes and traffic signal controls. The resultant operations were 11.5 seconds of delay at LOS B and 10.7 seconds of delay at LOS B for the AM and PM peak hours. At Buildout, the intersection operation would be 15.0 seconds of delay at LOS B and 11.7 seconds of delay at LOS B for the AM and PM peak hours. Caltrans and the

City have level of service goals of maintaining LOS C or better at signalized intersections. The installation of the traffic signal would meet that goal.

Based on the traffic signal design, no additional right-of-way is required. Minor pavement widening (approximately 2,000 SF) and restriping would be required in addition to the actual traffic signal equipment.

A conceptual engineering construction estimate of probable cost was prepared for the traffic signal. At this time, the traffic signal construction cost is estimated at $250,000 to $300,000.

Funding Sources

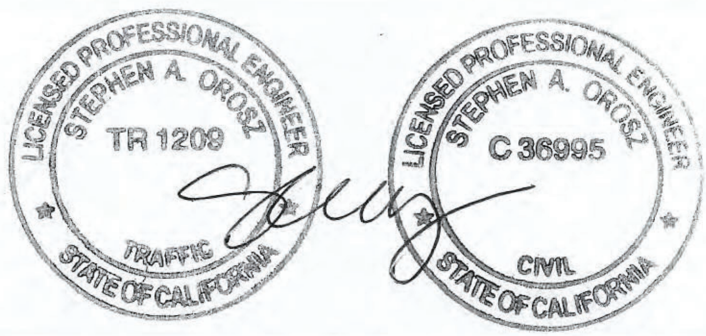
The cost of the installation of a traffic signal should be shared by the three local agencies that various projects contribute to the reduced level of service. An intergovernmental agreement to share in the cost to improve the operation of the access to the regional highway network may need to be considered, as this intersection provides regional access to the three cities. Based on the amount of projected cumulative project traffic volumes during the PM peak hour by each agency's projects, the following percentage contributions of each agency projects:

- Grover Beach 44.5%
- Arroyo Grande 36.0%
- Pismo Beach 9.5 %

SUMMARY

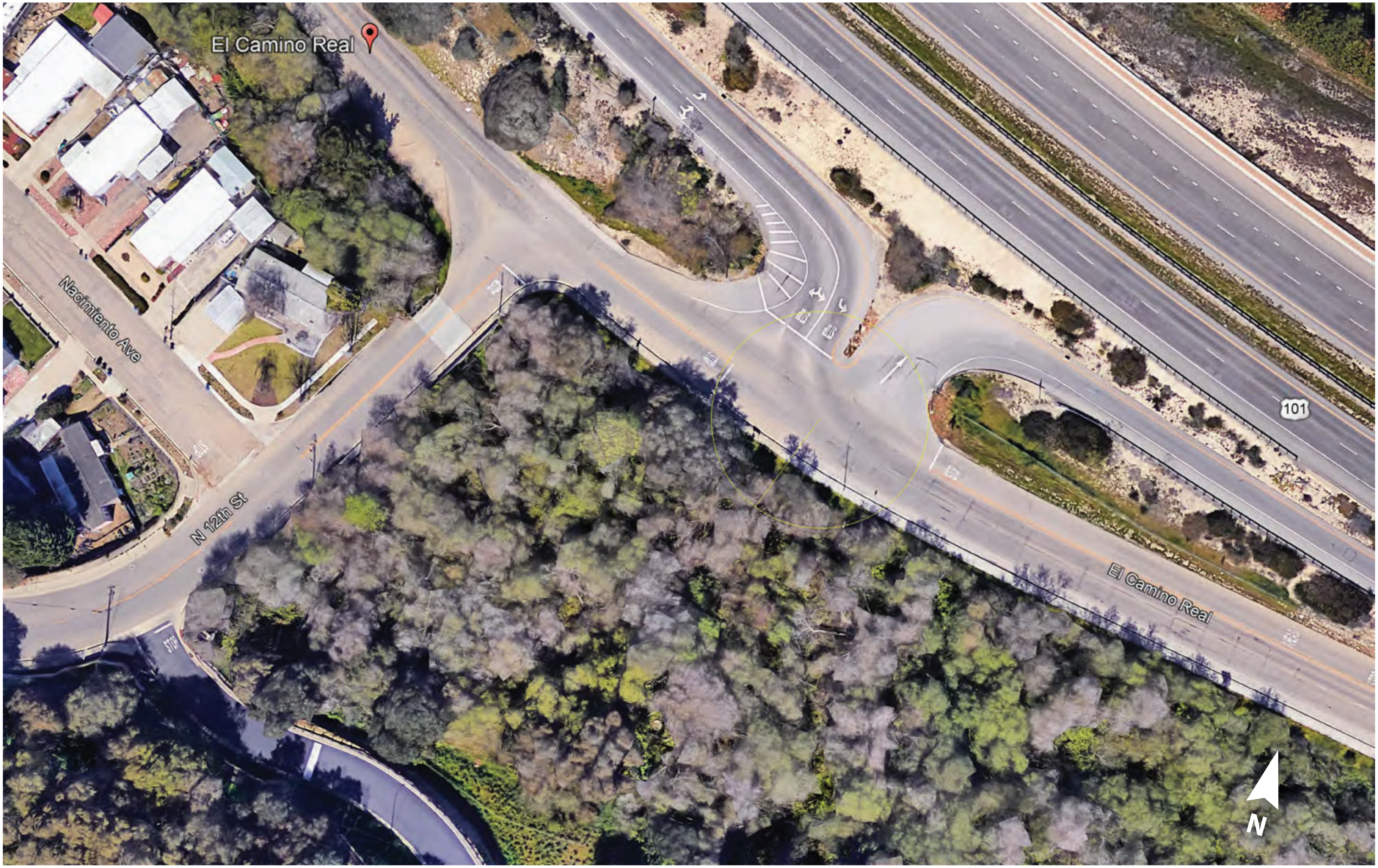
A summary of the right-of-way control system evaluation for the Southbound US Highway 101 Ramps at El Camino Real intersection found that the installation of a traffic signal is the most appropriate traffic control system for this intersection. A roundabout installation does not fit within the reasonably obtainable right of way and without environmental and circulation system impacts. The intersection operation for the study intersection with the installation of a traffic signal at the design year (20 years) is summarized in the table below. As seen in this table, the traffic signal provides for acceptable levels of service and delay for the intersection without right-of-way acquisition. Traffic Signal Warrants are met within 3-5 years.

Right-of-Way Control System	Level of Service at Design Year	ROW Acquisition	Construction Cost	Funding Source
Traffic Signal	15.0 sec/LOS B AM 11.7 sec/LOS B PM	None Required	$250-300,000	Funded by Local Agencies



APPENDIX

- Exhibits 1-6
- Existing Configuration Peak Hour Levels of Service Worksheets
- Existing Configuration Queue lengths
- Roundabout Levels of Service
- Average Daily Traffic – Traffic Signal Warrant Worksheets
- Engineers Estimate of Probable Cost (Conceptual)
- Traffic Signal Peak Hour Levels of Service Worksheets



oeG
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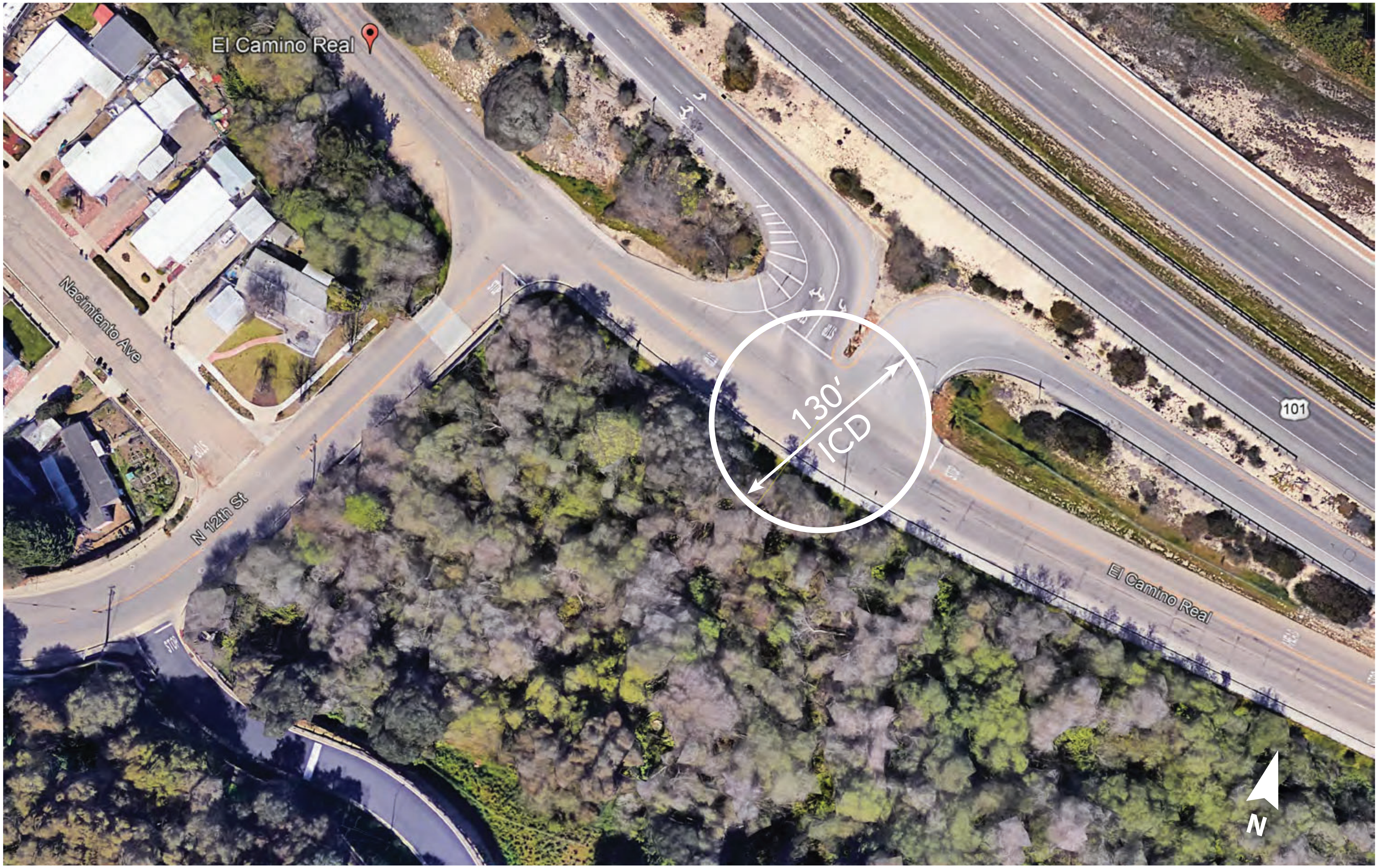
STUDY LOCATION

1



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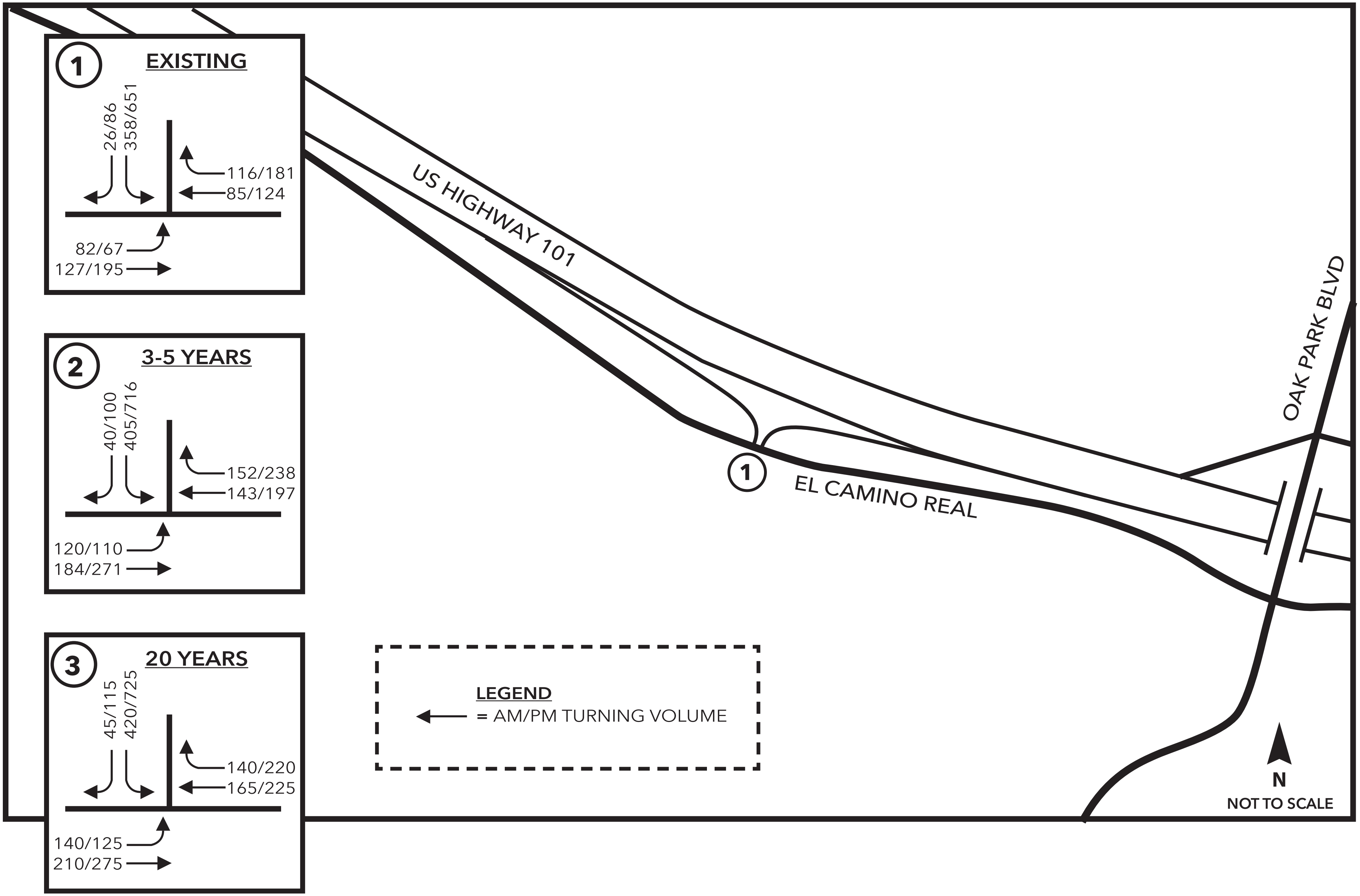
CONCEPTUAL ROUNDABOUT FOOTPRINT

2



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Peak Hour Traffic Volumes

ICE - EL CAMINO REAL AT SB 101 RAMPS

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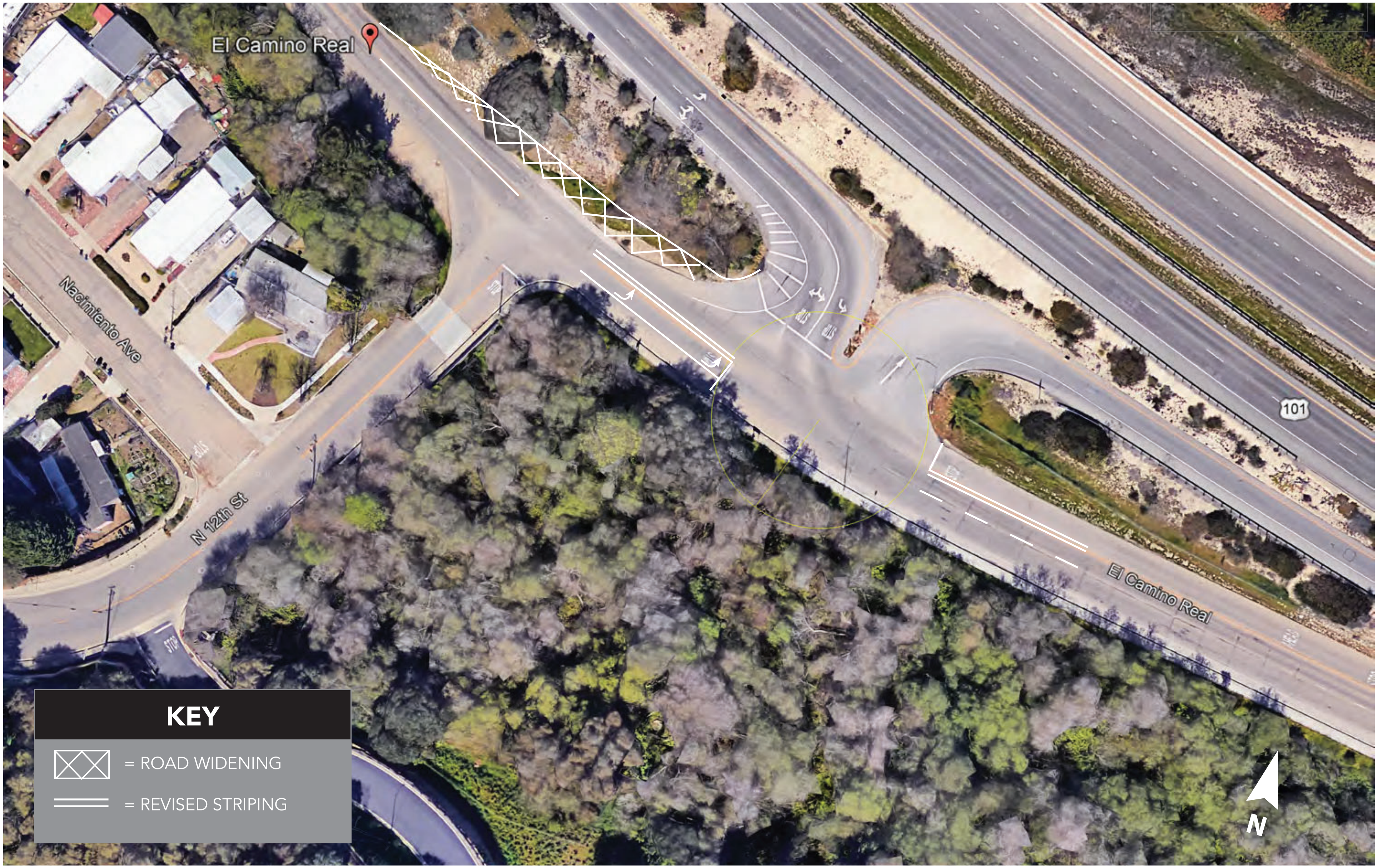
CONCEPTUAL DOUBLE LANE ROUNDABOUT FOOTPRINT

4



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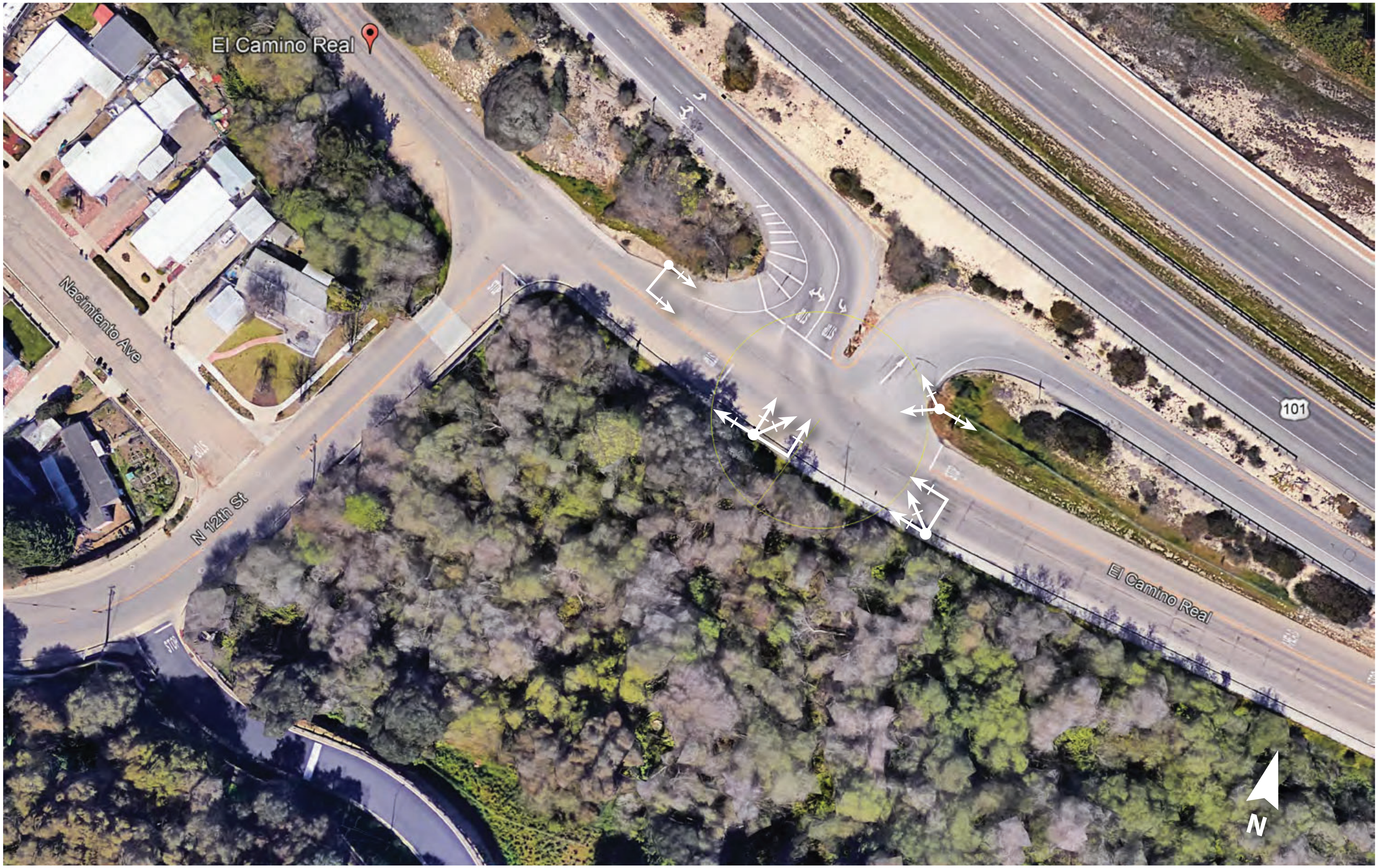
CONCEPTUAL WIDENING FOR TRAFFIC SIGNAL



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CONCEPTUAL TRAFFIC SIGNAL LAYOUT

6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	127	85	116	358	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	141	94	129	398	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	232	223	265	161
Volume Left (vph)	91	0	265	133
Volume Right (vph)	0	129	0	29
Hadj (s)	0.11	-0.31	0.53	0.32
Departure Headway (s)	5.5	5.1	6.3	6.0
Degree Utilization, x	0.36	0.32	0.46	0.27
Capacity (veh/h)	619	662	556	573
Control Delay (s)	11.6	10.5	13.3	10.1
Approach Delay (s)	11.6	10.5	12.1	
Approach LOS	B	B	B	

Intersection Summary			
Delay	11.6		
HCM Level of Service	B		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	195	124	181	651	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	205	131	191	685	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	276	321	457	319
Volume Left (vph)	71	0	457	228
Volume Right (vph)	0	191	0	91
Hadj (s)	0.09	-0.32	0.53	0.19
Departure Headway (s)	6.5	6.0	6.8	6.5
Degree Utilization, x	0.50	0.54	0.87	0.58
Capacity (veh/h)	538	579	520	546
Control Delay (s)	15.7	15.7	38.8	16.8
Approach Delay (s)	15.7	15.7	29.7	
Approach LOS	C	C	D	

Intersection Summary			
Delay	23.6		
HCM Level of Service	C		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	120	184	143	152	405	40
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	133	204	159	169	450	44

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	338	328	300	194
Volume Left (vph)	133	0	300	150
Volume Right (vph)	0	169	0	44
Hadj (s)	0.11	-0.28	0.53	0.26
Departure Headway (s)	6.0	5.7	6.9	6.6
Degree Utilization, x	0.56	0.52	0.58	0.36
Capacity (veh/h)	579	608	498	522
Control Delay (s)	16.5	14.5	17.7	12.1
Approach Delay (s)	16.5	14.5	15.5	
Approach LOS	C	B	C	

Intersection Summary			
Delay	15.5		
HCM Level of Service	C		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	110	271	197	238	716	100
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	110	271	197	238	716	100

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	381	435	477	339
Volume Left (vph)	110	0	477	239
Volume Right (vph)	0	238	0	100
Hadj (s)	0.09	-0.29	0.53	0.18
Departure Headway (s)	6.9	6.5	7.6	7.2
Degree Utilization, x	0.73	0.78	1.01	0.68
Capacity (veh/h)	517	552	477	488
Control Delay (s)	26.5	28.7	69.2	23.0
Approach Delay (s)	26.5	28.7	50.0	
Approach LOS	D	D	F	

Intersection Summary			
Delay	38.8		
HCM Level of Service	E		
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	140	210	165	140	420	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	156	233	183	156	467	50

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	389	339	311	206
Volume Left (vph)	156	0	311	156
Volume Right (vph)	0	156	0	50
Hadj (s)	0.11	-0.24	0.53	0.24
Departure Headway (s)	6.1	5.9	7.1	6.8
Degree Utilization, x	0.66	0.55	0.62	0.39
Capacity (veh/h)	569	586	485	509
Control Delay (s)	20.3	16.0	19.8	13.0
Approach Delay (s)	20.3	16.0	17.1	
Approach LOS	C	C	C	

Intersection Summary			
Delay	17.8		
HCM Level of Service	C		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	125	275	225	220	725	115
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	125	275	225	220	725	115

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	400	445	483	357
Volume Left (vph)	125	0	483	242
Volume Right (vph)	0	220	0	115
Hadj (s)	0.10	-0.26	0.53	0.15
Departure Headway (s)	6.8	6.4	7.7	7.3
Degree Utilization, x	0.76	0.80	1.03	0.72
Capacity (veh/h)	517	547	472	484
Control Delay (s)	28.3	29.9	77.1	25.9
Approach Delay (s)	28.3	29.9	55.3	
Approach LOS	D	D	F	

Intersection Summary			
Delay	42.2		
HCM Level of Service	E		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

QUEUE Lengths for ALL-WAY STOPS

L_{95} = QUEUE Length 95% confidence level
V = vph
C = CAPACITY (from HCM worksheet)
T = INTERVAL (time)

$$L_{95} = 900(T)\left[\left(\frac{V}{C}-1\right)+\sqrt{\left(\frac{V}{C}-1\right)^2+\frac{\frac{3600}{C}\left(\frac{V}{C}\right)}{150}}\right]\times\frac{C}{3600}$$

EXISTING CONDITIONS - PM PEAK HOUR

V = 457 C = 520 T = 1 hour

$$L_{95} = 900(1)\left[\left(\frac{457}{520}-1\right)+\sqrt{\left(\frac{457}{520}-1\right)^2+\frac{\frac{3600}{520}\left(\frac{457}{520}\right)}{150}}\right]\times\frac{520}{3600}$$

L_{95} = 375' = 15 veh × 25'/veh

Cumulative Conditions - PM PEAK HOUR

V = 477 C = 477 T = 1 hour

$$L_{95} = 900(1)\left[\left(\frac{477}{477}-1\right)+\sqrt{\left(\frac{477}{477}-1\right)^2+\frac{\frac{3600}{477}\left(\frac{477}{477}\right)}{150}}\right]\times\frac{477}{3600}$$

L_{95} = 675' = 27 veh × 25' veh

Buildout Conditions - PM Peak Hour

$v = 483 \qquad c = 472 \qquad T = 1\ \text{hour}$

$$L_{95} = 900(1)\left[\left(\frac{483}{472}-1\right)+\sqrt{\left(\frac{483}{472}-1\right)^2+\underbrace{\left(\frac{3600}{472}\right)\left(\frac{483}{472}\right)}_{150}}\right]\times\frac{472}{3600}$$

$L_{95} = 3125' = 125\ \text{veh} \times 25'/\text{veh}$

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized				Yes		Yes
Volume (veh/h)	67	195	124	181	651	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	205	131	191	685	91
Approach Volume (veh/h)		276	131		685	
Crossing Volume (veh/h)		685	71		131	
High Capacity (veh/h)		804	1311		1250	
High v/c (veh/h)		0.34	0.10		0.55	
Low Capacity (veh/h)		641	1094		1039	
Low v/c (veh/h)		0.43	0.12		0.66	

Intersection Summary			
Maximum v/c High	0.55		
Maximum v/c Low	0.66		
Intersection Capacity Utilization	66.6%	ICU Level of Service	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized				Yes		Yes
Volume (veh/h)	110	267	193	229	704	100
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	110	267	193	229	704	100
Approach Volume (veh/h)		377	193		704	
Crossing Volume (veh/h)		704	110		193	
High Capacity (veh/h)		792	1271		1191	
High v/c (veh/h)		0.48	0.15		0.59	
Low Capacity (veh/h)		630	1058		985	
Low v/c (veh/h)		0.60	0.18		0.71	

Intersection Summary			
Maximum v/c High	0.59		
Maximum v/c Low	0.71		
Intersection Capacity Utilization	79.3%	ICU Level of Service	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized				Yes		Yes
Volume (veh/h)	110	267	193	229	704	100
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	110	267	193	229	704	100
Approach Volume (veh/h)		377	193		704	
Crossing Volume (veh/h)		704	110		193	
High Capacity (veh/h)		792	1271		1191	
High v/c (veh/h)		0.48	0.15		0.59	
Low Capacity (veh/h)		630	1058		985	
Low v/c (veh/h)		0.60	0.18		0.71	

Intersection Summary			
Maximum v/c High	0.59		
Maximum v/c Low	0.71		
Intersection Capacity Utilization	60.4%	ICU Level of Service	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized				Yes		Yes
Volume (veh/h)	125	275	225	220	725	115
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	125	275	225	220	725	115
Approach Volume (veh/h)		400	225		725	
Crossing Volume (veh/h)		725	125		225	
High Capacity (veh/h)		779	1256		1161	
High v/c (veh/h)		0.51	0.18		0.62	
Low Capacity (veh/h)		618	1044		958	
Low v/c (veh/h)		0.65	0.22		0.76	

Intersection Summary			
Maximum v/c High	0.62		
Maximum v/c Low	0.76		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B

EXISTING CONDITIONS

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

05	SLO	101	14.9
DIST	CO	RTE	PM

COUNT DATE MAY 16, 2018
CALC SAO DATE 12/20/18
CHK SAO DATE 12/20/18

Major St: EL CAMINO REAL
Minor St: SB 101 RAMPS

Critical Approach Speed 40/45 mph
Critical Approach Speed 25 mph

Speed limit or critical speed on major street traffic > 40 mph.......................... ☒
or } **RURAL (R)**
In built up area of isolated community of < 10,000 population........................ ☐

☐ **URBAN (U)**

(Based on Estimated Average Daily Traffic - See Note)

URBAN........................ RURAL.......✓	Minimum Requirements 5400 EADT 6085			
CONDITION A - Minimum Vehicular Volume Satisfied ______ Not Satisfied ✓	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban	Rural	Urban	Rural
1........ / 1........	8,000	5,600	2,400	1,680
2 or More........ / 1........	9,600	6,720	2,400	1,680
2 or More........ / 2 or More........	9,600	6,720	3,200	2,240
1........ / 2 or More........	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ______ Not Satisfied ✓	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban	Rural	Urban	Rural
1........ / 1........	12,000	8,400	1,200	850
2 or More........ / 1........	14,400	10,080	1,200	850
2 or More........ / 2 or More........	14,400	10,080	1,600	1,120
1........ / 2 or More........	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B Satisfied ______ Not Satisfied ✓ <u>No one condition satisfied</u>, but following conditions fulfilled 80% or more.......... ✓ A X B	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

SHORT TERM (3-5YRS) CONDITIONS

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

05	SLO	101	149
DIST	CO	RTE	PM

COUNT DATE MAY 16, 2018
CALC SAO DATE 12/20/18
CHK SAO DATE 12/20/18

Major St: EL CAMINO REAL
Minor St: SB 101 RAMPS

Critical Approach Speed 40/45 mph
Critical Approach Speed 25 mph

Speed limit or critical speed on major street traffic > 40 mph.......................... ☑
or
In built up area of isolated community of < 10,000 population........................ ☐
} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN.......... RURAL.......✓	Minimum Requirements EADT	
	7820	6860
CONDITION A - Minimum Vehicular Volume Satisfied ✓ Not Satisfied ____	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
→ 1 / 2 or More	8,000 / 5,600	3,200 / 2,240
CONDITION B - Interruption of Continuous Traffic Satisfied ____ Not Satisfied ✓	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
→ 1 / 2 or More	12,000 / 8,400	1,600 / 1,120
Combination of CONDITIONS A + B Satisfied ✓ Not Satisfied ____ No one condition satisfied, but following conditions fulfilled 80% or more.......... ✓ A ✓ B	2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Buildout Conditions (20 yrs)

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

05	SLO	101	14.9
DIST	CO	RTE	PM

Major St: El Camino Real
Minor St: SB 101 Ramps

COUNT DATE May 16, 2018
CALC SMO DATE 12/20/18
CHK SMO DATE 12/20/18
Critical Approach Speed 40/45 mph
Critical Approach Speed 25 mph

Speed limit or critical speed on major street traffic > 40 mph.......................... ☑ or
In built up area of isolated community of < 10,000 population....................... ☐
} RURAL (R)

☐ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN.............................. RURAL.......... ✓

Minimum Requirements EADT: 8320 / 7100

CONDITION A - Minimum Vehicular Volume

Satisfied ✓ Not Satisfied ______

Number of lanes for moving traffic on each approach: Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches): Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only): Urban	Rural
1	1	8,000	5,600	2,400	1,680
2 or More	1	9,600	6,720	2,400	1,680
2 or More	2 or More	9,600	6,720	3,200	2,240
→ 1	2 or More	8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied ______ Not Satisfied ✓

Number of lanes for moving traffic on each approach: Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches): Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only): Urban	Rural
1	1	12,000	8,400	1,200	850
2 or More	1	14,400	10,080	1,200	850
2 or More	2 or More	14,400	10,080	1,600	1,120
→ 1	2 or More	12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied ✓ Not Satisfied ______

No one condition satisfied, but following conditions fulfilled 80% or more........... A ✓ B ✓

Vehicles Per Day on Major Street	Vehicles Per Day on Higher-Volume Minor Street Approach
2 CONDITIONS 80%	2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Engineer's Estimate of Probable Costs (Conceptual Level)

Project Traffic Signal and Safety Lighting Installation

Location El Camino Real
At SB US Highway 101 Ramps

Date 12/20/2018

Item	Description	Unit	Estimated Quantity	Unit Price	Estimated Cost
1	Mobilization	LS	1	$ 7,500.00	$ 7,500.00
2	Traffic Control	LS	1	$ 25,000.00	$ 25,000.00
3	Type 19-3-129 signal pole complete	EA	1	$ 7,500.00	$ 7,500.00
4	Type 24-3-129 signal pole complete	EA	2	$ 8,500.00	$ 17,000.00
5	Type 1-A signal pole complete	EA	1	$ 3,000.00	$ 3,000.00
6	State Furnished Materials -	LS	1	$ 30,000.00	$ 30,000.00
	Controller Assembly, Battery Back-up system and LED modules				
7	PG&E meter - unit plus installation	LS	1	$ 5,000.00	$ 5,000.00
8	Signing and Striping	LS	1	$ 5,000.00	$ 5,000.00
9	Minor Roadway Modificationis	LS	1	$ 50,000.00	$ 50,000.00
10	Loop Detectors - furnished and installed	EA	15	$ 1,000.00	$ 15,000.00
11	Misc Concrete	LS	1	$ 5,000.00	$ 5,000.00
12	Accessibility ramps	EA	2	$ 2,500.00	$ 5,000.00
13	Conductors/Electrical - Furnished and installed	LS	1	$ 30,000.00	$ 30,000.00
				Subtotal	$ 205,000.00
				20% contingency	$ 41,000.00
				Total	$ 246,000.00

Orosz Engineering Group, Inc

PO Box 2934

Prescott, AZ 86302

805-680-1586 steveoeg57@gmail.com

LICENSED PROFESSIONAL ENGINEER
STEPHEN A. OROSZ
C 36995
CIVIL
STATE OF CALIFORNIA

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.94		0.99	
Flt Protected		0.98	1.00		0.96	
Satd. Flow (prot)		1826	1747		3407	
Flt Permitted		0.67	1.00		0.96	
Satd. Flow (perm)		1245	1747		3407	
Volume (vph)	140	210	165	140	420	45
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	233	183	156	467	50
RTOR Reduction (vph)	0	0	84	0	17	0
Lane Group Flow (vph)	0	389	255	0	500	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		11.0	11.0		12.8	
Effective Green, g (s)		11.0	11.0		12.8	
Actuated g/C Ratio		0.35	0.35		0.40	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		431	604		1371	
v/s Ratio Prot			0.15		c0.15	
v/s Ratio Perm		c0.31				
v/c Ratio		0.90	0.42		0.36	
Uniform Delay, d1		9.9	8.0		6.7	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		21.7	0.5		0.2	
Delay (s)		31.6	8.4		6.8	
Level of Service		C	A		A	
Approach Delay (s)		31.6	8.4		6.8	
Approach LOS		C	A		A	

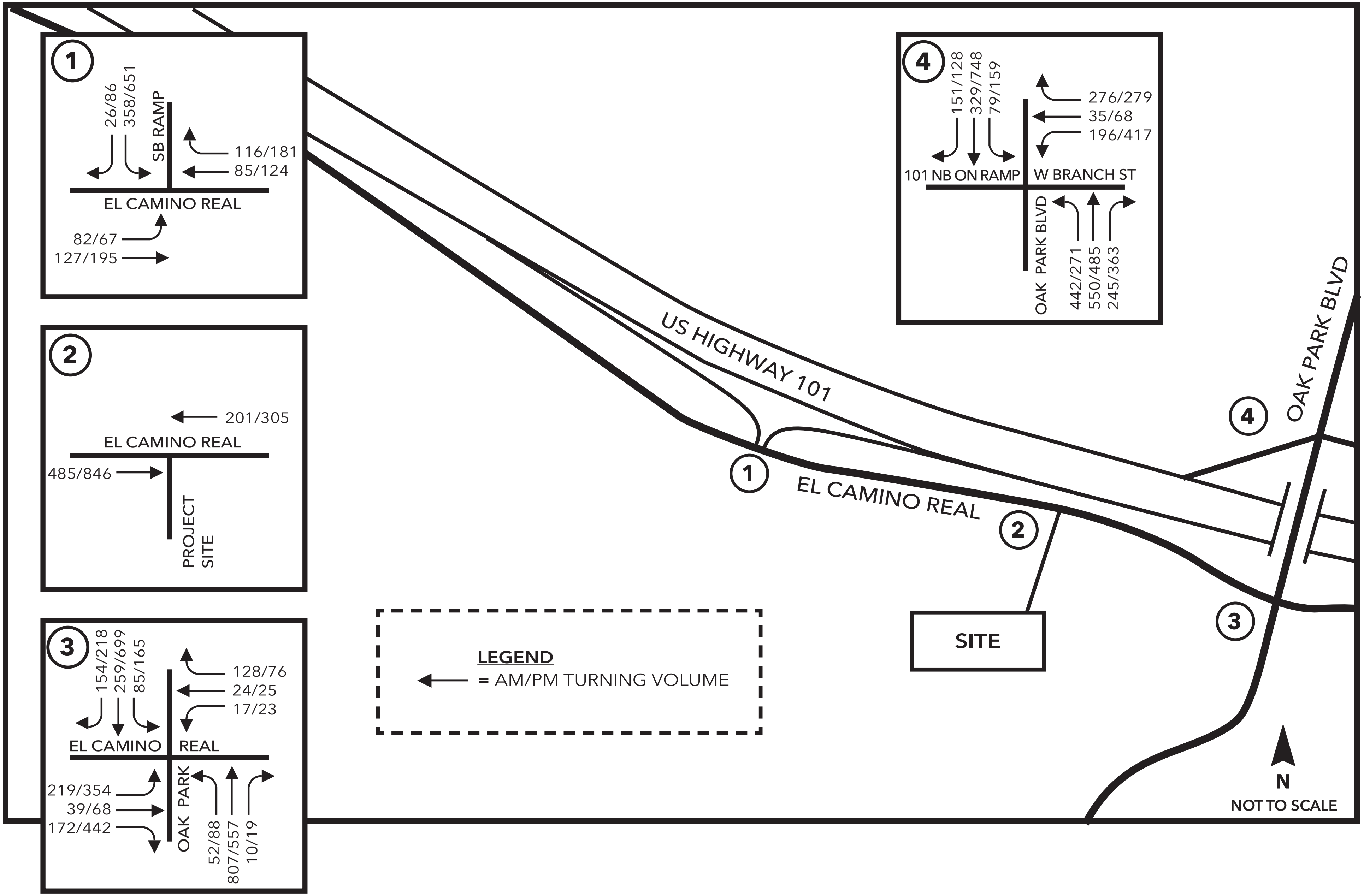
Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	31.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00		0.97	
Frt		1.00	0.93		0.98	
Flt Protected		0.98	1.00		0.96	
Satd. Flow (prot)		1834	1738		3393	
Flt Permitted		0.67	1.00		0.96	
Satd. Flow (perm)		1256	1738		3393	
Volume (vph)	125	275	225	220	725	115
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	125	275	225	220	725	115
RTOR Reduction (vph)	0	0	83	0	28	0
Lane Group Flow (vph)	0	400	362	0	812	0
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		15.8	15.8		14.7	
Effective Green, g (s)		15.8	15.8		14.7	
Actuated g/C Ratio		0.41	0.41		0.38	
Clearance Time (s)		4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		515	713		1296	
v/s Ratio Prot			0.21		c0.24	
v/s Ratio Perm		c0.32				
v/c Ratio		0.78	0.51		0.63	
Uniform Delay, d1		9.8	8.5		9.7	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		7.2	0.6		1.0	
Delay (s)		17.1	9.0		10.6	
Level of Service		B	A		B	
Approach Delay (s)		17.1	9.0		10.6	
Approach LOS		B	A		B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	38.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix - C

- Updated Exhibits 2-8 and Appendix D Exhibits A-C



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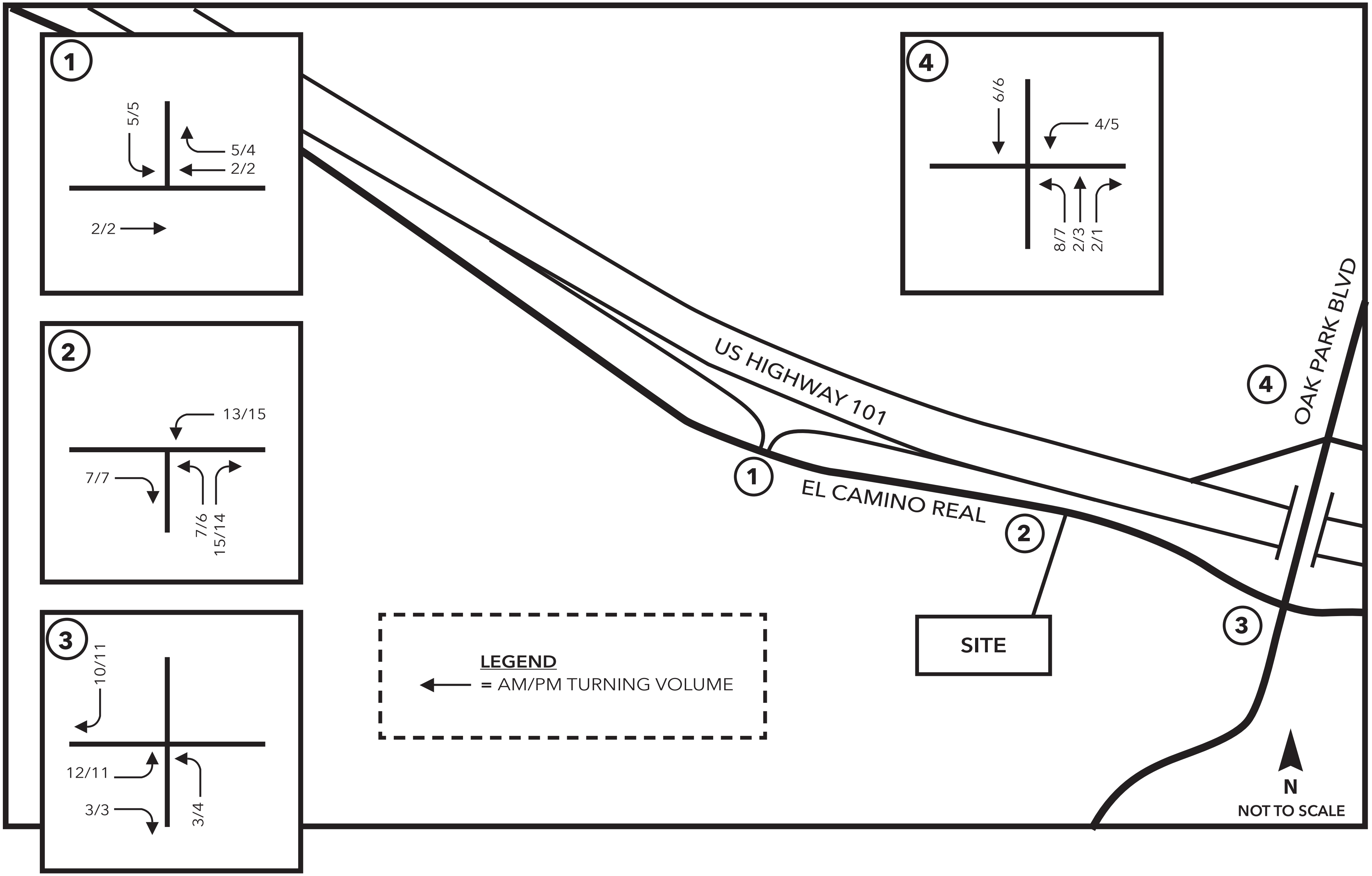
Existing Peak Hour Traffic Volumes

1598 EL CAMINO REAL

2



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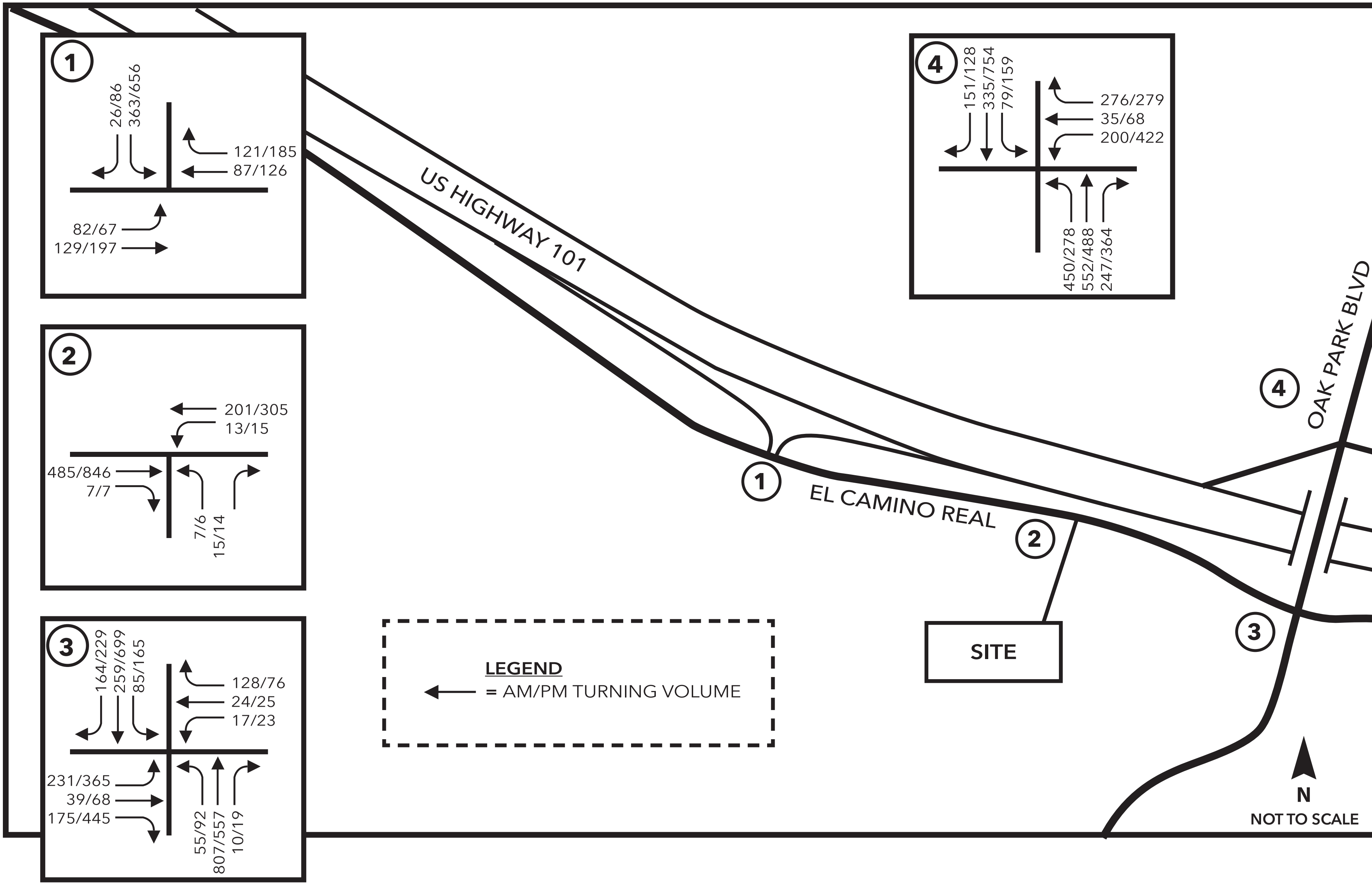
Phase 1 - Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL



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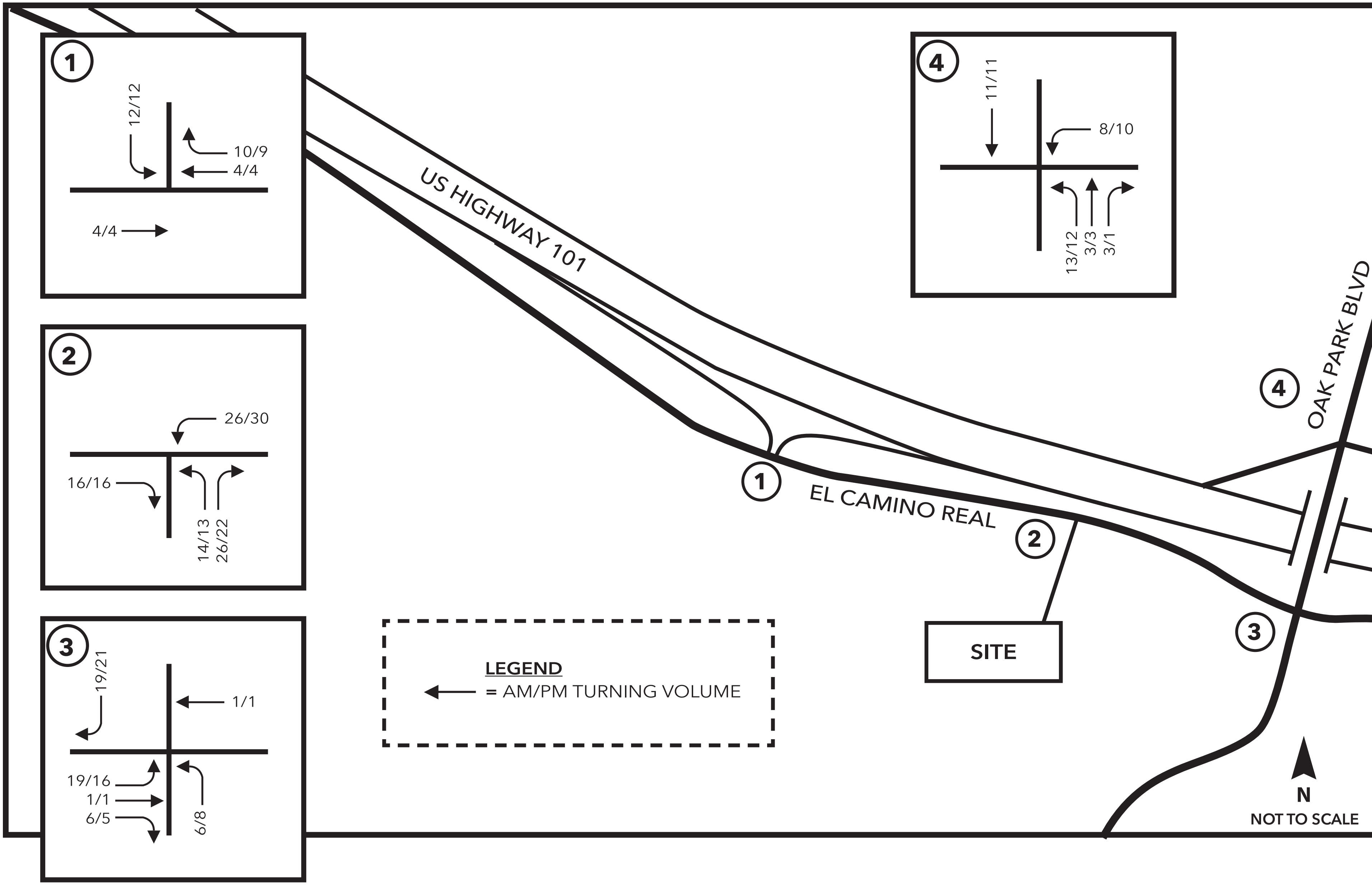
Existing Plus Project Phase 1 Peak Hour Traffic Volumes

1598 EL CAMINO REAL

4



Total Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL

5

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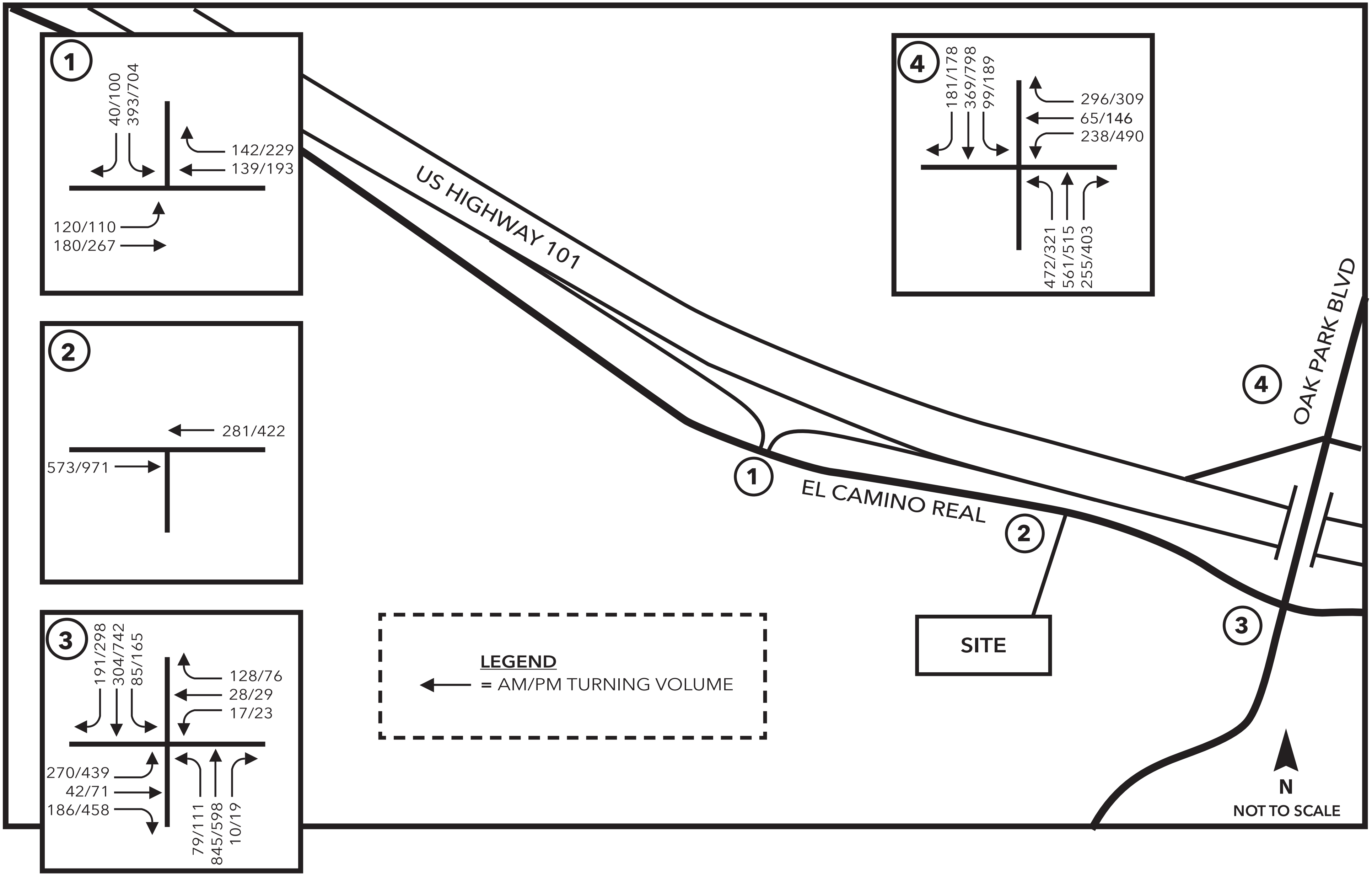

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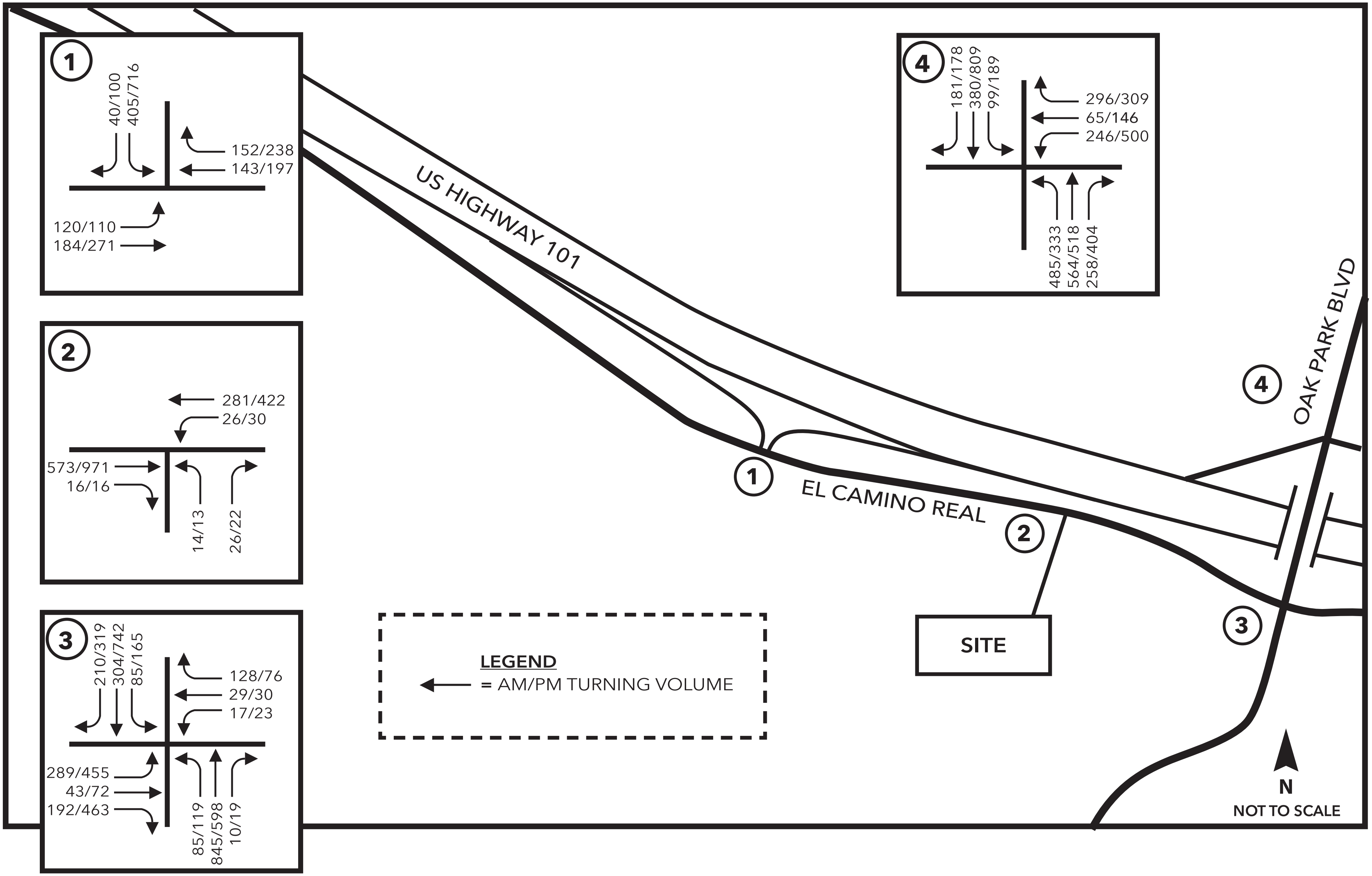
Cumulative Peak Hour Traffic Volumes

1598 EL CAMINO REAL

6



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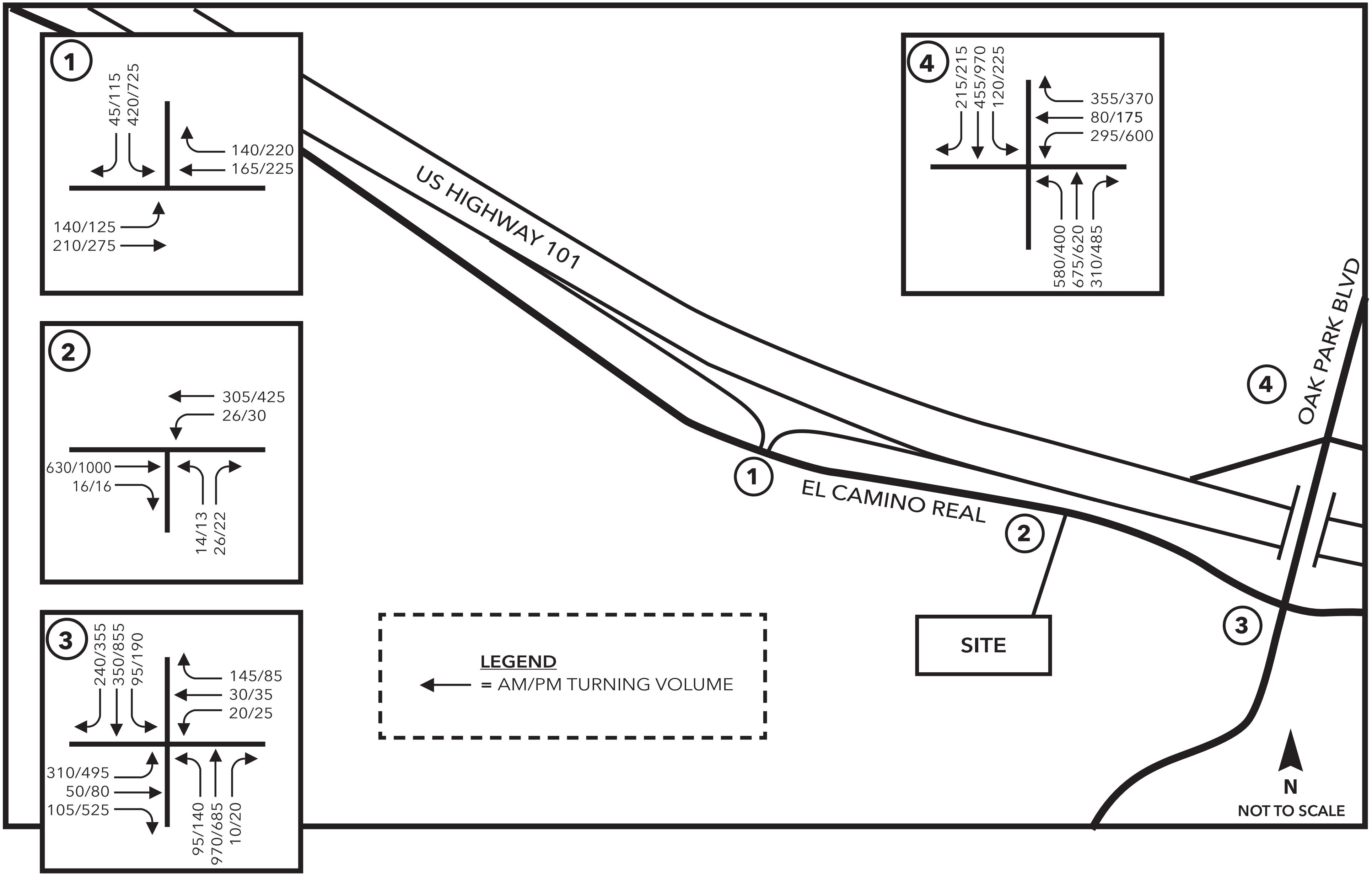
Cumulative Plus Project Peak Hour Traffic Volumes

1598 EL CAMINO REAL

7



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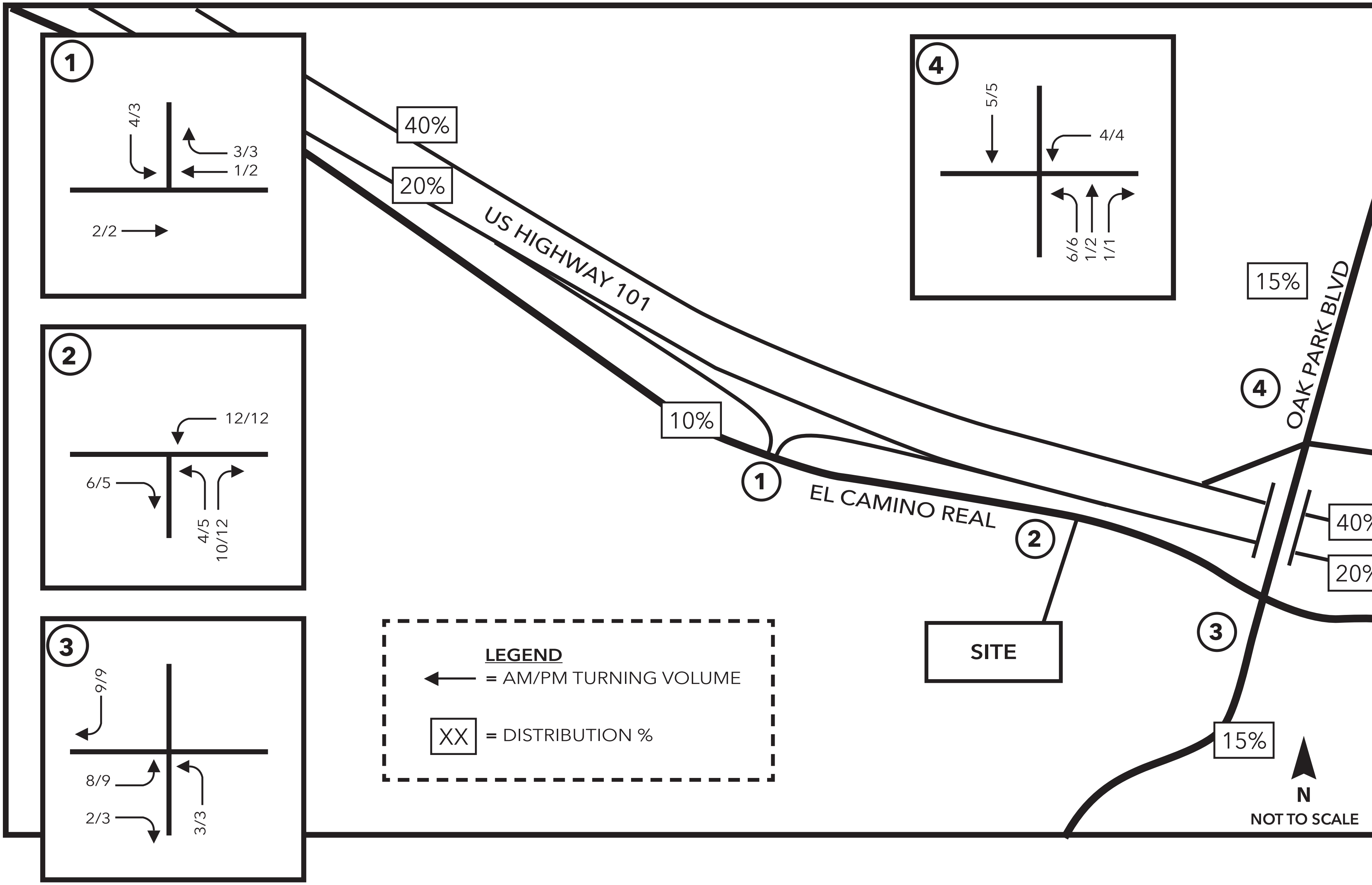
Buildout Peak Hour Traffic Volumes

1598 EL CAMINO REAL

8



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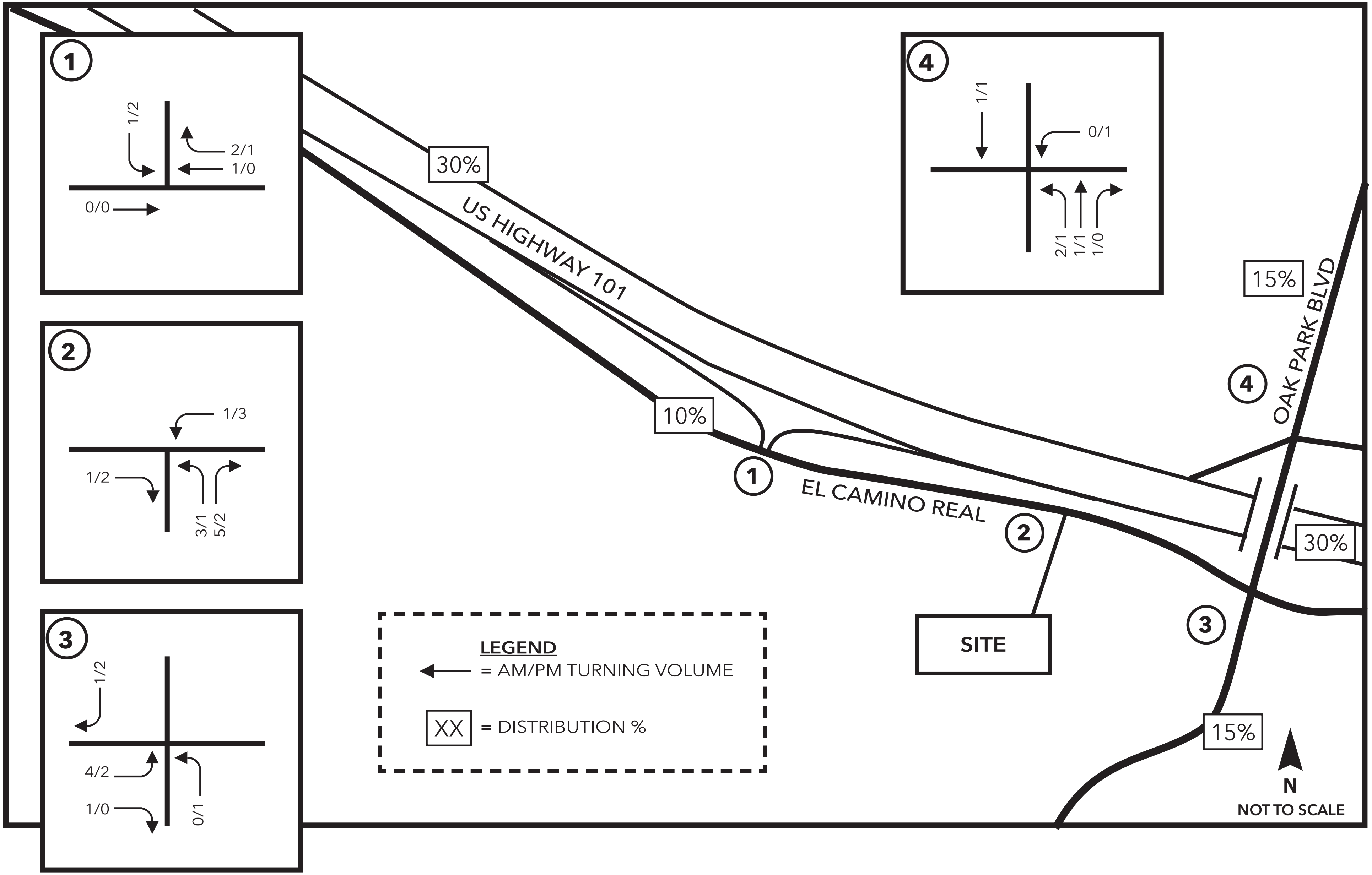
Hotel - Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL

A



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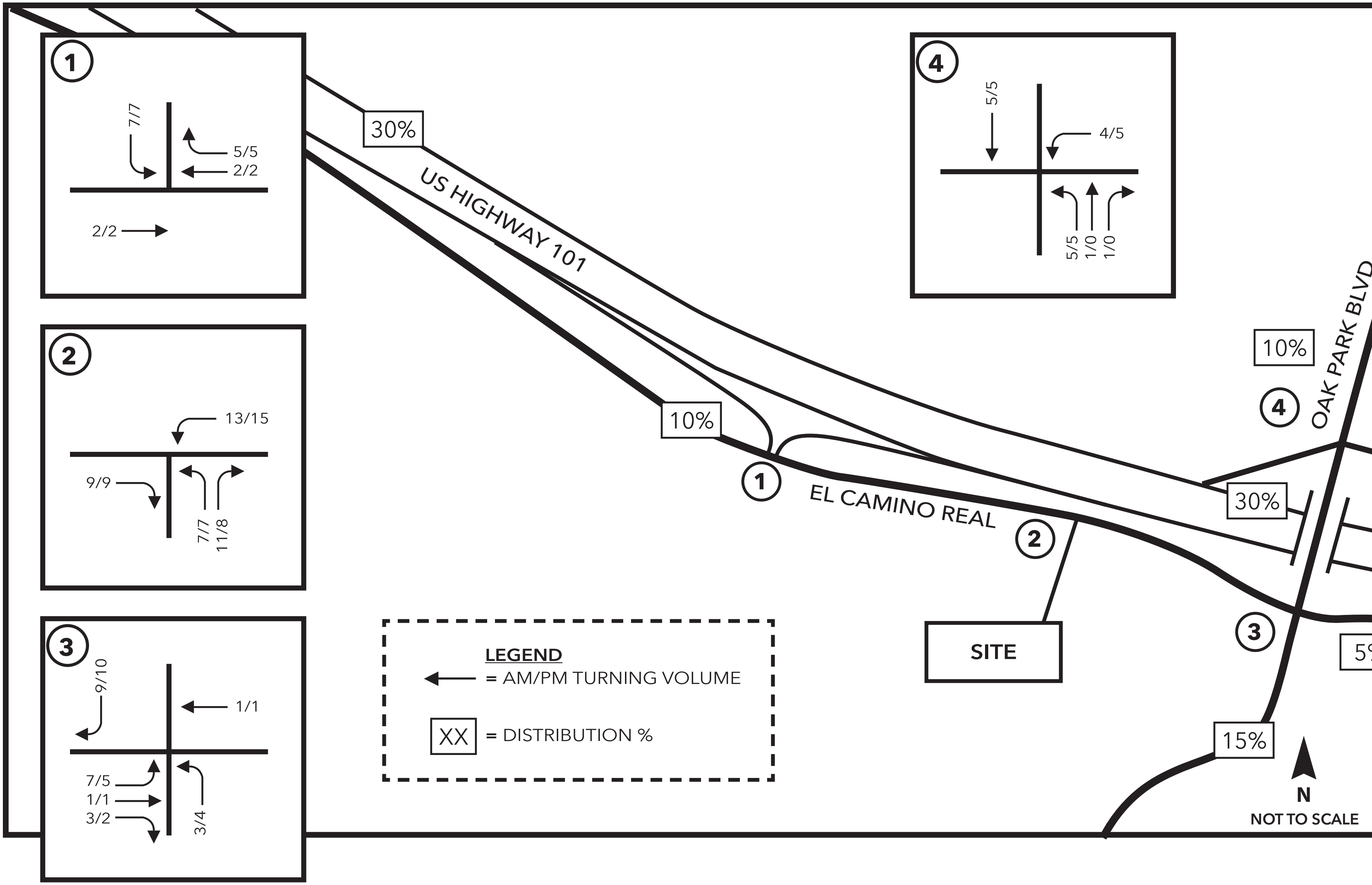
Residential - Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL

B



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Restaurant - Project Only Peak Hour Traffic Volumes

1598 EL CAMINO REAL

C

NOT TO SCALE

LEGEND

1 - Existing Conditions -- 308 feet
2 - Cumulative Conditions -- 410 feet
3 - Cumulative Plus Project Conditions -- 435 feet
4 - Buildout Plus Project Conditions -- 474 feet
5 - Driveway -- 516 feet

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PM Peak Hour Queing Distance

1598 EL CAMINO REAL

9

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TO:	A. Rafael Castillo, AICP Senior Planner, City of Grover Beach Gregory A. Ray, PE, Public Works, City of Grover Beach
FROM:	Stephen A Orosz, PE, TE, PTOE, Orosz Engineering Group, Inc.
DATE:	March 29, 2019
SUBJECT:	Response to Comments - 1598 El Camino Real Development Traffic Study Report City of Grover Beach Comments Existing Plus Phased Development Analysis

LICENSED PROFESSIONAL ENGINEER STEPHEN A. OROSZ TR 1209 TRAFFIC STATE OF CALIFORNIA

We have reviewed the City of Grover Beach comments for the above referenced traffic study report regarding the additional CEQA information for the existing plus phased development scenarios and have prepared the following information:

1. Provide Existing Plus Project Phase analysis for each construction phase of the project.

CONSTRUCTION PHASING

The proposed project is contemplated to be constructed in multiple phases. The proposed project phasing is summarized below.

Phase 1		**ADT**[1]
Existing Plus		
Residential Uses	7 Dwelling Units	66
Hotel B	60 Hotel Rooms	401
Phase 2		
Phase 1 Plus		
Hotel A	91 Hotel Rooms	426
Phase 3		
Phase 2 Plus		
High Turnover Sit-Down Restaurant	4,000 Square Feet	509

EXISTING PLUS PROJECT PHASING LEVEL OF SERVICE ANALYSIS

The existing AM and PM peak hour intersection turning movement count data was used to form the basis for the phasing analysis. The project trip generation by phase was utilized using the same trip generation of the primary report. The existing plus project phase intersection level of service was determined, and the results are summarized in Table 1.

As seen in this table, all of the study area intersections operate within acceptable levels of service (LOS C or better) during both AM and PM peak hours for project Phases 1 and 2. With project Phase 3, the unsignalized intersection of El Camino Real and the SB Highway 101 Ramps reaches LOS D.

[1] From Table 2 in main traffic report for the project dated September 2018.

Table 1
Existing Plus Project Phasing Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour			
		Existing Conditions	Plus Phase 1	Plus Phase 2	Plus Phase 3
El Camino Real at					
SB US Highway 101 Ramps	All-Way STOP	11.6 sec/veh – LOS B	11.7 sec/veh – LOS B	11.8 sec/veh – LOS B	12.0 sec/veh – LOS B
Project Site	One-Way STOP	NA	12.9 sec/veh – LOS B	13.2 sec/veh – LOS B	13.8 sec/veh – LOS B
Oak Park Boulevard	Traffic Signal	20.6 sec/veh – LOS C	20.9 sec/veh – LOS C	21.0 sec/veh – LOS C	21.2 sec/veh – LOS C
Oak Park Boulevard at					
W. Branch St/NB 101 On-ramp	Traffic Signal	17.2 sec/veh – LOS B	17.3 sec/veh – LOS B	17.4 sec/veh – LOS B	17.5 sec/veh – LOS B
		PM Peak Hour			
El Camino Real at		Existing Conditions	Plus Phase 1	Plus Phase 2	Plus Phase 3
SB US Highway 101 Ramps	All-Way STOP	23.6 sec/veh – LOS C	24.3 sec/veh – LOS C	24.9 sec/veh – LOS C	25.9 sec/veh – LOS D
Project Site	One-Way STOP	NA	20.6 sec/veh – LOS C	22.4 sec/veh – LOS C	23.8 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	21.6 sec/veh – LOS C	22.0 sec/veh – LOS C	22.6 sec/veh – LOS C	22.9 sec/veh – LOS C
Oak Park Boulevard at					
W. Branch St/NB 101 On-ramp	Traffic Signal	19.5 sec/veh – LOS B	19.8 sec/veh – LOS B	20.0 sec/veh – LOS C	20.2 sec/veh – LOS C

Appendix

A. Intersection Level of Service Worksheets for the Project Phasing

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	129	86	119	363	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	143	96	132	403	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	234	228	269	163
Volume Left (vph)	91	0	269	134
Volume Right (vph)	0	132	0	29
Hadj (s)	0.11	-0.31	0.53	0.32
Departure Headway (s)	5.6	5.2	6.3	6.1
Degree Utilization, x	0.36	0.33	0.47	0.28
Capacity (veh/h)	616	659	544	570
Control Delay (s)	11.7	10.6	13.5	10.2
Approach Delay (s)	11.7	10.6	12.3	
Approach LOS	B	B	B	

Intersection Summary			
Delay	11.7		
HCM Level of Service	B		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	485	7	13	201	7	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	527	8	14	218	8	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			535		778	531
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			535		778	531
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	97
cM capacity (veh/h)			1033		360	548

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	535	14	218	23
Volume Left	0	14	0	8
Volume Right	8	0	0	15
cSH	1700	1033	1700	822
Volume to Capacity	0.31	0.01	0.13	0.03
Queue Length 95th (ft)	0	1	0	2
Control Delay (s)	0.0	8.5	0.0	12.9
Lane LOS		A		B
Approach Delay (s)	0.0	0.5		12.9
Approach LOS				B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1627		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1627		1069	3533		304	3539	1583
Volume (vph)	230	39	175	17	24	128	54	807	10	85	259	165
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	258	44	197	19	27	144	61	907	11	96	291	185
RTOR Reduction (vph)	0	0	159	0	128	0	0	1	0	0	0	110
Lane Group Flow (vph)	75	227	38	19	43	0	61	917	0	96	291	75
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.4	13.4	13.4	7.7	7.7		31.2	26.8		34.6	28.5	28.5
Effective Green, g (s)	13.4	13.4	13.4	7.7	7.7		31.2	26.8		34.6	28.5	28.5
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11		0.45	0.38		0.49	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	322	326	303	195	179		521	1353		278	1441	645
v/s Ratio Prot	0.04	c0.13		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.04			0.14		0.05
v/c Ratio	0.23	0.70	0.12	0.10	0.24		0.12	0.68		0.35	0.20	0.12
Uniform Delay, d1	24.0	26.4	23.4	28.0	28.5		11.1	18.0		11.0	13.4	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	6.3	0.2	0.2	0.7		0.1	2.7		0.7	0.3	0.4
Delay (s)	24.3	32.7	23.6	28.2	29.2		11.2	20.7		11.8	13.7	13.3
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		27.9			29.1			20.2			13.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1708	1794	1770	3601		1770	3598	
Flt Permitted				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1708	1794	1770	3601		1770	3598	
Volume (vph)	0	0	0	204	35	276	449	553	246	79	332	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	212	36	288	468	576	256	82	346	157
RTOR Reduction (vph)	0	0	0	0	0	240	0	64	0	0	85	0
Lane Group Flow (vph)	0	0	0	121	127	48	468	768	0	82	418	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				10.1	10.1	10.1	20.9	33.7		4.2	17.0	
Effective Green, g (s)				10.1	10.1	10.1	20.9	33.7		4.2	17.0	
Actuated g/C Ratio				0.17	0.17	0.17	0.35	0.56		0.07	0.28	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				283	288	302	617	2023		124	1019	
v/s Ratio Prot							c0.26	c0.21		c0.05	0.12	
v/s Ratio Perm				0.07	0.07	0.03						
v/c Ratio				0.43	0.44	0.16	0.76	0.38		0.66	0.41	
Uniform Delay, d1				22.4	22.4	21.3	17.3	7.3		27.2	17.4	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.0	1.1	0.3	5.3	0.5		12.5	1.2	
Delay (s)				23.4	23.5	21.6	22.6	7.9		39.7	18.7	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.4			13.2			21.6	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	197	126	185	656	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	207	133	195	691	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	278	327	460	321
Volume Left (vph)	71	0	460	230
Volume Right (vph)	0	195	0	91
Hadj (s)	0.08	-0.32	0.53	0.20
Departure Headway (s)	6.5	6.0	6.9	6.5
Degree Utilization, x	0.50	0.55	0.88	0.58
Capacity (veh/h)	536	578	518	544
Control Delay (s)	15.8	16.1	40.4	17.0
Approach Delay (s)	15.8	16.1	30.8	
Approach LOS	C	C	D	

Intersection Summary			
Delay	24.3		
HCM Level of Service	C		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	846	7	14	305	6	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	920	8	15	332	7	14

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	613	314	347	7	14
Volume Left (vph)	0	0	15	7	0
Volume Right (vph)	0	8	0	0	14
Hadj (s)	0.03	0.02	0.04	0.53	-0.67
Departure Headway (s)	4.9	4.9	5.1	7.6	6.4
Degree Utilization, x	0.83	0.42	0.50	0.01	0.03
Capacity (veh/h)	723	732	690	446	523
Control Delay (s)	25.9	10.2	13.1	9.5	8.3
Approach Delay (s)	20.6		13.1	8.7	
Approach LOS	C		B	A	

Intersection Summary			
Delay	18.4		
HCM Level of Service	C		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1702	1583	1770	1653		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1681	1702	1583	1770	1653		506	3521		646	3539	1583
Volume (vph)	365	68	444	23	25	76	91	557	19	165	699	229
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	376	70	458	24	26	78	94	574	20	170	721	236
RTOR Reduction (vph)	0	0	351	0	71	0	0	3	0	0	0	125
Lane Group Flow (vph)	100	346	107	24	33	0	94	591	0	170	721	111
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.3	16.3	16.3	6.1	6.1		28.6	25.4		34.6	28.4	28.4
Effective Green, g (s)	16.3	16.3	16.3	6.1	6.1		28.6	25.4		34.6	28.4	28.4
Actuated g/C Ratio	0.23	0.23	0.23	0.09	0.09		0.41	0.36		0.49	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	391	396	369	154	144		265	1278		419	1436	642
v/s Ratio Prot	0.06	c0.20		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.13			0.16		0.07
v/c Ratio	0.26	0.87	0.29	0.16	0.23		0.35	0.46		0.41	0.50	0.17
Uniform Delay, d1	21.9	25.9	22.1	29.6	29.8		19.4	17.1		15.1	15.5	13.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	18.7	0.4	0.5	0.8		0.8	1.2		0.6	1.3	0.6
Delay (s)	22.2	44.6	22.5	30.0	30.6		20.2	18.3		15.7	16.8	13.9
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		30.9			30.5			18.5			16.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3534		1770	3693	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3534		1770	3693	
Volume (vph)	0	0	0	425	68	279	279	488	363	159	751	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	438	70	288	288	503	374	164	774	132
RTOR Reduction (vph)	0	0	0	0	0	220	0	214	0	0	23	0
Lane Group Flow (vph)	0	0	0	247	261	68	288	663	0	164	883	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				13.0	13.0	13.0	11.6	23.6		6.4	18.4	
Effective Green, g (s)				13.0	13.0	13.0	11.6	23.6		6.4	18.4	
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.43		0.12	0.33	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				397	403	424	373	1516		206	1235	
v/s Ratio Prot							c0.16	0.19		0.09	c0.24	
v/s Ratio Perm				0.15	0.15	0.04						
v/c Ratio				0.62	0.65	0.16	0.77	0.44		0.80	0.71	
Uniform Delay, d1				18.8	18.9	16.7	20.5	11.0		23.7	16.0	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				3.0	3.6	0.2	9.5	0.9		18.9	3.6	
Delay (s)				21.8	22.5	16.8	30.0	12.0		42.5	19.6	
Level of Service				C	C	B	C	B		D	B	
Approach Delay (s)		0.0			20.2			16.4			23.1	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	131	87	121	367	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	146	97	134	408	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	237	231	272	165
Volume Left (vph)	91	0	272	136
Volume Right (vph)	0	134	0	29
Hadj (s)	0.11	-0.32	0.53	0.32
Departure Headway (s)	5.6	5.2	6.3	6.1
Degree Utilization, x	0.37	0.33	0.48	0.28
Capacity (veh/h)	615	657	543	569
Control Delay (s)	11.8	10.7	13.7	10.2
Approach Delay (s)	11.8	10.7	12.4	
Approach LOS	B	B	B	

Intersection Summary			
Delay	11.8		
HCM Level of Service	B		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	485	13	29	201	10	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	527	14	32	218	11	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			541		816	534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			541		816	534
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		97	96
cM capacity (veh/h)			1027		336	546

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	541	32	218	35
Volume Left	0	32	0	11
Volume Right	14	0	0	24
cSH	1700	1027	1700	794
Volume to Capacity	0.32	0.03	0.13	0.04
Queue Length 95th (ft)	0	2	0	3
Control Delay (s)	0.0	8.6	0.0	13.2
Lane LOS		A		B
Approach Delay (s)	0.0	1.1		13.2
Approach LOS				B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1627		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1627		1069	3533		303	3539	1583
Volume (vph)	236	39	177	17	24	128	57	807	10	85	259	178
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	265	44	199	19	27	144	64	907	11	96	291	200
RTOR Reduction (vph)	0	0	161	0	128	0	0	1	0	0	0	119
Lane Group Flow (vph)	75	234	38	19	43	0	64	917	0	96	291	81
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.5	13.5	13.5	7.7	7.7		31.2	26.7		34.4	28.3	28.3
Effective Green, g (s)	13.5	13.5	13.5	7.7	7.7		31.2	26.7		34.4	28.3	28.3
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11		0.45	0.38		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	324	328	305	195	179		522	1348		277	1431	640
v/s Ratio Prot	0.04	c0.14		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.05			0.14		0.05
v/c Ratio	0.23	0.71	0.13	0.10	0.24		0.12	0.68		0.35	0.20	0.13
Uniform Delay, d1	23.9	26.4	23.4	28.0	28.5		11.2	18.1		11.1	13.5	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	7.2	0.2	0.2	0.7		0.1	2.8		0.8	0.3	0.4
Delay (s)	24.2	33.6	23.6	28.2	29.2		11.3	20.9		11.9	13.9	13.5
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		28.3			29.1			20.2			13.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3601		1770	3599	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3601		1770	3599	
Volume (vph)	0	0	0	214	35	276	453	555	246	79	335	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	223	36	288	472	578	256	82	349	157
RTOR Reduction (vph)	0	0	0	0	0	239	0	64	0	0	85	0
Lane Group Flow (vph)	0	0	0	126	133	49	472	770	0	82	421	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				10.3	10.3	10.3	20.9	33.5		4.2	16.8	
Effective Green, g (s)				10.3	10.3	10.3	20.9	33.5		4.2	16.8	
Actuated g/C Ratio				0.17	0.17	0.17	0.35	0.56		0.07	0.28	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				289	293	308	617	2011		124	1008	
v/s Ratio Prot							c0.27	c0.21		0.05	c0.12	
v/s Ratio Perm				0.07	0.08	0.03						
v/c Ratio				0.44	0.45	0.16	0.76	0.38		0.66	0.42	
Uniform Delay, d1				22.2	22.3	21.2	17.4	7.4		27.2	17.6	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.1	1.1	0.2	5.6	0.6		12.5	1.3	
Delay (s)				23.3	23.4	21.4	23.0	8.0		39.7	18.9	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.3			13.4			21.8	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	199	128	189	659	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	209	135	199	694	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	280	334	462	322
Volume Left (vph)	71	0	462	231
Volume Right (vph)	0	199	0	91
Hadj (s)	0.08	-0.32	0.53	0.20
Departure Headway (s)	6.5	6.0	6.9	6.6
Degree Utilization, x	0.51	0.56	0.89	0.59
Capacity (veh/h)	535	578	507	532
Control Delay (s)	16.0	16.4	41.6	17.3
Approach Delay (s)	16.0	16.4	31.6	
Approach LOS	C	C	D	

Intersection Summary			
Delay	24.9		
HCM Level of Service	C		
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	846	12	25	305	12	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	920	13	27	332	13	32

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	613	320	359	13	32
Volume Left (vph)	0	0	27	13	0
Volume Right (vph)	0	13	0	0	32
Hadj (s)	0.03	0.01	0.05	0.53	-0.67
Departure Headway (s)	5.0	5.0	5.3	7.7	6.4
Degree Utilization, x	0.85	0.44	0.52	0.03	0.06
Capacity (veh/h)	707	716	673	444	522
Control Delay (s)	28.5	10.6	13.9	9.7	8.6
Approach Delay (s)	22.4		13.9	8.9	
Approach LOS	C		B	A	

Intersection Summary			
Delay	19.6		
HCM Level of Service	C		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1653		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1653		503	3521		644	3539	1583
Volume (vph)	378	68	447	23	25	76	93	557	19	165	699	238
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	390	70	461	24	26	78	96	574	20	170	721	245
RTOR Reduction (vph)	0	0	352	0	71	0	0	3	0	0	0	131
Lane Group Flow (vph)	100	360	109	24	33	0	96	591	0	170	721	114
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.5	16.5	16.5	6.1	6.1		28.4	25.2		34.4	28.2	28.2
Effective Green, g (s)	16.5	16.5	16.5	6.1	6.1		28.4	25.2		34.4	28.2	28.2
Actuated g/C Ratio	0.24	0.24	0.24	0.09	0.09		0.41	0.36		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	396	401	373	154	144		262	1268		416	1426	638
v/s Ratio Prot	0.06	c0.21		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.13			0.16		0.07
v/c Ratio	0.25	0.90	0.29	0.16	0.23		0.37	0.47		0.41	0.51	0.18
Uniform Delay, d1	21.7	25.9	22.0	29.6	29.8		19.7	17.2		15.3	15.7	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	22.0	0.4	0.5	0.8		0.9	1.2		0.7	1.3	0.6
Delay (s)	22.1	47.9	22.4	30.0	30.6		20.5	18.5		15.9	17.0	14.1
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		32.3			30.5			18.7			16.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3534		1770	3693	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3534		1770	3693	
Volume (vph)	0	0	0	432	68	279	288	491	364	159	753	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	445	70	288	297	506	375	164	776	132
RTOR Reduction (vph)	0	0	0	0	0	220	0	212	0	0	23	0
Lane Group Flow (vph)	0	0	0	251	264	68	297	669	0	164	885	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				13.0	13.0	13.0	11.7	23.6		6.4	18.3	
Effective Green, g (s)				13.0	13.0	13.0	11.7	23.6		6.4	18.3	
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.43		0.12	0.33	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				397	403	424	377	1516		206	1229	
v/s Ratio Prot							c0.17	0.19		0.09	c0.24	
v/s Ratio Perm				0.15	0.15	0.04						
v/c Ratio				0.63	0.66	0.16	0.79	0.44		0.80	0.72	
Uniform Delay, d1				18.9	19.0	16.7	20.5	11.1		23.7	16.1	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				3.3	3.8	0.2	10.4	0.9		18.9	3.7	
Delay (s)				22.1	22.8	16.8	30.9	12.0		42.5	19.8	
Level of Service				C	C	B	C	B		D	B	
Approach Delay (s)		0.0			20.4			16.8			23.2	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	133	89	126	374	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	148	99	140	416	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	239	239	277	167
Volume Left (vph)	91	0	277	139
Volume Right (vph)	0	140	0	29
Hadj (s)	0.11	-0.32	0.53	0.33
Departure Headway (s)	5.6	5.2	6.3	6.1
Degree Utilization, x	0.37	0.35	0.49	0.28
Capacity (veh/h)	611	655	541	566
Control Delay (s)	11.9	10.9	14.0	10.3
Approach Delay (s)	11.9	10.9	12.6	
Approach LOS	B	B	B	

Intersection Summary			
Delay	12.0		
HCM Level of Service	B		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	485	22	42	201	17	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	527	24	46	218	18	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			551		849	539
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			551		849	539
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		94	93
cM capacity (veh/h)			1019		317	542

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	551	46	218	54
Volume Left	0	46	0	18
Volume Right	24	0	0	36
cSH	1700	1019	1700	822
Volume to Capacity	0.32	0.04	0.13	0.07
Queue Length 95th (ft)	0	4	0	5
Control Delay (s)	0.0	8.7	0.0	13.8
Lane LOS		A		B
Approach Delay (s)	0.0	1.5		13.8
Approach LOS				B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583	1770	1629		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1681	1700	1583	1770	1629		1069	3533		300	3539	1583
Volume (vph)	243	40	180	17	25	128	60	807	10	85	259	187
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	273	45	202	19	28	144	67	907	11	96	291	210
RTOR Reduction (vph)	0	0	162	0	128	0	0	1	0	0	0	126
Lane Group Flow (vph)	75	243	40	19	44	0	67	917	0	96	291	84
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.7	13.7	13.7	7.7	7.7		31.0	26.5		34.2	28.1	28.1
Effective Green, g (s)	13.7	13.7	13.7	7.7	7.7		31.0	26.5		34.2	28.1	28.1
Actuated g/C Ratio	0.20	0.20	0.20	0.11	0.11		0.44	0.38		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	329	333	310	195	179		518	1337		275	1421	635
v/s Ratio Prot	0.04	c0.14		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.05			0.14		0.05
v/c Ratio	0.23	0.73	0.13	0.10	0.24		0.13	0.69		0.35	0.20	0.13
Uniform Delay, d1	23.7	26.4	23.2	28.0	28.5		11.3	18.3		11.3	13.7	13.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	7.8	0.2	0.2	0.7		0.1	2.9		0.8	0.3	0.4
Delay (s)	24.1	34.2	23.4	28.2	29.2		11.4	21.1		12.0	14.0	13.7
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		28.5			29.1			20.5			13.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3601		1770	3601	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3601		1770	3601	
Volume (vph)	0	0	0	218	35	276	458	556	247	79	340	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	227	36	288	477	579	257	82	354	157
RTOR Reduction (vph)	0	0	0	0	0	239	0	64	0	0	83	0
Lane Group Flow (vph)	0	0	0	128	135	49	477	772	0	82	428	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				10.3	10.3	10.3	21.1	33.5		4.2	16.6	
Effective Green, g (s)				10.3	10.3	10.3	21.1	33.5		4.2	16.6	
Actuated g/C Ratio				0.17	0.17	0.17	0.35	0.56		0.07	0.28	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				289	293	308	622	2011		124	996	
v/s Ratio Prot							c0.27	0.21		0.05	c0.12	
v/s Ratio Perm				0.08	0.08	0.03						
v/c Ratio				0.44	0.46	0.16	0.77	0.38		0.66	0.43	
Uniform Delay, d1				22.3	22.4	21.2	17.3	7.4		27.2	17.8	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.1	1.1	0.2	5.6	0.6		12.5	1.4	
Delay (s)				23.4	23.5	21.4	22.9	8.0		39.7	19.2	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.4			13.4			22.0	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	201	130	194	666	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	212	137	204	701	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	282	341	467	324
Volume Left (vph)	71	0	467	234
Volume Right (vph)	0	204	0	91
Hadj (s)	0.08	-0.33	0.53	0.20
Departure Headway (s)	6.5	6.1	6.9	6.6
Degree Utilization, x	0.51	0.57	0.90	0.59
Capacity (veh/h)	523	577	506	530
Control Delay (s)	16.3	16.9	44.0	17.6
Approach Delay (s)	16.3	16.9	33.2	
Approach LOS	C	C	D	

Intersection Summary			
Delay	25.9		
HCM Level of Service	D		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	846	21	40	305	19	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	920	23	43	332	21	40

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	613	329	375	21	40
Volume Left (vph)	0	0	43	21	0
Volume Right (vph)	0	23	0	0	40
Hadj (s)	0.03	-0.01	0.06	0.53	-0.67
Departure Headway (s)	5.1	5.0	5.4	7.7	6.5
Degree Utilization, x	0.87	0.46	0.56	0.04	0.07
Capacity (veh/h)	695	705	661	442	519
Control Delay (s)	30.7	11.1	14.9	9.9	8.8
Approach Delay (s)	23.8		14.9	9.2	
Approach LOS	C		B	A	

Intersection Summary			
Delay	20.8		
HCM Level of Service	C		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1655		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.34	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1655		501	3521		642	3539	1583
Volume (vph)	383	69	449	23	26	76	97	557	19	165	699	248
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	395	71	463	24	27	78	100	574	20	170	721	256
RTOR Reduction (vph)	0	0	353	0	71	0	0	3	0	0	0	137
Lane Group Flow (vph)	100	366	110	24	34	0	100	591	0	170	721	119
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.6	16.6	16.6	6.1	6.1		28.2	25.0		34.4	28.1	28.1
Effective Green, g (s)	16.6	16.6	16.6	6.1	6.1		28.2	25.0		34.4	28.1	28.1
Actuated g/C Ratio	0.24	0.24	0.24	0.09	0.09		0.40	0.36		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	399	403	375	154	144		260	1258		417	1421	635
v/s Ratio Prot	0.06	c0.22		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.14			0.16		0.08
v/c Ratio	0.25	0.91	0.29	0.16	0.23		0.38	0.47		0.41	0.51	0.19
Uniform Delay, d1	21.7	26.0	21.9	29.6	29.8		20.0	17.4		15.3	15.7	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	23.6	0.4	0.5	0.8		0.9	1.3		0.7	1.3	0.7
Delay (s)	22.0	49.6	22.3	30.0	30.6		20.9	18.6		16.0	17.0	14.2
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		33.0			30.5			19.0			16.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3534		1770	3693	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3534		1770	3693	
Volume (vph)	0	0	0	437	68	279	293	491	364	159	758	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	451	70	288	302	506	375	164	781	132
RTOR Reduction (vph)	0	0	0	0	0	219	0	212	0	0	23	0
Lane Group Flow (vph)	0	0	0	254	267	69	302	669	0	164	890	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				13.1	13.1	13.1	11.7	23.5		6.4	18.2	
Effective Green, g (s)				13.1	13.1	13.1	11.7	23.5		6.4	18.2	
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.43		0.12	0.33	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				400	407	427	377	1510		206	1222	
v/s Ratio Prot							c0.17	0.19		0.09	c0.24	
v/s Ratio Perm				0.15	0.16	0.04						
v/c Ratio				0.64	0.66	0.16	0.80	0.44		0.80	0.73	
Uniform Delay, d1				18.8	18.9	16.6	20.5	11.1		23.7	16.2	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				3.3	3.8	0.2	11.6	0.9		18.9	3.8	
Delay (s)				22.1	22.7	16.8	32.1	12.1		42.5	20.0	
Level of Service				C	C	B	C	B		D	C	
Approach Delay (s)		0.0			20.4			17.2			23.5	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

oroszengineeringgroup

TO:	A. Rafael Castillo, AICP Senior Planner, City of Grover Beach Gregory A. Ray, PE, Public Works, City of Grover Beach
FROM:	Stephen A Orosz, PE, TE, PTOE, Orosz Engineering Group, Inc.
DATE:	March 29, 2019
SUBJECT:	Response to Comments - 1598 El Camino Real Development Traffic Study Report City of Grover Beach Comments Existing Plus Phased Development Analysis

LICENSED PROFESSIONAL ENGINEER STEPHEN A. OROSZ TR 1209 TRAFFIC STATE OF CALIFORNIA

We have reviewed the City of Grover Beach comments for the above referenced traffic study report regarding the additional CEQA information for the existing plus phased development scenarios and have prepared the following information:

1. Provide Existing Plus Project Phase analysis for each construction phase of the project.

CONSTRUCTION PHASING

The proposed project is contemplated to be constructed in multiple phases. The proposed project phasing is summarized below.

Phase 1		**ADT**[1]
Existing Plus		
Residential Uses	7 Dwelling Units	66
Hotel B	60 Hotel Rooms	401
Phase 2		
Phase 1 Plus		
Hotel A	91 Hotel Rooms	426
Phase 3		
Phase 2 Plus		
High Turnover Sit-Down Restaurant	4,000 Square Feet	509

EXISTING PLUS PROJECT PHASING LEVEL OF SERVICE ANALYSIS

The existing AM and PM peak hour intersection turning movement count data was used to form the basis for the phasing analysis. The project trip generation by phase was utilized using the same trip generation of the primary report. The existing plus project phase intersection level of service was determined, and the results are summarized in Table 1.

As seen in this table, all of the study area intersections operate within acceptable levels of service (LOS C or better) during both AM and PM peak hours for project Phases 1 and 2. With project Phase 3, the unsignalized intersection of El Camino Real and the SB Highway 101 Ramps reaches LOS D.

[1] From Table 2 in main traffic report for the project dated September 2018.

Table 1
Existing Plus Project Phasing Intersection Levels of Service
AM and PM Peak Hours

	Control	AM Peak Hour			
		Existing Conditions	Plus Phase 1	Plus Phase 2	Plus Phase 3
El Camino Real at					
SB US Highway 101 Ramps	All-Way STOP	11.6 sec/veh – LOS B	11.7 sec/veh – LOS B	11.8 sec/veh – LOS B	12.0 sec/veh – LOS B
Project Site	One-Way STOP	NA	12.9 sec/veh – LOS B	13.2 sec/veh – LOS B	13.8 sec/veh – LOS B
Oak Park Boulevard	Traffic Signal	20.6 sec/veh – LOS C	20.9 sec/veh – LOS C	21.0 sec/veh – LOS C	21.2 sec/veh – LOS C
Oak Park Boulevard at					
W. Branch St/NB 101 On-ramp	Traffic Signal	17.2 sec/veh – LOS B	17.3 sec/veh – LOS B	17.4 sec/veh – LOS B	17.5 sec/veh – LOS B
		PM Peak Hour			
El Camino Real at		Existing Conditions	Plus Phase 1	Plus Phase 2	Plus Phase 3
SB US Highway 101 Ramps	All-Way STOP	23.6 sec/veh – LOS C	24.3 sec/veh – LOS C	24.9 sec/veh – LOS C	25.9 sec/veh – LOS D
Project Site	One-Way STOP	NA	20.6 sec/veh – LOS C	22.4 sec/veh – LOS C	23.8 sec/veh – LOS C
Oak Park Boulevard	Traffic Signal	21.6 sec/veh – LOS C	22.0 sec/veh – LOS C	22.6 sec/veh – LOS C	22.9 sec/veh – LOS C
Oak Park Boulevard at					
W. Branch St/NB 101 On-ramp	Traffic Signal	19.5 sec/veh – LOS B	19.8 sec/veh – LOS B	20.0 sec/veh – LOS C	20.2 sec/veh – LOS C

Appendix

A. Intersection Level of Service Worksheets for the Project Phasing

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	129	86	119	363	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	143	96	132	403	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	234	228	269	163
Volume Left (vph)	91	0	269	134
Volume Right (vph)	0	132	0	29
Hadj (s)	0.11	-0.31	0.53	0.32
Departure Headway (s)	5.6	5.2	6.3	6.1
Degree Utilization, x	0.36	0.33	0.47	0.28
Capacity (veh/h)	616	659	544	570
Control Delay (s)	11.7	10.6	13.5	10.2
Approach Delay (s)	11.7	10.6	12.3	
Approach LOS	B	B	B	

Intersection Summary			
Delay	11.7		
HCM Level of Service	B		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	485	7	13	201	7	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	527	8	14	218	8	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			535		778	531
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			535		778	531
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	97
cM capacity (veh/h)			1033		360	548

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	535	14	218	23
Volume Left	0	14	0	8
Volume Right	8	0	0	15
cSH	1700	1033	1700	822
Volume to Capacity	0.31	0.01	0.13	0.03
Queue Length 95th (ft)	0	1	0	2
Control Delay (s)	0.0	8.5	0.0	12.9
Lane LOS		A		B
Approach Delay (s)	0.0	0.5		12.9
Approach LOS				B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1627		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1627		1069	3533		304	3539	1583
Volume (vph)	230	39	175	17	24	128	54	807	10	85	259	165
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	258	44	197	19	27	144	61	907	11	96	291	185
RTOR Reduction (vph)	0	0	159	0	128	0	0	1	0	0	0	110
Lane Group Flow (vph)	75	227	38	19	43	0	61	917	0	96	291	75
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.4	13.4	13.4	7.7	7.7		31.2	26.8		34.6	28.5	28.5
Effective Green, g (s)	13.4	13.4	13.4	7.7	7.7		31.2	26.8		34.6	28.5	28.5
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11		0.45	0.38		0.49	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	322	326	303	195	179		521	1353		278	1441	645
v/s Ratio Prot	0.04	c0.13		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.04			0.14		0.05
v/c Ratio	0.23	0.70	0.12	0.10	0.24		0.12	0.68		0.35	0.20	0.12
Uniform Delay, d1	24.0	26.4	23.4	28.0	28.5		11.1	18.0		11.0	13.4	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	6.3	0.2	0.2	0.7		0.1	2.7		0.7	0.3	0.4
Delay (s)	24.3	32.7	23.6	28.2	29.2		11.2	20.7		11.8	13.7	13.3
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		27.9			29.1			20.2			13.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1708	1794	1770	3601		1770	3598	
Flt Permitted				0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1708	1794	1770	3601		1770	3598	
Volume (vph)	0	0	0	204	35	276	449	553	246	79	332	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	212	36	288	468	576	256	82	346	157
RTOR Reduction (vph)	0	0	0	0	0	240	0	64	0	0	85	0
Lane Group Flow (vph)	0	0	0	121	127	48	468	768	0	82	418	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				10.1	10.1	10.1	20.9	33.7		4.2	17.0	
Effective Green, g (s)				10.1	10.1	10.1	20.9	33.7		4.2	17.0	
Actuated g/C Ratio				0.17	0.17	0.17	0.35	0.56		0.07	0.28	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				283	288	302	617	2023		124	1019	
v/s Ratio Prot							c0.26	c0.21		c0.05	0.12	
v/s Ratio Perm				0.07	0.07	0.03						
v/c Ratio				0.43	0.44	0.16	0.76	0.38		0.66	0.41	
Uniform Delay, d1				22.4	22.4	21.3	17.3	7.3		27.2	17.4	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.0	1.1	0.3	5.3	0.5		12.5	1.2	
Delay (s)				23.4	23.5	21.6	22.6	7.9		39.7	18.7	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.4			13.2			21.6	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	197	126	185	656	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	207	133	195	691	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	278	327	460	321
Volume Left (vph)	71	0	460	230
Volume Right (vph)	0	195	0	91
Hadj (s)	0.08	-0.32	0.53	0.20
Departure Headway (s)	6.5	6.0	6.9	6.5
Degree Utilization, x	0.50	0.55	0.88	0.58
Capacity (veh/h)	536	578	518	544
Control Delay (s)	15.8	16.1	40.4	17.0
Approach Delay (s)	15.8	16.1	30.8	
Approach LOS	C	C	D	

Intersection Summary			
Delay	24.3		
HCM Level of Service	C		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	846	7	14	305	6	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	920	8	15	332	7	14

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	613	314	347	7	14
Volume Left (vph)	0	0	15	7	0
Volume Right (vph)	0	8	0	0	14
Hadj (s)	0.03	0.02	0.04	0.53	-0.67
Departure Headway (s)	4.9	4.9	5.1	7.6	6.4
Degree Utilization, x	0.83	0.42	0.50	0.01	0.03
Capacity (veh/h)	723	732	690	446	523
Control Delay (s)	25.9	10.2	13.1	9.5	8.3
Approach Delay (s)	20.6		13.1	8.7	
Approach LOS	C		B	A	

Intersection Summary			
Delay	18.4		
HCM Level of Service	C		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1702	1583	1770	1653		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1681	1702	1583	1770	1653		506	3521		646	3539	1583
Volume (vph)	365	68	444	23	25	76	91	557	19	165	699	229
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	376	70	458	24	26	78	94	574	20	170	721	236
RTOR Reduction (vph)	0	0	351	0	71	0	0	3	0	0	0	125
Lane Group Flow (vph)	100	346	107	24	33	0	94	591	0	170	721	111
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.3	16.3	16.3	6.1	6.1		28.6	25.4		34.6	28.4	28.4
Effective Green, g (s)	16.3	16.3	16.3	6.1	6.1		28.6	25.4		34.6	28.4	28.4
Actuated g/C Ratio	0.23	0.23	0.23	0.09	0.09		0.41	0.36		0.49	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	391	396	369	154	144		265	1278		419	1436	642
v/s Ratio Prot	0.06	c0.20		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.13			0.16		0.07
v/c Ratio	0.26	0.87	0.29	0.16	0.23		0.35	0.46		0.41	0.50	0.17
Uniform Delay, d1	21.9	25.9	22.1	29.6	29.8		19.4	17.1		15.1	15.5	13.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	18.7	0.4	0.5	0.8		0.8	1.2		0.6	1.3	0.6
Delay (s)	22.2	44.6	22.5	30.0	30.6		20.2	18.3		15.7	16.8	13.9
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		30.9			30.5			18.5			16.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3534		1770	3693	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3534		1770	3693	
Volume (vph)	0	0	0	425	68	279	279	488	363	159	751	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	438	70	288	288	503	374	164	774	132
RTOR Reduction (vph)	0	0	0	0	0	220	0	214	0	0	23	0
Lane Group Flow (vph)	0	0	0	247	261	68	288	663	0	164	883	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				13.0	13.0	13.0	11.6	23.6		6.4	18.4	
Effective Green, g (s)				13.0	13.0	13.0	11.6	23.6		6.4	18.4	
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.43		0.12	0.33	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				397	403	424	373	1516		206	1235	
v/s Ratio Prot							c0.16	0.19		0.09	c0.24	
v/s Ratio Perm				0.15	0.15	0.04						
v/c Ratio				0.62	0.65	0.16	0.77	0.44		0.80	0.71	
Uniform Delay, d1				18.8	18.9	16.7	20.5	11.0		23.7	16.0	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				3.0	3.6	0.2	9.5	0.9		18.9	3.6	
Delay (s)				21.8	22.5	16.8	30.0	12.0		42.5	19.6	
Level of Service				C	C	B	C	B		D	B	
Approach Delay (s)		0.0			20.2			16.4			23.1	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	131	87	121	367	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	146	97	134	408	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	237	231	272	165
Volume Left (vph)	91	0	272	136
Volume Right (vph)	0	134	0	29
Hadj (s)	0.11	-0.32	0.53	0.32
Departure Headway (s)	5.6	5.2	6.3	6.1
Degree Utilization, x	0.37	0.33	0.48	0.28
Capacity (veh/h)	615	657	543	569
Control Delay (s)	11.8	10.7	13.7	10.2
Approach Delay (s)	11.8	10.7	12.4	
Approach LOS	B	B	B	

Intersection Summary			
Delay	11.8		
HCM Level of Service	B		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	485	13	29	201	10	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	527	14	32	218	11	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			541		816	534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			541		816	534
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		97	96
cM capacity (veh/h)			1027		336	546

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	541	32	218	35
Volume Left	0	32	0	11
Volume Right	14	0	0	24
cSH	1700	1027	1700	794
Volume to Capacity	0.32	0.03	0.13	0.04
Queue Length 95th (ft)	0	2	0	3
Control Delay (s)	0.0	8.6	0.0	13.2
Lane LOS		A		B
Approach Delay (s)	0.0	1.1		13.2
Approach LOS				B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1627		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1627		1069	3533		303	3539	1583
Volume (vph)	236	39	177	17	24	128	57	807	10	85	259	178
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	265	44	199	19	27	144	64	907	11	96	291	200
RTOR Reduction (vph)	0	0	161	0	128	0	0	1	0	0	0	119
Lane Group Flow (vph)	75	234	38	19	43	0	64	917	0	96	291	81
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.5	13.5	13.5	7.7	7.7		31.2	26.7		34.4	28.3	28.3
Effective Green, g (s)	13.5	13.5	13.5	7.7	7.7		31.2	26.7		34.4	28.3	28.3
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11		0.45	0.38		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	324	328	305	195	179		522	1348		277	1431	640
v/s Ratio Prot	0.04	c0.14		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.05			0.14		0.05
v/c Ratio	0.23	0.71	0.13	0.10	0.24		0.12	0.68		0.35	0.20	0.13
Uniform Delay, d1	23.9	26.4	23.4	28.0	28.5		11.2	18.1		11.1	13.5	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	7.2	0.2	0.2	0.7		0.1	2.8		0.8	0.3	0.4
Delay (s)	24.2	33.6	23.6	28.2	29.2		11.3	20.9		11.9	13.9	13.5
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		28.3			29.1			20.2			13.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3601		1770	3599	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3601		1770	3599	
Volume (vph)	0	0	0	214	35	276	453	555	246	79	335	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	223	36	288	472	578	256	82	349	157
RTOR Reduction (vph)	0	0	0	0	0	239	0	64	0	0	85	0
Lane Group Flow (vph)	0	0	0	126	133	49	472	770	0	82	421	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				10.3	10.3	10.3	20.9	33.5		4.2	16.8	
Effective Green, g (s)				10.3	10.3	10.3	20.9	33.5		4.2	16.8	
Actuated g/C Ratio				0.17	0.17	0.17	0.35	0.56		0.07	0.28	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				289	293	308	617	2011		124	1008	
v/s Ratio Prot							c0.27	c0.21		0.05	c0.12	
v/s Ratio Perm				0.07	0.08	0.03						
v/c Ratio				0.44	0.45	0.16	0.76	0.38		0.66	0.42	
Uniform Delay, d1				22.2	22.3	21.2	17.4	7.4		27.2	17.6	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.1	1.1	0.2	5.6	0.6		12.5	1.3	
Delay (s)				23.3	23.4	21.4	23.0	8.0		39.7	18.9	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.3			13.4			21.8	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	199	128	189	659	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	209	135	199	694	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	280	334	462	322
Volume Left (vph)	71	0	462	231
Volume Right (vph)	0	199	0	91
Hadj (s)	0.08	-0.32	0.53	0.20
Departure Headway (s)	6.5	6.0	6.9	6.6
Degree Utilization, x	0.51	0.56	0.89	0.59
Capacity (veh/h)	535	578	507	532
Control Delay (s)	16.0	16.4	41.6	17.3
Approach Delay (s)	16.0	16.4	31.6	
Approach LOS	C	C	D	

Intersection Summary			
Delay	24.9		
HCM Level of Service	C		
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	846	12	25	305	12	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	920	13	27	332	13	32

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	613	320	359	13	32
Volume Left (vph)	0	0	27	13	0
Volume Right (vph)	0	13	0	0	32
Hadj (s)	0.03	0.01	0.05	0.53	-0.67
Departure Headway (s)	5.0	5.0	5.3	7.7	6.4
Degree Utilization, x	0.85	0.44	0.52	0.03	0.06
Capacity (veh/h)	707	716	673	444	522
Control Delay (s)	28.5	10.6	13.9	9.7	8.6
Approach Delay (s)	22.4		13.9	8.9	
Approach LOS	C		B	A	

Intersection Summary			
Delay	19.6		
HCM Level of Service	C		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1653		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.35	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1653		503	3521		644	3539	1583
Volume (vph)	378	68	447	23	25	76	93	557	19	165	699	238
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	390	70	461	24	26	78	96	574	20	170	721	245
RTOR Reduction (vph)	0	0	352	0	71	0	0	3	0	0	0	131
Lane Group Flow (vph)	100	360	109	24	33	0	96	591	0	170	721	114
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.5	16.5	16.5	6.1	6.1		28.4	25.2		34.4	28.2	28.2
Effective Green, g (s)	16.5	16.5	16.5	6.1	6.1		28.4	25.2		34.4	28.2	28.2
Actuated g/C Ratio	0.24	0.24	0.24	0.09	0.09		0.41	0.36		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	396	401	373	154	144		262	1268		416	1426	638
v/s Ratio Prot	0.06	c0.21		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.13			0.16		0.07
v/c Ratio	0.25	0.90	0.29	0.16	0.23		0.37	0.47		0.41	0.51	0.18
Uniform Delay, d1	21.7	25.9	22.0	29.6	29.8		19.7	17.2		15.3	15.7	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	22.0	0.4	0.5	0.8		0.9	1.2		0.7	1.3	0.6
Delay (s)	22.1	47.9	22.4	30.0	30.6		20.5	18.5		15.9	17.0	14.1
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		32.3			30.5			18.7			16.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3534		1770	3693	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3534		1770	3693	
Volume (vph)	0	0	0	432	68	279	288	491	364	159	753	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	445	70	288	297	506	375	164	776	132
RTOR Reduction (vph)	0	0	0	0	0	220	0	212	0	0	23	0
Lane Group Flow (vph)	0	0	0	251	264	68	297	669	0	164	885	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				13.0	13.0	13.0	11.7	23.6		6.4	18.3	
Effective Green, g (s)				13.0	13.0	13.0	11.7	23.6		6.4	18.3	
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.43		0.12	0.33	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				397	403	424	377	1516		206	1229	
v/s Ratio Prot							c0.17	0.19		0.09	c0.24	
v/s Ratio Perm				0.15	0.15	0.04						
v/c Ratio				0.63	0.66	0.16	0.79	0.44		0.80	0.72	
Uniform Delay, d1				18.9	19.0	16.7	20.5	11.1		23.7	16.1	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				3.3	3.8	0.2	10.4	0.9		18.9	3.7	
Delay (s)				22.1	22.8	16.8	30.9	12.0		42.5	19.8	
Level of Service				C	C	B	C	B		D	B	
Approach Delay (s)		0.0			20.4			16.8			23.2	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	82	133	89	126	374	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	91	148	99	140	416	29

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	239	239	277	167
Volume Left (vph)	91	0	277	139
Volume Right (vph)	0	140	0	29
Hadj (s)	0.11	-0.32	0.53	0.33
Departure Headway (s)	5.6	5.2	6.3	6.1
Degree Utilization, x	0.37	0.35	0.49	0.28
Capacity (veh/h)	611	655	541	566
Control Delay (s)	11.9	10.9	14.0	10.3
Approach Delay (s)	11.9	10.9	12.6	
Approach LOS	B	B	B	

Intersection Summary			
Delay	12.0		
HCM Level of Service	B		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	485	22	42	201	17	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	527	24	46	218	18	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			551		849	539
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			551		849	539
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		94	93
cM capacity (veh/h)			1019		317	542

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	551	46	218	54
Volume Left	0	46	0	18
Volume Right	24	0	0	36
cSH	1700	1019	1700	822
Volume to Capacity	0.32	0.04	0.13	0.07
Queue Length 95th (ft)	0	4	0	5
Control Delay (s)	0.0	8.7	0.0	13.8
Lane LOS		A		B
Approach Delay (s)	0.0	1.5		13.8
Approach LOS				B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583	1770	1629		1770	3533		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.57	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1681	1700	1583	1770	1629		1069	3533		300	3539	1583
Volume (vph)	243	40	180	17	25	128	60	807	10	85	259	187
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	273	45	202	19	28	144	67	907	11	96	291	210
RTOR Reduction (vph)	0	0	162	0	128	0	0	1	0	0	0	126
Lane Group Flow (vph)	75	243	40	19	44	0	67	917	0	96	291	84
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	13.7	13.7	13.7	7.7	7.7		31.0	26.5		34.2	28.1	28.1
Effective Green, g (s)	13.7	13.7	13.7	7.7	7.7		31.0	26.5		34.2	28.1	28.1
Actuated g/C Ratio	0.20	0.20	0.20	0.11	0.11		0.44	0.38		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	329	333	310	195	179		518	1337		275	1421	635
v/s Ratio Prot	0.04	c0.14		0.01	c0.03		0.01	c0.26		c0.03	0.08	
v/s Ratio Perm			0.02				0.05			0.14		0.05
v/c Ratio	0.23	0.73	0.13	0.10	0.24		0.13	0.69		0.35	0.20	0.13
Uniform Delay, d1	23.7	26.4	23.2	28.0	28.5		11.3	18.3		11.3	13.7	13.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	7.8	0.2	0.2	0.7		0.1	2.9		0.8	0.3	0.4
Delay (s)	24.1	34.2	23.4	28.2	29.2		11.4	21.1		12.0	14.0	13.7
Level of Service	C	C	C	C	C		B	C		B	B	B
Approach Delay (s)		28.5			29.1			20.5			13.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.95		1.00	0.95	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3601		1770	3601	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3601		1770	3601	
Volume (vph)	0	0	0	218	35	276	458	556	247	79	340	151
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	227	36	288	477	579	257	82	354	157
RTOR Reduction (vph)	0	0	0	0	0	239	0	64	0	0	83	0
Lane Group Flow (vph)	0	0	0	128	135	49	477	772	0	82	428	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				10.3	10.3	10.3	21.1	33.5		4.2	16.6	
Effective Green, g (s)				10.3	10.3	10.3	21.1	33.5		4.2	16.6	
Actuated g/C Ratio				0.17	0.17	0.17	0.35	0.56		0.07	0.28	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				289	293	308	622	2011		124	996	
v/s Ratio Prot							c0.27	0.21		0.05	c0.12	
v/s Ratio Perm				0.08	0.08	0.03						
v/c Ratio				0.44	0.46	0.16	0.77	0.38		0.66	0.43	
Uniform Delay, d1				22.3	22.4	21.2	17.3	7.4		27.2	17.8	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				1.1	1.1	0.2	5.6	0.6		12.5	1.4	
Delay (s)				23.4	23.5	21.4	22.9	8.0		39.7	19.2	
Level of Service				C	C	C	C	A		D	B	
Approach Delay (s)		0.0			22.4			13.4			22.0	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Volume (vph)	67	201	130	194	666	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	71	212	137	204	701	91

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total (vph)	282	341	467	324
Volume Left (vph)	71	0	467	234
Volume Right (vph)	0	204	0	91
Hadj (s)	0.08	-0.33	0.53	0.20
Departure Headway (s)	6.5	6.1	6.9	6.6
Degree Utilization, x	0.51	0.57	0.90	0.59
Capacity (veh/h)	523	577	506	530
Control Delay (s)	16.3	16.9	44.0	17.6
Approach Delay (s)	16.3	16.9	33.2	
Approach LOS	C	C	D	

Intersection Summary			
Delay	25.9		
HCM Level of Service	D		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	846	21	40	305	19	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	920	23	43	332	21	40

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	613	329	375	21	40
Volume Left (vph)	0	0	43	21	0
Volume Right (vph)	0	23	0	0	40
Hadj (s)	0.03	-0.01	0.06	0.53	-0.67
Departure Headway (s)	5.1	5.0	5.4	7.7	6.5
Degree Utilization, x	0.87	0.46	0.56	0.04	0.07
Capacity (veh/h)	695	705	661	442	519
Control Delay (s)	30.7	11.1	14.9	9.9	8.8
Approach Delay (s)	23.8		14.9	9.2	
Approach LOS	C		B	A	

Intersection Summary			
Delay	20.8		
HCM Level of Service	C		
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1701	1583	1770	1655		1770	3521		1770	3539	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.27	1.00		0.34	1.00	1.00
Satd. Flow (perm)	1681	1701	1583	1770	1655		501	3521		642	3539	1583
Volume (vph)	383	69	449	23	26	76	97	557	19	165	699	248
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	395	71	463	24	27	78	100	574	20	170	721	256
RTOR Reduction (vph)	0	0	353	0	71	0	0	3	0	0	0	137
Lane Group Flow (vph)	100	366	110	24	34	0	100	591	0	170	721	119
Turn Type	Split		Perm	Split			pm+pt			pm+pt		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	16.6	16.6	16.6	6.1	6.1		28.2	25.0		34.4	28.1	28.1
Effective Green, g (s)	16.6	16.6	16.6	6.1	6.1		28.2	25.0		34.4	28.1	28.1
Actuated g/C Ratio	0.24	0.24	0.24	0.09	0.09		0.40	0.36		0.49	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	399	403	375	154	144		260	1258		417	1421	635
v/s Ratio Prot	0.06	c0.22		0.01	c0.02		0.02	0.17		c0.04	c0.20	
v/s Ratio Perm			0.07				0.14			0.16		0.08
v/c Ratio	0.25	0.91	0.29	0.16	0.23		0.38	0.47		0.41	0.51	0.19
Uniform Delay, d1	21.7	26.0	21.9	29.6	29.8		20.0	17.4		15.3	15.7	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	23.6	0.4	0.5	0.8		0.9	1.3		0.7	1.3	0.7
Delay (s)	22.0	49.6	22.3	30.0	30.6		20.9	18.6		16.0	17.0	14.2
Level of Service	C	D	C	C	C		C	B		B	B	B
Approach Delay (s)		33.0			30.5			19.0			16.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	14	12	12	14	12
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt				1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1681	1707	1794	1770	3534		1770	3693	
Flt Permitted				0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)				1681	1707	1794	1770	3534		1770	3693	
Volume (vph)	0	0	0	437	68	279	293	491	364	159	758	128
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	451	70	288	302	506	375	164	781	132
RTOR Reduction (vph)	0	0	0	0	0	219	0	212	0	0	23	0
Lane Group Flow (vph)	0	0	0	254	267	69	302	669	0	164	890	0
Turn Type				Perm		Perm	Prot			Prot		
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8						
Actuated Green, G (s)				13.1	13.1	13.1	11.7	23.5		6.4	18.2	
Effective Green, g (s)				13.1	13.1	13.1	11.7	23.5		6.4	18.2	
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.43		0.12	0.33	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				400	407	427	377	1510		206	1222	
v/s Ratio Prot							c0.17	0.19		0.09	c0.24	
v/s Ratio Perm				0.15	0.16	0.04						
v/c Ratio				0.64	0.66	0.16	0.80	0.44		0.80	0.73	
Uniform Delay, d1				18.8	18.9	16.6	20.5	11.1		23.7	16.2	
Progression Factor				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2				3.3	3.8	0.2	11.6	0.9		18.9	3.8	
Delay (s)				22.1	22.7	16.8	32.1	12.1		42.5	20.0	
Level of Service				C	C	B	C	B		D	C	
Approach Delay (s)		0.0			20.4			17.2			23.5	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group