APPENDIX A
CALEEMOD OUTPUT TABLES

Highland Springs Office Commercial Project

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	6.40	1000sqft	0.25	6,400.00	0
Other Non-Asphalt Surfaces	0.30	Acre	0.30	13,068.00	0
Parking Lot	1.65	Acre	1.65	71,874.00	0
Fast Food Restaurant with Drive Thru	2.48	1000sqft	0.10	2,480.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per site plan

Construction Phase -

Vehicle Trips - Per TIA

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	0.15	0.25
tblLandUse	LotAcreage	0.06	0.10
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	722.03	434.70
tblVehicleTrips	ST_TR	2.46	9.74
tblVehicleTrips	SU_TR	542.72	434.70
tblVehicleTrips	SU_TR	1.05	9.74
tblVehicleTrips	WD_TR	496.12	434.70
tblVehicleTrips	WD_TR	11.03	9.74

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					
2021	0.1767	1.3844	1.2556	2.6300e-003	0.0731	0.0643	0.1374	0.0241	0.0615	0.0856	0.0000	225.5924	225.5924	0.0357	0.0000	226.4852
2022	0.1377	0.6420	0.6591	1.3700e-003	0.0267	0.0287	0.0554	7.1900e-003	0.0274	0.0346	0.0000	117.0970	117.0970	0.0185	0.0000	117.5602
Maximum	**0.1767**	**1.3844**	**1.2556**	**2.6300e-003**	**0.0731**	**0.0643**	**0.1374**	**0.0241**	**0.0615**	**0.0856**	**0.0000**	**225.5924**	**225.5924**	**0.0357**	**0.0000**	**226.4852**

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					
2021	0.1767	1.3844	1.2556	2.6300e-003	0.0731	0.0643	0.1374	0.0241	0.0615	0.0856	0.0000	225.5923	225.5923	0.0357	0.0000	226.4850
2022	0.1377	0.6420	0.6591	1.3700e-003	0.0267	0.0287	0.0554	7.1900e-003	0.0274	0.0346	0.0000	117.0969	117.0969	0.0185	0.0000	117.5601
Maximum	**0.1767**	**1.3844**	**1.2556**	**2.6300e-003**	**0.0731**	**0.0643**	**0.1374**	**0.0241**	**0.0615**	**0.0856**	**0.0000**	**225.5923**	**225.5923**	**0.0357**	**0.0000**	**226.4850**

	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**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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	5-28-2021	8-27-2021	0.6609	0.6609
2	8-28-2021	11-27-2021	0.6546	0.6546
3	11-28-2021	2-27-2022	0.6187	0.6187
4	2-28-2022	5-27-2022	0.4079	0.4079
		Highest	0.6609	0.6609

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	0.0429	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.9000e-004
Energy	3.7800e-003	0.0343	0.0288	2.1000e-004		2.6100e-003	2.6100e-003		2.6100e-003	2.6100e-003	0.0000	102.3187	102.3187	3.4000e-003	1.2400e-003	102.7732
Mobile	0.2587	2.1096	2.1742	9.0800e-003	0.6020	6.1500e-003	0.6082	0.1613	5.7600e-003	0.1671	0.0000	844.8466	844.8466	0.0625	0.0000	846.4095
Waste						0.0000	0.0000		0.0000	0.0000	7.0073	0.0000	7.0073	0.4141	0.0000	17.3602
Water						0.0000	0.0000		0.0000	0.0000	0.5997	10.4803	11.0800	0.0620	1.5400e-003	13.0907
Total	**0.3053**	**2.1439**	**2.2032**	**9.2900e-003**	**0.6020**	**8.7600e-003**	**0.6108**	**0.1613**	**8.3700e-003**	**0.1697**	**7.6069**	**957.6458**	**965.2528**	**0.5421**	**2.7800e-003**	**979.6338**

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	0.0429	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.9000e-004
Energy	3.7800e-003	0.0343	0.0288	2.1000e-004		2.6100e-003	2.6100e-003		2.6100e-003	2.6100e-003	0.0000	102.3187	102.3187	3.4000e-003	1.2400e-003	102.7732
Mobile	0.2587	2.1096	2.1742	9.0800e-003	0.6020	6.1500e-003	0.6082	0.1613	5.7600e-003	0.1671	0.0000	844.8466	844.8466	0.0625	0.0000	846.4095
Waste						0.0000	0.0000		0.0000	0.0000	7.0073	0.0000	7.0073	0.4141	0.0000	17.3602
Water						0.0000	0.0000		0.0000	0.0000	0.5997	10.4803	11.0800	0.0620	1.5400e-003	13.0907
Total	**0.3053**	**2.1439**	**2.2032**	**9.2900e-003**	**0.6020**	**8.7600e-003**	**0.6108**	**0.1613**	**8.3700e-003**	**0.1697**	**7.6069**	**957.6458**	**965.2528**	**0.5421**	**2.7800e-003**	**979.6338**

	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**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/28/2021	6/1/2021	5	3	
2	Grading	Grading	6/2/2021	6/9/2021	5	6	
3	Building Construction	Building Construction	6/10/2021	4/13/2022	5	220	
4	Paving	Paving	4/14/2022	4/27/2022	5	10	
5	Architectural Coating	Architectural Coating	4/28/2022	5/11/2022	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 1.95

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,320; Non-Residential Outdoor: 4,440; Striped Parking Area: 5,097 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
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
Site Preparation	3	8.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	39.00	15.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 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					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	2.3200e-003	0.0274	0.0161	4.0000e-005		1.0500e-003	1.0500e-003		9.7000e-004	9.7000e-004	0.0000	3.2290	3.2290	1.0400e-003	0.0000	3.2551
Total	**2.3200e-003**	**0.0274**	**0.0161**	**4.0000e-005**	**2.3900e-003**	**1.0500e-003**	**3.4400e-003**	**2.6000e-004**	**9.7000e-004**	**1.2300e-003**	**0.0000**	**3.2290**	**3.2290**	**1.0400e-003**	**0.0000**	**3.2551**

3.2 Site Preparation - 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	0.0000	0.0000	0.0000	0.0000	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	7.0000e-005	5.0000e-005	4.9000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1429	0.1429	0.0000	0.0000	0.1429
Total	**7.0000e-005**	**5.0000e-005**	**4.9000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1429**	**0.1429**	**0.0000**	**0.0000**	**0.1429**

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					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	2.3200e-003	0.0274	0.0161	4.0000e-005		1.0500e-003	1.0500e-003		9.7000e-004	9.7000e-004	0.0000	3.2290	3.2290	1.0400e-003	0.0000	3.2551
Total	**2.3200e-003**	**0.0274**	**0.0161**	**4.0000e-005**	**2.3900e-003**	**1.0500e-003**	**3.4400e-003**	**2.6000e-004**	**9.7000e-004**	**1.2300e-003**	**0.0000**	**3.2290**	**3.2290**	**1.0400e-003**	**0.0000**	**3.2551**

3.2 Site Preparation - 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	0.0000	0.0000	0.0000	0.0000	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	7.0000e-005	5.0000e-005	4.9000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1429	0.1429	0.0000	0.0000	0.1429
Total	**7.0000e-005**	**5.0000e-005**	**4.9000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1429**	**0.1429**	**0.0000**	**0.0000**	**0.1429**

3.3 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					0.0197	0.0000	0.0197	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**5.4800e-003**	**0.0606**	**0.0293**	**6.0000e-005**	**0.0197**	**2.7500e-003**	**0.0224**	**0.0101**	**2.5300e-003**	**0.0126**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

3.3 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	0.0000	0.0000	0.0000	0.0000	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	1.6000e-004	1.1000e-004	1.2300e-003	0.0000	4.4000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3571	0.3571	1.0000e-005	0.0000	0.3573
Total	**1.6000e-004**	**1.1000e-004**	**1.2300e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3571**	**0.3571**	**1.0000e-005**	**0.0000**	**0.3573**

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					0.0197	0.0000	0.0197	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	**5.4800e-003**	**0.0606**	**0.0293**	**6.0000e-005**	**0.0197**	**2.7500e-003**	**0.0224**	**0.0101**	**2.5300e-003**	**0.0126**	**0.0000**	**5.4312**	**5.4312**	**1.7600e-003**	**0.0000**	**5.4751**

3.3 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	0.0000	0.0000	0.0000	0.0000	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	1.6000e-004	1.1000e-004	1.2300e-003	0.0000	4.4000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3571	0.3571	1.0000e-005	0.0000	0.3573
Total	**1.6000e-004**	**1.1000e-004**	**1.2300e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3571**	**0.3571**	**1.0000e-005**	**0.0000**	**0.3573**

3.4 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	0.1503	1.1780	1.0704	1.8400e-003		0.0601	0.0601		0.0576	0.0576	0.0000	152.6218	152.6218	0.0300	0.0000	153.3725
Total	**0.1503**	**1.1780**	**1.0704**	**1.8400e-003**		**0.0601**	**0.0601**		**0.0576**	**0.0576**	**0.0000**	**152.6218**	**152.6218**	**0.0300**	**0.0000**	**153.3725**

3.4 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	2.7700e-003	0.1073	0.0207	3.1000e-004	7.9700e-003	2.2000e-004	8.1900e-003	2.3000e-003	2.1000e-004	2.5100e-003	0.0000	29.6858	29.6858	2.0900e-003	0.0000	29.7381
Worker	0.0155	0.0109	0.1174	3.8000e-004	0.0424	2.5000e-004	0.0427	0.0113	2.3000e-004	0.0115	0.0000	34.1247	34.1247	7.8000e-004	0.0000	34.1442
Total	**0.0183**	**0.1181**	**0.1381**	**6.9000e-004**	**0.0504**	**4.7000e-004**	**0.0509**	**0.0136**	**4.4000e-004**	**0.0140**	**0.0000**	**63.8105**	**63.8105**	**2.8700e-003**	**0.0000**	**63.8823**

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	0.1503	1.1780	1.0704	1.8400e-003		0.0601	0.0601		0.0576	0.0576	0.0000	152.6216	152.6216	0.0300	0.0000	153.3723
Total	**0.1503**	**1.1780**	**1.0704**	**1.8400e-003**		**0.0601**	**0.0601**		**0.0576**	**0.0576**	**0.0000**	**152.6216**	**152.6216**	**0.0300**	**0.0000**	**153.3723**

3.4 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	2.7700e-003	0.1073	0.0207	3.1000e-004	7.9700e-003	2.2000e-004	8.1900e-003	2.3000e-003	2.1000e-004	2.5100e-003	0.0000	29.6858	29.6858	2.0900e-003	0.0000	29.7381
Worker	0.0155	0.0109	0.1174	3.8000e-004	0.0424	2.5000e-004	0.0427	0.0113	2.3000e-004	0.0115	0.0000	34.1247	34.1247	7.8000e-004	0.0000	34.1442
Total	**0.0183**	**0.1181**	**0.1381**	**6.9000e-004**	**0.0504**	**4.7000e-004**	**0.0509**	**0.0136**	**4.4000e-004**	**0.0140**	**0.0000**	**63.8105**	**63.8105**	**2.8700e-003**	**0.0000**	**63.8823**

3.4 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	0.0677	0.5331	0.5239	9.1000e-004		0.0256	0.0256		0.0246	0.0246	0.0000	75.8032	75.8032	0.0146	0.0000	76.1689
Total	**0.0677**	**0.5331**	**0.5239**	**9.1000e-004**		**0.0256**	**0.0256**		**0.0246**	**0.0246**	**0.0000**	**75.8032**	**75.8032**	**0.0146**	**0.0000**	**76.1689**

3.4 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	1.2900e-003	0.0500	9.5600e-003	1.5000e-004	3.9600e-003	9.0000e-005	4.0500e-003	1.1400e-003	9.0000e-005	1.2300e-003	0.0000	14.6155	14.6155	9.9000e-004	0.0000	14.6401
Worker	7.2400e-003	4.8600e-003	0.0537	1.8000e-004	0.0211	1.2000e-004	0.0212	5.5900e-003	1.1000e-004	5.7000e-003	0.0000	16.3276	16.3276	3.5000e-004	0.0000	16.3363
Total	**8.5300e-003**	**0.0549**	**0.0633**	**3.3000e-004**	**0.0250**	**2.1000e-004**	**0.0252**	**6.7300e-003**	**2.0000e-004**	**6.9300e-003**	**0.0000**	**30.9431**	**30.9431**	**1.3400e-003**	**0.0000**	**30.9764**

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	0.0677	0.5331	0.5239	9.1000e-004		0.0256	0.0256		0.0246	0.0246	0.0000	75.8032	75.8032	0.0146	0.0000	76.1688
Total	**0.0677**	**0.5331**	**0.5239**	**9.1000e-004**		**0.0256**	**0.0256**		**0.0246**	**0.0246**	**0.0000**	**75.8032**	**75.8032**	**0.0146**	**0.0000**	**76.1688**

3.4 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	1.2900e-003	0.0500	9.5600e-003	1.5000e-004	3.9600e-003	9.0000e-005	4.0500e-003	1.1400e-003	9.0000e-005	1.2300e-003	0.0000	14.6155	14.6155	9.9000e-004	0.0000	14.6401
Worker	7.2400e-003	4.8600e-003	0.0537	1.8000e-004	0.0211	1.2000e-004	0.0212	5.5900e-003	1.1000e-004	5.7000e-003	0.0000	16.3276	16.3276	3.5000e-004	0.0000	16.3363
Total	**8.5300e-003**	**0.0549**	**0.0633**	**3.3000e-004**	**0.0250**	**2.1000e-004**	**0.0252**	**6.7300e-003**	**2.0000e-004**	**6.9300e-003**	**0.0000**	**30.9431**	**30.9431**	**1.3400e-003**	**0.0000**	**30.9764**

3.5 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	2.1600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.8700e-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**

3.5 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	3.8000e-004	2.6000e-004	2.8300e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.8603	0.8603	2.0000e-005	0.0000	0.8607
Total	**3.8000e-004**	**2.6000e-004**	**2.8300e-003**	**1.0000e-005**	**1.1100e-003**	**1.0000e-005**	**1.1200e-003**	**2.9000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**0.8603**	**0.8603**	**2.0000e-005**	**0.0000**	**0.8607**

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	2.1600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.8700e-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**

3.5 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	3.8000e-004	2.6000e-004	2.8300e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.8603	0.8603	2.0000e-005	0.0000	0.8607
Total	**3.8000e-004**	**2.6000e-004**	**2.8300e-003**	**1.0000e-005**	**1.1100e-003**	**1.0000e-005**	**1.1200e-003**	**2.9000e-004**	**1.0000e-005**	**3.0000e-004**	**0.0000**	**0.8603**	**0.8603**	**2.0000e-005**	**0.0000**	**0.8607**

3.6 Architectural Coating - 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					
Archit. Coating	0.0530					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	**0.0540**	**7.0400e-003**	**9.0700e-003**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2787**

3.6 Architectural Coating - 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	2.0000e-004	1.4000e-004	1.5100e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4588	0.4588	1.0000e-005	0.0000	0.4591
Total	**2.0000e-004**	**1.4000e-004**	**1.5100e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4588**	**0.4588**	**1.0000e-005**	**0.0000**	**0.4591**

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	0.0530					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	**0.0540**	**7.0400e-003**	**9.0700e-003**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.2766**	**1.2766**	**8.0000e-005**	**0.0000**	**1.2787**

3.6 Architectural Coating - 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	2.0000e-004	1.4000e-004	1.5100e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4588	0.4588	1.0000e-005	0.0000	0.4591
Total	**2.0000e-004**	**1.4000e-004**	**1.5100e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4588**	**0.4588**	**1.0000e-005**	**0.0000**	**0.4591**

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	0.2587	2.1096	2.1742	9.0800e-003	0.6020	6.1500e-003	0.6082	0.1613	5.7600e-003	0.1671	0.0000	844.8466	844.8466	0.0625	0.0000	846.4095
Unmitigated	0.2587	2.1096	2.1742	9.0800e-003	0.6020	6.1500e-003	0.6082	0.1613	5.7600e-003	0.1671	0.0000	844.8466	844.8466	0.0625	0.0000	846.4095

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant with Drive Thru	1,078.06	1,078.06	1078.06	1,345,731	1,345,731
General Office Building	62.34	62.34	62.34	231,104	231,104
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,140.39	1,140.39	1,140.39	1,576,835	1,576,835

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
Fast Food Restaurant with Drive	18.50	10.10	7.90	2.20	78.80	19.00	29	21	50
General Office Building	18.50	10.10	7.90	33.00	48.00	19.00	77	19	4
Other Non-Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
Parking Lot	18.50	10.10	7.90	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
Fast Food Restaurant with Drive Thru	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
General Office Building	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
Other Non-Asphalt Surfaces	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
Parking Lot	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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	64.9460	64.9460	2.6800e-003	5.5000e-004	65.1783
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	64.9460	64.9460	2.6800e-003	5.5000e-004	65.1783
NaturalGas Mitigated	3.7800e-003	0.0343	0.0288	2.1000e-004		2.6100e-003	2.6100e-003		2.6100e-003	2.6100e-003	0.0000	37.3728	37.3728	7.2000e-004	6.9000e-004	37.5949
NaturalGas Unmitigated	3.7800e-003	0.0343	0.0288	2.1000e-004		2.6100e-003	2.6100e-003		2.6100e-003	2.6100e-003	0.0000	37.3728	37.3728	7.2000e-004	6.9000e-004	37.5949

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					
Fast Food Restaurant with Drive Thru	678131	3.6600e-003	0.0332	0.0279	2.0000e-004		2.5300e-003	2.5300e-003		2.5300e-003	2.5300e-003	0.0000	36.1877	36.1877	6.9000e-004	6.6000e-004	36.4027
General Office Building	22208	1.2000e-004	1.0900e-003	9.1000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	1.1851	1.1851	2.0000e-005	2.0000e-005	1.1922
Other Non-Asphalt Surfaces	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
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		**3.7800e-003**	**0.0343**	**0.0288**	**2.1000e-004**		**2.6100e-003**	**2.6100e-003**		**2.6100e-003**	**2.6100e-003**	**0.0000**	**37.3728**	**37.3728**	**7.1000e-004**	**6.8000e-004**	**37.5949**

5.2 Energy by Land Use - NaturalGas

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					
Fast Food Restaurant with Drive Thru	678131	3.6600e-003	0.0332	0.0279	2.0000e-004		2.5300e-003	2.5300e-003		2.5300e-003	2.5300e-003	0.0000	36.1877	36.1877	6.9000e-004	6.6000e-004	36.4027
General Office Building	22208	1.2000e-004	1.0900e-003	9.1000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	1.1851	1.1851	2.0000e-005	2.0000e-005	1.1922
Other Non-Asphalt Surfaces	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
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		**3.7800e-003**	**0.0343**	**0.0288**	**2.1000e-004**		**2.6100e-003**	**2.6100e-003**		**2.6100e-003**	**2.6100e-003**	**0.0000**	**37.3728**	**37.3728**	**7.1000e-004**	**6.8000e-004**	**37.5949**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant with Drive Thru	117750	37.5178	1.5500e-003	3.2000e-004	37.6520
General Office Building	60928	19.4130	8.0000e-004	1.7000e-004	19.4824
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	25155.9	8.0152	3.3000e-004	7.0000e-005	8.0439
Total		**64.9460**	**2.6800e-003**	**5.6000e-004**	**65.1783**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant with Drive Thru	117750	37.5178	1.5500e-003	3.2000e-004	37.6520
General Office Building	60928	19.4130	8.0000e-004	1.7000e-004	19.4824
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	25155.9	8.0152	3.3000e-004	7.0000e-005	8.0439
Total		**64.9460**	**2.6800e-003**	**5.6000e-004**	**65.1783**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.0429	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.9000e-004
Unmitigated	0.0429	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.9000e-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	5.3000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0376					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	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.9000e-004
Total	**0.0429**	**0.0000**	**1.4000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.9000e-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	5.3000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0376					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	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.9000e-004
Total	**0.0429**	**0.0000**	**1.4000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.9000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	11.0800	0.0620	1.5400e-003	13.0907
Unmitigated	11.0800	0.0620	1.5400e-003	13.0907

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant with Drive Thru	0.752764 / 0.0480487	3.5320	0.0247	6.1000e-004	4.3295
General Office Building	1.1375 / 0.697175	7.5480	0.0374	9.4000e-004	8.7612
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**11.0800**	**0.0620**	**1.5500e-003**	**13.0907**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant with Drive Thru	0.752764 / 0.0480487	3.5320	0.0247	6.1000e-004	4.3295
General Office Building	1.1375 / 0.697175	7.5480	0.0374	9.4000e-004	8.7612
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**11.0800**	**0.0620**	**1.5500e-003**	**13.0907**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	7.0073	0.4141	0.0000	17.3602
Unmitigated	7.0073	0.4141	0.0000	17.3602

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Fast Food Restaurant with Drive Thru	28.57	5.7995	0.3427	0.0000	14.3679
General Office Building	5.95	1.2078	0.0714	0.0000	2.9923
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**7.0073**	**0.4141**	**0.0000**	**17.3602**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Fast Food Restaurant with Drive Thru	28.57	5.7995	0.3427	0.0000	14.3679
General Office Building	5.95	1.2078	0.0714	0.0000	2.9923
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**7.0073**	**0.4141**	**0.0000**	**17.3602**

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

Highland Springs Office Commercial Project

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	6.40	1000sqft	0.25	6,400.00	0
Other Non-Asphalt Surfaces	0.30	Acre	0.30	13,068.00	0
Parking Lot	1.65	Acre	1.65	71,874.00	0
Fast Food Restaurant with Drive Thru	2.48	1000sqft	0.10	2,480.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per site plan

Construction Phase -

Vehicle Trips - Per TIA

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	0.15	0.25
tblLandUse	LotAcreage	0.06	0.10
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	722.03	434.70
tblVehicleTrips	ST_TR	2.46	9.74
tblVehicleTrips	SU_TR	542.72	434.70
tblVehicleTrips	SU_TR	1.05	9.74
tblVehicleTrips	WD_TR	496.12	434.70
tblVehicleTrips	WD_TR	11.03	9.74

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2021	2.3120	20.2489	16.7142	0.0349	6.7029	0.9166	7.6195	3.4074	0.8433	4.2507	0.0000	3,296.959 3	3,296.959 3	0.7701	0.0000	3,309.292 5
2022	10.8430	16.0879	16.3406	0.0347	0.6969	0.7080	1.4049	0.1873	0.6785	0.8658	0.0000	3,273.131 0	3,273.131 0	0.5464	0.0000	3,285.175 6
Maximum	**10.8430**	**20.2489**	**16.7142**	**0.0349**	**6.7029**	**0.9166**	**7.6195**	**3.4074**	**0.8433**	**4.2507**	**0.0000**	**3,296.959 3**	**3,296.959 3**	**0.7701**	**0.0000**	**3,309.292 5**

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	lb/day										lb/day					
2021	2.3120	20.2489	16.7142	0.0349	6.7029	0.9166	7.6195	3.4074	0.8433	4.2507	0.0000	3,296.959 3	3,296.959 3	0.7701	0.0000	3,309.292 5
2022	10.8430	16.0879	16.3406	0.0347	0.6969	0.7080	1.4049	0.1873	0.6785	0.8658	0.0000	3,273.131 0	3,273.131 0	0.5464	0.0000	3,285.175 6
Maximum	**10.8430**	**20.2489**	**16.7142**	**0.0349**	**6.7029**	**0.9166**	**7.6195**	**3.4074**	**0.8433**	**4.2507**	**0.0000**	**3,296.959 3**	**3,296.959 3**	**0.7701**	**0.0000**	**3,309.292 5**

	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**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Energy	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753
Mobile	1.7215	11.5662	12.7388	0.0528	3.3627	0.0335	3.3963	0.8997	0.0314	0.9311		5,411.7075	5,411.7075	0.3684		5,420.9165
Total	**1.9772**	**11.7543**	**12.8979**	**0.0540**	**3.3627**	**0.0478**	**3.4106**	**0.8997**	**0.0457**	**0.9454**		**5,637.4437**	**5,637.4437**	**0.3727**	**4.1400e-003**	**5,647.9942**

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	lb/day										lb/day					
Area	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Energy	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753
Mobile	1.7215	11.5662	12.7388	0.0528	3.3627	0.0335	3.3963	0.8997	0.0314	0.9311		5,411.7075	5,411.7075	0.3684		5,420.9165
Total	**1.9772**	**11.7543**	**12.8979**	**0.0540**	**3.3627**	**0.0478**	**3.4106**	**0.8997**	**0.0457**	**0.9454**		**5,637.4437**	**5,637.4437**	**0.3727**	**4.1400e-003**	**5,647.9942**

	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/28/2021	6/1/2021	5	3	
2	Grading	Grading	6/2/2021	6/9/2021	5	6	
3	Building Construction	Building Construction	6/10/2021	4/13/2022	5	220	
4	Paving	Paving	4/14/2022	4/27/2022	5	10	
5	Architectural Coating	Architectural Coating	4/28/2022	5/11/2022	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 1.95

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,320; Non-Residential Outdoor: 4,440; Striped Parking Area: 5,097 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
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
Site Preparation	3	8.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	39.00	15.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457		2,372.883 2	2,372.883 2	0.7674		2,392.069 2
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.5908**	**0.7019**	**2.2926**	**0.1718**	**0.6457**	**0.8175**		**2,372.883 2**	**2,372.883 2**	**0.7674**		**2,392.069 2**

3.2 Site Preparation - 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	lb/day										lb/day					
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
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
Worker	0.0472	0.0283	0.3880	1.1500e-003	0.1204	6.9000e-004	0.1211	0.0319	6.4000e-004	0.0326		114.1207	114.1207	2.6800e-003		114.1878
Total	**0.0472**	**0.0283**	**0.3880**	**1.1500e-003**	**0.1204**	**6.9000e-004**	**0.1211**	**0.0319**	**6.4000e-004**	**0.0326**		**114.1207**	**114.1207**	**2.6800e-003**		**114.1878**

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	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457	0.0000	2,372.883 2	2,372.883 2	0.7674		2,392.069 2
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.5908**	**0.7019**	**2.2926**	**0.1718**	**0.6457**	**0.8175**	**0.0000**	**2,372.883 2**	**2,372.883 2**	**0.7674**		**2,392.069 2**

3.2 Site Preparation - 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	lb/day										lb/day					
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
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
Worker	0.0472	0.0283	0.3880	1.1500e-003	0.1204	6.9000e-004	0.1211	0.0319	6.4000e-004	0.0326		114.1207	114.1207	2.6800e-003		114.1878
Total	**0.0472**	**0.0283**	**0.3880**	**1.1500e-003**	**0.1204**	**6.9000e-004**	**0.1211**	**0.0319**	**6.4000e-004**	**0.0326**		**114.1207**	**114.1207**	**2.6800e-003**		**114.1878**

3.3 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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425		1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5523**	**0.9158**	**7.4681**	**3.3675**	**0.8425**	**4.2100**		**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 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	lb/day										lb/day					
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
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
Worker	0.0590	0.0354	0.4850	1.4300e-003	0.1505	8.7000e-004	0.1514	0.0399	8.0000e-004	0.0407		142.6509	142.6509	3.3500e-003		142.7347
Total	**0.0590**	**0.0354**	**0.4850**	**1.4300e-003**	**0.1505**	**8.7000e-004**	**0.1514**	**0.0399**	**8.0000e-004**	**0.0407**		**142.6509**	**142.6509**	**3.3500e-003**		**142.7347**

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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425	0.0000	1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5523**	**0.9158**	**7.4681**	**3.3675**	**0.8425**	**4.2100**	**0.0000**	**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 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	lb/day										lb/day					
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
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
Worker	0.0590	0.0354	0.4850	1.4300e-003	0.1505	8.7000e-004	0.1514	0.0399	8.0000e-004	0.0407		142.6509	142.6509	3.3500e-003		142.7347
Total	**0.0590**	**0.0354**	**0.4850**	**1.4300e-003**	**0.1505**	**8.7000e-004**	**0.1514**	**0.0399**	**8.0000e-004**	**0.0407**		**142.6509**	**142.6509**	**3.3500e-003**		**142.7347**

3.4 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	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831		2,288.935 5	2,288.935 5	0.4503		2,300.193 5
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**		**2,288.935 5**	**2,288.935 5**	**0.4503**		**2,300.193 5**

3.4 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	lb/day										lb/day					
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
Vendor	0.0370	1.4454	0.2598	4.2800e-003	0.1099	2.9800e-003	0.1129	0.0316	2.8500e-003	0.0345		451.6853	451.6853	0.0299		452.4335
Worker	0.2300	0.1382	1.8914	5.5800e-003	0.5870	3.3800e-003	0.5904	0.1557	3.1100e-003	0.1588		556.3384	556.3384	0.0131		556.6655
Total	**0.2670**	**1.5835**	**2.1512**	**9.8600e-003**	**0.6969**	**6.3600e-003**	**0.7033**	**0.1873**	**5.9600e-003**	**0.1933**		**1,008.0237**	**1,008.0237**	**0.0430**		**1,009.0989**

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	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831	0.0000	2,288.9355	2,288.9355	0.4503		2,300.1935
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**	**0.0000**	**2,288.9355**	**2,288.9355**	**0.4503**		**2,300.1935**

3.4 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	lb/day										lb/day					
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
Vendor	0.0370	1.4454	0.2598	4.2800e-003	0.1099	2.9800e-003	0.1129	0.0316	2.8500e-003	0.0345		451.6853	451.6853	0.0299		452.4335
Worker	0.2300	0.1382	1.8914	5.5800e-003	0.5870	3.3800e-003	0.5904	0.1557	3.1100e-003	0.1588		556.3384	556.3384	0.0131		556.6655
Total	**0.2670**	**1.5835**	**2.1512**	**9.8600e-003**	**0.6969**	**6.3600e-003**	**0.7033**	**0.1873**	**5.9600e-003**	**0.1933**		**1,008.0237**	**1,008.0237**	**0.0430**		**1,009.0989**

3.4 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	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731		2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**		**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.4 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	lb/day										lb/day					
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
Vendor	0.0345	1.3595	0.2418	4.2500e-003	0.1099	2.5100e-003	0.1124	0.0316	2.4000e-003	0.0340		447.8476	447.8476	0.0284		448.5567
Worker	0.2154	0.1244	1.7455	5.3800e-003	0.5870	3.2900e-003	0.5903	0.1557	3.0300e-003	0.1587		536.0021	536.0021	0.0118		536.2960
Total	**0.2499**	**1.4839**	**1.9873**	**9.6300e-003**	**0.6969**	**5.8000e-003**	**0.7027**	**0.1873**	**5.4300e-003**	**0.1927**		**983.8497**	**983.8497**	**0.0401**		**984.8527**

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	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731	0.0000	2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**	**0.0000**	**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.4 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	lb/day										lb/day					
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
Vendor	0.0345	1.3595	0.2418	4.2500e-003	0.1099	2.5100e-003	0.1124	0.0316	2.4000e-003	0.0340		447.8476	447.8476	0.0284		448.5567
Worker	0.2154	0.1244	1.7455	5.3800e-003	0.5870	3.2900e-003	0.5903	0.1557	3.0300e-003	0.1587		536.0021	536.0021	0.0118		536.2960
Total	**0.2499**	**1.4839**	**1.9873**	**9.6300e-003**	**0.6969**	**5.8000e-003**	**0.7027**	**0.1873**	**5.4300e-003**	**0.1927**		**983.8497**	**983.8497**	**0.0401**		**984.8527**

3.5 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	lb/day										lb/day					
Off-Road	0.9412	9.3322	11.6970	0.0179		0.4879	0.4879		0.4500	0.4500		1,709.6892	1,709.6892	0.5419		1,723.2356
Paving	0.4323					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3735**	**9.3322**	**11.6970**	**0.0179**		**0.4879**	**0.4879**		**0.4500**	**0.4500**		**1,709.6892**	**1,709.6892**	**0.5419**		**1,723.2356**

3.5 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	lb/day										lb/day					
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
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
Worker	0.0829	0.0478	0.6714	2.0700e-003	0.2258	1.2600e-003	0.2271	0.0599	1.1600e-003	0.0610		206.1547	206.1547	4.5200e-003		206.2677
Total	**0.0829**	**0.0478**	**0.6714**	**2.0700e-003**	**0.2258**	**1.2600e-003**	**0.2271**	**0.0599**	**1.1600e-003**	**0.0610**		**206.1547**	**206.1547**	**4.5200e-003**		**206.2677**

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	lb/day										lb/day					
Off-Road	0.9412	9.3322	11.6970	0.0179		0.4879	0.4879		0.4500	0.4500	0.0000	1,709.6892	1,709.6892	0.5419		1,723.2356
Paving	0.4323					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3735**	**9.3322**	**11.6970**	**0.0179**		**0.4879**	**0.4879**		**0.4500**	**0.4500**	**0.0000**	**1,709.6892**	**1,709.6892**	**0.5419**		**1,723.2356**

3.5 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	lb/day										lb/day					
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
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
Worker	0.0829	0.0478	0.6714	2.0700e-003	0.2258	1.2600e-003	0.2271	0.0599	1.1600e-003	0.0610		206.1547	206.1547	4.5200e-003		206.2677
Total	**0.0829**	**0.0478**	**0.6714**	**2.0700e-003**	**0.2258**	**1.2600e-003**	**0.2271**	**0.0599**	**1.1600e-003**	**0.0610**		**206.1547**	**206.1547**	**4.5200e-003**		**206.2677**

3.6 Architectural Coating - 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	lb/day										lb/day					
Archit. Coating	10.5942					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**10.7988**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 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	lb/day										lb/day					
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
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
Worker	0.0442	0.0255	0.3581	1.1000e-003	0.1204	6.7000e-004	0.1211	0.0319	6.2000e-004	0.0326		109.9492	109.9492	2.4100e-003		110.0094
Total	**0.0442**	**0.0255**	**0.3581**	**1.1000e-003**	**0.1204**	**6.7000e-004**	**0.1211**	**0.0319**	**6.2000e-004**	**0.0326**		**109.9492**	**109.9492**	**2.4100e-003**		**110.0094**

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	lb/day										lb/day					
Archit. Coating	10.5942					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**10.7988**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 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	lb/day										lb/day					
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
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
Worker	0.0442	0.0255	0.3581	1.1000e-003	0.1204	6.7000e-004	0.1211	0.0319	6.2000e-004	0.0326		109.9492	109.9492	2.4100e-003		110.0094
Total	**0.0442**	**0.0255**	**0.3581**	**1.1000e-003**	**0.1204**	**6.7000e-004**	**0.1211**	**0.0319**	**6.2000e-004**	**0.0326**		**109.9492**	**109.9492**	**2.4100e-003**		**110.0094**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	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
	lb/day										lb/day					
Mitigated	1.7215	11.5662	12.7388	0.0528	3.3627	0.0335	3.3963	0.8997	0.0314	0.9311		5,411.7075	5,411.7075	0.3684		5,420.9165
Unmitigated	1.7215	11.5662	12.7388	0.0528	3.3627	0.0335	3.3963	0.8997	0.0314	0.9311		5,411.7075	5,411.7075	0.3684		5,420.9165

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant with Drive Thru	1,078.06	1,078.06	1078.06	1,345,731	1,345,731
General Office Building	62.34	62.34	62.34	231,104	231,104
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,140.39	1,140.39	1,140.39	1,576,835	1,576,835

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
Fast Food Restaurant with Drive	18.50	10.10	7.90	2.20	78.80	19.00	29	21	50
General Office Building	18.50	10.10	7.90	33.00	48.00	19.00	77	19	4
Other Non-Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
Parking Lot	18.50	10.10	7.90	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
Fast Food Restaurant with Drive Thru	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
General Office Building	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
Other Non-Asphalt Surfaces	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
Parking Lot	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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	lb/day										lb/day					
NaturalGas Mitigated	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753
NaturalGas Unmitigated	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753

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	lb/day										lb/day					
Fast Food Restaurant with Drive Thru	1857.89	0.0200	0.1822	0.1530	1.0900e-003		0.0138	0.0138		0.0138	0.0138		218.5757	218.5757	4.1900e-003	4.0100e-003	219.8746
General Office Building	60.8438	6.6000e-004	5.9700e-003	5.0100e-003	4.0000e-005		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		7.1581	7.1581	1.4000e-004	1.3000e-004	7.2006
Other Non-Asphalt Surfaces	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
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
Total		**0.0207**	**0.1881**	**0.1580**	**1.1300e-003**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**225.7338**	**225.7338**	**4.3300e-003**	**4.1400e-003**	**227.0753**

5.2 Energy by Land Use - NaturalGas

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	lb/day										lb/day					
Fast Food Restaurant with Drive Thru	1.85789	0.0200	0.1822	0.1530	1.0900e-003		0.0138	0.0138		0.0138	0.0138		218.5757	218.5757	4.1900e-003	4.0100e-003	219.8746
General Office Building	0.0608438	6.6000e-004	5.9700e-003	5.0100e-003	4.0000e-005		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		7.1581	7.1581	1.4000e-004	1.3000e-004	7.2006
Other Non-Asphalt Surfaces	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
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
Total		**0.0207**	**0.1881**	**0.1580**	**1.1300e-003**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**225.7338**	**225.7338**	**4.3300e-003**	**4.1400e-003**	**227.0753**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	lb/day										lb/day					
Mitigated	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Unmitigated	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-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	lb/day										lb/day					
Architectural Coating	0.0290					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2059					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-004	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Total	**0.2350**	**1.0000e-005**	**1.1100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.3700e-003**	**2.3700e-003**	**1.0000e-005**		**2.5300e-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	lb/day										lb/day					
Architectural Coating	0.0290					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2059					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-004	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Total	**0.2350**	**1.0000e-005**	**1.1100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.3700e-003**	**2.3700e-003**	**1.0000e-005**		**2.5300e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

Highland Springs Office Commercial Project

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	6.40	1000sqft	0.25	6,400.00	0
Other Non-Asphalt Surfaces	0.30	Acre	0.30	13,068.00	0
Parking Lot	1.65	Acre	1.65	71,874.00	0
Fast Food Restaurant with Drive Thru	2.48	1000sqft	0.10	2,480.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per site plan

Construction Phase -

Vehicle Trips - Per TIA

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	0.15	0.25
tblLandUse	LotAcreage	0.06	0.10
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	722.03	434.70
tblVehicleTrips	ST_TR	2.46	9.74
tblVehicleTrips	SU_TR	542.72	434.70
tblVehicleTrips	SU_TR	1.05	9.74
tblVehicleTrips	WD_TR	496.12	434.70
tblVehicleTrips	WD_TR	11.03	9.74

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2021	2.3149	20.2502	16.3781	0.0342	6.7029	0.9166	7.6195	3.4074	0.8433	4.2507	0.0000	3,224.0916	3,224.0916	0.7698	0.0000	3,236.4640
2022	10.8432	16.0816	16.0299	0.0339	0.6969	0.7081	1.4050	0.1873	0.6786	0.8659	0.0000	3,202.4318	3,202.4318	0.5458	0.0000	3,214.5169
Maximum	**10.8432**	**20.2502**	**16.3781**	**0.0342**	**6.7029**	**0.9166**	**7.6195**	**3.4074**	**0.8433**	**4.2507**	**0.0000**	**3,224.0916**	**3,224.0916**	**0.7698**	**0.0000**	**3,236.4640**

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	lb/day										lb/day					
2021	2.3149	20.2502	16.3781	0.0342	6.7029	0.9166	7.6195	3.4074	0.8433	4.2507	0.0000	3,224.0916	3,224.0916	0.7698	0.0000	3,236.4640
2022	10.8432	16.0816	16.0299	0.0339	0.6969	0.7081	1.4050	0.1873	0.6786	0.8659	0.0000	3,202.4318	3,202.4318	0.5458	0.0000	3,214.5169
Maximum	**10.8432**	**20.2502**	**16.3781**	**0.0342**	**6.7029**	**0.9166**	**7.6195**	**3.4074**	**0.8433**	**4.2507**	**0.0000**	**3,224.0916**	**3,224.0916**	**0.7698**	**0.0000**	**3,236.4640**

	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**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Energy	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753
Mobile	1.4246	11.3717	11.8483	0.0485	3.3627	0.0343	3.3970	0.8997	0.0321	0.9318		4,966.4417	4,966.4417	0.3969		4,976.3633
Total	**1.6803**	**11.5598**	**12.0074**	**0.0496**	**3.3627**	**0.0486**	**3.4113**	**0.8997**	**0.0464**	**0.9461**		**5,192.1779**	**5,192.1779**	**0.4012**	**4.1400e-003**	**5,203.4411**

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	lb/day										lb/day					
Area	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Energy	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753
Mobile	1.4246	11.3717	11.8483	0.0485	3.3627	0.0343	3.3970	0.8997	0.0321	0.9318		4,966.4417	4,966.4417	0.3969		4,976.3633
Total	**1.6803**	**11.5598**	**12.0074**	**0.0496**	**3.3627**	**0.0486**	**3.4113**	**0.8997**	**0.0464**	**0.9461**		**5,192.1779**	**5,192.1779**	**0.4012**	**4.1400e-003**	**5,203.4411**

	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/28/2021	6/1/2021	5	3	
2	Grading	Grading	6/2/2021	6/9/2021	5	6	
3	Building Construction	Building Construction	6/10/2021	4/13/2022	5	220	
4	Paving	Paving	4/14/2022	4/27/2022	5	10	
5	Architectural Coating	Architectural Coating	4/28/2022	5/11/2022	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 1.95

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,320; Non-Residential Outdoor: 4,440; Striped Parking Area: 5,097 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
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
Site Preparation	3	8.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	39.00	15.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	19.80	7.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457		2,372.883 2	2,372.883 2	0.7674		2,392.069 2
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.5908**	**0.7019**	**2.2926**	**0.1718**	**0.6457**	**0.8175**		**2,372.883 2**	**2,372.883 2**	**0.7674**		**2,392.069 2**

3.2 Site Preparation - 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	lb/day										lb/day					
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
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
Worker	0.0473	0.0293	0.3098	1.0300e-003	0.1204	6.9000e-004	0.1211	0.0319	6.4000e-004	0.0326		102.3359	102.3359	2.3200e-003		102.3938
Total	**0.0473**	**0.0293**	**0.3098**	**1.0300e-003**	**0.1204**	**6.9000e-004**	**0.1211**	**0.0319**	**6.4000e-004**	**0.0326**		**102.3359**	**102.3359**	**2.3200e-003**		**102.3938**

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	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.5463	18.2862	10.7496	0.0245		0.7019	0.7019		0.6457	0.6457	0.0000	2,372.8832	2,372.8832	0.7674		2,392.0692
Total	**1.5463**	**18.2862**	**10.7496**	**0.0245**	**1.5908**	**0.7019**	**2.2926**	**0.1718**	**0.6457**	**0.8175**	**0.0000**	**2,372.8832**	**2,372.8832**	**0.7674**		**2,392.0692**

3.2 Site Preparation - 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	lb/day										lb/day					
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
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
Worker	0.0473	0.0293	0.3098	1.0300e-003	0.1204	6.9000e-004	0.1211	0.0319	6.4000e-004	0.0326		102.3359	102.3359	2.3200e-003		102.3938
Total	**0.0473**	**0.0293**	**0.3098**	**1.0300e-003**	**0.1204**	**6.9000e-004**	**0.1211**	**0.0319**	**6.4000e-004**	**0.0326**		**102.3359**	**102.3359**	**2.3200e-003**		**102.3938**

3.3 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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425		1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5523**	**0.9158**	**7.4681**	**3.3675**	**0.8425**	**4.2100**		**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 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	lb/day										lb/day					
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
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
Worker	0.0592	0.0366	0.3872	1.2800e-003	0.1505	8.7000e-004	0.1514	0.0399	8.0000e-004	0.0407		127.9199	127.9199	2.9000e-003		127.9923
Total	**0.0592**	**0.0366**	**0.3872**	**1.2800e-003**	**0.1505**	**8.7000e-004**	**0.1514**	**0.0399**	**8.0000e-004**	**0.0407**		**127.9199**	**127.9199**	**2.9000e-003**		**127.9923**

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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.8271	20.2135	9.7604	0.0206		0.9158	0.9158		0.8425	0.8425	0.0000	1,995.6114	1,995.6114	0.6454		2,011.7470
Total	**1.8271**	**20.2135**	**9.7604**	**0.0206**	**6.5523**	**0.9158**	**7.4681**	**3.3675**	**0.8425**	**4.2100**	**0.0000**	**1,995.6114**	**1,995.6114**	**0.6454**		**2,011.7470**

3.3 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	lb/day										lb/day					
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
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
Worker	0.0592	0.0366	0.3872	1.2800e-003	0.1505	8.7000e-004	0.1514	0.0399	8.0000e-004	0.0407		127.9199	127.9199	2.9000e-003		127.9923
Total	**0.0592**	**0.0366**	**0.3872**	**1.2800e-003**	**0.1505**	**8.7000e-004**	**0.1514**	**0.0399**	**8.0000e-004**	**0.0407**		**127.9199**	**127.9199**	**2.9000e-003**		**127.9923**

3.4 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	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831		2,288.935 5	2,288.935 5	0.4503		2,300.193 5
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**		**2,288.935 5**	**2,288.935 5**	**0.4503**		**2,300.193 5**

3.4 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	lb/day										lb/day					
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
Vendor	0.0392	1.4365	0.3050	4.1400e-003	0.1099	3.0600e-003	0.1130	0.0316	2.9300e-003	0.0346		436.2686	436.2686	0.0333		437.1005
Worker	0.2307	0.1429	1.5101	5.0000e-003	0.5870	3.3800e-003	0.5904	0.1557	3.1100e-003	0.1588		498.8874	498.8874	0.0113		499.1700
Total	**0.2699**	**1.5794**	**1.8152**	**9.1400e-003**	**0.6969**	**6.4400e-003**	**0.7034**	**0.1873**	**6.0400e-003**	**0.1934**		**935.1560**	**935.1560**	**0.0446**		**936.2704**

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	lb/day										lb/day					
Off-Road	2.0451	16.0275	14.5629	0.0250		0.8173	0.8173		0.7831	0.7831	0.0000	2,288.935 5	2,288.935 5	0.4503		2,300.193 5
Total	**2.0451**	**16.0275**	**14.5629**	**0.0250**		**0.8173**	**0.8173**		**0.7831**	**0.7831**	**0.0000**	**2,288.935 5**	**2,288.935 5**	**0.4503**		**2,300.193 5**

3.4 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	lb/day										lb/day					
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
Vendor	0.0392	1.4365	0.3050	4.1400e-003	0.1099	3.0600e-003	0.1130	0.0316	2.9300e-003	0.0346		436.2686	436.2686	0.0333		437.1005
Worker	0.2307	0.1429	1.5101	5.0000e-003	0.5870	3.3800e-003	0.5904	0.1557	3.1100e-003	0.1588		498.8874	498.8874	0.0113		499.1700
Total	**0.2699**	**1.5794**	**1.8152**	**9.1400e-003**	**0.6969**	**6.4400e-003**	**0.7034**	**0.1873**	**6.0400e-003**	**0.1934**		**935.1560**	**935.1560**	**0.0446**		**936.2704**

3.4 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	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731		2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**		**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.4 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	lb/day										lb/day					
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
Vendor	0.0366	1.3490	0.2848	4.1000e-003	0.1099	2.5800e-003	0.1125	0.0316	2.4700e-003	0.0341		432.4755	432.4755	0.0316		433.2647
Worker	0.2167	0.1286	1.3918	4.8200e-003	0.5870	3.2900e-003	0.5903	0.1557	3.0300e-003	0.1587		480.6750	480.6750	0.0102		480.9292
Total	**0.2533**	**1.4776**	**1.6766**	**8.9200e-003**	**0.6969**	**5.8700e-003**	**0.7028**	**0.1873**	**5.5000e-003**	**0.1928**		**913.1505**	**913.1505**	**0.0417**		**914.1939**

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	lb/day										lb/day					
Off-Road	1.8555	14.6040	14.3533	0.0250		0.7022	0.7022		0.6731	0.6731	0.0000	2,289.2813	2,289.2813	0.4417		2,300.3230
Total	**1.8555**	**14.6040**	**14.3533**	**0.0250**		**0.7022**	**0.7022**		**0.6731**	**0.6731**	**0.0000**	**2,289.2813**	**2,289.2813**	**0.4417**		**2,300.3230**

3.4 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	lb/day										lb/day					
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
Vendor	0.0366	1.3490	0.2848	4.1000e-003	0.1099	2.5800e-003	0.1125	0.0316	2.4700e-003	0.0341		432.4755	432.4755	0.0316		433.2647
Worker	0.2167	0.1286	1.3918	4.8200e-003	0.5870	3.2900e-003	0.5903	0.1557	3.0300e-003	0.1587		480.6750	480.6750	0.0102		480.9292
Total	**0.2533**	**1.4776**	**1.6766**	**8.9200e-003**	**0.6969**	**5.8700e-003**	**0.7028**	**0.1873**	**5.5000e-003**	**0.1928**		**913.1505**	**913.1505**	**0.0417**		**914.1939**

3.5 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	lb/day										lb/day					
Off-Road	0.9412	9.3322	11.6970	0.0179		0.4879	0.4879		0.4500	0.4500		1,709.6892	1,709.6892	0.5419		1,723.2356
Paving	0.4323					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3735**	**9.3322**	**11.6970**	**0.0179**		**0.4879**	**0.4879**		**0.4500**	**0.4500**		**1,709.6892**	**1,709.6892**	**0.5419**		**1,723.2356**

3.5 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	lb/day										lb/day					
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
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
Worker	0.0834	0.0495	0.5353	1.8500e-003	0.2258	1.2600e-003	0.2271	0.0599	1.1600e-003	0.0610		184.8750	184.8750	3.9100e-003		184.9728
Total	**0.0834**	**0.0495**	**0.5353**	**1.8500e-003**	**0.2258**	**1.2600e-003**	**0.2271**	**0.0599**	**1.1600e-003**	**0.0610**		**184.8750**	**184.8750**	**3.9100e-003**		**184.9728**

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	lb/day										lb/day					
Off-Road	0.9412	9.3322	11.6970	0.0179		0.4879	0.4879		0.4500	0.4500	0.0000	1,709.6892	1,709.6892	0.5419		1,723.2356
Paving	0.4323					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3735**	**9.3322**	**11.6970**	**0.0179**		**0.4879**	**0.4879**		**0.4500**	**0.4500**	**0.0000**	**1,709.6892**	**1,709.6892**	**0.5419**		**1,723.2356**

3.5 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	lb/day										lb/day					
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
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
Worker	0.0834	0.0495	0.5353	1.8500e-003	0.2258	1.2600e-003	0.2271	0.0599	1.1600e-003	0.0610		184.8750	184.8750	3.9100e-003		184.9728
Total	**0.0834**	**0.0495**	**0.5353**	**1.8500e-003**	**0.2258**	**1.2600e-003**	**0.2271**	**0.0599**	**1.1600e-003**	**0.0610**		**184.8750**	**184.8750**	**3.9100e-003**		**184.9728**

3.6 Architectural Coating - 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	lb/day										lb/day					
Archit. Coating	10.5942					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**10.7988**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 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	lb/day										lb/day					
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
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
Worker	0.0445	0.0264	0.2855	9.9000e-004	0.1204	6.7000e-004	0.1211	0.0319	6.2000e-004	0.0326		98.6000	98.6000	2.0900e-003		98.6521
Total	**0.0445**	**0.0264**	**0.2855**	**9.9000e-004**	**0.1204**	**6.7000e-004**	**0.1211**	**0.0319**	**6.2000e-004**	**0.0326**		**98.6000**	**98.6000**	**2.0900e-003**		**98.6521**

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	lb/day										lb/day					
Archit. Coating	10.5942					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**10.7988**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.6 Architectural Coating - 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	lb/day										lb/day					
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
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
Worker	0.0445	0.0264	0.2855	9.9000e-004	0.1204	6.7000e-004	0.1211	0.0319	6.2000e-004	0.0326		98.6000	98.6000	2.0900e-003		98.6521
Total	**0.0445**	**0.0264**	**0.2855**	**9.9000e-004**	**0.1204**	**6.7000e-004**	**0.1211**	**0.0319**	**6.2000e-004**	**0.0326**		**98.6000**	**98.6000**	**2.0900e-003**		**98.6521**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	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
	lb/day										lb/day					
Mitigated	1.4246	11.3717	11.8483	0.0485	3.3627	0.0343	3.3970	0.8997	0.0321	0.9318		4,966.4417	4,966.4417	0.3969		4,976.3633
Unmitigated	1.4246	11.3717	11.8483	0.0485	3.3627	0.0343	3.3970	0.8997	0.0321	0.9318		4,966.4417	4,966.4417	0.3969		4,976.3633

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant with Drive Thru	1,078.06	1,078.06	1078.06	1,345,731	1,345,731
General Office Building	62.34	62.34	62.34	231,104	231,104
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,140.39	1,140.39	1,140.39	1,576,835	1,576,835

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
Fast Food Restaurant with Drive	18.50	10.10	7.90	2.20	78.80	19.00	29	21	50
General Office Building	18.50	10.10	7.90	33.00	48.00	19.00	77	19	4
Other Non-Asphalt Surfaces	18.50	10.10	7.90	0.00	0.00	0.00	0	0	0
Parking Lot	18.50	10.10	7.90	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
Fast Food Restaurant with Drive Thru	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
General Office Building	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
Other Non-Asphalt Surfaces	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965
Parking Lot	0.545527	0.036856	0.186032	0.115338	0.015222	0.004970	0.017525	0.069528	0.001397	0.001160	0.004547	0.000932	0.000965

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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	lb/day										lb/day					
NaturalGas Mitigated	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753
NaturalGas Unmitigated	0.0207	0.1881	0.1580	1.1300e-003		0.0143	0.0143		0.0143	0.0143		225.7338	225.7338	4.3300e-003	4.1400e-003	227.0753

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	lb/day										lb/day					
Fast Food Restaurant with Drive Thru	1857.89	0.0200	0.1822	0.1530	1.0900e-003		0.0138	0.0138		0.0138	0.0138		218.5757	218.5757	4.1900e-003	4.0100e-003	219.8746
General Office Building	60.8438	6.6000e-004	5.9700e-003	5.0100e-003	4.0000e-005		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		7.1581	7.1581	1.4000e-004	1.3000e-004	7.2006
Other Non-Asphalt Surfaces	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
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
Total		**0.0207**	**0.1881**	**0.1580**	**1.1300e-003**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**225.7338**	**225.7338**	**4.3300e-003**	**4.1400e-003**	**227.0753**

5.2 Energy by Land Use - NaturalGas

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	lb/day										lb/day					
Fast Food Restaurant with Drive Thru	1.85789	0.0200	0.1822	0.1530	1.0900e-003		0.0138	0.0138		0.0138	0.0138		218.5757	218.5757	4.1900e-003	4.0100e-003	219.8746
General Office Building	0.0608438	6.6000e-004	5.9700e-003	5.0100e-003	4.0000e-005		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		7.1581	7.1581	1.4000e-004	1.3000e-004	7.2006
Other Non-Asphalt Surfaces	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
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
Total		**0.0207**	**0.1881**	**0.1580**	**1.1300e-003**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**225.7338**	**225.7338**	**4.3300e-003**	**4.1400e-003**	**227.0753**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	lb/day										lb/day					
Mitigated	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Unmitigated	0.2350	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-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	lb/day										lb/day					
Architectural Coating	0.0290					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2059					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-004	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Total	**0.2350**	**1.0000e-005**	**1.1100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.3700e-003**	**2.3700e-003**	**1.0000e-005**		**2.5300e-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	lb/day										lb/day					
Architectural Coating	0.0290					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2059					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-004	1.0000e-005	1.1100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.3700e-003	2.3700e-003	1.0000e-005		2.5300e-003
Total	**0.2350**	**1.0000e-005**	**1.1100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.3700e-003**	**2.3700e-003**	**1.0000e-005**		**2.5300e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

APPENDIX B
BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND MULTIPLE SPECIES HABITAT CONSERVATION PLAN CONSISTENCY ANALYSIS
SEPTEMBER 2020

BIOLOGICAL RESOURCES ASSESSMENT,
JURISDICTIONAL DELINEATION, AND
MSHCP CONSISTENCY ANALYSIS FOR THE
HIGH SANDS CAR WASH REMODEL AND RETAIL DEVELOPMENT PROJECT
BEAUMONT, RIVERSIDE COUNTY, CALIFORNIA

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Contents

SECTION 1.0 - INTRODUCTION

Jennings Environmental, LLC (Jennings) was retained by Lilburn Corporation (Lilburn) to conduct a literature review and reconnaissance-level survey for the proposed High Sands Car Wash Remodel and Retail Development Project (Project). The survey identified vegetation communities, the potential for the occurrence of special status species, or habitats that could support special status wildlife species, and recorded all plants and animals observed or detected within the Project boundary. This biological resources assessment is designed to address potential effects of the proposed project to designated critical habitats and/or any species currently listed or formally proposed for listing as endangered or threatened under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA) or species designated as sensitive by the California Department of Fish and Wildlife (CDFW) or the California Native Plant Society (CNPS).

Information contained in this document is in accordance with accepted scientific and technical standards that are consistent with the requirements of the United States Fish and Wildlife Service (USFWS) and (CDFW). Additionally, the site was surveyed for any drainage features that would meet the definition of the Waters of the US (WOUS), Waters of the State (WOS), or CDFW jurisdiction. Additionally, the project is located within the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP). As such, this report also contains the results of the consistency analysis performed for the project.

1.1 PROJECT LOCATION

The project is generally located in the northeast portion of Section 11, Township 3 South, Range 1 West, and is depicted on the *Beaumont* U.S. Geological Survey's (USGS) 7.5-minute topographic map. More specifically the project is located within APNs 419-150-026, 419-150-027, and 419-150-046, within the City of Beaumont, Riverside County, California. The Project site is located 0.05 miles north of the intersection of E 6th Street and Highland Springs Ave. The site is surrounded by commercial development to the north, south, and east which includes, two health care facilities, the San Gorgonio Memorial Hospital and a Walgreens. To the west is residential developments and a vacant lot. (Figures 1 and 2 in Appendix A).

1.2 PROJECT DESCRIPTION

The proposed Project is for the remodeling of an existing car wash and developing a new drive-thru restaurant at 655, 675, and 695 Highland Springs Avenue in the City of Beaumont. The site currently consists of three parcels, and City staff has indicated that a lot line adjustment may be required to combine the three parcels into one Project Site. A conditional Use Permit will also be required for the fast-food drive-thru restaurant.

2.0 – METHODOLOGY

2.1 LITERATURE REVIEW

Prior to performing the field survey, existing documentation relevant to the Project site was reviewed. The most recent records of the California Natural Diversity Database (CNDDB) managed by CDFW (CDFW 2020), the USFWS Critical Habitat Mapper (USFWS 2020), and the California Native Plant Society's

Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California (CNPS 2020) were reviewed for the following quadrangle containing and surrounding the Project site: *Beaumont*, USGS 7.5 minute quadrangle. These databases contain records of reported occurrences of federal- or state-listed endangered or threatened species, California Species of Concern (SSC), or otherwise special status species or habitats that may occur within or in the immediate vicinity of the Project site.

2.2 SOILS

Before conducting the surveys, soil maps for Riverside County were referenced online to determine the types of soil found within the Project site. Soils were determined in accordance with categories set forth by the United States Department of Agriculture (USDA) Soil Conservation Service and by referencing the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2020).

2.3 BIOLOGICAL RECONNAISSANCE-LEVEL SURVEY

Jennings biologist, Gene Jennings, conducted the general reconnaissance survey within the Project site to identify the potential for the occurrence of special status species, vegetation communities, or habitats that could support special status wildlife species. The surveys were conducted on foot, throughout the Project site between 0800 and 0900 hours on September 20, 2020. Weather conditions during the survey included temperatures ranging from 68 to 73 degrees Fahrenheit, with no cloud cover, no precipitation, 0 to 2 mile per hour winds. Photographs of the Project site were taken to document existing conditions (Appendix B).

2.4 JURISDICTIONAL FEATURES

A general assessment of jurisdictional waters regulated by the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and CDFW was conducted for the proposed Project area. Pursuant to Section 404 of the Clean Water Act, USACE regulates the discharge of dredged and/or fill material into waters of the United States. The State of California (State) regulates the discharge of material into waters of the State pursuant to Section 401 of the Clean Water Act and the California Porter- Cologne Water Quality Control Act (California Water Code, Division 7, §13000 et seq.). Pursuant to Division 2, Chapter 6, Sections 1600-1602 of the California Fish and Game Code, CDFW regulates all substantial diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife. The initial assessment was conducted by a desktop survey through the USGS National Hydrography Dataset for hydrological connectivity. Additional assessment findings are discussed in Sections 3.1.2 and 3.2.4. A discussion of the regulatory framework is provided in Appendix C.

2.5 WESTERN RIVERSIDE MULTIPLE SPECIES HABITAT CONSERVATION PLAN

The MSHCP is intended to balance the demands of the growth of western Riverside County with the need to preserve open space and protect species of plants and animals that are threatened with extinction. The MSHCP addresses incidental take of “covered” species. Of the 146 species addressed in the Western Riverside County MSHCP, 118 are adequately conserved simply by implementing the conservation program. Incidental take of these 118 species is permitted by the Western Riverside County MSHCP. The remaining 28 species are partially conserved. They would be adequately conserved when certain additional conservation requirements are implemented. The additional requirements are identified in the species-specific conservation objectives for those 28 species. The Riverside Conservation Authority (RCA) is the governing body that administers the MSHCP. Their database was researched prior to conducting the filed visit.

2.6 VEGETATION

All plant species observed within the Project site were recorded. Vegetation communities within the Project site were identified, qualitatively described, and mapped onto a high-resolution imagery aerial photograph. Plant communities were determined in accordance with the *Manual of California Vegetation*, *Second Edition* (Sawyer et al. 2009). Plant nomenclature follows that of *The Jepson Manual, Second Edition* (Baldwin et al. 2012). A comprehensive list of the plant species observed during the survey is provided in Appendix D.

2.7 WILDLIFE

All wildlife and wildlife signs observed and detected, including tracks, scat, carcasses, burrows, excavations, and vocalizations, were recorded. Additional survey time was spent in those habitats most likely to be utilized by wildlife (native vegetation, wildlife trails, etc.) or in habitats with the potential to support state- and/or federally listed or otherwise special status species. Notes were made on the general habitat types, species observed, and the conditions of the Project site. A comprehensive list of the wildlife species observed during the survey is provided in Appendix D.

SECTION 3.0 – RESULTS

3.1 LITERATURE REVIEW RESULTS

According to the CNDDB, CNPSEI, and other relevant literature and databases, 33 sensitive species including 5 listed species and 1 sensitive habitat, have been documented in the *Beaumont* quad. This list of sensitive species and habitats includes any State and/or federally listed threatened or endangered species, CDFW designated Species of Special Concern (SSC), and otherwise Special Animals. “Special Animals” is a general term that refers to all of the taxa the CNDDB is interested in tracking, regardless of their legal or protection status. This list is also referred to as the list of “species at risk” or “special status species.” The CDFW considers the taxa on this list to be those of greatest conservation need.

An analysis of the likelihood for the occurrence of all CNDDB sensitive species documented in the *Beaumont* quad is provided in Table 2, in Appendix D. This analysis takes into account species range as well as documentation within the vicinity of the project area and includes the habitat requirements for each species and the potential for their occurrence on the site, based on required habitat elements and range relative to the current site conditions. According to the databases, no USFWS designated critical habitat occurs within or adjacent to the project site.

3.1.1 SOILS

After review of USDA Soil Conservation Service and by referencing the USDA NRCS Web Soil Survey (USDA 2020), it was determined that the Project site is located within the Western Riverside Area, California area CA679. Based on the results of the database search none of the soils present on site are classified as hydric soils. The Project site contains one (1) soil type (Figure 3 in Appendix A):

Ramona sandy loam (RaB2). 2 to 5 percent slope. This soil is well-drained with a moderately high capacity to transmit water. This soil consists of alluvium derived from granite, typically ranges in elevation from 250 to 3,500 feet amsl, and is considered prime farmland if irrigated.

3.1.2 JURISDICTIONAL WATERS

Aerial imagery of the site was examined and compared with the surrounding USGS 7.5-minute topographic quadrangle maps to identify drainage features within the survey area as indicated from topographic changes, blue-line features, or visible drainage patterns. The U.S. Fish and Wildlife Service National Wetland Inventory and Environmental Protection Agency (EPA) Water Program "My Waters" data layers were also reviewed to determine whether any hydrologic features and wetland areas had been documented within the vicinity of the site. Similarly, the Soil maps from the U.S. Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2020) were reviewed to identify the soil series on-site and to check if they have been identified regionally as hydric soils. Upstream and downstream connectivity of waterways (if present) was reviewed in the field, on aerial imagery, and topographic maps to determine jurisdictional status. No obvious signs of jurisdictional features were observed during the literature review.

3.1.3 HYDROLOGY AND HYDROLOGIC CONNECTIVITY

Hydrologically, the project site is located within Gilman Hot Springs Hydrologic Sub-Area (HSA 802.21) which comprises a 193,598-acre drainage area within the larger Middle San Jacinto River Hydrologic Area (Hydrologic Unit Code [HUC10] 1807020202) (CalTrans, 2020) (Figure 4 in Appendix A). The Middle San Jacinto River watershed in Beaumont is bordered to the north by the San Timoteo Wash and the San Gorgonio River watersheds, to the west and south by the Lower San Jacinto River watershed, and to the east by the Upper San Jacinto River watershed (Figure 4 in Appendix A).

3.1.4 MSHCP

Prior to the filed visit the Riverside Conservation Authority's website and databases were searched. This includes the MSHCP plan itself and any relevant protocol survey requirements. The database also includes a mapping program that contains site-specific information related to criteria cell location, special survey areas for plants and animals, and vegetation mapping.

A summary of the MSHCP Conservation Goals and Policies as they relate to this Project is provided below in Table 1.

Table 1: MSHCP Conservation Goals for Project Area

Conservation Goals	Within /Adjacent	Not Within /Adjacent
Proposed Constrained Linkages: **None**		X
Core Areas: **None**		X
Linkages: **None**		X

Conservation Goals	Within /Adjacent	Not Within /Adjacent
Constrained Linkage:		X
Habitat Block:		X
Core: **None**		X
Criteria Cell**:**		X
Pre-existing conservation Area		X
Riparian/Riverine or Vernal Pool Habitat		X
Narrow Endemic Plant Survey Area		X
Urban/Wildlife Interface		X
Mammal Survey Area		X
Amphibian Survey Area		X
Burrowing Owl Survey Area		X

3.2 FIELD STUDY RESULTS

3.2.1 HABITAT

The habitat on-site consists of a mix of ruderal vegetation/bare ground with Mediterranean mustard (*Hirschfeldia incana*) being the dominant ruderal vegetation. The ruderal vegetation is classified as *Brassica nigra - Centaurea* (*solstitialis*, *melitensis*) Herbaceous Semi-Natural Alliance (Sawyer, 2015). The site shows signs of recent vegetation management in the form of mowing and historical disturbance in the form of vehicle use and pedestrian traffic. The southern portion of the Project area is a developed parcel with existing commercial businesses (e.g. car wash to be remodeled and auto service building) with paved parking lots. Table 1 in Appendix D contains a list of all plants found on-site. Surrounding land uses include undeveloped parcels, residential developments, and commercial developments.

3.2.2 WILDLIFE

Species observed or otherwise detected on or in the vicinity of the project site during the surveys included; common raven (*Corvus corax*) and house finch (*Haemorhous mexicanus*).

The project site is located within a developed area of Beaumont. Although the site is undeveloped, very little evidence of any wildlife existed on-site and only two bird species were observed during the site survey.

3.2.3 SPECIAL STATUS SPECIES

No State and/or federally listed threatened or endangered species or other sensitive species were observed on-site during surveys.

Designated Critical Habitat

The site is not located within or adjacent to any USFWS designated Critical Habitat. No further action is required.

Nesting Birds

The Project site and immediate surrounding area does contain habitat suitable for nesting birds. Nesting bird surveys should be conducted prior to any construction activities taking place during the nesting season to avoid potentially taking any birds or active nests. In general, impacts to all bird species (common and special status) can be avoided by conducting work outside of the nesting season (generally March 15th to September 15th), and conducting a worker awareness training. However, if all work cannot be conducted outside of the nesting season, a project-specific Nesting Bird Management Plan can be prepared to determine suitable buffers.

3.2.4 JURISDICTIONAL WATERS

Waters of the United States and Waters of the State

The USACE has the authority to permit the discharge of dredged or fill material in Waters of the U.S. under Section 404 CWA. While the Regional Water Quality Board has authority over the discharge of dredged or fill material in Waters of the State under Section 401 CWA as well as the Porter-Cologne Water Quality Control Act. The Project area was surveyed with 100 percent visual coverage and no drainage features were present on site. As such, the subject parcel does not contain any wetlands, waters of the U.S., or Waters of the State.

Fish and Game Code Section 1602 - State Lake and/or Streambed

The CDFW asserts jurisdiction over any drainage feature that contains a definable bed and bank or associated riparian vegetation. The Project area was surveyed with 100 percent visual coverage and no definable bed or bank features exist on the project site. As such, the subject parcel does not contain any areas under CDFW jurisdiction.

3.2.5 WETLANDS

NWI maps did not identify portions within the Project site as a Riverine/Riparian system. Additionally, none of the requirements for wetland designation (hydric vegetation, hydric soils, and/or wetland hydrology) were present on site. As such, there are no wetlands currently present on site.

3.3 MSHCP Consistency Analysis

The Project is located within The Pass Area Plan of the MSHCP. The target conservation acreage range for The Pass Area Plan is 22,510 – 27,895 acres; it is composed of approximately 13,970 acres of existing Public/Quasi-Public Lands and 8,540 – 13,925 acres of Additional Reserve Lands.

The MSHCP Conservation Area comprises a variety of existing and proposed Cores, Linkages, Constrained Linkages, and Noncontiguous Habitat Blocks (referred to herein generally as "Cores and Linkages"). The Cores and Linkages within the Pass Area Plan include:

- Contains the Proposed Constrained Linkage 22
- Contains the Proposed Constrained Linkage 23
- Contains a portion of Proposed Core 3
- Contains a portion of Proposed Linkage 6
- Contains Proposed Linkage 12
- Contains a portion of Existing Core I
- Contains a portion of Existing Core K
- Contains a portion of Existing Noncontiguous Habitat Block B

3.3.1 Public Quasi-Public Lands (PQP) and Covered Roads

Pursuant to Sections 3.2.1 PQP Lands are a Subset of MSHCP Conservation Area lands totaling approximately 347,000 acres of lands known to be in public/private ownership and expected to be managed for open space value and/or in a manner that contributes to the Conservation of Covered Species (including lands contained in existing reserves), as generally depicted in Figure 3-1 of the MSHCP, Volume I. Section 7.2.1 Existing Roads within Existing PQP Lands are existing roadways within existing Public/Quasi-Public Lands, including interstates, freeways, State highways, city and county maintained roadways, as well as local roads, which are not city, or county maintained that provide property access. This latter category of other maintained roadways are generally maintained by the adjacent property owners, either individually or collectively. Table 7-1 provides an estimate summarizing the extent of these various types of existing roadways which are permitted to remain within Public/Quasi-Public Lands.

The Project site is not located within or adjacent to any PQP Lands and will not impact a covered road.

- *No further discussion on this subject is made in this analysis*

3.3.2 Subunit Area/Cell Criteria

Pursuant to Section 3.3.12, Subunits are areas within an area plan that contain target conservation acreages along with a description of the planning species, biological issues, and considerations. The Project site is not located within a subunit area or cell criteria.

- *No further discussion on this subject is made in this analysis*

3.3.3 Narrow Endemic Plant Species

Pursuant to Section 6.1.3 of the MSHCP, focused surveys for narrow endemic plant species are required for properties within the mapped areas if the appropriate habitat is present. The survey area maps have been reviewed and assessed, and the proposed project is not located within a Narrow Endemic Plant Species Survey Area based on Figure 6-1 of the MSHCP.

- *No further discussion on this subject is made in this analysis*

3.3.4 Additional Survey Needs and Procedures

Based on Figures 6-2 (Criteria Area Species Survey Areas), 6-3 (Amphibian Species Survey Areas), 6-4 (BUOW Survey Areas), and 6-5 (Mammal Species Survey Areas) of the MSHCP and the MSHCP Mapping Program, the site is not located in an area where additional surveys are needed for certain species in conjunction with MSHCP implementation in order to achieve coverage for these species.

- *No further discussion on Criteria Area or Special Status Species is made in* this analysis

3.3.5 Riparian/Riverine Areas and Vernal Pools

The MSHCP describes the protection of Riparian/Riverine Areas and Vernal Pools within the MSHCP Plan Area as important to the conservation of certain amphibian, avian, fish, invertebrate and plant species. The MSHCP describes guidelines to ensure that the biological functions and values for species inside the MSHCP Conservation Area are maintained, as outlined in Volume 1, Section 6.1.2.

Riparian/ Riverine

Pursuant to Section 6.1.2 of the MSHCP, Riparian/Riverine areas are lands which contain habitat dominated by trees, shrubs, persistent emergent vegetation, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from nearby freshwater sources, or areas with freshwater flow during all or a portion of the year. Riverine habitat includes all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between the two bodies of standing water. Riverine habitat is bounded on the landward side by upland, by the channel bank (including natural and man-made levees), or by wetlands dominated by trees, shrubs, persistent emergents, mosses, or lichens. In braided streams, the system is bounded by the banks forming the outer limits of the depression within which the braiding occurs. Springs discharging into a channel are considered part of the riverine habitat. The term riparian is used to define the type of wildlife habitat found along the banks of a river, stream, lake, or other body of water. Riparian habitats are ecologically diverse and can be found in many types of environments including grasslands, wetlands, and forests.

The Project site does not contain any areas that meet the definition of Riparian/Riverine.

- *No further discussion on this subject is made in this analysis*

Vernal Pools

Pursuant to Section 6.1.2 of the MSHCP, Vernal Pools are seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics should consider (1) the length of time the area exhibits upland and wetland characteristics, and (2) the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, uses to which it has been subjected, and weather and hydrologic records.

The Project site does not contain the appropriate soils, vegetation, or hydrology to allow for vernal pools.

- *No further discussion on this subject is made in this analysis*

Fairy Shrimp

The MSHCP contains coverage for three species of fairy shrimp (Riverside, vernal pool, and Santa Rosa fairy shrimps). As mentioned in the Vernal Pool discussion, the site does not contain vernal pools. Vernal pools are a required constituent element for all three fairy shrimp species in the MSHCP. As such, they are considered absent from the Project site.

- *No further discussion on this subject is made in this analysis*

Riparian Birds

The MSCHP includes coverage for many riparian birds, including least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo. As mentioned above in the Riparian/Riverine section, the site does not contain any riparian or riverine habitats which are a required constituent element for the riparian bird species. As such, these species are considered absent from the Project site.

- *No further discussion on this subject is made in this analysis*

3.3.6 Information on Other Species

Delhi sands flower-loving fly

The Delhi Sands flower-loving fly is found at low numbers and is narrowly distributed within the Plan Area. This species is restricted by the distribution and availability of open Habitats within the fine, sandy Delhi series soils. USFWS has identified three main population areas are known to currently or to have at one time existed in the Plan Area. One is located in the northwestern corner of the Plan Area, a second is located in the Jurupa Hills, and the third is located in the Agua Mansa Industrial Center area. Because the Delhi Sands flower-loving fly requires a specific Habitat type, this species will require site-specific considerations, protection and enhancement of this limited Habitat type, and species-specific management to maintain the Habitat and populations.

The Project site does not contain the appropriate soils for this species and is not within or near known areas for this species.

- *No further discussion on this subject is made in this analysis*

Species Not Adequately Conserved

As described in Section 2.1.4, of the 146 Covered Species addressed in the MSHCP, 118 species are considered to be adequately conserved. The remaining 28 Covered Species will be considered to be adequately conserved when certain conservation requirements are met as identified in the species-specific conservation objectives for those species. For 16 of the 28 species, particular species-specific conservation objectives, which are identified in Table 9-3, must be satisfied to shift those particular species to the list of Covered Species Adequately Conserved. For the remaining 12 species, a

Memorandum of Understanding must be executed with the Forest Service that addresses management for these species on Forest Service Land in order to shift these species to the list of Covered Species Adequately Conserved.

The Project site does not contain the appropriate habitats for any of these species. There is no occurrence potential for any of these species to occur within the Project site.

- *No further discussion on this subject is made in this analysis*

3.3.7 Urban/ Wildlands Interface

Section 6.1.4 of the MSHCP presents guidelines to minimize the indirect effects of projects in proximity to the MSCHP Conservation areas. This section provides mitigation measures for impacts associated with Drainage, Toxics, Lighting, Noise, Invasives, Barriers, and Grading/Land Development.

The Project site is not within or adjacent to any area the meets the definition of an urban/wildland interface. The site is fenced off and mostly surrounded by other fenced off developed parcels.

- *No further discussion on this subject is made in this analysis*

3.3.7 Best Management Practices (Volume I, Appendix C)

Appendix C of the MSHCP details Best Management Practices (BMPs) that should be implemented. However, the project does not impact any of the covered species or habitats described in the MSHCP or any federally or state-listed species. As such, there are only two BMPs that could qualify as required for this project:

> 13. To avoid attracting predators of the species of concern, the project site shall be kept as clean of debris as possible. All food-related trash items shall be enclosed in sealed containers and regularly removed from the site(s).
>
> 14. Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. Construction limits will be fenced with an orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas.

SECTION 4.0 - CONCLUSIONS AND RECOMMENDATIONS

Based on the literature review and personal observations made in the immediate vicinity, no State and/or federally listed threatened or endangered species are documented/or expected to occur within the Project site. Additionally, no plant species with the California Rare Plant Rank (CRPR) of 1 or 2 were observed on-site or documented/expected to occur on-site. No other sensitive species were observed within the project area or buffer area.

There are no streams, channels, washes, or swales that meet the definitions of Section 1600 of the State of California Fish and Game Code (FGC) under the jurisdiction of the CDFW, Section 401 (“Waters of the

State") of the Clean Water Act (CWA) under the jurisdiction of the Regional Water Quality Control Board (RWQCB), or "Waters of the United States" (WoUS) as defined by Section 404 of the CWA under the jurisdiction of the U.S. Army Corps of Engineers (Corps) within the subject parcel. Therefore, no permit from any regulatory agency will be required.

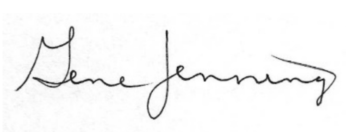
The site is not mapped within a criteria cell or subunit. The Project is also consistent with the MSHCP policies found in Section 6 which include Riparian/Riverine Areas/ Vernal Pools; Narrow Endemic Plant Species; Urban/Wildlands Interface; and Surveys for Special Status Species. The site is not located within an area mapped for Narrow Endemic or Criteria Area Plant Species, Special Status Species, Riparian/Riverine/Vernal Pools, and Urban/Wildlife Interface. Therefore, the Project is consistent with MSCHP policies and conditions.

Since there is some habitat within the project site and adjacent area that is suitable for nesting birds in general, a preconstruction nesting bird survey is recommended before the commencement of any project-related work activities, within nesting bird season, to avoid any potential project-related impacts to nesting birds.

I hereby certify that the statements furnished herein, and in the attached exhibits present data and information required for this analysis to the best of my ability, and the facts, statements, and information presented are true and correct to the best of my knowledge and belief. This report was prepared in accordance with professional requirements and standards. Fieldwork conducted for this assessment was performed by me. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project proponent and that I have no financial interest in the project.

Please do not hesitate to contact me at 909-534-4547 should you have any questions or require further information.

Sincerely,



Gene Jennings
Principal/Regulatory Specialist

Appendices:

- Appendix A – Figures
- Appendix B – Site Photos
- Appendix C – Regulatory Framework
- Appendix D – Tables

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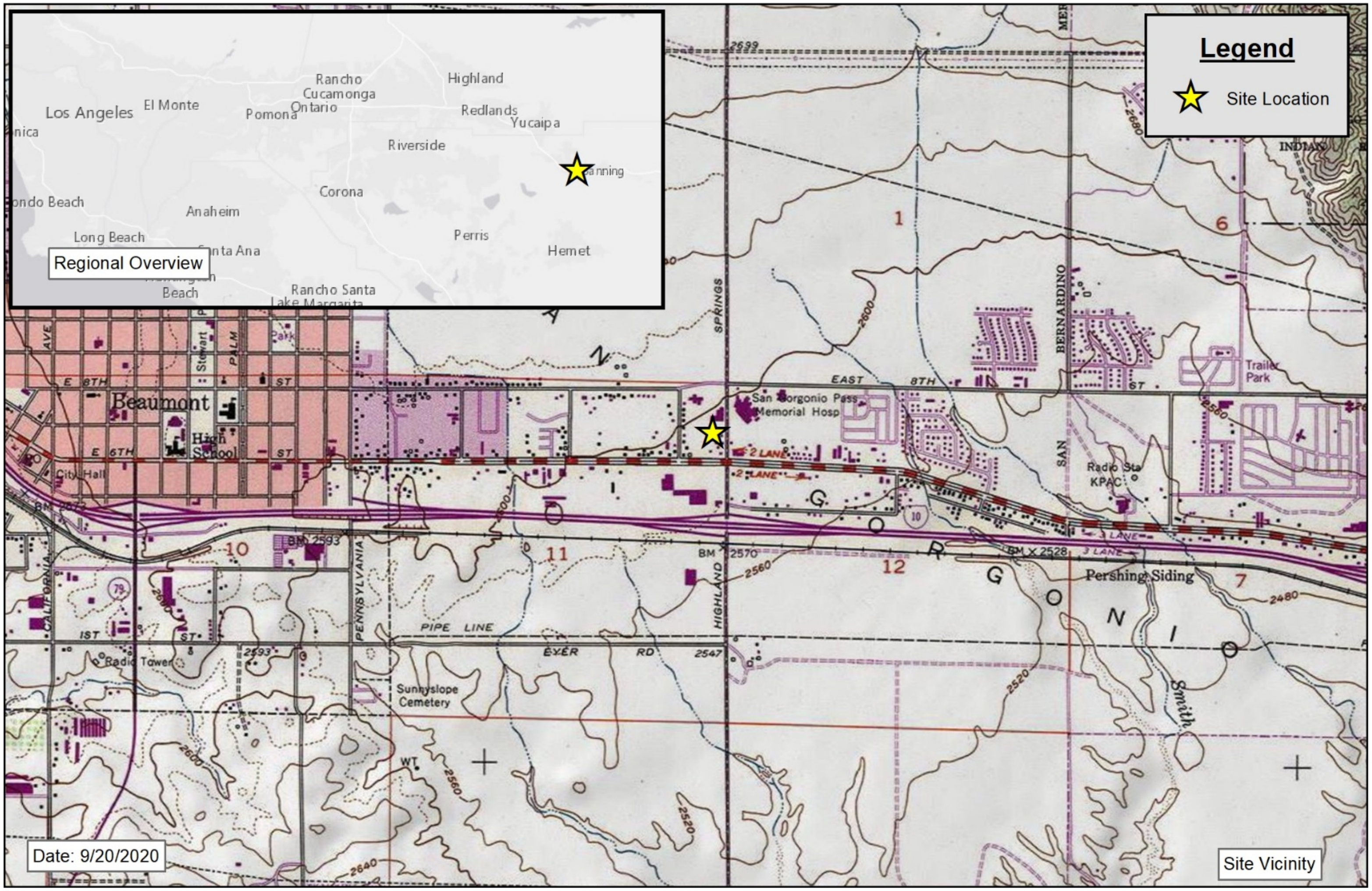
Appendix A - Figures



Highland Springs Remodel and Development Beaumont, CA	0 700 1,400 2,800 4,200 5,600 Feet	1:24,000
Figure 1 - Regional Overview and Site Vicinity	Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community Copyright:© 2013 National Geographic Society, i-cubed	

Highland Springs Remodel and Development
Beaumont, CA

Figure 2 - Site Location

JE JENNINGS ENVIRONMENTAL

0 20 40 80 120 160 Feet

1:989

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Highland Springs Remodel and Development
Beaumont, CA

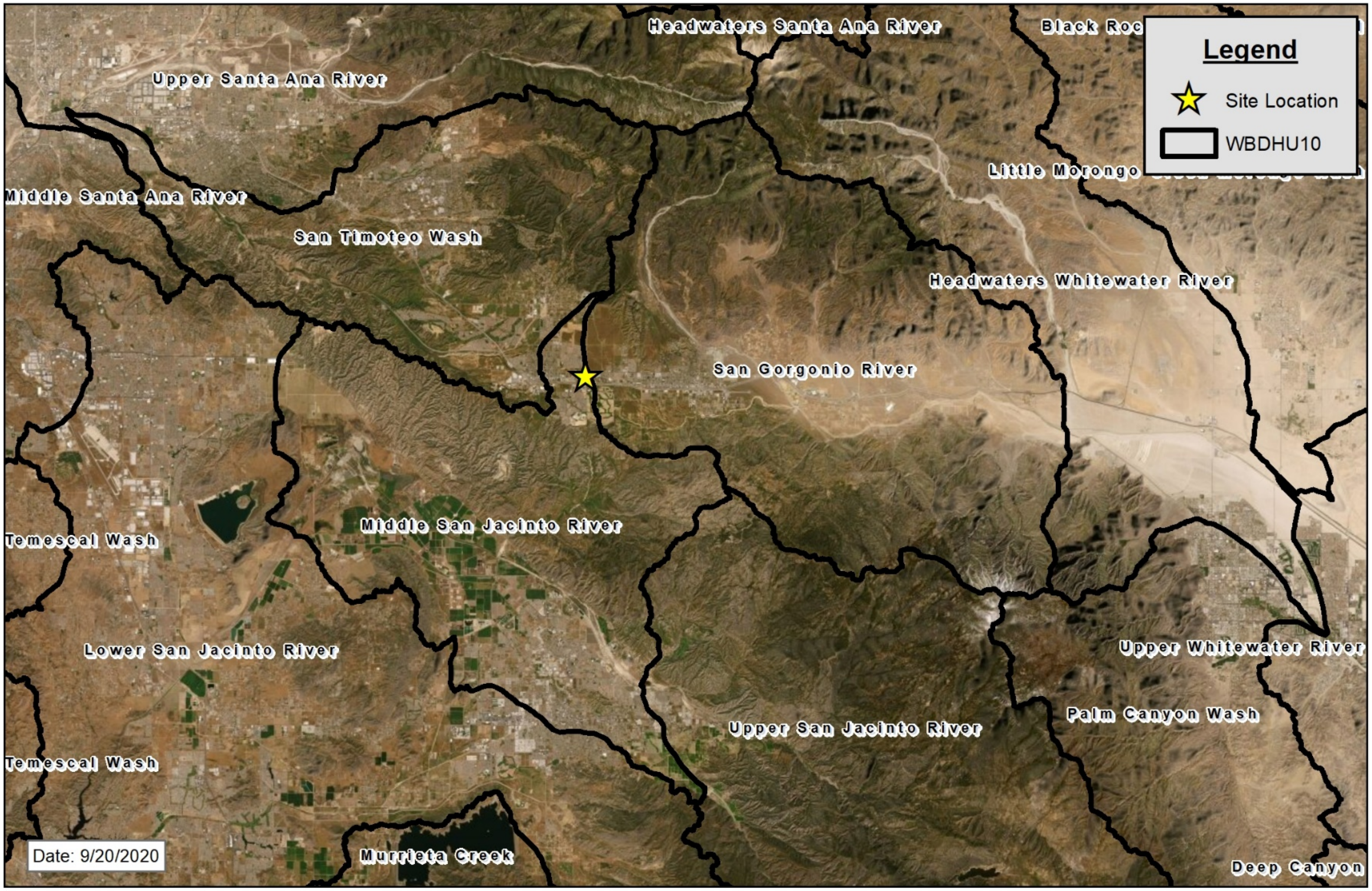
Figure 3 - Soils Overlay

JE JENNINGS ENVIRONMENTAL

0 20 40 80 120 160 Feet

1:989

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Highland Springs Remodel and Development
Beaumont, CA

Figure 4 - Watershed Overlay

JE JENNINGS ENVIRONMENTAL

0 1.5 3 6 9 12 Miles

1:300,000

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix B - Photos

	Photo 1 – Center portion of parcel, facing northeast. Showing ruderal/disturbed habitat.
	Photo 2 – Center portion facing southeast. Showing ruderal/disturbed habitat and non-native trees.

	Photo 3 – Center portion of parcel, facing northwest. Showing ruderal/disturbed and non-native vegetation.
	Photo 4 – Center of parcel facing southwest. Showing ruderal/disturbed and non-native vegetation and additional access to exiting auto repair shop.

Appendix C – Regulatory Framework

1.1 FEDERAL JURISDICTION

1.1.1 United States Army Corps of Engineers

Pursuant to Section 404 of the CWA, the United States Army Corps of Engineers (USACE) regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined by 33 Code of Federal Regulations (CFR) Part 328 and currently includes: (1) all navigable waters (including all waters subject to the ebb and flow of the tide), (2) all interstate waters and wetlands, (3) all other waters (e.g., lakes, rivers, intermittent streams) that could affect interstate or foreign commerce, (4) all impoundments of waters mentioned above, (5) all tributaries to waters mentioned above, (6) the territorial seas, and (7) all wetlands adjacent to waters mentioned above. Waters of the United States do not include (1) waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act (CWA), and (2) prior converted cropland. Waters of the United States typically are separated into two types: (1) wetlands and (2) "other waters" (non-wetlands) of the United States.

Wetlands are defined by 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support … a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987, USACE published a manual (1987 Wetland Manual) to guide its field personnel in determining jurisdictional wetland boundaries. This manual was amended in 2008 to the USACE 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (2008 Arid West Supplement). Currently, the 1987 Wetland Manual and the 2008 Arid West Supplement provide the legally accepted methodology for identification and delineation of USACE-jurisdictional wetlands in southern California.

In the absence of wetlands, the limits of USACE jurisdiction in nontidal waters, including intermittent Relatively Permanent Water (RPW) streams, extend to the Ordinary High Water Mark (OHWM), which is defined by 33 CFR 328.3(e) as:

> … that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

On January 9, 2001, the U.S. Supreme Court ruled (in Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers) (SWANCC) that USACE jurisdiction does not extend to previously regulated isolated waters, including but not limited to isolated ponds, reservoirs, and wetlands. Examples of isolated waters that are affected by this ruling include vernal pools, stock ponds, lakes (without outlets), playa lakes, and desert washes that are not tributary to navigable or interstate waters or to other jurisdictional waters. A joint legal memorandum by EPA and USACE was signed on January 15, 2003.

In May 2007, USACE and EPA jointly published and authorized the use of the Jurisdictional Determination Form Instructional Guidebook (USACE 2007). The form and guidebook define how to determine if an area is USACE jurisdictional and if a significant nexus exists per the Rapanos decision. A nexus must have more than insubstantial and speculative effects on the downstream TNW to be considered a significant nexus. This guidebook is updated by the 2008 Arid West Supplement, the 2010 Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, and the 2011 Ordinary High Flows and the Stage-Discharge Relationship in the Arid West Region.

A joint guidance by EPA and USACE was issued on June 5, 2007, and revised on December 2, 2008, is consistent with the Supreme Court's decision in the consolidated cases Rapanos v. United States and Carabell v. United States (126 S. Ct. 2208 [2006]) (Rapanos), which addresses the jurisdiction over waters of the United States under the CWA (33 U.S.C. §1251 et seq.). A draft guidance was circulated in April 2011 to supercede both the 2003 SWANCC guidance and 2008 Rapanos decision; however, this guidance is not finalized and lacks the force of law.

USACE will continue to assert jurisdiction over Traditionally Navigable Waters (TNWs), wetlands adjacent to TNW, non-navigable tributaries of TNW that are Relatively Permanent Waters (RPW) where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), and wetlands that directly abut such tributaries.

USACE generally will not assert jurisdiction over swales or erosional features (e.g., gullies or small washes characterized by low volume, infrequent, or short duration flow) or nontidal drainage ditches (including roadside ditches) that are (1) excavated wholly in and draining only uplands and (2) that do not carry a relatively permanent flow of water. USACE defines a drainage ditch as:

> A linear excavation or depression constructed for the purpose of conveying surface runoff or groundwater from one area to another. An "upland drainage ditch" is a drainage ditch constructed entirely in uplands (i.e., not in waters of the United States) and is not a water of the United States, unless it becomes tidal or otherwise extends the ordinary high water line of existing waters of the United States.

Furthermore, USACE generally does not consider "[a]rtificially irrigated areas which would revert to upland if the irrigation ceased" to be subject to their jurisdiction. Such irrigation ditches are linear excavations constructed for the purpose of conveying agricultural water from the adjacent fields. Therefore, such agricultural ditches are not considered to be subject to USACE jurisdiction.

USACE will use fact-specific analysis to determine whether waters have a significant nexus with (1) TNW for nonnavigable tributaries that are not relatively permanent (non-RPW); (2) wetlands adjacent to nonnavigable tributaries that are not relatively permanent; and (3) wetlands adjacent to, but that do not directly abut, a relatively permanent nonnavigable tributary. According to USACE, "a significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters," including consideration of hydrologic and ecologic factors. A primary component of this determination lies in establishing the connectivity or lack of connectivity of the subject drainages to a TNW.

1.2 STATE JURISDICTION

The State of California (State) regulates discharge of material into waters of the State pursuant to Section 401 of the CWA as well as the California Porter-Cologne Water Quality Control Act (Porter-Cologne; California Water Code, Division 7, §13000 et seq.). Waters of the State are defined by Porter-Cologne as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code Section 13050(e)). Waters of the State broadly includes all waters within the State's boundaries (public or private), including waters in both natural and artificial channels.

1.2.1 Regional Water Quality Control Board

Under Porter-Cologne, the State Water Resources Control Board (SWRCB) and the local Regional Water Quality Control Boards (RWQCB) regulate the discharge of waste into waters of the State. Discharges of waste include "fill, any material resulting from human activity, or any other 'discharge' that may directly or indirectly impact 'waters of the state.'" Porter-Cologne reserves the right for the State to regulate activities that could affect the quantity and/or quality of surface and/or groundwaters, including isolated wetlands, within the State. Wetlands were defined as waters of the State if they demonstrated both wetland hydrology and hydric soils. Waters of the State determined to be jurisdictional for these purposes require, if impacted, waste discharge requirements (WDRs).

When an activity results in fill or discharge directly below the OHWM of jurisdictional waters of the United States (federal jurisdiction), including wetlands, a CWA Section 401 Water Quality Certification is required. If a proposed project is not subject to CWA Section 401 certification but involves activities that may result in a discharge to waters of the State, the project may still be regulated under Porter-Cologne and may be subject to waste discharge requirements. In cases where waters apply to both CWA and Porter-Cologne, RWQCB may consolidate permitting requirements to one permit.

1.2.2 California Department of Fish and Wildlife

Pursuant to Division 2, Chapter 6, Sections 1600-1602 of the California Fish and Game Code, the California Department of Fish and Wildlife (CDFW) regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation" (California Code of Regulations, Title 14, Section 1.72). The jurisdiction of CDFW may include areas in or near intermittent streams, ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams that are indicated on USGS maps, watercourses that may contain subsurface flows, or within the flood plain of a water body. CDFW's definition of "lake" includes "natural lakes or man-made reservoirs." CDFW limits of jurisdiction typically include the maximum extents of the uppermost bank-to-bank distance and/or the outermost extent of riparian vegetation dripline, whichever measurement is greater.

In a CDFW guidance of stream processes and forms in dryland watersheds (Vyverberg 2010), streams are identified as having one or more channels that may all be active or receive water only during some high flow event. Subordinate features, such as low flow channels, active channels, banks associated with secondary channels, floodplains, and stream-associated vegetation, may occur within the bounds of a single, larger channel. The water course is defined by the topography or elevations of land that confine a stream to a definite course when its waters rise to their highest level. A watercourse is defined as a stream with boundaries defined by the maximal extent or expression on the landscape even though flow may otherwise be intermittent or ephemeral.

Artificial waterways such as ditches (including roadside ditches), canals, aqueducts, irrigation ditches, and other artificially created water conveyance systems also may be under the jurisdiction of CDFW. CDFW may claim jurisdiction over these features based on the presence of habitat characteristics suitable to support aquatic life, riparian vegetation, and/or stream-dependent terrestrial wildlife. As with natural waterways, the limit of CDFW jurisdiction of artificial waterways includes the uppermost bank-to-bank distance and/or the outermost extent of riparian vegetation dripline, whichever measurement is greater.

CDFW does not have jurisdiction over wetlands but has jurisdiction to protect against a net loss of wetlands. CDFW supports the wetland criteria recognized by USFWS; one or more indicators of wetland conditions must exist for wetlands conditions to be considered present. The following is the USFWS accepted definition of a wetland:

> Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes:
> (1) at least periodically, the lands supports hydrophytes, (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated withwater or covered by shallow water at some time during the growing season of each year (Cowardin et al. 1979).

In A Clarification of the U.S. Fish and Wildlife Service's Wetland Definition (Tiner 1989), the USFWS definition was further clarified "that in order for any area to be classified as wetland by the Service, the area must be periodically saturated or covered by shallow water, whether wetland vegetation and/or hydric soils are present or not; this hydrologic requirement is addressed in the first sentence of the definition." When considering whether an action would result in a net loss of wetlands, CDFW will extend jurisdiction to USFWS-defined wetland conditions where such conditions exist within the riparian vegetation that is associated with a stream or lake and does not depend on whether those features meet the three-parameter USACE methodology of wetland determination. If impacts to wetlands under the jurisdiction of CDFW are unavoidable, a mitigation plan will be implemented in coordination with CDFW to support the CDFW policy of "no net loss" of wetland habitat.

Appendix D – Tables

Table 1. Species Observed On-Site

Common Name	Scientific Name
Plants	
Tumbleweed	*Salsola tragus*
Mediterranean mustard	*Hirschfeldia incana*
black locust	*Robinia pseudoacacia*
Peruvian pepper tree	*Schinus molle*
dove weed	*Croton setigerus*
ripgut brome	*Bromus diandrus*
Jimsonweed	*Datura wrightii*
tall annual willowherb	*Epilobium brachycarpum*
telegraph weed	*Heterotheca grandiflora*
valley vinegar weed	*Lessingia glandulifera*
Aleppo pine	*Pinus halepensis*
tree of heaven	*Ailanthus altissima*
yellow star thistle	*Centaurea solstitialis*
Birds	
common raven	*Corvus corax*
house finch	*Haemorhous mexicanus*

Table 2 – CNDDB Potential to Occur

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Abronia villosa var. aurita	chaparral sand-verbena	None, None	G5T2?, S2, 1B.1	Chaparral, coastal scrub, desert dunes. Sandy areas. -60-1570 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	None, None	G5T3, S3, CDFW-WL	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Allium marvinii	Yucaipa onion	None, None	G1, S1, 1B.2	Chaparral. In openings on clay soils. 850-1070 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Anniella stebbinsi	Southern California legless lizard	None, None	G3, S3, CDFW-SSC	Generally south of the Transverse Range, extending to northwestern Baja California. Occurs in sandy or loose loamy soils under sparse vegetation. Disjunct populations in the Tehachapi and Piute Mountains in Kern County. Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Antrozous pallidus	pallid bat	None, None	G5, S3, CDFW-SSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Aspidoscelis hyperythra	orange-throated whiptail	None, None	G5, S2S3, CDFW-WL	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food: termites.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Aspidoscelis tigris stejnegeri	coastal whiptail	None, None	G5T5, S3, CDFW-SSC	Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland & riparian areas. Ground may be firm soil, sandy, or rocky.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Astragalus hornii var. hornii	Horn's milk-vetch	None, None	GUT1, S1, 1B.1	Meadows and seeps, playas. Lake margins, alkaline sites. 75-350 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Astragalus lentiginosus var. coachellae	Coachella Valley milk-vetch	Endangered, None	G5T1, S1, 1B.2	Sonoran desert scrub, desert dunes. Sandy flats, washes, outwash fans, sometimes on dunes. 35-695 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Astragalus pachypus var. jaegeri	Jaeger's milk-vetch	None, None	G4T1, S1, 1B.1	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland. Dry ridges and valleys and open sandy slopes; often in grassland and oak-chaparral. 365-1040 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Bombus crotchii	Crotch bumble bee	None, Candidate Endangered	G3G4, S1S2	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Calochortus palmeri var. palmeri	Palmer's mariposa-lily	None, None	G3T2, S2, 1B.2	Meadows and seeps, chaparral, lower montane coniferous forest. Vernally moist places in yellow-pine forest, chaparral. 195-2530 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Calochortus plummerae	Plummer's mariposa-lily	None, None	G4, S4, 4.2	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest. Occurs on rocky and sandy sites, usually of granitic or alluvial material. Can be very common after fire. 60-2500 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Caulanthus simulans	Payson's jewelflower	None, None	G4, S4, 4.2	Chaparral, coastal scrub. Frequently in burned areas, or in disturbed sites such as streambeds; also on rocky, steep slopes. Sandy, granitic soils. 90-2200 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Centromadia pungens ssp. laevis	smooth tarplant	None, None	G3G4T2, S2, 1B.1	Valley and foothill grassland, chenopod scrub, meadows and seeps, playas, riparian woodland. Alkali meadow, alkali scrub; also in disturbed places. 5-1170 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Chaetodipus californicus femoralis	Dulzura pocket mouse	None, None	G5T3, S3, CDFW-SSC	Variety of habitats including coastal scrub, chaparral & grassland in San Diego County. Attracted to grass-chaparral edges.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	None, None	G5T3T4, S3S4, CDFW-SSC	Coastal scrub, chaparral, grasslands, sagebrush, etc. in western San Diego County. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Chorizanthe parryi var. parryi	Parry's spineflower	None, None	G3T2, S2, 1B.1	Coastal scrub, chaparral, cismontane woodland, valley and foothill grassland. Dry slopes and flats; sometimes at interface of 2 vegetation types, such as chaparral and oak woodland. Dry, sandy soils. 90-1220 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Deinandra mohavensis	Mojave tarplant	None, Endangered	G2, S2, 1B.3	Riparian scrub, coastal scrub, chaparral. Low sand bars in river bed; mostly in riparian areas or in ephemeral grassy areas. 640-1645 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Dipodomys stephensi	Stephens' kangaroo rat	Endangered, Threatened	G2, S2	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Horkelia cuneata var. puberula	mesa horkelia	None, None	G4T1, S1, 1B.1	Chaparral, cismontane woodland, coastal scrub. Sandy or gravelly sites. 15-1645 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Lanius ludovicianus	loggerhead shrike	None, None	G4, S4, CDFW-SSC	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Lasiurus xanthinus	western yellow bat	None, None	G5, S3, CDFW-SSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Mentzelia tricuspis	spiny-hair blazing star	None, None	G4, S2, 2B.1	Mojavean desert scrub. Sandy or gravelly slopes and washes.150-1280 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Neotoma lepida intermedia	San Diego desert woodrat	None, None	G5T3T4, S3S4, CDFW-SSC	Coastal scrub of Southern California from San Diego County to San Luis Obispo County. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops, rocky cliffs, and slopes.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Perognathus longimembris brevinasus	Los Angeles pocket mouse	None, None	G5T1T2, S1S2, CDFW-SSC	Lower elevation grasslands and coastal sage communities in and around the Los Angeles Basin. Open ground with fine, sandy soils. May not dig extensive burrows, hiding under weeds and dead leaves instead.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Petalonyx linearis	narrow-leaf sandpaper-plant	None, None	G4, S3?, 2B.3	Mojavean desert scrub, Sonoran desert scrub. Sandy or rocky canyons. -30-1090 m.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Phrynosoma blainvillii	coast horned lizard	None, None	G3G4, S3S4, CDFW-SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Progne subis	purple martin	None, None	G5, S3, CDFW-SSC	Inhabits woodlands, low elevation coniferous forest of Douglas-fir, ponderosa pine, and Monterey pine. Nests in old woodpecker cavities mostly; also in human-made structures. Nest often located in tall, isolated tree/snag.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Setophaga petechia	yellow warbler	None, None	G5, S3S4, CDFW-SSC	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	None, None	G3, S3.2	Riparian Forest	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Spea hammondii	western spadefoot	None, None	G3, S3, CDFW-SSC	Occurs primarily in grassland habitats but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Scientific Name	Common Name	Federal/State Status	Other Status	Habitat	Occurrence Potential
Taxidea taxus	American badger	None, None	G5, S3, CDFW-SSC	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.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.
Vireo bellii pusillus	least Bell's vireo	Endangered, Endangered	G5T2, S2	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	Suitable habitat for this species does not occur on site. As such, this species is considered **absent** from the Project site.

Coding and Terms

E = Endangered   T = Threatened   C = Candidate   FP = Fully Protected   SSC = Species of Special Concern   R = Rare

State Species of Special Concern: An administrative designation given to vertebrate species that appear to be vulnerable to extinction because of declining populations, limited acreages, and/or continuing threats. Raptor and owls are protected under section 3502.5 of the California Fish and Game code: "It is unlawful to take, possess or destroy any birds in the orders Falconiformes or Strigiformes or to take, possess or destroy the nest or eggs of any such bird."

State Fully Protected: The classification of Fully Protected was the State's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, mammals, amphibians and reptiles. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Global Rankings (Species or Natural Community Level):

G1 = Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2 = Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 = Secure – Common; widespread and abundant.
? = Uncertainty in the exact status of an element (could move up or down one direction from current rank)

Subspecies Level: Taxa which are subspecies or varieties receive a taxon rank (T-rank**)** attached to their G-rank. Where the G-rank reflects the condition of the entire species, the T-rank reflects the global situation of just the subspecies. For example: the Point Reyes mountain beaver, *Aplodontia rufa* ssp. *phaea* is ranked G5T2. The G-rank refers to the whole species range i.e., *Aplodontia rufa.* The T-rank refers only to the global condition of ssp. *phaea*.

State Ranking:

S1 = Critically Imperiled – Critically imperiled in the State because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the State.
S2 = Imperiled – Imperiled in the State because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the State.
S3 = Vulnerable – Vulnerable in the State due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the State.
S4 = Apparently Secure – Uncommon but not rare in the State; some cause for long-term concern due to declines or other factors.
S5 = Secure – Common, widespread, and abundant in the State.

California Rare Plant Rankings (CNPS List):

1A = Plants presumed extirpated in California and either rare or extinct elsewhere.
1B = Plants rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California, but common elsewhere.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed; a review list.
4 = Plants of limited distribution; a watch list.

Threat Ranks:

.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 = Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
.3 = Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

APPENDIX C
PHASE I CULTURAL RESOURCES INVESTIGATION
OCTOBER 6, 2020

CULTURAL RESOURCES INVESTIGATION: A PHASE I CULTURAL RESOURCES INVESTIGATION FOR THE PROPOSED REDEVELOPMENT OF APNs 419-150-026, -027, AND -046, AT 655, 675, AND 695 HIGHLAND SPRINGS AVENUE, BEAUMONT, RIVERSIDE COUNTY, CALIFORNIA

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October 6, 2020
REVISED March 23, 2021

CULTURAL RESOURCES INVESTIGATION: A PHASE I CULTURAL RESOURCES INVESTIGATION FOR THE PROPOSED REDEVELOPMENT OF APNs 419-150-026, -027, AND -046, AT 655, 675, AND 695 HIGHLAND SPRINGS AVENUE, BEAUMONT, RIVERSIDE COUNTY, CALIFORNIA

by,

Jeanette A. McKenna
McKenna et al., Whittier CA

INTRODUCTION

McKenna et al. (Appendix A) initiated this Phase I cultural resources survey for the project area at 655, 675, and 695 Highland Springs Avenue (APNs 419-150-026, -027, and -046), Beaumont, Riverside County, California, at the request of Lilburn Corporation, San Bernardino, representing Highland Springs Remodel and Redevelopment High Sand, Inc. This investigation was prepared for the City of Beaumont for compliance with the California Environmental Quality Act (CEQA), as amended, and City policies and guidelines. This project/undertaking has been required by the City, the Lead Agency responsible for reviewing and approving the project. As such, any identified cultural resources have been subjected to an evaluation in accordance with applicable policies, guidelines, and defined criteria for the assessment of cultural resources.

PROJECT LOCATION AND DESCRIPTION

The proposed project area is located on Highland Springs Avenue, between W. Ransey Street (originally 6th Street) and 8th Street; north of I-10 and on the eastern boundary of the City of Beaumont. The project area is a composite of three properties – APNs 419-150-026, -027, and -046. These properties are cross-referenced as 655, 675, and 695 Highland Springs Avenue and both 675 and 695 Highland Springs Avenue ate currently vacant lots. Modern improvements at 655 Highland Springs Avenue include a car wash and supporting facilities. Each property consists of approximately .8 acres, resulting in a total area of 2.4 acres (Figures 1 thru 3).

Figure 1. General Location of the Proposed Project Area.

More specifically, the project area is located in the northeastern corner of Section 11 (Township 3 South, Range 1 West). This project area is located between modern improvements (post-1966; Figures 4 and 5) and a more recent redevelopment (ca. 1991) at 655 Highland Springs Avenue (car wash). The UTM coordinates for the project area are presented in Table 1. The property rests at an average of 2,598 feet Above Mean Sea Level (AMSL).

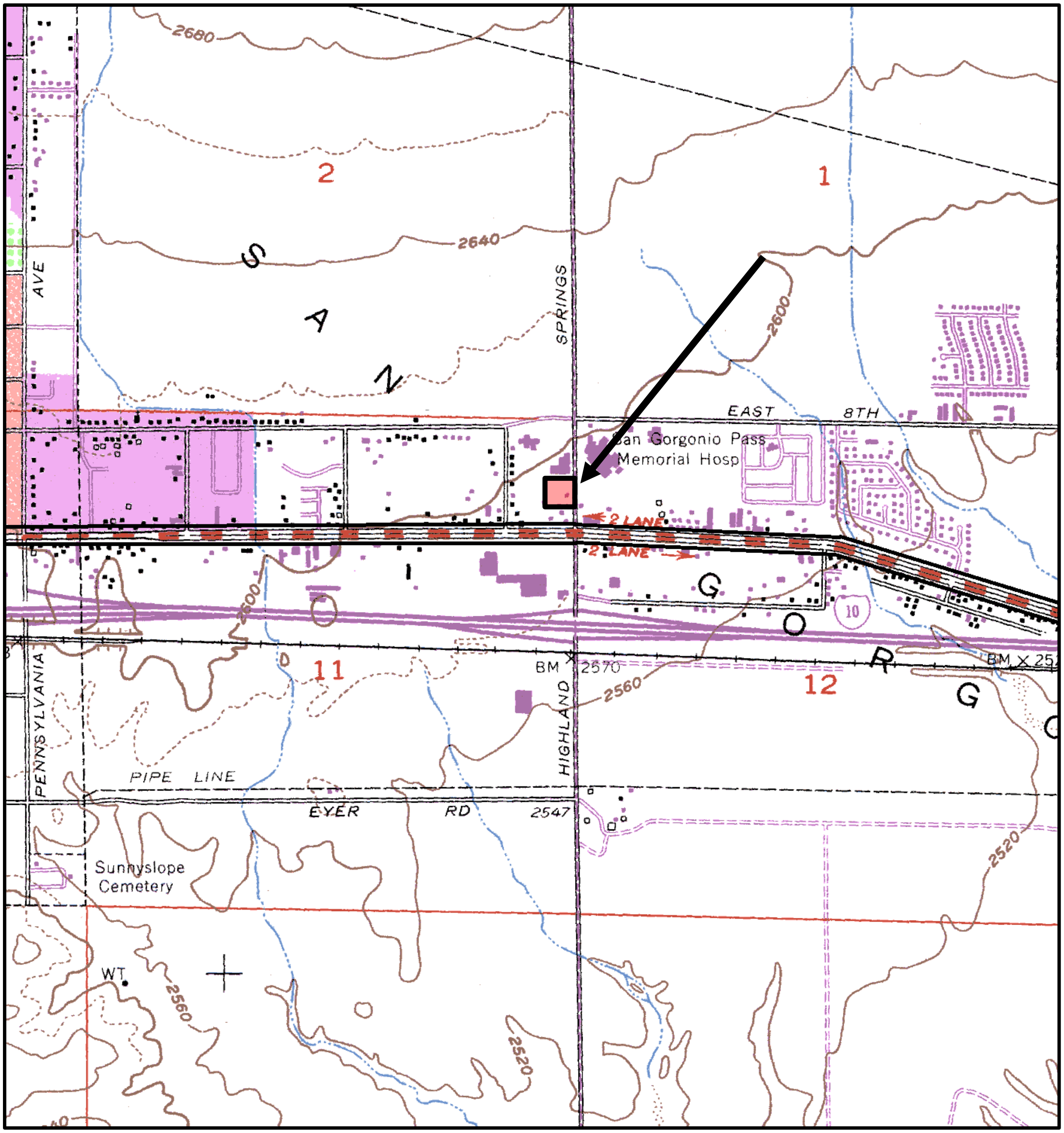

Figure 2. Specific Location of the Project Area (USGS Beaumont Quadrangle (rev. 1988).

The proposed project involves the upgrading of the facilities at the existing car wash (655 Highland Springs Avenue) and the development of the two vacant lots to the north of the car wash. The current development plans call for the establishment of an office complex, a restaurant, and parking areas, with access from Highland Springs Avenue.

Table 1. UTM Coordinates of the Current Project Area.				
Location	NAD 83 Coordinates		NAD 27 Coordinates	
NE	504890	3754523	504969	3754327
NW	504790	3754523	504869	3754327
SE	504891	3754431	504970	3754235
SW	504789	3754432	504868	3754236

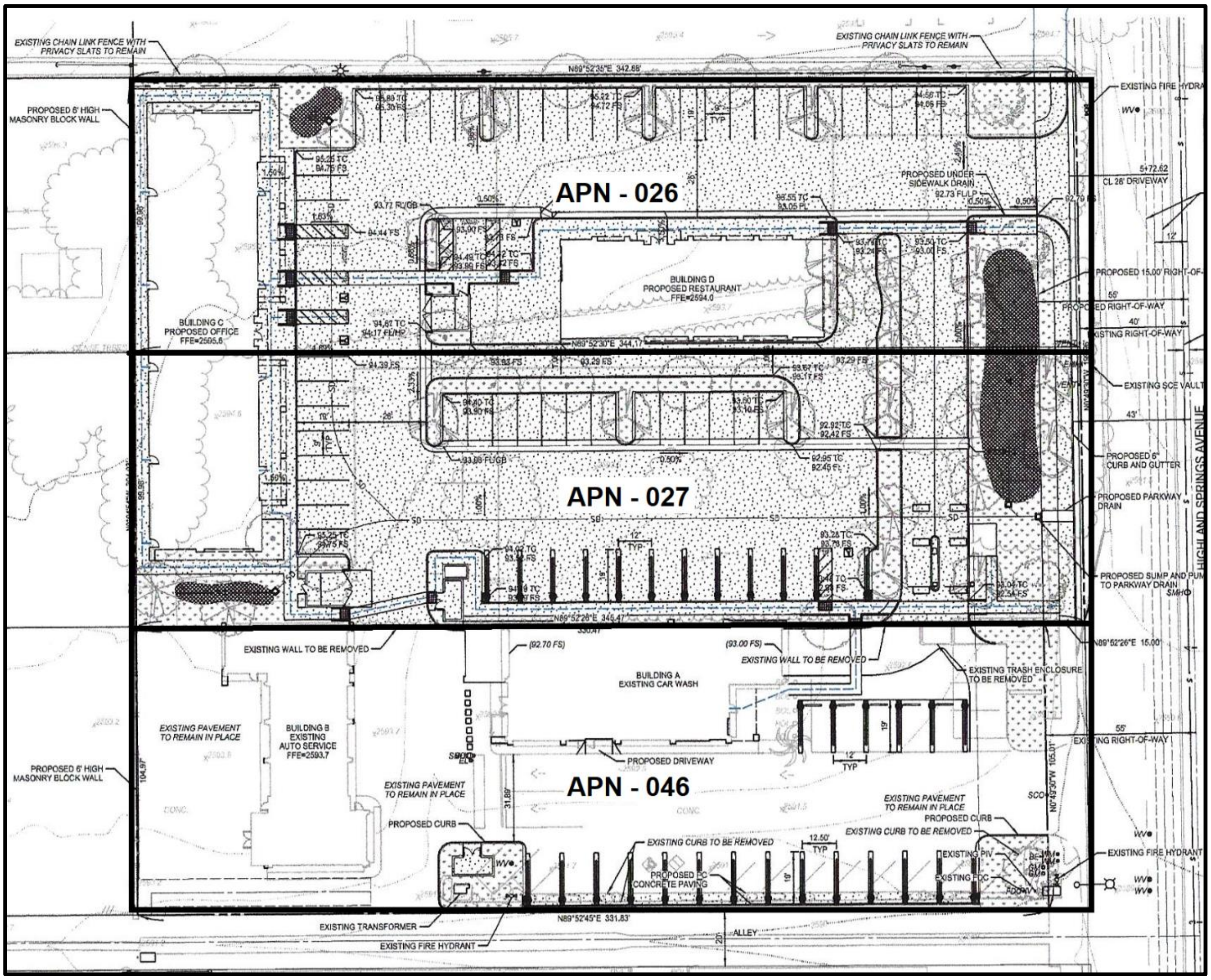

Figure 3. Site Plan Identifying Applicable Assessor Parcels.

The plans for the development have been tentatively approved by the City but may be altered, as necessary, to comply with the City requirements. The exact plans for development do not affect the approach or findings of this cultural resource investigation, but the extent of earthmoving is a concern. Some significant excavation may be necessary for site preparation.

Figure 4. Aerial Photograph Illustrating the Project Area and Surrounding Properties.

Figure 5. Street View of the Project Area between 655 and 675 Highland Springs Avenue (W).

ENVIRONMENTAL SETTING

The proposed project is within the City of Beaumont, north of Interstate 10, between W. Ransey Street and 8th Street, and on the west side of Highland Springs Avenue. Highland Springs Avenue defines the eastern boundary of Beaumont and with western boundary of the City of Banning. This general area is associated with the San Gorgonio Pass, a relatively narrow valley located between the San Bernardino Mountains (north) and the San Jacinto Mountains (south). As a portion of the southern extent of the Mojave Desert and western extent of the Colorado Desert, this area is characterized by the presence of decomposing granite derived from the nearby hillsides and wind-borne or water-borne alluvial deposits. Native vegetation in the area is generally limited to desert sage scrub, but riparian zones can be found along washes and intermittent streams.

Citing McLeod (2003), the general area of the San Gorgonio Pass is characterized as having "… exposures of some Mesozoic age granitics and metasedimentary rocks that, of course, will not contain recognizable vertebrate fossils ... Quaternary Alluvium that are unlikely to contain significant vertebrate fossils, at least in the uppermost layers." More recently, however, McLeod (2018), with respect to the current project area, stated:

> "Surficial deposits in the entire proposed project area consists of older Quaternary Alluvium, derived as alluvial fan deposits from the San Jacinto Mountains to the south. These deposits usually do not contain significant fossil vertebrates in the uppermost layers in the vicinity, but at relatively shallow depth there may be older Quaternary deposits with finer-grained pockets. Our closest vertebrate fossil locality from older Quaternary deposits is LACM 4540, situated west-southwest of the proposed project area along Jackrabbit Trail near the east side of the San Jacinto Valley, that produced a specimen of fossil horse, *Equus …* Shallow excavations in the older Quaternary alluvial fan deposits exposed throughout the proposed project area are unlikely to uncover significant fossil vertebrate remains. Deeper excavations in those Quaternary deposits, however, may well encounter significant vertebrate fossils similar to those found at the Rancho La Brea asphalt deposits in Los Angeles."

A geotechnical report was completed for this property (Salem Engineering Group, Inc. 2020:3) described the general area as being dominated by northwest-trending faults and anticlinal uplifts with "… intervening deep synclinal troughs filled with poorly consolidated Upper Pleistocene and unconsolidated Holocene sediments." The Upper Pleistocene and Holocene deposits are subsets of the larger Quaternary period and the most recent. In Southern California, the Upper Pleistocene is generally associated with a pre-human presence, although research is now showing humans were present in the later years of the Upper Pleistocene. Fossil specimens are also associated with the Pleistocene, particularly in area where deposits are referred to as "older Alluvium" (McLeod 2020; Lowe and Walker 1997). The Holocene is considered to be the most recent geologic period and one that is directly associated with human activity. The Holocene is also generally associated with "younger Alluvium" and not fossil bearing, except in instances where fossils have been redeposited.

Currently, non-native grasses and some mature trees dominate much of the project area and there is no evidence of the native Desert Sage Scrub biotic community.

CULTURE HISTORY BACKGROUND

The project area is geographically associated with both the Serrano and Cahuilla of Southern California (Kroeber 1925:615-619 and 692-708). Though near the territorial boundary separating these two populations, the area is more generally considered part of the "Pass Cahuilla" territory, a reference to the San Gorgonio Pass (Strong 1929:88-143). Cahuilla culture has been described by a number of scholars, but most thoroughly by Bean (1972 and 1978). The name "Cahuilla" translates as "master" or "powerful one."

The "Pass Cahuilla" are one of the three main Cahuilla populations associated with western Riverside County (with the Desert Cahuilla and Mountain Cahuilla). Wilke's studies have shown that the local population exploited almost every available food resource in the area.

The Cahuilla were hunter-gatherers of Shoshonean heritage who lived in small villages of 100 to 200 persons and who were organized into clans and lineages owning village areas and associate gathering tracts (James 1969; Kroeber 1976; Bean 1978; and Emanuels 1991). The Cahuilla produced skillfully manufactured pottery (believed to have been introduced by Colorado River tribes) and basketry. They constructed brush dwellings and ritual structures; conducted trade between the eastern desert and coastal populations, enjoyed games, music, and a rich ceremonial life.

The Cahuilla had relatively extensive exchanges and interactions with neighboring populations and maintained a wide range of cultural traditions represented in the material remains recovered in archaeological sites throughout the area.

In the mid-1800s (ca. 1849-50), the United States took possession of the State of California and immediately initiated the completion of surveys and property identifications. Government surveyors documented the presence of twenty-two Cahuilla villages in the San Gorgonio Pass and larger Coachella Valley (to the east), with most of the populations in these villages exceeded 100 individuals (Wilke 1978:120; Wilke and Lawton 1975). Many of these villages were located in areas of fresh water – as springs, streams, or well sites. Smaller, limited use areas have been identified in areas where "walk-in wells" were excavated and maintained (Strong 1929:38), hence the references to "Indians Wells" in the Coachella Valley.

Population estimates for the prehistoric Cahuilla range from 2600 to 10,000 individuals. These individuals maintained extensive networks for trade, including contacts along the

Colorado River and the Pacific Coast. Trails, small camp sites, and other limited use areas have been recorded throughout the area and attest to the wide-spread use of the Valley and Pass. Additional evidence of long-term occupation has been identified along the various shorelines of prehistoric Lake Cahuilla. Trade routes (e.g. the Coco-Maricopa Trail) and encampments between known freshwater sites have been identified through archaeological evidence and some have been recorded in historic records or on historic period maps.

Wilke (1986:9) also emphasized that the Cahuilla did not rely heavily on stone tools, but manufactured numerous tools and utility items of wood (even projectile points, at times) and ceramic goods. Nets and traps were also used in hunting and fishing. Ceramics, mainly Tizon Brown and Salton Buff wares, have been found throughout the area, represented by a wide variety of vessel types. Basketry was used, but few examples have survived. Likewise, few examples of wooden implements have survived. Recent archaeological investigations have suggested some Cahuilla practiced limited agriculture (von Worloff n.d.; see Wilke 1986:9).

The Cahuilla are also associated with a relatively complex social organization based on lineages and clans. Individual clans occupied village sites and exploited specific clan-related territories. Interactions between clans provided exchange in the form of trade, marriages, and ceremonial contacts (e.g. funerary practices). The Cahuilla practiced cremation and often burned the residences of the deceased. Extensive grave goods have also been identified and associated with the cremation practices. New residences were built some distance from the burned residence and the families reestablished themselves at the new locale. Analysis of ethnographic and archaeological data has resulted in the development of various chronologies for the Cahuilla (Wallace 1962; Warren and Orr 1978; Weide and Barker 1975; Hall and Barker 1976; and Gallegos et al. 1979). Jertberg (1982:5-7) synthesized this data and proposed the following chronology for comparative purposes:

10,000 - 6,000 B.C.: The Lake Mojave/San Dieguito Complex and/or Western Lithic Co-Tradition). Characterized by the presence of projectile points, large knives, scrapers, chopping tools, and scraper planes (Bettinger and Taylor 1974; Campbell and Campbell 1937; Rogers 1939; Davis et al. 1969). Items associated with vegetal food processing and hunting and the presence of a coniferous woodland and pluvial lakes. (This tradition is not known to be represented in the Indio area).

6,000 B.C. - A.D. 500: Archaic or Pinto Armagosa periods (Wallace 1962: Bettinger and Taylor 1974; Weide and Barker 1974). Characterized by diagnostic projectile points, leaf shaped blades, choppers, and scraper planes. Some sites exhibit a small

	assemblage of milling stones. A shift in climate and vegetation les to a shift in exploitation with an emphasis on vegetal resources. (Likewise, these periods are not represented in the immediate area, but associated with other desert populations to the north).
A.D. 500 to Contact:	(unnamed). Characterized by the presence of the bow and arrow (as opposed to darts), ceramics, and cremations. Milling tools increase, including mortars and pestles. There is evidence of limited agriculture and the appearance of Shoshonean-speakers displacing local Hokan-speaking populations (Wallace 1962:176). Sites are associated with the presence of Lake Cahuilla and the exploitation of resources directly associated with fresh water sources. This unnamed period is more directly associated with the presence of Native Americans in the Indio/La Quinta area and surrounding Cahuilla territories.

Initial contact with the Cahuilla occurred in the early 1800s (ca. 1823) with the Jose Romero Expedition through the Colorado Desert (Bean and Mason 1962). This expedition noted some agricultural activities conducted by the Cahuilla and including corn, beans, and squash. Wilke and Lawton (1975) suggest the presence of agriculture was a trait derived from contact with populations in Mexico (or the Greater Southwest).

U.S. Government surveys were completed in the 1850s and led to the identification of occupied Cahuilla villages. Shortly thereafter, Blake completed surveys for railroad development in 1856, which also resulted in the identification of village sites. By 1862, the Homestead Act opened government-owned lands for settlement through purchase, land trades, or homesteading. With respect to the San Gorgonio Pass, Gunther (1984:457-458) states:

> **"SAN GORGONIO PASS.** Named for San Gorgonio Rancho (see), which occupied the entire pass areas. The pass as known to the Spaniards and Mexicans at least as early as 1815. When the first *jornada para sal*, of "journey for salt," set out from Los Angeles to secure a salt supply from what is now Salton Sea, but no name was recorded for it at the time (Guinn 1907-08, p. 169). Although existence of the pass and its name were undoubtedly known to American at an early date, the first mention of the pass by name in print has yet been found was in Lieut. E.O.C. Ord's November 6, 1849, report in which he called it "San Gorgona [sic] Pass … Long before the Spanish name was applied to the pass, the Indians had their name for it. According to legend, when the Indian tribes first came into this desert area from the west, so many people were trying to get through the pass, some of the smaller tribes decided to settle where they were. The Indians called

> this great gap (which measures 21 miles between two high peaks of San Gorgonio and San Jacinto) *Ha much cha visba*, meaning “the place where there were so many people trying to get through” (Patencio 1943, p. 100).”

The San Gorgonio Rancho is described by Gunter (1984:458) as “… one of the 24 principal cattle ranchos or rancherias, as well as the most distant, belonging to San Gabriel Mission …”. After several disputes over the ownership of the rancho, sales were recorded in the early 1850s and into the 1860s. Subdivision and continued sales were recorded into the early 1900s. Lamb Canyon was named for Elijah Weston Lamb, who settled in the area in 1866. He and an associate, Mr. Snyder, are credited with establishing the road through the canyon, permitted access between “San Gorgonia” (as the area was called) and San Jacinto. The Lamb family was in the Beaumont area until the 1840s.

Nearby Laborda Canyon (and creek), also referred to as Necochea – for Jose Maria de Necochea, an 1890 homesteader, was named for Jacques LaBorde, a Frenchman who arrived in the United States in 1874 and eventually married Necochea’s daughter (ca. 1883). The road through Laborda Canyon reportedly follows an old Indian trail through the hills. Eyer (1974) prepared a brief history of the Beaumont area and states:

> “Beaumont, originally called Summit, later named San Gorgonio, and finally renamed Beaumont, was in the earliest date, 1800 and prior to that date solely occupied by three tribes of Indians, known as the Cahuillas, Kawais and Shoshone … They roamed the country from San Bernardino territory, Mt. San Gorgonio, Mt. San Jacinto, Palm Springs, Coachella Valley, Banning and San Timoteo Canyon … In deciding who came thru the Pass first, it is noted that the Mexican Army traveled [sic] thru in 1820 … 1843 marks the data wherein [sic] Governor Pio Pico granted Rancho San Gorgonio to a Santiago Johnson. He failed to develop it.
>
> “July 2, 1845 Paulino Weaver, a Mexican citizen, acquired Rancho San Gorgonio and settled down to live with the Indians … In 1846 A Dr. Isaac Smith came from San Bernardino and lived with Paulino Weaver. Later he bought the ranch from Weaver.
>
> “Smith raised cattle, sheep, vegetables and planted a fruit orchard and a small vineyard … In 1862 Smith’s Ranch was named Smith’s Station and was made the stage coach stop on the way to Yuma, Arizona …The route followed San Timoteo Canyon past Brookside, Siding and Edgar’s ranch to Smith’s Station (Highland Home) thence one half mile north of Banning, north of Cabazon and to White Water which was the last stop before entering the desert … Beaumont was not to see a railroad until 1876 when the first passenger train come chugging up to Summit (Beaumont) stopping at Cabazon and continued as far as Indian Wells (Indio) …”.

The origin of the City of Beaumont has been reported by Gunther (1984), who relates that it began modestly in 1866 as a mail stop called “Summit Station”, the highest point on the passenger stage route through San Gorgonio Pass. The Summit Station mail stop became a railroad telegraph office for the Southern Pacific Company in 1876 and the name was changed to “San Gorgonio” in 1884 to coincide with the newly named town site (established by George C. Egan in 1884). The Southern California Investment Company purchased Egan’s town site in 1886 and, headed by H.C. Sigler from Beaumont, Texas, renamed the station “Beaumont” (beautiful mountain” in French).

The Beaumont town site was officially surveyed in 1886 by John Goldworthy and filed in San Bernardino County on March 15, 1887. When the county of Riverside was established in 1893, Beaumont was included within the Riverside County boundaries and, therefore, records prior to 1893 would be in the San Bernardino County Archives and records following 1893 would be in the Riverside County Archives.

In this case, the Bureau of Land Management, General Land Office records confirmed all of Township 3 North, Range 1 West, Section 11 was granted to the Southern Pacific Railroad in 1885. Although the Southern Pacific Railroad was granted all of Section 11, it was not unusual for the railroad to establish their right-of-way (in this case at the east/west midsection line) and allow settlement in the remainder of the Section (selling unused lands that would, with settlement, further support the railroad enterprises). Here, in Beaumont, the settlement was concentrated to the north of the railroad, with 6th Street (now W. Ramsey Street) representing to original roadway through the area.

The area south of the railroad was sold as agricultural land (e.g. the Stewart Ranch). Improvements or occupation in Section 11 were initiated slowly and, as late as 1952, the USGS topographic quadrangle identified few structures between Pennsylvania Avenue and Highland Springs Avenue (and between 6th Street and 8th Street).

A review of historic Sanborn Fire Insurance Maps confirmed this particular project area was east of the community of Beaumont and west of the community of Banning and, therefore, not mapped. Aerial photographs provided by Salem Engineering Group, Inc. (2020; and as part of the larger EDR documentation) was summarized in the AAI Phase I Environmental Site Assessment. These data, with additional data compiled by McKenna et al., has resulted in the following summary:

- **1938** Subject property is undeveloped, but appears to be under cultivation (grain). The subject property is also depicted as part of a larger property bounded by 6th Street (south); 8th Street (north); Highland Springs Avenue (east) and Allegeheny Avenue (west). The larger property was approximately 20 acres. A modest improvement appears to be present in the southwestern area of the larger property and a residence appears to the west of this property. Current project area in disked grasses.

Highland Springs Avenue is present, but unpaved, as is the early alignment for 8th Street (unpaved). It is noted, Highland Springs Avenue will become the boundary between Beaumont (west) and Banning (east).

- **1949** The larger property was significantly changed by 1949, with various subdivision and improvements – primarily along the 6th Street and Highland Springs Avenue frontages. All three Assessor Parcels comprising the current project area are improved – presumably as residences, but possibly as small businesses. Because this area is still outside the incorporated boundaries of Beaumont, they were not included in the directories or represented in City records.

- **1953** Aerial photograph shows the three properties to be improved with structures near the Highland Springs Avenue frontage and the rear of the properties (west) being open land. No street addresses have been associated with these improvements (per directories), and no specific owner(s) has been identified.

- **1961** The improvements appear to be the same, with some additional vegetation around the structures. The large development on the east side of Highland Springs Avenue (at 8th Street) has been established (medical center).

- **1967** Same as 1961, no significant changes, although vegetation (trees) appear to obscure some improvements.

- **1975** No significant changes were noted. However, it appears that shortly after ca. 1975 (and certainly by 1985), this area has been incorporated into the City and directories begin to reference the properties by street address.

- **1985** The improvements at 695 Highland Springs Avenue have been demolished. The improvements at 675 Highland Springs Avenue may have been demolished, but the mature trees have obscured the property and this is not confirmed.

- **1989** It is apparent the improvements at 675 Highland Springs Avenue had been demolished.

- **1990** Improvements at 695 Highland Springs Avenue have been demolished and redevelopment initiated.

- **1996** 655 Highland Springs Avenue developed as the car wash and two northern parcels remain vacant.

- **2002** Improvement at 655 Highland Springs Avenue continue (rear building construction).

- **2006** No significant changes; property covered in dense grass cover, except in southeastern corner where area has been cleared an apparently used as a staging area for unspecified activity..

- **2012** Aerial photo shows some surficial impacts to 695 Highland Springs Avenue (not construction, but possibly used as a temporary staging area for improvements to the north.

- **2016** No significant changes.

Based on the data compiled BLM-GLO, County, City, historic research, and aerial photographs, the current project area was originally granted to the railroad (all of Section 11) and later sold in smaller lots to individuals settling in the Beaumont area. In this case, the project area is on the west side of Highland Springs Avenue and the very eastern extent of Beaumont and in an area still considered rural.

The earliest available directories date to 1981 and identify the occupants of 375 and 395 Highland Springs Avenue as Highland Springs realty and Highland Springs Mobile Homes, respectively. There was no listing for 655 Highland Springs Avenue.

From 1995 (and as early as 1991), the property at 655 Highland Springs Avenue has been occupied by the modern improvements identified as Highland Springs Car Wash, Labounty's Automotive, A1 Coins, Inc., and/or Splash Car Wash. There are no listings for 675 or 695 Highland Springs Avenue after 1981.

These properties were not covered by the Sanborn maps (not within the incorporated City when occupied) and the City was not responsible for or issuing building or use permits prior to annexing this area. McKenna et al. requested any address files that might be on file with the City, but was informed no files were available, as most files were out for digitizing and staff was limited due to COVID-19. City Hall was not open to the public and the County Archives were closed to research. McKenna et al. could not confirm the property ownership in the 1940s to 1980s, although such data may be available at some later date.

METHODOLOGY

To adequately investigate and address this project area for compliance with the California Environmental Quality Act, as amended, McKenna et al. relied on preliminary research completed for an adjacent property research in November, 2019, and supplemented that research for the current project area. By doing such, McKenna et al. was able to work around some research limitations resulting from the COVID-19 restrictions. In general, McKenna et al. completed the following tasks for CEQA compliance:

1. Archaeological Records Search: McKenna et al. completed a standard archaeological records search through the University of California, Riverside, Eastern Information Center, Riverside, California (Appendix B). This research was conducted as an in-house search and included a review of previously completed projects within one mile of the project area; a review of the recorded cultural resources within one mile of the project area; a review of listings for the National Register of Historic Places, the California Register of Historical Resources, California Landmarks, and California Points of Historical Interest. Historic maps were also reviewed. Although originally completed for the project area at 8th Street and Highland Springs Avenue, the research radius covered the current project area and provided all pertinent information for assessing the properties for cultural resource sensitivity. The results are documented later in this report (see Previous Research).

2. Native American Consultation: McKenna et al. consulted with the Native American Heritage Commission as to the presence/absence of sacred or religious sites in the vicinity of the project area (Appendix C). McKenna et al. relied on the letters sent for the previous studies to those Native American representatives identified by the Commission, requesting information on any issues, concerns, or resources they may be aware of and requested written responses. McKenna et al. identified the City as the Lead Agency for this project and recommended the individuals contact the city for formal consultation, if requested.

3. Paleontological Overview: A paleontological overview was prepared by the Natural History Museum of Los Angeles County for the general area (Appendix D). Data compiled by the Museum and supplemental data from the Riverside County GIS system were used to assess the potential for the project area to yield evidence of fossil specimens.

4. Historic Background Research: Historic background research was completed through a review of the Bureau of Land Management, General Land Office Records; San Bernardino County Archives; Riverside County Archives, Riverside County Assessor data; local research; and research through the McKenna et al. in-house library. Additional research was completed through the University of California, Riverside, Historic Map Library, and aerials photographs available on-line. McKenna et al. reviewed histories for the City of Beaumont and the San Gorgonio Pass. Some resources were found on-line, while others were found in published references. Supplemental data is presented in Appendix E of this report. (NOTE: McKenna et al. was provided the EDR summary for this area and incorporated the applicable data into this study. As noted above, McKenna et al. could not

complete the research at the City and County Archives, although research was attempted).

5. Field Survey: The field survey for this undertaking was completed on September 10, 2020. This fieldwork was completed by Jeanette A Mc-Kenna, Principal Investigator for McKenna et al. Prior to the completion of the field survey, McKenna et al. reviewed the Archaeological Records Search data and visited the Beaumont City Hall, Department of Community Planning to request supplemental data on the project area. To provide accurate and adequate coverage, the project area was subjected to an intensive level of survey with paralleling swaths averaging fifteen meters apart (east/west and from north to south). The surveyor carried a Garmin GPS unit to record any identified resources and the survey was supplemented by field notes (on file, McKenna et al.) and a detailed photographic record (Appendix E).

6. Analysis: The analysis was dependent upon the nature of the resources, if any, were identified within the project area and accordance with state guidelines and criteria (CEQA) for assessing the significance of the resources.

7. Report Preparation: This report was prepared in a format and with the data requirements consistent with the Office of Historic Preservation Archaeological Resource Management Report guidelines and the data requested by the University of California, Riverside, Eastern Information Center.

EVALUATION CRITERIA

The approach to the current research was designed to address the potential eligibility of any identified cultural resource for eligibility for the California Register of Historic Resources (CEQA, as amended). The state (CEQA, Section 15064.5) criteria for evaluation mirror the federal guidelines and read as follows:

a) For purposes of this section, the term "historical resources" shall include the following:

    1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Pub. Res. Code §5024.1, Title 14 CCR, Section 4850 et seq.).

    2) A resource included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must

treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code§5024.1, Title 14 CCR, Section 4852) including the following:

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

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

    C) 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

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

PREVIOUS RESEARCH

McKenna et al. completed a standard archaeological records search through the University of California, Riverside, Eastern Information Center, Riverside (Appendix B). This research confirmed the project APE was not previously surveyed for cultural resources but identified a minimum of 29 studies within one mile of the project area (Table 2).

As a result of the studies identified above, only six cultural resources have been recorded within one mile of the project area (Table 3). Both prehistoric and historic resources have been identified. None of these resources is within the project area, but the three resources recorded by Harris (2004) are located north of the current project area and within Section 2 (north of 8th Street).

Resources that were identified included properties included in the Office of Historic Preservation Historic Property Data File, including thirteen (13) properties determined "potentially eligible for National Register listing. Other structures were specifically identified as **NOT** eligible for National register listing, but may be of local interest. The remaining resources have not been evaluated. None of the resources are within one mile of the current project area.

Table 2. Cultural Resources Investigations Completed within One Mile of the Current Project Area.			
Report	Citation	Description	Resources
RI-01432	SRS 1986	Stewart Ranch Monitoring	
RI-01433	SRS 1985	Stewart Ranch Project	
RI-01434	SRS 1981	900 Acres Stewart Ranch	Yes
RI-01830	Sutton 1984	Parcel 18132	
RI-02210	Underwood et al. 1986	US Telecom Fiber Optic Cable	Yes
RI-02917	McMillan 1989	Sewer System, Beaumont	Yes
RI-03421	Brown & Shinn 1989	1162 Deutsch Specific Plan	
RI-03852	Whitney-Desautels 1993	Water Importation Project	
RI-04840	Demcak 2002	23 Acres	
RI-04841	Demcak 2002	23 Acres Addendum	
RI-06722	Brunzell 2006	Deutsch Prop. Specific Plan	Yes
RI-07055	Tang & Hogan 2007	APN 419-170-031	
RI-03997	Shepard & McKenna 1996	3 Acres and Pipeline	Yes
RI-04421	LSA Associates 1990	Measure A Program	Yes
RI-04815	York & Wooley 1987	Oak Valley Evaluation	Yes
RI-07364	Crews & Sander 2007	29.7 Acres	
RI-08027	Allred 2009	Cell Tower Site	
RI-08409	Eckhardt et al. 2004	Transmission Alignment	Yes
RI-08449	Tang et al. 2004	Beaumont General Plan	
RI-08980	Justus et al. 2010	DPV2 Construction Yards	Yes
RI-09167	McLean et al. 2013	Devers Project	Yes
RI-09230	Puckett 2014	Transmission Alignment	Yes
RI-09460	Tang & Hogan 2015	Beaumont Project	
RI-10157	Williams and Belcourt 2014	Transmission Alignment	Yes
RI-10219	Puckett 2015	Cell Tower Site	
RI-10461	Eckhardt et al. 2015	Transmission Alignment	Yes
RI-10478	McKenna 2018	6th and Maple Septic Project	Yes
RI-10754	Garrison and Smith 2018	Atwell Project	Yes
RI-10766	Garrison and Smith 2018	Atwell Project Phase II	Yes

The paleontological overview for this undertaking identified the project area as consisting entirely of "… Quaternary Alluvium, derived as alluvial fan deposits from the San Jacinto Mountains." Despite these deposits of Quaternary Alluvium (Upper Pleistocene and Holocene deposits), the shallow deposits are not considered sensitive for paleontological specimens. However, deeper deposits of older Quaternary Alluvium (Late Pleistocene), likely present in pockets, have been associated with paleontological specimens. McLeod (2018 and 2020) concluded shallow excavations are not likely to impact fossil bearing deposits, but deeper excavations may impact Older Quaternary Alluvium (fossil bearing deposits) and, therefore, should be subjected to paleontological monitoring – specifically in areas of undisturbed substrate.

Table 3. Cultural Resources Identified within One Mile of the Current Project Area.

Primary No.	Trinomial	Citation	Description
---	CA-RIV-4038	Drover and Smith1990	Lithic Scatter
33-013827	---	Harris 2004	Historic Refuse
33-013828	---	Harris 2004	Historic Refuse
33-013829	---	Harris 2004	Historic Complex
33-015033	CA-RIV-7997	Decarlo and Mengers 2018; Williams 2014; Miller et al 2013; Wilson and Giacinto 2010; Brunzell 2006	Smith Creek Ditch
33-015034	CA-RIV-7998	Brunzell 2006	Modern and Historic Refuse

Summary

As noted above, the project area has not been associated with any recorded prehistoric archaeological resources, historic archaeological resources, built environments, or paleontological resources. Numerous historic structures have been recorded west of Pennsylvania Avenue and research identified earlier improvements with the project area. These improvements have since been removed (no physical evidence). Nonetheless, since the San Gorgonio Pass is known to have been a major trade route during both prehistoric and historic times, there is a low to moderate potential for the presence of buried prehistoric and/or historic archaeological resource. The area should be considered to have a low to moderate level of sensitive for archaeological and paleontological resources.

RESULTS OF THE INVESTIGATION

At the time of the recent field investigations, the weather was clear and warm (hot). McKenna et al. confirmed APN -046 was development with the modern car wash complex and no native soils were exposed (Figure 6). All of Parcel -046 was under paved surfaces and/or structures. Parcels -026 and -027 were confirmed to be vacant. Both were easily accessed from Highland Springs Avenue and found to be covered with dry grasses, some weeds, and both young and mature trees. Smaller trees were found along the western boundaries, along the fence line, and intermittently within the properties (Figure 7).

Ground visibility on the two northern parcels ranged from 25% to 75%. The survey was determined to be consistent with an intensive level of coverage and findings deemed credible. Summaries of the findings are presented below.

Figure 6. Modern Improvements within Parcel -046, 655 Highland Springs Avenue, Beaumont (WNW).

Native American Consultation

The Native American Heritage Commission responded to the McKenna et al. request for data pertaining to the project area at 8th Street and Highland Springs Avenue, but were designed to cover an area larger than the project-specific area. As such, the findings also included the current project area and McKenna et al. was informed the Commission's files have no records of any sacred or religious sites in the general area. No burials were reported. To date, McKenna et al. has received no responses to the letters sent to local Native American representatives.

The project area is relatively close to the Morongo Band of Mission Indians reservation and the Morongo. As a rule, the Morongo request copies of technical reports for review and to insure no Native American resources will be adverse impacted by any proposed project. McKenna et al. recommends the City initiate contact with the Morongo representatives to assure compliance with consultation requirements.

Figure 7. Young Trees Bounding the Western Boundary of Parcels -026 and -027, 675 and 795 Highland Springs Avenue (W).

Paleontological Resources

The paleontological overview for this undertaking identified the project area as consisting entirely of "… Quaternary Alluvium, derived as alluvial fan deposits from the San Jacinto Mountains." Shallow deposits are not considered sensitive for paleontological specimens, but deeper deposits of older Quaternary Alluvium (Late Pleistocene) may yield paleontological specimens. McLeod (2018 and 2020) concluded very shallow excavations are not likely to impact fossil bearing deposits, but deeper excavation may and, therefore, should be subjected to paleontological monitoring – specifically in areas of undisturbed substrate. A monitoring program consistent with the policies and guidelines of the County Geologist should be considered, should project-related grading and site preparation impact the older Quaternary deposits. The County generally requires any excavations exceeding eight feet below present-day surfaces and/or excavations impacting older alluvium be subjected to paleontological monitoring.

Archaeological Resources

No evidence of prehistoric or historic archaeological resources were identified within the project area. Much of the project area was dominated by intrusive grasses and trees, while approximately 1/3 of the project area was paved. Visual inspection yield no evidence of the previous improvements, save the presence of mature trees.

The native soils have been disturbed by disking, weed abatement, peripheral road development, and impacts from demolition activities (occurring in the 1980s). No evidence of foundations was found, but gravel within the properties were indicative of driveway or parking areas.

Built Environment

There are no standing structures on the two northern parcels and the structures on the southern parcel (-046; 655 Highland Springs Avenue) are all modern (post-1990). There are no historic structures within the project area and, therefore, there will be no impacts to historic structures.

Ethnic Resources or Historic Landscapes

No physical or documentary evidence was found to suggest the project area (all three parcels) is associated with a specific ethnic group or indicative of a cultural landscape, as each is defined in the guidelines and policies. Therefore, these are not issues requiring addressing in this overall investigation.

Summary

In summary, McKenna et al. found no physical evidence of archaeological or paleontological resources within the project area. This finding is based primarily on a visual examination of the exposed native soils per a surface survey. Likewise, no ethnic or historic landscapes were identified. Standing structures were limited to the southern parcel and confirmed to be modern and of no historical significance. While no surficial evidence of prehistoric or historic archaeological resources was identified, the local Native American community considers the area of the San Gorgonio Pass to be highly sensitive for potentially significant Native American resources. Likewise, the property area has been associated with early Beaumont (and Banning) development. With limited documentary resources available, archaeological evidence may be the only source of property-specific resource identification. There is still a potential for late-period historic archaeological evidence to be present in a shallow context. If uncovered, an archaeological monitoring program should be initiated for the remainder of the earthmoving activities. The built environment is not applicable to this analysis.

McLeod, in assessing the potential for paleontological resources, recommended paleontological monitoring if excavations impact older alluvium, in which fossil bearing deposits are likely to be impacted by the undertaking. Overall, the subsurface within the project area is still considered sensitive for paleontological resources. McKenna et al. concurs with McLeod and the project area should be deemed sensitive for buried resources and monitored if older alluvium is impacted.

FINDING OF FACT

No surficial evidence of cultural/archaeological or paleontological resources was found during the recent investigations. The project area is considered clear of any surface resources, but McKenna et al. acknowledges there is still a relative level of sensitivity for buried resources. To avoid any adverse impacts to previously unidentified finds (paleontological or archaeological), McKenna et al. has developed recommendations consistent with CEQA to lessen any impacts to a level of insignificance.

RECOMMENDATIONS

Based on the relative sensitivity for the project area to be associated with prehistoric archaeological resources, historic archaeological resources, and/or paleontological resources, McKenna et al. is recommending the following:

Mitigation Measure CR-1: Should older Quaternary Alluvial deposits be encountered during site preparation activities, a qualified paleontologist shall oversee the excavations to insure any paleontological specimens are identified, recovered, analyzed, reported, and curated in accordance wit CEQA and the County of Riverside policies and guidelines. This program should be conducted while these older deposits are impacted and while the paleontological consultant deems the program necessary..

Mitigation Measure CR-2: A qualified archaeologist shall oversee excavations in the younger alluvial deposits (Holocene) during the first two days of ground disturbance. If the archaeologist determines it necessary, an archaeological monitoring program shall be implemented. The monitoring program shall be conducted in accordance with current professional guidelines and protocols. The program should be designed to be flexible and account for changes in findings through the management of the resources in a professional manner and via evaluation in accordance with the current CEQA criteria. If Native American resources are identified, a Native American (Morongo) representative should be included in any monitoring program.

Mitigation Measure CR-3: If, at any time, human remains or suspected human remains are identified within the project area, the Contractor will halt work in the immediate vicinity of the find and establish a buffer zone around the find. If the archaeological consultant is on-site, the archaeological consultant will oversee this level of protection. The City will be immediately notified and the City will contact the County Coroner (within 24 hours). The Coroner has the authority to examine the find in situ and make a determination as to the nature of the find:

a) If the remains are determined to be human, the Coroner will determine whether or not they are likely of Native American origin. If so, the Coroner will contact the Native American Heritage Commission and the Commission will name the Most Likely Descendent (MLD). In consultation between the City, Property Owner, MLD, and consulting archaeologist, the disposition of the remains will be defined. If there is a conflict, the Native American Heritage Commission with act as an mediator.

b) If the remains are determined to be archaeological, but not of Native American origin, the City, Property Owner and archaeological consultant will determine the management of the find and the removal from the site. The Property Owner would be responsible for any costs related to the removal, analysis, and reburial.

c) If the remains are determined to be of forensic value, the Coroner will arrange for the removal of the remains and oversee the analysis and disposition.

CERTIFICATION

CERTIFICATION. I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological/cultural resources report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Jeanette A. McKenna — March 23, 2021

Jeanette A. McKenna, Principal Investigator, McKenna et al. — Date (of revisions)
Certified Riverside County Cultural Resources Consultant #62

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APPENDIX D
FUEL CALCULATIONS

Operational Trips

Use	Annual Miles	MPG	Total Gallons (50%)
Fast food restaurant with Drive-thru	3871855.0	24	80663.6
General Office Building	282585.0	24	5887.2
Other Non-asphalt surfaces	0.0	24	0.0
Parking Lot	0.0	24	0.0
		Total	86550.8

Use	Annual Miles	MPG	Total Gallons (50%)
Fast food restaurant with Drive-thru	3871855.0	7	276561.1
General Office Building	282585.0	7	20184.6
Other Non-asphalt surfaces	0.0	7	0.0
Parking Lot	0.0	7	0.0
		Total	276561.1
		Grand Tota	**363111.9**

Car Wash Remodel in Beaumont

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors **[1]**:

HP: 0 to 100	0.059	HP: Greater than 100	0.0529

Values above are expressed in gallons per horsepower-hour/BSFC.

CONSTRUCTION EQUIPMENT							
Construction Equipment	**#**	**Hours per Day**	**Horsepower**	**Load Factor**	**Construction Phas**	**Fuel Used (gallons)**	**Total Gallons**
Graders	1	8	187	0.41	Site Prep	97.34	97.34
Other Material Handling Eqp.					Site Prep	0.00	0.00
Scrapers	1	8	367	0.48	Site Prep	223.65	223.65
Tractors/Loaders/Backhoes	1	7	97	0.37	Site Prep	44.32	44.32
Concrete/Industrial Saws					Grading	0.00	0.00
Graders	1	8	187	0.41	Grading	194.68	194.68
Excavators					Grading	0.00	0.00
Rubber Tired Dozer	1	8	247	0.4	Grading	250.87	250.87
Tractors/Loaders/Backhoes	2	7	97	0.37	Grading	88.63	177.27
Bore/Drill Rig					Building Con.	0.00	0.00
Cranes	1	8	231	0.29	Building Con.	6237.04	6237.04
Forklifts	2	7	89	0.2	Building Con.	1611.83	3223.65
Generator Sets	1	8	84	0.74	Building Con.	6432.81	6432.81
Other Construction Eqp.					Building Con.	0.00	0.00
Rubber Tired Dozer					Building Con.	0.00	0.00
Tractors/Loaders/Backhoes	1	6	97	0.37	Building Con.	2785.64	2785.64
Welders	3	8	46	0.45	Building Con.	2142.20	6426.60
Cement and Mortar Mixers	1	8	9	0.56	Paving	23.71	23.71
Concrete/Industiral Saws					Paving	0.00	0.00
Dumpers/Tenders					Paving	0.00	0.00
Graders					Paving	0.00	0.00
Pavers	1	8	130	0.42	Paving	231.07	231.07
Paving Equipment	1	8	132	0.36	Paving	201.10	201.10
Rollers	2	8	80	0.38	Paving	143.00	286.00
Tractors/Loaders/Backhoes	1	8	97	0.37	Paving	168.83	168.83
Air Compressors	1	6	78	0.48	Architectual Coat.	132.09	132.09
					Total Fuel Used	21008.81	**27136.67 (Gallons)**

Construction Phase	**Days of Operation**
Site Preparation	3
Grading	6
Building Construction	220
Paving	10
Architectual Coating	10

WORKER TRIPS					
Construction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)	Total Gallons
Site Prepration Phase	24.0	8	19.8	6.60	19.8
Grading	24.0	10	19.8	8.25	49.5
Building Construction Phase	24.0	39	19.8	32.18	7078.5
Paving Phase	24.0	15	19.8	12.38	123.75
Architectural Coating	24.0	8	19.8	6.60	66
			Total	66.00	**7337.55**

VENDOR TRIPS					
Construction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)	Total Gallons
Site Preparation Phase	7.4	0	7.9	0.00	0.00
Grading	7.4	0	7.9	0.00	0.00
Building Construction Phase	7.4	15	7.9	16.01	3522.97
Paving Phase	7.4	0	7.9	0.00	0.00
			Total	16.01	**3522.97**

Construction Phase	Days of Operation
Site Preparation	3
Grading	6
Building Construction	220
Paving	10
Architectural Coating	10

Total Gasoline Consumption (gallons)	**10860.52**
Total Diesel Consumption (gallons)	**27136.67**

Sources:

[1] United States Environmental Protection Agency. 2018. Exhaust and Crankcase Emission Factors for Nonrod Compression-Ignition Engines in MOVES2014b. July 2018. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf.

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APPENDIX E
SOIL INVESTIGATION AND INFILTRATION TESTS REPORT

SOIL EXPLORATION COMPANY, INC.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

March 16, 2020

Project No. 19137-01

TO: Ali Harb
Harkon, Inc.
18651 Van Buren Blvd.
Riverside, CA 92508

SUBJECT: Preliminary Soil Investigation and Infiltration Tests Report, Proposed Office Complex, 675 and 695 N. Highland Springs Ave (APN 419-150-026, & -027), City of Beaumont, California

Introduction

In accordance with your authorization, Soil Exploration Co., Inc. has performed a preliminary soil investigation and infiltration tests for the subject site (see Figure 1, Site Location Map). The accompanying report presents a summary of our findings, conclusions, recommendations and limitations of our work for construction of the proposed office complex and associated parking and driveway(s).

Scope of Work

- Review soils, geologic, seismic, groundwater data and maps in our files.
- Perform exploration of the site by means of four 8" diameter borings, 16.5 to 25 feet deep, at readily accessible locations.
- Field Engineer (California Registered RCE) for logging, sampling of select soils, observation of excavation resistance, record SPT blow counts and water seepage (if any).
- Perform basic laboratory testing on select soil samples, expected to include moisture, density, sand equivalent, expansion index and water soluble sulfates.
- Perform digitized search of known faults within a 50-mile radius of the site.
- Determine California Building Code (CBC) 2019 seismic parameters for the site.
- Consult with project architect/civil design engineer.
- Perform four shallow infiltration tests at locations suggested by you.
- Prepare a report of our findings, conclusions and recommendations for site preparation, including overexcavation/removal depth, allowable bearing value, foundation/slab-on-grade depth/thickness recommendations, excavation characteristics, lateral static/seismic earth pressures for retaining walls design, general grading and grading specifications, California Building Code (2019) seismic design coefficient, Cal/OSHA soil classification and infiltration rate in inches/hour.

Existing Site Condition

The rectangular shaped, relatively flat, vacant site is located on the east side of N. Highland Spring Ave. and north of E. 6th St. in the City of Beaumont, Riverside County, California. N. Highland Spring Ave. is a paved road with curbs and gutters. A chain link fence borders the site on the north and west side. A medical and dental building is located on adjacent property to the north, a car wash to the south and an existing house to the west. Vegetation consists of dense weeds, scattered trees and debris.

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soilexploration@yahoo.com • www.soilexp.com

The approximate locations of the above and other features are shown on Exploratory Boring and Infiltration Tests Location Map (Plate 1).

Proposed Development

We understand that a two-story office complex and related improvements are proposed at the site. We understand that the proposed structures will be wood frame construction with concrete slabs supported on prepared subgrade. Based on the relatively flat topography of the site, modest cut or fill grading and no significant cut or fill slopes are proposed.

Field Work

Four exploratory borings were drilled on February 14, 2020, to a maximum depth of 20 feet below existing ground surface, utilizing a B-53 mobile drill rig equipped with 8-inch diameter hollow stem auger. Refer to Plate 1 for boring locations. Standard Penetration Tests (SPT) blow counts were recorded for the earth materials. Relatively undisturbed samples of the soils were also obtained by utilizing California Ring Sampler.

In general these borings revealed that the site area is underlain by alluvial soils consisting of silty sand (USCS "SM"). The earth materials are loose to very dense. Geologic Map of the Beaumont Quadrangle shows the site area is underlain with alluvial-fan deposits (see Figure 2). Detailed descriptions of the earth materials encountered are presented in the form of Geotechnical Boring Logs in Appendix B.

Laboratory Testing

Laboratory tests were performed for select soils samples. The tests consisted primarily of natural moisture contents, dry density and water soluble sulfates. . Laboratory test results are presented in Appendix C and with Geotechnical Boring Logs in Appendix B.

Groundwater/Liquefaction

Groundwater, seepage or wet soils were not encountered in our exploratory borings, drilled to a maximum depth of 20 feet, at the time this work was performed. Groundwater study is not within the scope of this work. However groundwater data from State well in the vicinity of the site is tabulated below (see Figure 1, Site Location Map, for location of well):

State Well No.	WSE* (ft)	Date Measured	Distance/Location Relative to Site	Estimated Depth of Water Below Site (ft)
03S01W01N00S	2300.09	12/3/1930	N/0.33 miles	308.3
	2240.89	10/26/1999		367.5
03S01W12E001S	2191.4	11/17/2000	SE/0.13 miles	401
	2189.27	11/06/2017		390.73

* WSE = Water Surface Elevation

Liquefaction occurs when loose, fine grained (poorly graded), saturated cohesionless soils are subject to ground shaking during an earthquake of large magnitude. Liquefaction potential in general is relatively high when the ground water table is less than thirty feet below ground surface. Based on the Riverside County GIS map, the site is located in a zone of low liquefaction potential (see Figure 3). Considering depth to groundwater (over 300 feet below ground surface), the potential for liquefaction at the site is very low.

Seismicity/Faulting

The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone or County of Riverside fault zone.

A computer search of known Quaternary major faults within 50 miles of the site from USGS National Seismic Hazard Maps is presented in Appendix D. Please note that it is probable that not all-active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Conclusions

- Any vegetable matter, existing structures, old foundations, seepage pits, leach lines, septic tanks, old fills, buried utilities/irrigation lines, etc. and deleterious materials associated with previous use of the site would require removal from the proposed building/grading areas.
- Overexcavation and recompaction of loose/porous surficial soils should be anticipated to provide adequate and uniform support for the proposed building(s), pavement and settlement sensitive improvements. All earth materials encountered during our exploration can be excavated with normal grading equipment in good working condition.
- Based on observations and soil classification, the expansion potential of the sandy foundation soils at the site is expected to be very low (EI<20).
- Subsequent to site preparation the use of shallow spread footings appears feasible for the proposed construction.
- Site is located approximately 6.70 miles from the San Jacinto fault. The site is located in a region of generally high seismicity, as is all of Southern California. During its design life, the site is expected to experience moderate to strong ground motions from earthquakes on regional and/or nearby causative faults.
- There is a 2 percent probability in 50 years (2475 year return period) that site modified peak ground acceleration (PGAm) at the site will be 0.917g (see Appendix D).
- Based on Riverside County GIS map, the site is in an area of low liquefaction potential (see Figure 3).
- Flooding potential of the site should be determined by the design civil engineer and considered in planning and construction.
- The potential for seismically induced dynamic settlement of the onsite sandy soils during a strong earthquake is low, however cannot be precluded. This would be partially mitigated by overexcavation and recompaction of the upper foundations soils.
- Groundwater and/or seepage were not encountered during our subsurface investigation. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. We have no way of predicting depth to the groundwater which may fluctuate with seasonal changes and from one year to the next due to precipitation, irrigation, land use, climatic conditions as well as other factors. Subdrains, horizontal drains or other devices may be recommended in future for graded areas that exhibit nuisance seepage conditions.

Recommendations

Site Preparation/Overexcavation

All grading and backfills should be performed in accordance with City of Beaumont Grading Ordinance and the attached General Earthwork and Grading Specifications (Appendix E), except as modified in the text of this report. The proposed grading area should be cleared of existing structures, vegetation and deleterious material which should be hauled off site.

New buildings/structures should be provided with a compacted fill mat that extends to at least 5 feet beyond the structure lines in plan (where practical) and to a depth of at least 3 feet below existing ground or proposed grade, whichever is deeper. The excavated bottoms should be cleaned of roots, soft spots, deleterious materials, old fills, etc. As a result, deeper excavations should not be precluded. After cleaning of the excavated bottom, the exposed surfaces should be further scarified to a depth of at least 6 inches, thoroughly watered and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557-12 Test Method, prior to placement of fill. All fills should be compacted to at least 90 percent of the maximum dry density.

Compacted Fills/Imported Soils

Any soil to be placed as fill, whether presently onsite or import, should be approved by the soil engineer or his representative prior to its placement. All onsite soils to be used as fill should be cleansed of any roots or other deleterious materials. Cobbles larger than 3 inches in diameter should not be placed in the vicinity of foundations and for utility line backfills. All fills should be placed in 6 to 8 inch loose lifts, thoroughly watered, mixed and compacted to at least 90 percent relative compaction. This is relative to the maximum dry density determined by ASTM 1557-12 Test Method.

Any imported soils should be sandy (preferably (USCS "SM" or "SW" and very low in expansion potential, EI<20) and approved by the soil engineer. The soil engineer or his representative should observe the placement of fill and take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained.

Foundation Design/Footings

Following site preparation, the use of shallow spread footings is feasible. A maximum allowable bearing value of 2000 psf is recommended. This bearing pressure has been established based on the assumption that the footings will be embedded at least 18 inches below lowest adjacent firm grade and into the onsite compacted soil mat, and measure at least 15 inches in width. Isolated column footings should be embedded at least 24 inches below lowest adjacent firm grade. This bearing value may be increased by one third for temporary (wind or seismic) loads. Reinforcement of the footings should be determined by qualified structural engineer, however minimum reinforcement of two No. 5 bars at top and two at bottom of continuous footings is recommended.

Concrete Slabs-On-Grade

Floor slabs-on-grade should be at least 4 inches thick and should be reinforced with at least No. 3 bars at 18-inches on-center both ways, properly centered in mid-thickness of slabs (structural recommendations govern). Thicker slabs (at least 8 inches thick and supported on 4-inch thick aggregate base) should be considered for canopy area and driveways by structural design engineer based on the use of facilities.

A moisture barrier comprised of 10-mil Visqueen underlain with 2-inches of sand below the Visqueen should be provided for office areas and where moisture intrusion from slabs-on-grade is objectionable. The Visqueen member should be lapped and sealed around all utility conduits. We recommend that a slipsheet (or equivalent) be utilized if grouted tiles or other crack sensitive flooring (such as marble tiles) is planned directly on concrete slabs.

Concrete Joints

The joints spacing for concrete slabs should be determined by the project architect. Joints should be laid out to form approximately square panels (equal transverse and longitudinal joint spacing). Rectangular panels, with the long dimension no more than one-and-one-half times the short, may be used when square panels are not feasible. The depth of longitudinal and transverse joints should be one-fourth the depth of the slab thickness.

Joint layout should be adjusted so that the joints will line up with the corners of structures, small foundations and other built-in structures. Acute angles or small pieces of slab curves as a result of joints layout should not be permitted.

Concrete Slump/Curing

The use of mechanically compacted/dense concrete with slump not exceeding 4 inches is recommended. Fresh concrete should be cured by protecting it against loss of moisture, rapid temperature change, and mechanical injury for at least 3 days after placement. Moist curing, waterproof paper, white polyethylene sheeting, white liquid membrane compound, or a combination thereof may be used. After finishing operations have been completed, the entire surface of the newly placed concrete should be covered by whatever curing medium is applicable to local conditions and approved by the engineer. The edges of concrete slabs exposed by the removal of forms should be protected immediately to provide these surfaces with continuous curing treatment equal to the method selected for curing the slab surfaces. The contractor should have at hand and ready to install before actual placement begins the equipment needed for adequate curing of the concrete.

Special Considerations/Excess Soils From Foundation Excavations

Excess soils generated from foundation excavations should not be placed on slabs and driveways without proper moisture and compaction. Slab subgrade should be verified to contain 1.2 times the soil optimum moisture content to a depth of 6 inches prior to placement of slab building materials. Moisture content must be tested in the field by the soil engineer. The addition of fiber mesh in the concrete and careful control of water/cement ratios may lessen the potential for slab cracking.

In hot or windy weather (80°F or 12 mph), the contractor must take appropriate curing precautions after the placement of concrete. The use of mechanically compacted low slump concrete (not exceeding 4 inches at the time of placement) is recommended.

Lateral Earth Pressures

The following lateral earth pressures and soil parameters in conjunction with the above recommended bearing value (2000 psf), may be used for design of canopy caissons and retaining walls with free draining compacted backfills. If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the following recommendations:

Active Earth Pressure with level backfill (P_a)	35 pcf (EFP), drained, yielding
At Rest Pressure (P_0)	55 pcf (EFP), drained, non-yielding (part of building wall)
Passive Earth Pressure (P_p)	250 pcf (EFP), drained, maximum of 2500 psf
Horizontal Coefficient of Friction (μ)	0.30
Unit Soil Weight (γ_t)	120 pcf
Skin Friction Value (caissons)	300 psf/foot of bounding area of caisson

We recommend drainage for retaining walls to be provided in accordance with Plate 2 of this report. Maximum precautions should be taken when placing drainage materials and during backfilling. Retaining walls should be waterproofed in accordance with project architect recommendations. All wall backfills should be properly compacted to at least 90 percent relative compaction.

Seismic Considerations

The site is located approximately 6.70 miles from the San Jacinto fault. The site soils class is D. Moderate to strong ground shaking can be expected at the site and there is a 2 percent probability in 50 years (2475 year return period) that site modified peak ground acceleration (PGAm) will be 0.917g. The site soil profile is Class D (stiff soils). The structural engineer should consider City/County local codes, California Building Code (CBC) 2019 seismic data presented in this report (Appendix D), the latest requirements of the Structural Engineers Association of Southern California and any other pertinent data in selecting design parameters.

Expansion Index and Soluble Sulfates

Based on observation and soil classification, the expansion potential of the onsite soils is anticipated to be very low (EI<20).

Results of tests also performed by Cal Land Engineering, Inc. of Brea, California on a select soil sample indicate moderate soluble sulfate exposure (0.18 percent water soluble sulfates by weight) (see Appendix C). Concrete, mix, placement and curing for concrete should comply with ACI guidelines. Based on sulfate test results, cement type II maximum water cement ration of 0.50 and minimum 4000psf compression strength should be used. Ferrous metal pipes should be protected in accordance with recommendations of your structural or corrosion engineer.

Surface Drainage/Groundwater

The surface of the site should be graded to provide positive drainage away from structures and foundations. Drainage should be directed to established swales and then to appropriate drainage structures to minimize the possibility of serious erosion. Surface drainage must be directed and maintained away from the foundations. Water, either natural or by irrigation, should not be permitted to pond or saturate the surface soils.

Pavement Design/Subgrade-Base Compaction

On the basis of laboratory classification, we are of the opinion that the tentative new pavement design may be based on an R-value on the order of 30 (or better) corresponding to near surface soils. Considering this and based on typical traffic indices, the recommended pavement sections are outlined as follows:

Location	TI	Recommended Tentative Pavement Thickness
Heavy Truck/Traffic	6.5	4" asphalt concrete over 8" Class II aggregate base
Concrete Pad Areas	---	8" PCC over 4" Class II aggregate base
Vehicle Drive Area	5.5	3" AC over 7" aggregate base
Parking Area	4.5	3" AC over 4" aggregate base

The upper at least 12 inches of pavement subgrade soils should be recompacted to at least 95 percent relative compaction per maximum dry density determined by ASTM D1557-12. The aggregate base should also be compacted to at least 95 percent relative compaction. All subgrade and base must be firm and unyielding without pumping condition prior to placement of asphalt concrete or PCC pavement. Reinforcement of the concrete pavement (with at least No. 3 bars at 18-inches on-center) and use of 4000 psi concrete should also be a consideration.

Cal/OSHA Classification/Trench Excavations/Backfills

In general Cal/OSHA classification of onsite soils appears to be Type B.

Temporary trench excavations deeper than 5 feet should be shored or sloped at 1:1 or flatter in compliance with Cal/OSHA requirements:

a.) The shoring should be designed by a qualified engineer experienced in the shoring design.

b.) The tops of any temporary unshored excavations should be barricaded to prevent vehicle and storage loads within a 1:1 line projected upward from the bottom of the excavation or a minimum of 5 feet, whichever is greater. If the temporary construction embankments, including shored excavations, are to be maintained during the rainy season, berms are suggested along the tops of the excavations where necessary to prevent runoff from entering the excavation and eroding the slope faces.

c.) The soils exposed in the excavations should be inspected during excavation by the soils engineer so that modifications can be made if variations in the soil conditions occur.

d.) All unshored excavations should be stabilized within 30 days of initial excavation.

Backfills in the utility trenches should be compacted to at least 90 percent relative compaction. Onsite earth materials will be suitable for backfills. Clean sandy materials with sand equivalent value of at least 30 must be utilized for the pipe bedding and shading zone. Placement of the trench backfill in lifts and compaction by mechanical effort should be anticipated.

Foundation Plan Review/Observations and Testing

The recommendations provided in this report are based on preliminary design information and subsurface conditions as interpreted from limited exploratory work. Soil Exploration Co., Inc. should review the foundation plans prior to construction. Our conclusions and recommendations should also be reviewed, verified during grading/construction and revised as necessary.

Soil Exploration Co., Inc. should observe and/or test at the following stages of construction:

- During all overexcavations and grading.
- Following footing excavation and prior to placement of footing materials.
- During wetting of slab subgrade and prior to placement of slab materials.
- During all trench and wall backfills.
- During subgrade and base compaction prior to paving.
- When any unusual conditions are encountered.

Final Compaction Report

A final report of compaction control should be prepared subsequent to the completion of grading. The report should include a summary of work performed, laboratory test results, and the results, locations and elevations of field density tests performed during grading.

Limitation of Investigation

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar locations. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The field and laboratory test data are believed representative of the project site; however, soil conditions can vary significantly. As in most projects, conditions revealed during grading may be at variance with preliminary findings. If this condition occurs, the possible variations must be evaluated by the Project Geotechnical Engineer and adjusted as required or alternate design recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractor carry out such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In additions, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

This report was prepared for the client based on client's needs, directions and requirements at the time. This report is not authorized for use by and is not to be relied upon by any party except the client with whom Soil Exploration Co., Inc. contracted for the work. Use of, or reliance on, this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Soil Exploration Co., Inc. from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Soil Exploration Co., Inc.

Closure

If you should have any questions or concerns regarding this report, please do not hesitate to call our office. We appreciate this opportunity to be of service.

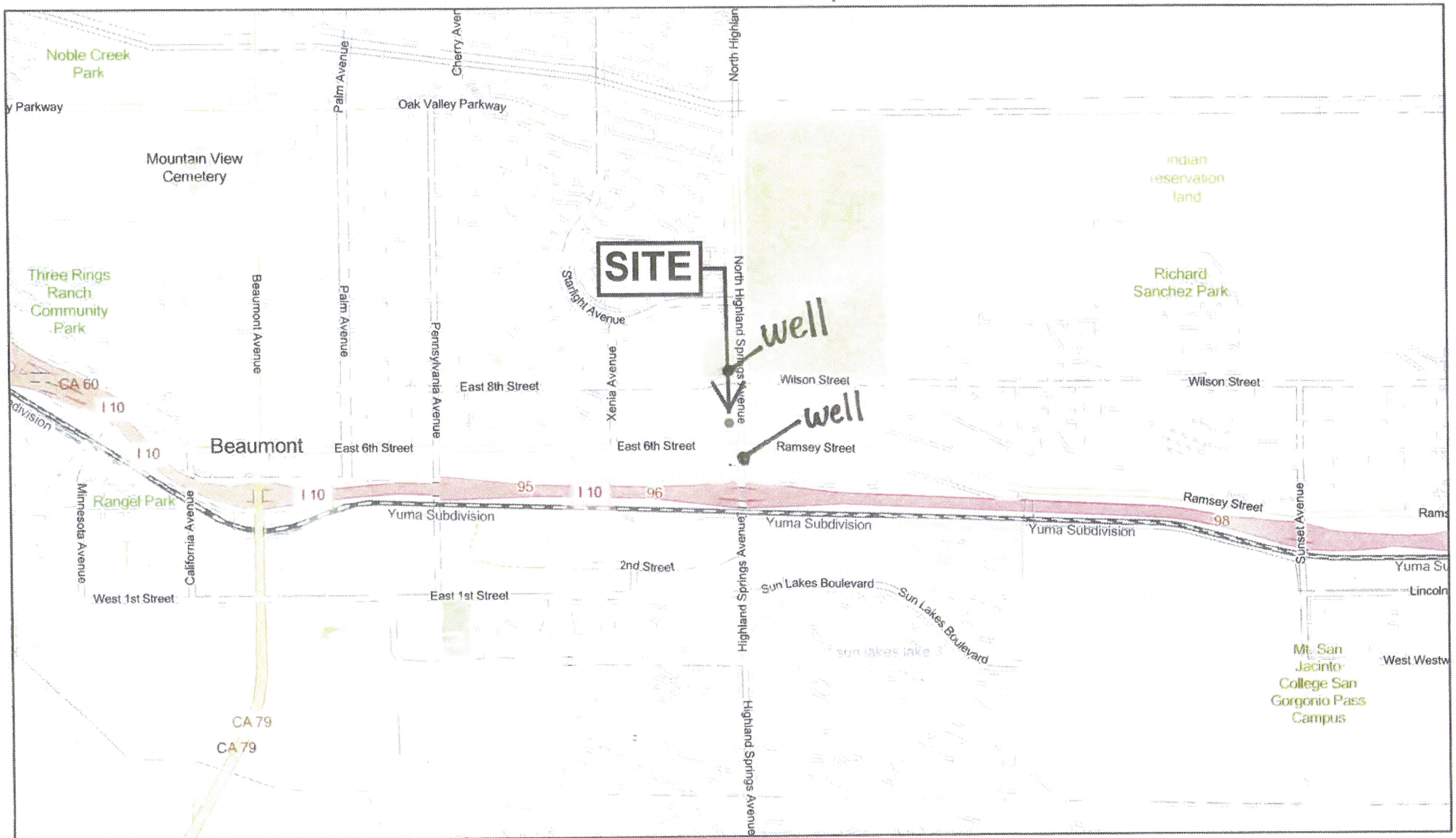
Very truly yours,
Soil Exploration Co., Inc.

REGISTERED PROFESSIONAL ENGINEER
GENE KINH-TOAN LUU
C 53417
EXP. 6/30/21
CIVIL
STATE OF CALIFORNIA

Gene K. Luu, PE 53417
Project Engineer

Distribution:	[1] Addressee	
Attachments:	Figure 1	Site Location Map
	Figure 2	Geologic Map
	Figure 3	Riverside County GIS Map
	Figure 4	U.S. Geological Survey Faults Map
	Plate 1	Exploratory Boring and Infiltration Test Location Map
	Plate 2	Retaining Wall Backfill and Subdrain Detail
	Appendix A	References
	Appendix B	Geotechnical Boring Logs
	Appendix C	Laboratory Test Results
	Appendix D	National Seismic Hazard Maps-Source Parameters and CBC (2019) Seismic Parameters
	Appendix E	General Earthwork and Grading Specifications
	Appendix F	Infiltration Test Procedure and Test Results

Site Location Map



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1:36,112

0 0.25 0.5 1 mi

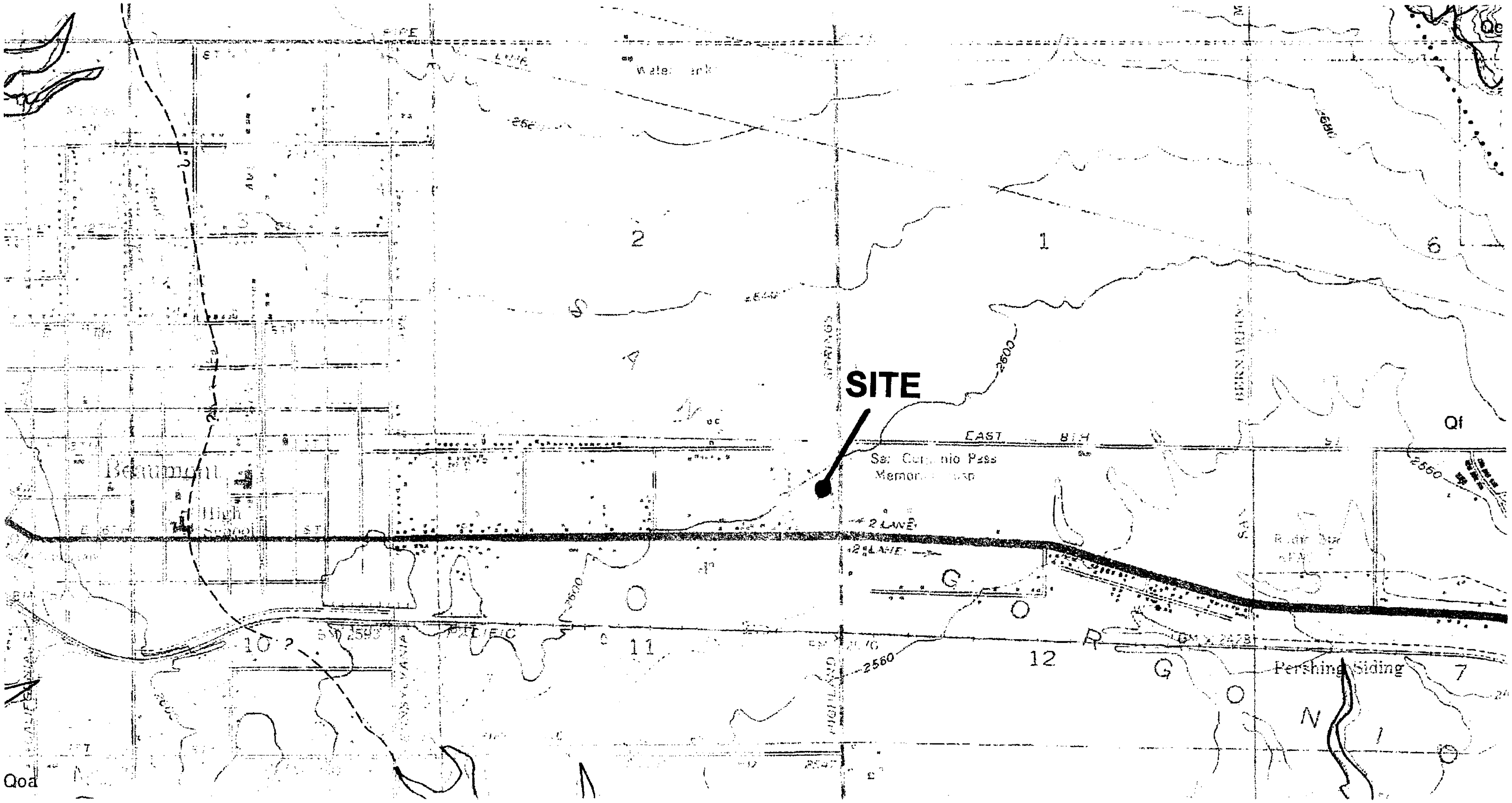
0 0.4 0.8 1.6 km

Map data © OpenStreetMap contributors, Map layer by Esri

N

Figure 1

Map data © OpenStreetMap contributors, Map layer by Esri



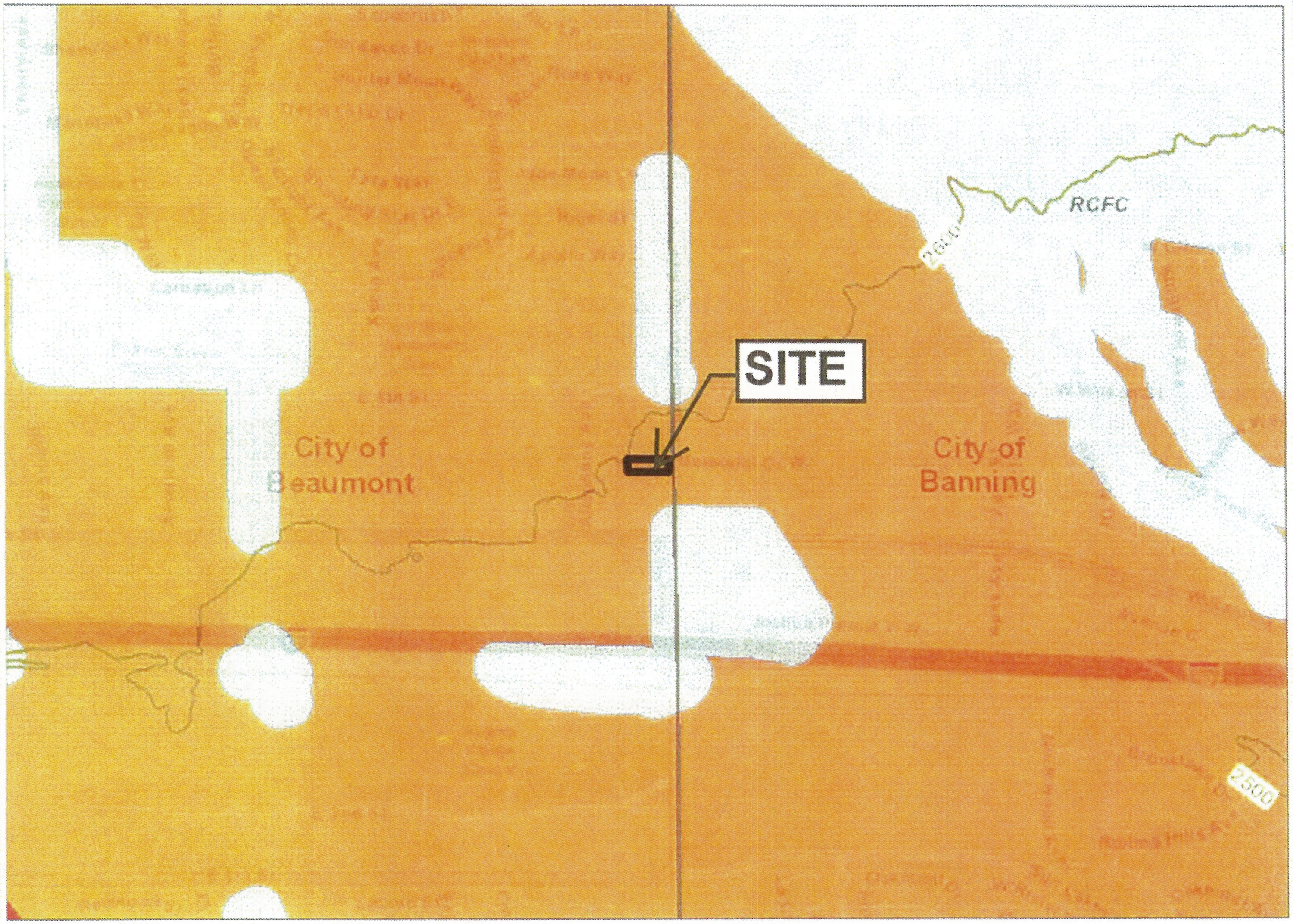
Base Map: USGS Geologic Map of the Beaumont Quadrangle, Riverside County, California.

LEGEND:

Qf: Alluvial fan of San Gorgonio Pass, sand and gravel of plutonic and gneissic detritus derived from rising San Bernardino mountains to the north.

N. Highland Springs Ave. City of Beaumont, California 92223	**Soil Exploration Co., Inc.** Project No.: 19137-01 Date: March 16, 2020 Figure: 2

Map My County Map



Legend

- Contours100 ft interval (with 1(
- Faults
  - OTHER AUTHORITY
  - ALQUIST-PRIOLO
  - RIVERSIDE COUNTY
- Fault Zones
  - OTHER FAULT ZONE
  - COUNTY FAULT ZONE
  - ELSINORE FAULT ZONE
  - SAN ANDREAS FAULT ZONE
  - SAN JACINTO FAULT ZONE
- Flood
- Liquefaction
  - Other Susceptibility
  - High
  - Low
  - Moderate
  - Very High
  - Very low
- Blueline Streams
- City Areas
- World Street Map

0 1,505 3,009 Feet

IMPORTANT Maps and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

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Notes

APN 419-150-026, 027

Figure 3

U.S. Geological Survey 2014 Faults

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1:577,791

0 4 8 16 mi

0 5 10 20 km

NSHM 2014 Fault Sources

Normal

Strike Slip

Thrust

Unassigned

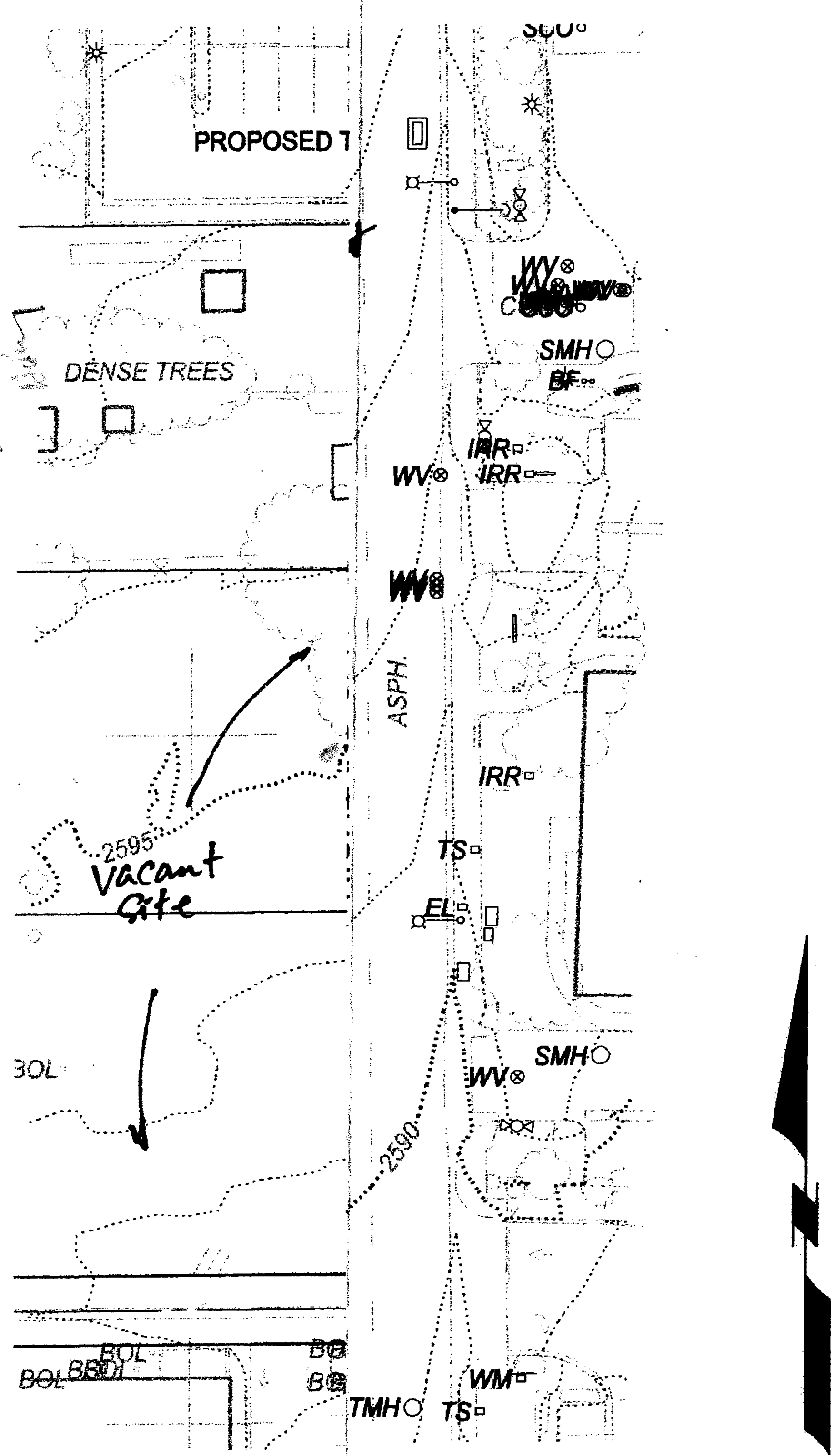
N

USGS, National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Figure 4

USGS

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. | USGS |



MTH2 engineering inc

639 Lakewood
Riverside, CA 92
(951) 850-2190
www.mth2engineering.com
civil • water resources • sto
urban design and planning

SCALE: 1" = 50'

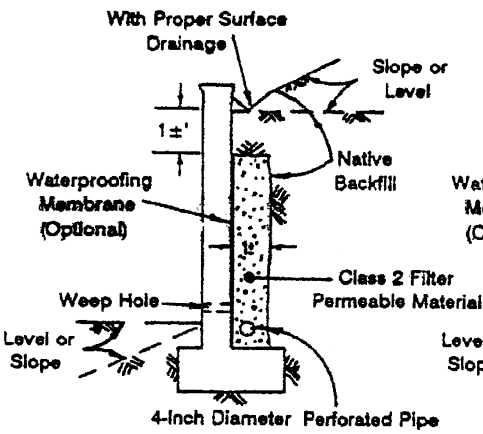
50 0 50 100

D:\MTH2\Engineering\2019_23 Beaumont\Civil\2019_23exb02_Infiltration_

JOB 2019_23 PLOTTED: 06-FEB-2020

SUBDRAIN OPTIONS FOR NATIVE MATERIAL BACKFILL

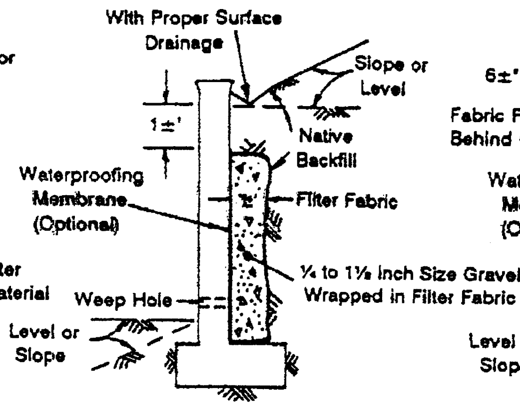
OPTION N2: Pipe Surrounded with Class 2 Material



Class 2 Filter Permeable Material Grading
Per Caltrans Specifications

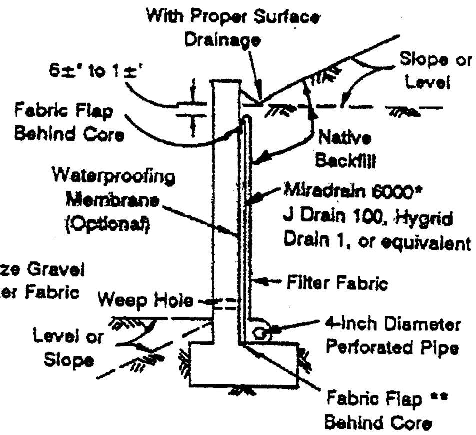
Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

OPTION N1: Gravel Wrapped in Filter Fabric



Proper Outlet Should be Provided for Gravel Subdrain (See Notes)

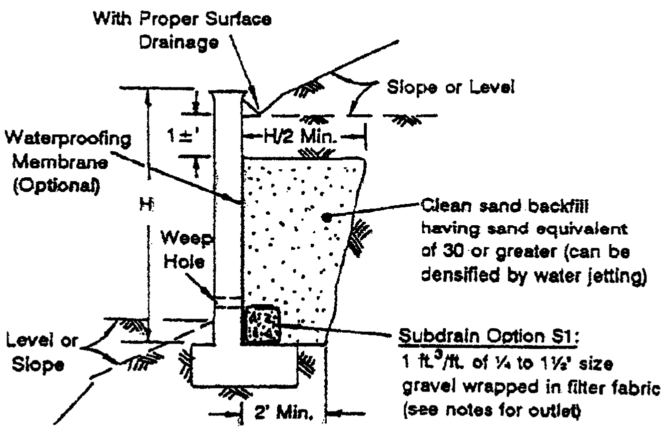
OPTION N3: Geotextile Drain

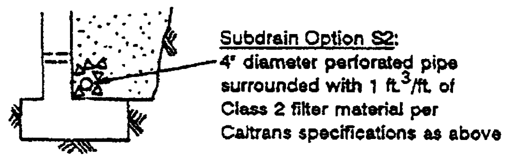


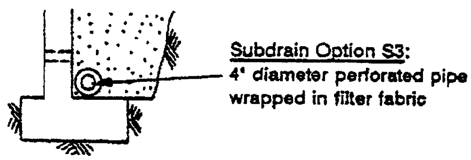
*Miradrain 6000 or J Drain 100 for non-waterproofed walls;
Miradrain 6200 or J Drain 200 for completed waterproofed walls

**Peel back the bottom fabric flap, place pipe next to core, wrap fabric around pipe and tuck behind core.

SUBDRAIN OPTIONS FOR CLEAN SAND BACKFILL







Notes:

- Pipe type should be ASTM D1527 Acrylonitrile Butediene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down.
- Filter fabric should be Mirafi 140N, 140NS, Supac 4NP, Amoco 4545, Trevira 1114, or approved equivalent.
- All drains should have a gradient of 1 percent minimum.
- Outlet portion for gravel subdrain should have a 4"-diameter pipe with the perforated portion inserted into the gravel approximately 2' minimum and the nonperforated portion extending approximately 1' outside the gravel. Proper sealing should be provided at the pipe insertion enabling water to run from the gravel portion into rather than outside the pipe.
- Waterproofing membrane may be required for a specific retaining wall such as a stucco or basement wall.
- Weephole should be 2" minimum diameter and provided at 25' minimum in length of wall. If exposure is permitted, weephole should be located at 3±" above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to discharge through the curb face or equivalent should be provided, or for a basement-type wall, a proper subdrain outlet system should be provided. Open vertical masonry joints (i.e., omit mortar from joints of first course above finished grade) at 32" maximum intervals may be substituted for weepholes. Screening such as with a filter fabric should be provided for weepholes/open joints to prevent earth materials from entering the holes/joints.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

Soil Exploration Co. Inc.

Plate: 2

APPENDIX A

REFERENCES

- CDMG, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, Dated February 1998.
- Riverside County GIS Map
- Geologic Map of the Beaumont Quadrangle, Riverside County, California, by Thomas W. Dibblee, Jr., 2003.
- U.S. Geological Survey Faults, 2014.
- Riverside County Stormwater Quality Best Management Practice, Design Handbook for Low Impact Development, Riverside County, June 2014.

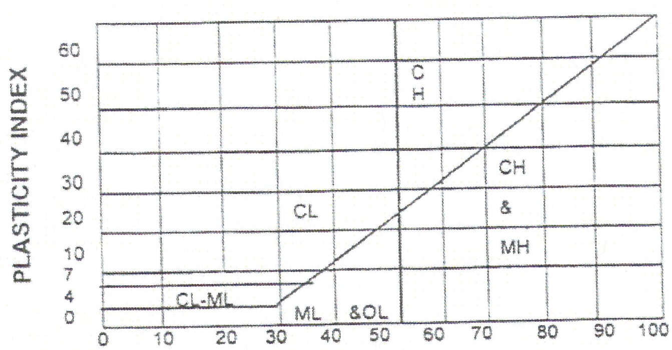
APPENDIX B

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS	(More than ½ of soil < No. 200 sieve)	GRAVELS (More than ½ of coarse fraction > No. 4 sieve size)	GW	Well-graded gravels or 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
			GC	Clayey gravels, gravel-sand-clay mixtures
		SANDS (More than ½ of coarse fraction < No. 4 sieve size)	SW	Well-graded sands or gravely sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-salt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS	(More than ½ of soil < No. 200 sieve)	SILTS & CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, 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.
		SILTS & CLAYS LL > 50	MH	Inorganic silts, caceous or diatonaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of medium to high plasticity, organic silty clays, organic silts
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
		HIGHLY ORGANIC SOILS	Pt	Peat and other highly organic soils

CLASSIFICATION CHART
(UNIFIED SOIL CLASSIFICATION SYSTEM)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDER	ABOVE 12"	ABOVE 305
COBBLES	3" to 12"	305 to 76.2
GRAVEL COARSE FINE	3" to No. 4 3" TO ¾" ¾'"to No. 4	762 to 4.76 76.2 to 19.1 19.1 to 4.76
SAND COARSE MEDIUM FINE	No. 4 to 200 No. 4 to 10 No. 10 to 40 No. 40 to 200	4.76 to 0.074 4.76 to 2.00 2.00 to 0.420 0.420 to 0.074
SILT & CLAY	BELOW No. 200	BELOW 0.074

GRAIN SIZE CHART



PLASTICITY CHART

Ring Sample	Bag Sample	NR No Recovery	Classification in accordance with ASTM D2487 Description and visual observation in accordance with ASTM D2488 All Sieve Sizes shown are US Standard SPT Refusal is defined as one of the following: 10 blows for no apparent displacement 50 blows for less than 6 inches advancement 100 blows for 6 to 18 inches advancement
SPT Sample	Seepage		

GEOTECHNICAL BORING LOGS

Drill Hole No. B-1

Date: 2/14/20
Drilling Company: Larry Harklerode
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 19137-01
Type of Rig: B-53
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Brown, fine to medium silty sand, slightly moist, loose
2							
3		X		4/5/5	11.6		Slightly moist, loose
4							
5							
6		X		7/8/9	7.8		Light brown, fine to medium, slightly moist, medium dense, porous
7							
8							
9							
10							
11		X		10/13/15			Slightly moist, medium dense
12							
13							
14							
15							
16		X		12/16/22			Yellowish light brown, slightly moist, dense
17							
18							
19		X		22/26/36			Slightly moist, very dense
20							Boring end at 20', no groundwater, no caving
21							
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-2

Date: 2/14/20 **Project No.** 19137-01

Drilling Company: Larry Harklerode **Type of Rig:** B-53

Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Light brown, fine to medium silty sand, slightly moist, medium dense
2							
3		■	7/15/27	119.2	10.4		Slightly moist, medium dense
4							
5							
6		■	12/27/27	110.0	8.3		Slightly moist, dense
7							
8							
9							
10							
11		⊠	8/14/17				Slightly moist, dense
12							
13							
14							
15							
16		⊠	12/15/22				Slightly moist, dense
17							
18							
19		⊠	31/33				Yellowish light brown, fine to coarse grained, slightly moist, very dense
20							Boring end at 20', no groundwater, no caving
21							
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-3

Date: 2/14/20 **Project No.** 19137-01

Drilling Company: Larry Harklerode **Type of Rig:** B-53

Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Light brown, fine to medium silty sand, slightly moist, loose
2							
3		X	5/5/10		8.9		Slightly moist, medium dense
4							
5							
6		X	12/15/15		9.2		Slightly moist, medium dense
7							
8							
9							
10							
11		X	17/21/22				Slightly moist, dense
12							
13							
14		X	30/50/3"				Slightly moist, dense
15							Boring end at 15', no groundwater, no caving
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

Soil Exploration Co., Inc.

GEOTECHNICAL BORING LOGS

Drill Hole No. B-4

Date: 2/14/20
Drilling Company: Larry Harklerode
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 19137-01
Type of Rig: B-53
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Light brown, fine to medium silty sand, slightly moist, medium dense
2							
3			10/14/31	109.2	6.6		Slightly moist, dense
4							
5							
6			21/23/40	102.2	6.9		Slightly moist, dense
7							
8							
9							
10							
11			21/28/30				Very dense
12							
13							
14			40/50/5"				Yellowish light brown, dry, very dense
15							Boring end at 15', no groundwater, no caving
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

APPENDIX C

Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental & Civil Engineering

February 19, 2020

Soil Exploration Company Inc.
7535 Jurupa Avenue, Unit C
Riverside, California 92504

Attn: Mr. Gene Luu

RE: **LABORATORY TEST RESULTS/REPORT**
Client: MTH2 Engineering
Project No.: 19137-01
QCI Job No.: 20-183-002i

Gentlemen:

We have completed the testing program conducted on sample for above project. The tests were performed in accordance with testing procedures as follows:

Sample ID	Sample Depth (ft)	Sulfate CT-417 % By Weight
B-1	0-5'	0.180

We appreciate the opportunity to provide testing services to Soil Exploration Company Inc. Should you have any questions, please call the undersigned.

Sincerely yours,

Cal Land Engineering, Inc. (CLE)
dba Quartech Consultants (QCI)

Jack C. Lee, GE 2153
Principle Engineer

REGISTERED PROFESSIONAL ENGINEER
JACK C. S. LEE
2153
Exp. 3-31-21
GEOTECHNICAL
STATE OF CALIFORNIA

Matthew Au
Project Engineer

Enclosure

576 E. Lambert Road, Brea, CA 92821; Tel: 714-671-1050, Fax: 714-671-1090

APPENDIX D

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)
6.70	San Jacinto;SBV+SJV	CA	n/a	90	V	strike slip	0	16
6.70	San Jacinto;SJV	CA	18	90	V	strike slip	0	16
6.82	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
6.82	S. San Andreas;SSB+BG	CA	n/a	71		strike slip	0	13
6.82	S. San Andreas;SSB+BG+CO	CA	n/a	77		strike slip	0.2	12
6.82	S. San Andreas;SSB	CA	16	90	V	strike slip	0	13
6.82	S. San Andreas;SM+NSB+SSB+BG+CO	CA	n/a	83		strike slip	0.1	13
6.82	S. San Andreas;SM+NSB+SSB+BG	CA	n/a	81		strike slip	0	13
6.82	S. San Andreas;SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13
6.82	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0.1	13
6.82	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14
6.82	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13
6.82	S. San Andreas;NM+SM+NSB+SSB+BG+CO	CA	n/a	84		strike slip	0.1	13
6.82	S. San Andreas;NM+SM+NSB+SSB+BG	CA	n/a	83		strike slip	0	14

6.82	S. San Andreas;NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13
6.82	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0	14
6.82	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
6.82	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	85		strike slip	0	14
6.82	S. San Andreas;CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
6.82	S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	85		strike slip	0.1	13
6.82	S. San Andreas;NSB+SSB+BG+CO	CA	n/a	79		strike slip	0.2	12
6.82	S. San Andreas;BB+NM+SM+NSB+SSB+BG	CA	n/a	84		strike slip	0	14
7.37	San Jacinto;SBV+SJV+A	CA	n/a	90	V	strike slip	0	16
7.37	San Jacinto;SBV+SJV+A+CC	CA	n/a	90	V	strike slip	0	16
7.37	San Jacinto;SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
7.37	San Jacinto;SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15
7.37	San Jacinto;SJV+A+CC	CA	n/a	90	V	strike slip	0	16
7.37	San Jacinto;SBV+SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15
7.37	San Jacinto;SBV+SJV+A+C	CA	n/a	90	V	strike slip	0	17
7.37	San Jacinto;SJV+A+C	CA	n/a	90	V	strike slip	0	17
7.37	San Jacinto;SJV+A	CA	n/a	90	V	strike slip	0	17
7.37	San Jacinto;SBV+SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
8.50	S. San Andreas;BG+CO	CA	n/a	72		strike slip	0.3	12
8.50	S. San Andreas;BG	CA	n/a	58		strike slip	0	13

8.61	San Jacinto;A+C	CA	n/a	90	V	strike slip	0	17
8.61	San Jacinto;A	CA	9	90	V	strike slip	0	17
8.61	San Jacinto;A+CC	CA	n/a	90	V	strike slip	0	16
8.61	San Jacinto;A+CC+B	CA	n/a	90	V	strike slip	0.1	15
8.61	San Jacinto;A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
15.56	Pinto Mtn	CA	2.5	90	V	strike slip	0	16
17.70	San Jacinto;SBV	CA	6	90	V	strike slip	0	16
21.87	S. San Andreas;NM+SM+NSB	CA	n/a	90	V	strike slip	0	13
21.87	S. San Andreas;SM+NSB	CA	n/a	90	V	strike slip	0	13
21.87	S. San Andreas;BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
21.87	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0.1	13
21.87	S. San Andreas;NSB	CA	22	90	V	strike slip	0	13
21.87	S. San Andreas;CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
21.87	S. San Andreas;CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
28.19	Elsinore;W+GI	CA	n/a	81	NE	strike slip	0	14
28.19	Elsinore;GI	CA	5	90	V	strike slip	0	13
28.21	Helendale-So Lockhart	CA	0.6	90	V	strike slip	0	13
28.42	Cleghorn	CA	3	90	V	strike slip	0	16
29.18	Elsinore;W+GI+T+J+CM	CA	n/a	84	NE	strike slip	0	16
29.18	Elsinore;GI+T	CA	5	90	V	strike slip	0	14
29.18	Elsinore;GI+T+J	CA	n/a	86	NE	strike slip	0	17

29.18	Elsinore;GI+T+J+CM	CA	n/a	86	NE	strike slip	0	16
29.18	Elsinore;W+GI+T+J	CA	n/a	84	NE	strike slip	0	16
29.18	Elsinore;W+GI+T	CA	n/a	84	NE	strike slip	0	14
29.20	Elsinore;T+J	CA	n/a	86	NE	strike slip	0	17
29.20	Elsinore;T	CA	5	90	V	strike slip	0	14
29.20	Elsinore;T+J+CM	CA	n/a	85	NE	strike slip	0	16
29.24	North Frontal (East)	CA	0.5	41	S	thrust	0	16
29.95	North Frontal (West)	CA	1	49	S	reverse	0	16
31.88	Burnt Mtn	CA	0.6	67	W	strike slip	0	16
33.20	Cucamonga	CA	5	45	N	thrust	0	8
33.74	Lenwood-Lockhart-Old Woman Springs	CA	0.9	90	V	strike slip	0	13
34.32	Landers	CA	0.6	90	V	strike slip	0	15
34.34	Eureka Peak	CA	0.6	90	V	strike slip	0	15
36.33	Chino, alt 2	CA	1	65	SW	strike slip	0	14
37.64	Elsinore;W	CA	2.5	75	NE	strike slip	0	14
37.77	Chino, alt 1	CA	1	50	SW	strike slip	0	9
38.47	Johnson Valley (No)	CA	0.6	90	V	strike slip	0	16
39.33	San Jacinto;C	CA	14	90	V	strike slip	0	17
39.41	San Jacinto;CC+B	CA	n/a	90	V	strike slip	0.2	14
39.41	San Jacinto;CC	CA	4	90	V	strike slip	0	16
39.41	San Jacinto;CC+B+SM	CA	n/a	90	V	strike slip	0.2	14
40.80	Elsinore;J	CA	3	84	NE	strike slip	0	19

40.80	Elsinore;J+CM	CA	3	84	NE	strike slip	0	17
41.45	S. San Andreas;CO	CA	20	90	V	strike slip	0.6	11
43.57	S. San Andreas;CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;BB+NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;PK+CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0.1	13
43.57	S. San Andreas;NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;SM	CA	29	90	V	strike slip	0	13
44.04	So Emerson-Copper Mtn	CA	0.6	90	V	strike slip	0	14
44.49	San Jose	CA	0.5	74	NW	strike slip	0	15
47.42	Sierra Madre	CA	2	53	N	reverse	0	14
47.42	Sierra Madre Connected	CA	2	51		reverse	0	14
47.76	San Joaquin Hills	CA	0.5	23	SW	thrust	2	13
48.17	Calico-Hidalgo	CA	1.8	90	V	strike slip	0	14

2019 CBC – SEISMIC PARAMETERS		
Site Coordinates	**Latitude**	**Longitude**
	33.9306	**-116.9476**
Mapped Spectral Response Acceleration	**S_s = 2.044**	**S_1 = 0.701**
Site Coefficients (Class "D")	**F_a = 1.00**	**F_v = 1.70**
Maximum Considered Earthquake (MCE) Spectral Response Acceleration	**S_{MS} = 2.044**	**S_{M1} = 1.192**
Design Spectral Response Acceleration Parameters	**S_{DS} = 1.363**	**S_{D1} = 0.795**
Seismic Design Category	**D**	
Peak Ground Acceleration (PGA)	**0.834g**	
Site Amplification factor at PGA (F_{PGA})	**1.1**	
Site Modified Peak Ground Acceleration (PGA_m)	**0.917**	

References:

- Earthquake.usgs.gov/research/hazmaps/design
- 2019 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Section 1613, Earthquake Loads

APPENDIX E

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL INTENT

These specifications present general procedures and requirements for grading and earthwork as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installations of subdrains, and excavations. The recommendations contained in the geotechnical report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations which could supersede these specifications or the recommendations of the geotechnical report.

2.0 EARTHWORK OBSERVATIONS AND TESTING

Prior to the commencement of grading, a qualified geotechnical consultant (soils engineer and engineering geologist, and their representatives) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. It will be necessary that the consultant provide adequate testing and observations so that he may determine that the work was accomplished as specified. It shall be the responsibility of the contractor to assist the consultant and keep him apprised of work schedules and changes so that he may schedule his personnel accordingly.

It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and approved grading plans. If, in the opinion of the consultant, unsatisfactory conditions, such as questionable soil, poor moisture conditions, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the consultant will be empowered to reject the work and recommend that construction be stopped until the unsatisfactory conditions are rectified.

Maximum dry density tests used to determine the degree of compaction will be performed in accordance with the American Society of Testing and Materials, test method ASTM D1557-12.

3.0 PREPARATION OF AREAS TO BE FILLED

3.1 Clearing and Grubbing

All brush, vegetation, and debris shall be removed or piled and otherwise disposed of.

3.2 Processing

The existing ground which is determined to be satisfactory for support of fill shall be scarified to a minimum depth of 6 inches. Existing ground which is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until the soils are broken down and free of large clay lumps or clods and until the working surface is reasonably uniform and free of uneven features which would inhibit uniform compaction.

3.3 Overexcavation

Soft, dry, spongy, highly fractured or otherwise unsuitable ground, extending to such depth that surface processing cannot adequately improve the condition, shall be overexcavated down to firm ground, approved by the consultant.

3.4 Moisture Conditioning

Overexcavated and processed soils shall be watered, dried-back, blended, and/or mixed, as required to attain a uniform moisture content near optimum.

3.5 Recompaction

Overexcavation and processed soils which have been properly mixed and moisture-conditioned shall be recompacted to a minimum relative compaction of 90 percent.

3.6 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal : vertical), the ground shall be stepped or benched. The lowest bench shall be a minimum of 15 feet wide, shall be at least 2 feet deep, shall expose firm materials, and shall be approved by the consultant. Other benches shall be excavated in firm materials for a minimum width of 4 feet. Ground sloping flatter than 5:1 (horizontal : vertical) shall be benched or otherwise overexcavated when considered necessary by the consultant.

3.7 Approval

All areas to receive fill, including processed areas, removal areas and toe-of-fill benches shall be approved by the consultant prior to fill placement.

4.0 FILL MATERIAL

4.1 General

Material to be placed as fill shall be free of organic matter and other deleterious substances, and shall be approved by the consultant. Soils of poor gradation, expansion, or strength characteristics shall be placed in areas designated by consultant or shall be mixed with other soils to serve as satisfactory fill material.

4.2 Oversize

Oversize materials defined as rock, or other irreducible material with maximum dimension greater than 12 inches, shall not be buried or placed in fills, unless the location, materials, and disposal methods are specifically approved by the consultant. Oversize disposal operations shall be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet vertically of finish grade or within the range of future utilities or underground construction, unless specifically approved by the consultant.

4.3 Import

If importing of fill material is required for grading, the import material shall meet the requirements of Section 4.1.

5.0 FILL PLACEMENT and COMPACTION

5.1 Fill Lifts

Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding 6 inches in compacted thickness. The consultant may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

5.2 Fill Moisture

Fill layers at a moisture content less than optimum shall be watered and mixed, and wet fill layers shall be aerated by scarification or shall be blended with drier material. Moisture conditioning and mixing of fill layers shall continue until the fill material is at a uniform moisture content at or near optimum.

5.3 Compaction of Fill

After each layer has been evenly spread, moisture-conditioned, and mixed, it shall be uniformly compacted to not less than 90 percent of maximum dry density. Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

5.4 *Fill Slopes*

Compacting of slopes shall be accomplished, in addition to normal compacting procedures, by backrolling of slopes with sheepsfoot rollers at frequent increments of 2 to 3 feet in fill elevation gain, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be at least 90 percent.

5.5 *Compaction Testing*

Field-tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests shall be at the consultant's discretion. In general, the tests will be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of embankment.

6.0 SUBDRAIN INSTALLATION

Subdrain systems, if required, shall be installed in approved ground to conform to the approximate alignment and details shown on the plans or herein. The subdrain location or materials shall not be changed or modified without the approval of the consultant. The consultant, however, may recommend and upon approval, direct changes in subdrain line, grade or material. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to commencement of filling over the subdrain.

7.0 EXCAVATION

Excavations and cut slopes will be examined during grading. If directed by the consultant, further excavation or overexcavation and refilling of cut areas shall be performed, and/or remedial grading of cut slopes shall be performed. Where fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope shall be made and approved by the consultant prior to placement of materials for construction of the fill portion of the slope.

8.0 TRENCH BACKFILLS

Trench excavations for utility pipes shall be backfilled under engineering supervision.

After the utility pipe has been laid, the space under and around the pipe shall be backfilled with clean sand or approved granular soil to a depth of at least one foot over the top of the pipe. The sand backfill shall be uniformly jetted into place before the controlled backfill is placed over the sand.

The onsite materials, or other soils approved by the soil engineer, shall be watered and mixed as necessary prior to placement in lifts over the sand backfill.

The controlled backfill shall be compacted to at least 90 percent of the maximum dry density as determined by the ASTM D1557-12 test method.

Field density tests and inspection of the backfill procedures shall be made by the soil engineer during backfilling to see that proper moisture content and uniform compaction is being maintained. The contractor shall provide test holes and exploratory pits as required by the soil engineer to enable sampling and testing.

APPENDIX F

Infiltration Test (Percolation Test Procedure)

The tests were performed in accordance with Riverside County Stormwater Quality Best Management Practice Design Handbook for Low Impact Development, dated June 2014.

Four 8-inch diameter test holes (I-1, I-2, I-3 and I-4) were drilled at the suggested locations. The soil at the test locations was visually classified as silty sand. To mitigate any possible caving or sloughing of the test holes, a 6-inch diameter perforated pipe was placed in the hole. The bottom of the hole was covered with 2 inches of gravel.

The testing was conducted after presoaking. Two consecutive measurements showed that 6 inches of water seeped away in more than 25 minutes for I-1, I-2, I-3 and I-4. The tests for an additional six hours with measurements taken at 30 minute intervals. Water level was adjusted to 20 inches above the bottom of the test hole after each measurement. The drop that occurred during the final reading was used for design rate purposes.

Infiltration Test/Tabulated Test Results

Test No.	Depth of Test (feet)	Earth Material	Infiltration Rate (in/hr)
I-1	4	Silty Sand (SM)	0.05
I-2	4	Silty Sand (SM)	0.88
I-3	4	Silty Sand (SM)	0.67
I-4	4	Silty Sand (SM)	0.69

We recommend that a suitable factor of safety should be applied to the rate in design of the system.

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: MTH2 Engineering, INC. Project No.: 19137-01
Test Hole No.: I-1 Date Excavated: 2/14/20
Depth of Test Hole: 4' Soil Classification: SM
Diameter: 8" Presoak: 24 hrs
Tested By: ER Date: 12/25/20

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	8:35:09 9:00:09	25	28	28.75	0.75	N
2	9:03:20 9:28:20	25	"	28.5	0.5	N

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	9:33:19	10:03:19	30	28	28.375	0.375	
2	10:09:33	10:39:33	30	"	28.25	0.25	
3	10:43:05	11:13:05	30	"	"	"	
4	11:17:16	11:47:16	"	"	"	"	
5	11:50:27	12:20:27	"	"	"	"	
6	12:24:38	12:54:38	"	"	"	"	
7	12:57:49	1:27:49	"	"	"	"	
8	1:30:02	2:01:02	"	"	"	"	
9	2:05:13	2:35:13	"	"	"	"	
10	2:39:25	3:09:25	"	"	"	"	
11	3:12:37	3:42:37	"	"	"	"	
12	3:45:49	4:15:49	"	"	"	"	0.05

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 0.25}{30(4+(20+(20-0.25)))}$ = 0.05 in/hr

K

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: MTH2 Engineering, INC Project No.: 19137-01
Test Hole No.: T-2 Date Excavated: 2/14/20
Depth of Test Hole: 4' Soil Classification: SM
Diameter: 8" Presoak: 24 hr
Tested By: TR Date: 12/23/20

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	8:36:38 9:01:38	25	28	32	4.0	N
2	9:05:49 9:30:49	25	"	31.5	3.5	N

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	9:34:37	10:04:37	30	28	32.375	4.375	
2	10:10:40	10:40:40	30	"	"	"	
3	10:44:30	11:14:30	30	"	"	"	
4	11:18:41	11:48:41	"	"	"	"	
5	11:52:52	12:22:52	"	"	"	"	
6	12:26:04	12:56:04	"	"	"	"	
7	1:00:16	1:30:16	"	"	"	"	
8	1:34:28	2:04:28	"	"	"	"	
9	2:08:40	2:38:40	"	"	"	"	
10	2:42:52	3:12:52	"	"	"	"	
11	3:16:05	3:46:05	"	"	"	"	
12	3:50:18	4:20:18	"	"	"	4.375	0.88

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 4.375}{30(4+(20+(20-4.375)))}$ = 0.88 in/hr

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: MTHD Engineering, Inc. Project No.: 19137-01
Test Hole No.: I-4 Date Excavated: 2/14/20
Depth of Test Hole: 4' Soil Classification: SM
Diameter: 8" Presoak: 24 hrs
Tested By: ER Date: 12/25/20

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1		25	28	32	4.0	N
2	9:10:01 9:35:01	25	"	31.75	3.75	"

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	9:39:10	10:09:10	30	28	31.5	3.5	
2	10:14:29	10:44:29	30	"	"	"	
3	10:48:01	11:18:01	30	"	"	"	
4	11:25:12	11:55:12	"	"	"	"	
5	11:59:23	12:29:23	"	"	"	"	
6	12:33:34	1:03:34	"	"	"	"	
7	1:07:45	1:37:45	"	"	"	"	
8	1:41:56	2:11:56	"	"	"	"	
9	2:16:08	2:46:08	"	"	"	"	
10	3:00:20	3:30:20	"	"	"	"	
11	3:35:32	4:05:32	"	"	"	"	
12	4:09:43	4:39:43	"	"	"	"	0.69

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 3.5}{30(4+(20+(20-3.5)))} = 0.69$ in/hr

APPENDIX F
PRELIMINARY WATER QUALITY MANAGEMENT PLAN
MAY 12, 2020

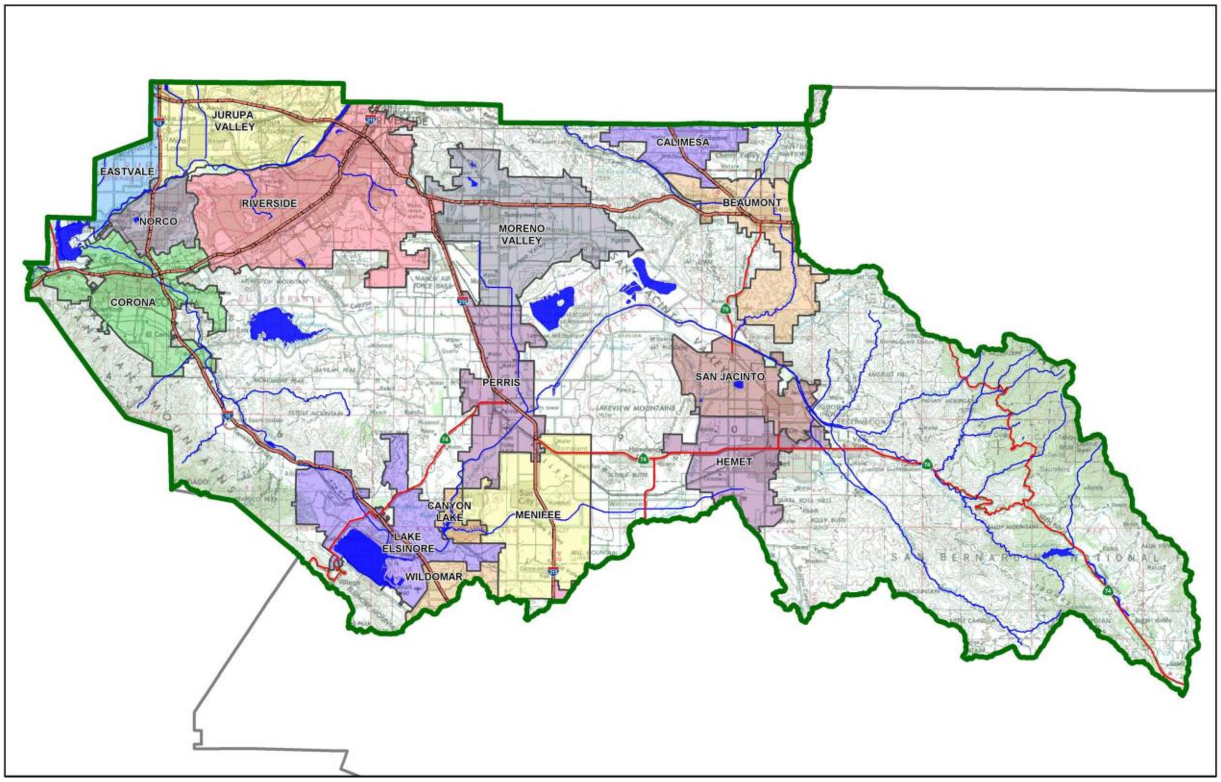
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Highland Springs Remodel and Development

Development No:

Design Review/Case No:



☒ **Preliminary**
☐ **Final**

Original Date Prepared: May 12, 2020

Revision Date(s):

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

Contact Information:

Prepared for:
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OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for High Sand, Inc. by MTH2 Engineering, Inc. for the Highland Springs Remodel and Development project.

This WQMP is intended to comply with the requirements of City of Beaumont for <Insert Ordinance No.> which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Beaumont Water Quality Ordinance (Municipal Code Section X).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	May 12, 2020 Date
Marten L. Anderson Preparer's Printed Name	President Preparer's Title/Position

Preparer's Licensure:

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List of Tables

List of Appendices

Section A: Project and Site Information

Project Information		
Type of Project:	Commercial	
Planning Area:	City of Beaumont	
Community Name:	City of Beaumont	
Development Name:	Highland Springs Remodel and Development	
Project Location		
Latitude & Longitude (DMS): 33°55’51.50” N 116°56’52.50” W		
Project Watershed and Sub-Watershed: Santa Ana Region		
Gross Acres: 65819.04 SF (1.511 Ac)		
APN(s): 419-150-026 and -027		
Map Book and Page No.: Scenic View Subdivision, MB 19/41		
Project Characteristics		
Proposed or Potential Land Use(s)		Commercial
Proposed or Potential SIC Code(s)		5812
Area of Impervious Project Footprint (SF)		55,405.96 SF
Total Area of <u>proposed</u> Impervious Surfaces within the Project Footprint (SF)/or Replacement		55,405.96 SF
Does the project consist of offsite road improvements?		☒ Y ☐ N
Does the project propose to construct unpaved roads?		☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?		☐ Y ☒ N
Existing Site Characteristics		
Total area of <u>existing</u> Impervious Surfaces within the Project limits Footprint (SF)		0.00
Is the project located within any MSHCP Criteria Cell?		☐ Y ☒ N
If so, identify the Cell number:		---
Are there any natural hydrologic features on the project site?		☐ Y ☒ N
Is a Geotechnical Report attached?		☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)		---
What is the Water Quality Design Storm Depth for the project?		0.85”

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
San Timoteo Creek Reach 3 (Yucaipa Creek to Headwaters)	None	GWR, REC1, REC2, WARM, WILD, RARE	1.8 mi
Yucaipa Creek	None	RARE	
San Timoteo Wash	None	RARE	
Santa Ana River Reach 5	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	
Santa Ana River Reach 4	Pathogens	GWR, REC1, REC2, WARM, WILD, RARE, SPWN	
Santa Ana River Reach 3	Copper, Lead, Pathogens	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☐ N
Other *(please list in the space below as required)* City of Beaumont Conditional Use Permit, various construction permits	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, constraints might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. Opportunities might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Yes, the existing site generally drains from northwest to southeast to Highland Springs Avenue, which is mimicked by the proposed development.

Did you identify and protect existing vegetation? If so, how? If not, why?

The existing site was previously developed. Any existing vegetation will be removed and replaced per City of Beaumont development requirements.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

The existing site was previously developed and existing infiltration rates are very low.

Did you identify and minimize impervious area? If so, how? If not, why?

Parking areas were designed to the City minimum dimensions.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes, a parking area and the office building roof partially disperse runoff to landscape areas.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[12]	Area (Sq. Ft.)	DMA Type
1c	Landscape	1,743.91	A
2a	Concrete or Asphalt	807.31	D
2b	Roofs	3,214.33	D
2c	Landscape	851.16	D
3a	Concrete or Asphalt	701.04	D
3b	Roofs	3,214.17	D
3c	Landscape	1,078.35	D
4a	Concrete or Asphalt	42,451.43	D
4b	Roofs	3,444.68	D
4c	Landscape	3,755.50	D
5a	Concrete or Asphalt	1,573	C
5c	Landscape	911.41	B

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*
[2]*If multi-surface provide back-up*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
1C	1,743.91	Landscape	Drip

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet)	Storm Depth (inches)	DMA Name / ID	[C] from Table C.4 =	Required Retention Depth (inches)
		[A]	[B]		[C]	[D]
5c	Ornamental Landscape	911.41	0.85	5A	1573	2.32

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type ‘C’, Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Impervious fraction	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
5a	1573	Concrete or Asphalt	1	1573	5c	911.41	1.73<2

Table C.5 Type ‘D’, Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
2a, 2b 2c	BR 2
3a, 3b, 3c	BR 3
4a, 4b, 4c	BR 4

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		√
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		√
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		√
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	√	
If Yes, list affected DMAs: 1, 2, 3, 4, 5		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		√
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		√
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 8,340.32 SF (0.191 Ac)

Type of Landscaping (Conservation Design or Active Turf): Conservative

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 55,405.96 SF (1.272 Ac)

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 2.12

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 117,460.64 SF (2.697 Ac)

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
117,460.64 SF (2.697 Ac)	8,340.32 SF (0.191 Ac)

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 100

Project Type: Commercial

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 55,405.96 SF (1.272 Ac)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 176

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 223

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
223	100

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

Not applicable

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: 0 GPD

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 55,405.96 SF (1.272 Ac)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: 1,259

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: 1,601 GPD

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
1,601 GPD	0 GPD

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA 2	☐	☐	☒	☐	☐
DMA 3	☐	☐	☒	☐	☐
DMA 4	☐	☐	☒	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Not applicable.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First, calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

<table>
<tr><th>DMA Type/ID</th><th>DMA Area (square feet)</th><th>Post-Project Surface Type</th><th>Effective Impervious Fraction, I_f</th><th>DMA Runoff Factor</th><th>DMA Areas x Runoff Factor</th><th colspan="3" rowspan="2">Enter BMP Name / Identifier Here</th></tr>
<tr><td></td><td>[A]</td><td></td><td>[B]</td><td>[C]</td><td>[A] x [C]</td></tr>
<tr><td>D/2a</td><td>807.31</td><td>Concrete or Asphalt</td><td>1.0</td><td>0.89</td><td>720.1</td><td rowspan="4">Design Storm Depth (in)</td><td rowspan="4">Design Capture Volume, V_{BMP} (cubic feet)</td><td rowspan="4">Proposed Volume on Plans (cubic feet)</td></tr>
<tr><td>D/2b</td><td>3,214.33</td><td>Roofs</td><td>1.0</td><td>0.89</td><td>2,867.2</td></tr>
<tr><td>D/2c</td><td>851.16</td><td>Landscape</td><td>0.1</td><td>0.11</td><td>94.0</td></tr>
<tr><td>BR 2</td><td>196.00</td><td>Landscape</td><td>0.1</td><td>0.11</td><td>21.6</td></tr>
<tr><td></td><td>5,068.8</td><td colspan="3"></td><td>3,702.9</td><td>0.85</td><td>262.3</td><td>284.2</td></tr>
</table>

<table>
<tr><th>DMA Type/ID</th><th>DMA Area (square feet)</th><th>Post-Project Surface Type</th><th>Effective Impervious Fraction, I_f</th><th>DMA Runoff Factor</th><th>DMA Areas x Runoff Factor</th><th colspan="3" rowspan="2">Enter BMP Name / Identifier Here</th></tr>
<tr><td></td><td>[A]</td><td></td><td>[B]</td><td>[C]</td><td>[A] x [C]</td></tr>
<tr><td>D/3a</td><td>701.04</td><td>Concrete or Asphalt</td><td>1.0</td><td>0.89</td><td>625.3</td><td rowspan="4">Design Storm Depth (in)</td><td rowspan="4">Design Capture Volume, V_{BMP} (cubic feet)</td><td rowspan="4">Proposed Volume on Plans (cubic feet)</td></tr>
<tr><td>D/3b</td><td>3,214.17</td><td>Roofs</td><td>1.0</td><td>0.89</td><td>2867.0</td></tr>
<tr><td>D/3c</td><td>1,096.35</td><td>Landscape</td><td>0.1</td><td>0.11</td><td>121.1</td></tr>
<tr><td>BR 3</td><td>180.00</td><td>Landscape</td><td>0.1</td><td>0.11</td><td>19.9</td></tr>
<tr><td></td><td>5,191.56</td><td colspan="3"></td><td>3,633.3</td><td>0.85</td><td>257.4</td><td>275.4</td></tr>
</table>

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	*Design Capture Volume, **V_{BMP}** (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
D/4a	*42,451.43*	*Concrete or Asphalt*	*1.0*	*0.89*	*37,866.7*			
D/4b	*3,444.68*	*Roofs*	*1.0*	*0.89*	*3,072.7*			
D/4c	*3,755.50*	*Landscape*	*0.1*	*0.11*	*414.8*			
BR 4	*1,678.75*	*Landscape*	*0.1*	*0.11*	*185.4*			
	51,330.36				41,539.6	0.85	2,942.4	2,954.6

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P[2]
☐ Commercial/Industrial Development	P[3]	P	P[1]	P[1]	P[5]	P[1]	P	P
☐ Automotive Repair Shops	N	P	N	N	P[4, 5]	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P[6]	P	P[1]	P[1]	P[4]	P[1]	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☐	☐	☐	☐	☐	☐	☐

P = Potential
N = Not Potential
[1] A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected
[2] A potential Pollutant if the project includes uncovered parking areas; otherwise not expected
[3] A potential Pollutant is land use involving animal waste
[4] Specifically petroleum hydrocarbons
[5] Specifically solvents
[6] Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

[1]Cannot Exceed 50%
[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	$A_T = \Sigma[A]$				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration			
Volume (Cubic Feet)			

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources***: Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit***: Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative***: Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Inlets marked with "Only Rain Down the Drain"	SC-44 Drainage System Maintenance
Landscape/Outdoor Pest Control	Pest-resistant plant species will be considered and selected based upon site soil type, slope, climate, ecological and plant interactions	Maintain landscaping using minimal pesticides. Integrated pest management information will be provided to owner and operator.

Refuse areas	Trash enclosures will be covered and signs posted "Do not dump hazardous materials here."	SC-34 Waste Handling and Disposal
Fire sprinkler test water	Test water to be collected and drained to sewer.	SC-41 Building and Grounds Maintenance
Rooftop equipment, drainage sumps and roofing, gutters and trim.	Rooftop equipment with potential to produce pollutants shall be covered and/or have secondary containment. Drainage sumps shall have a sediment sum to reduce the quantity of sediment in pumped water.	
Plazas, sidewalks and parking lots		SC-43 Regular Sweeping Practices

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BR 2	BR 2	Preliminary grading plan, WQMP site plan	33°55’51.90” N 116°56’52.65” W
BR 3	BR 3	Preliminary grading plan, WQMP site plan	33°55’50.21” N 116°56’52.90” W
BR 4	BR 4	Preliminary grading plan, WQMP site plan	33°55’50.88” N 116°56’49.56” W

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: Covenant and Agreement with City of Beaumont

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

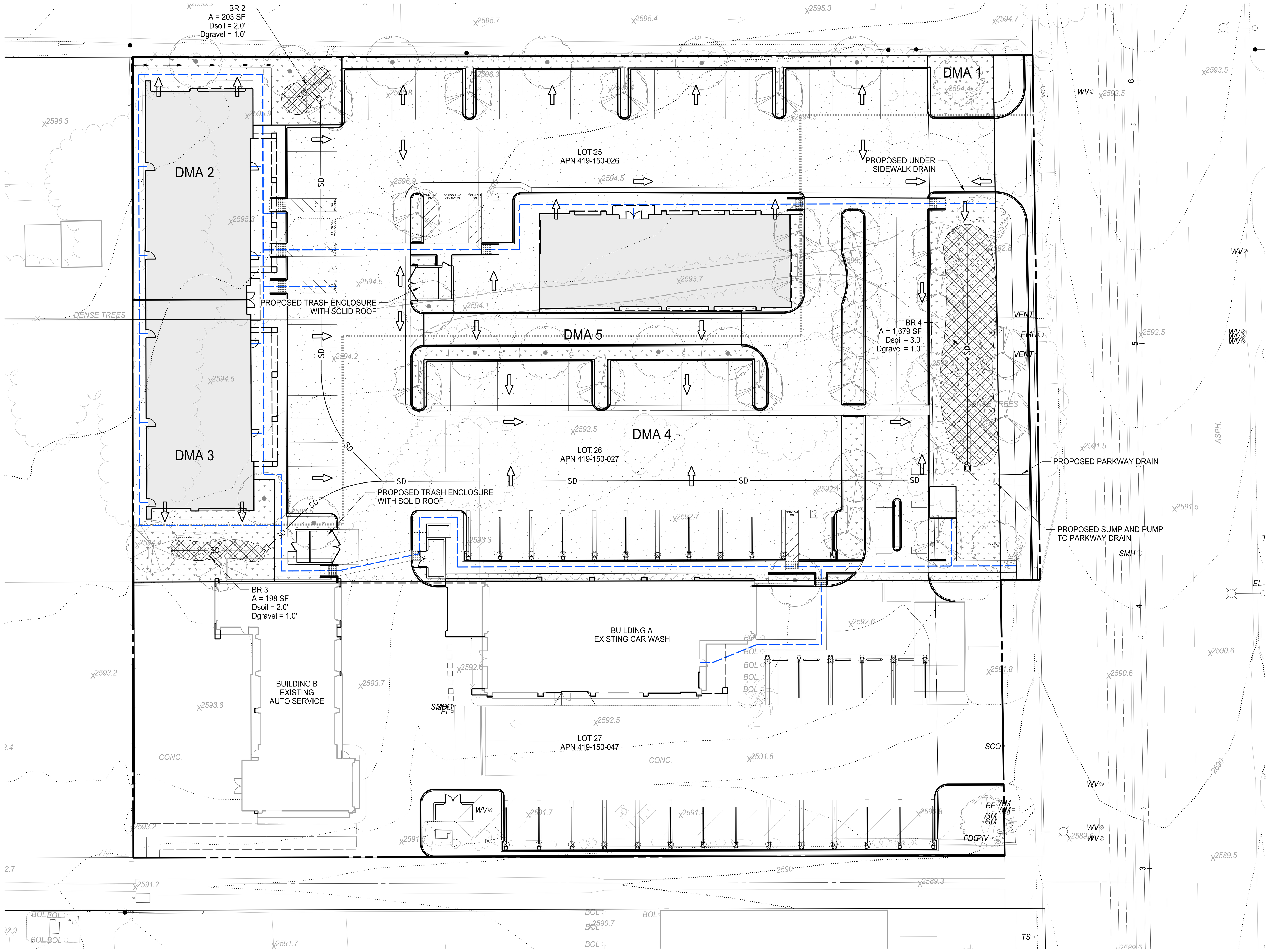
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

IN THE CITY OF BEAUMONT, CALIFORNIA

WQMP SITE PLAN

HIGHLAND SPRINGS REMODEL AND DEVELOPMENT
HIGH SAND, INC.

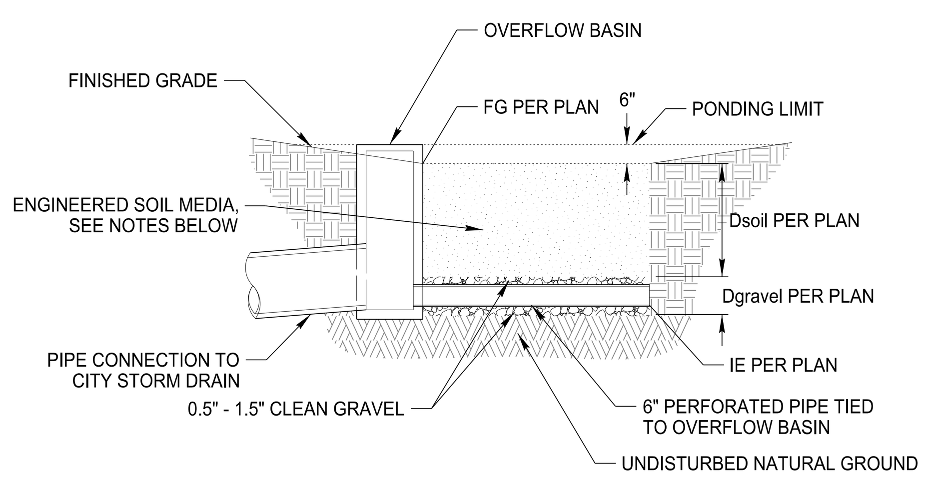


NOTES

1. LANDSCAPE AREAS TO BE DEPRESSED BELOW ADJACENT HARDSCAPE OR TOP OF CURB A MINIMUM OF 1" UNLESS OTHERWISE NOTED.
2. THE EXISTING DEVELOPED SITE WITHIN LOT 27 (APN 419-150-047) IS NOT A PART SINCE THE REDEVELOPMENT PROPOSED WITHIN LOT 27 DOES NOT MEET THE MINIMUM THRESHOLDS LISTED PER TABLE 1-1 "PRIORITY DEVELOPMENT CATEGORIES" IN THE SANTA ANA REGION WATER QUALITY MANAGEMENT PLAN TECHNICAL GUIDANCE DOCUMENT.

DMA SURFACE TYPE AREA SUMMARY

DMA 1			
	Landscape	1743.91	SF
		1743.91	SF Total
DMA 2			
	Concrete or Asphalt	807.31	SF
	Roofs	3214.33	SF
	Landscape	851.16	SF
	BMP	196.00	SF
		5068.80	SF Total
DMA 3			
	Concrete or Asphalt	701.04	SF
	Roofs	3214.17	SF
	Landscape	1078.35	SF
	BMP	198.00	SF
		5191.55	SF Total
DMA 4			
	Concrete or Asphalt	42451.43	SF
	Roofs	3444.68	SF
	Landscape	3755.50	SF
	BMP	1678.75	SF
		51330.37	SF Total
DMA 5			
	Concrete or Asphalt	1573.00	SF
	Landscape	911.41	SF
		2484.41	SF Total



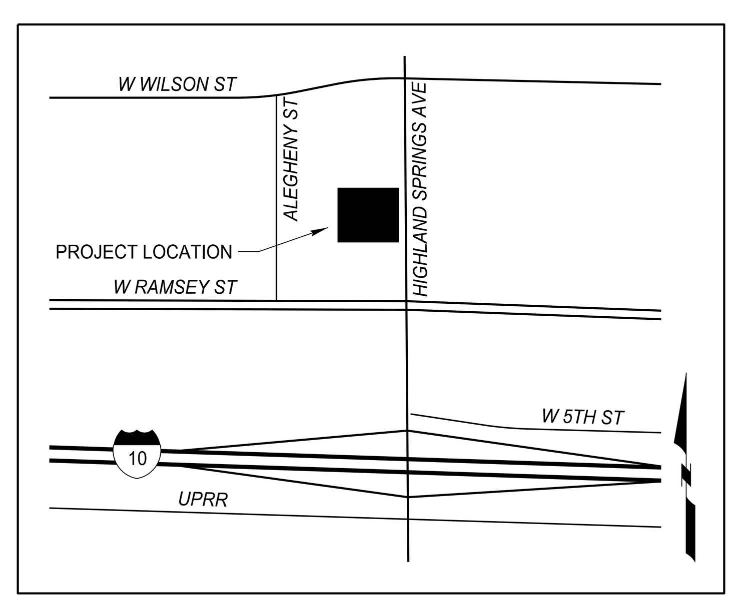
NOTES:

1. ENGINEERED SOIL MEDIA SHALL BE COMPRISED OF 85% MINERAL AND 15% ORGANIC COMPONENTS BY VOLUME, DRUM MIXED PRIOR TO PLACEMENT.
2. THE MINERAL COMPONENT SHALL BE CLASS A SANDY LOAM TOPSOIL MEETING THE RANGES BELOW:

70%-80%	SAND
15%-20%	SILT
5%-10%	CLAY

3. THE ORGANIC COMPONENT SHALL BE NITROGEN STABILIZED COMPOST, SUCH THAT THE NITROGEN DOES NOT LEACH FROM THE MEDIA.

BIO-RETENTION BASIN



VICINITY MAP
NOT TO SCALE

LEGEND

INDICATES PC CONCRETE PAVEMENT
INDICATES BUILDING ROOF
INDICATES LANDSCAPE
INDICATES BIO-RETENTION BASIN
INDICATES DMA BOUNDARY
SD INDICATES DMA BOUNDARY
INDICATES FLOW DIRECTION
INDICATES OVERFLOW INLET

SCALE: 1" = 20'
20 0 20 40

MTH2
engineering, inc.
639 Lakewood Drive
Riverside, CA 92506
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www.mth2engineering.com
civil • water resources • storm water
urban design and planning

Appendix 2: Construction Plans

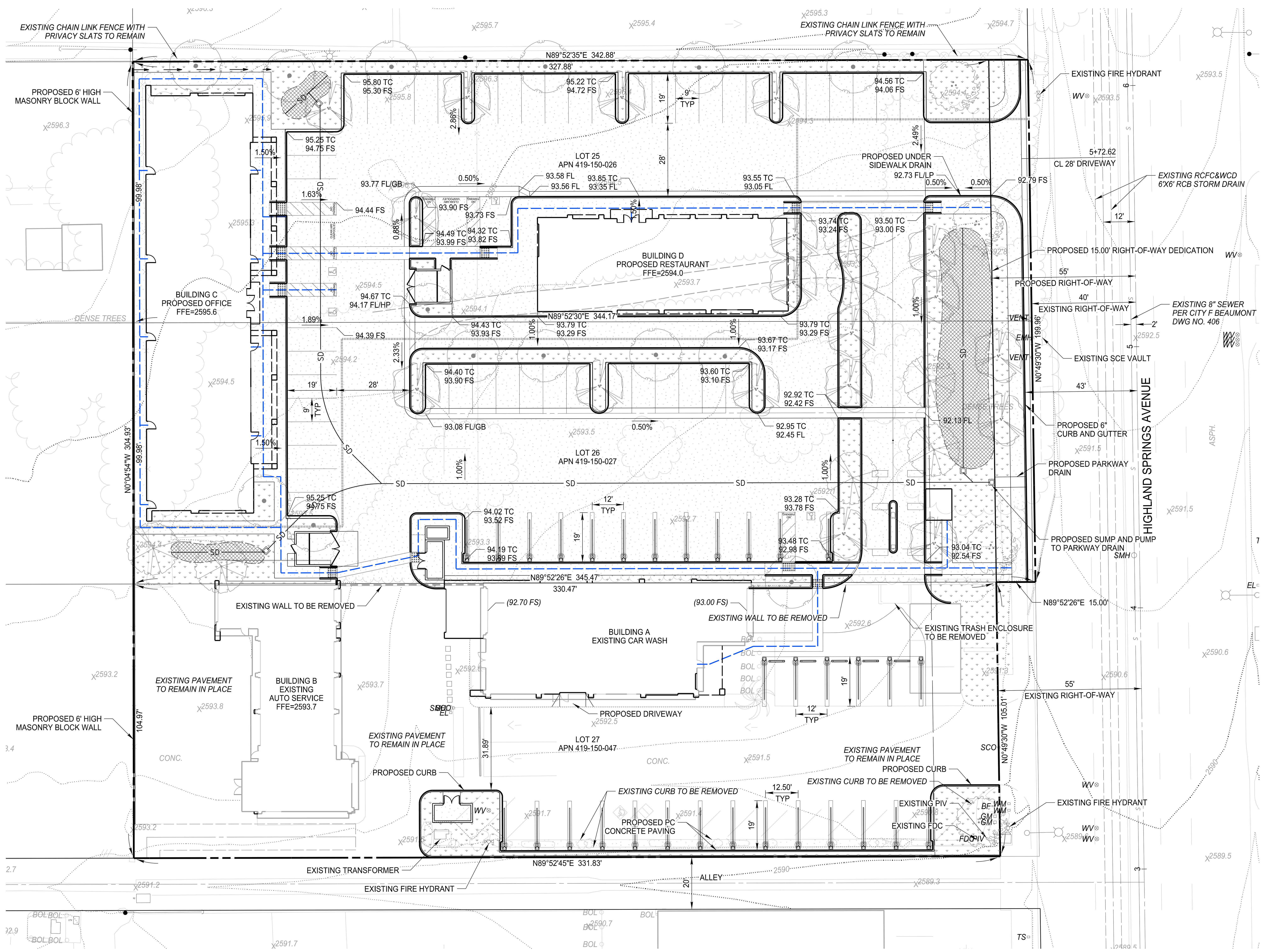
Preliminary Grading and Drainage Plan

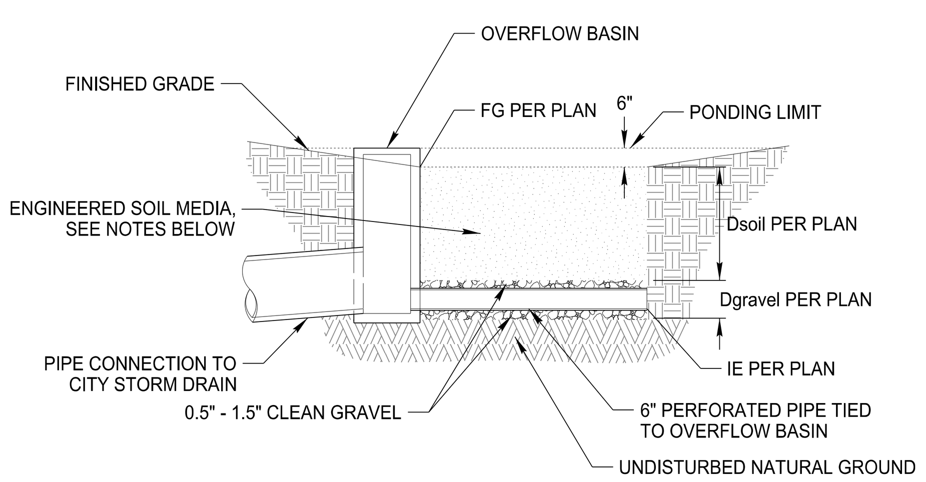
IN THE CITY OF BEAUMONT, CALIFORNIA

PRELIMINARY GRADING AND DRAINAGE PLAN

HIGHLAND SPRINGS REMODEL AND DEVELOPMENT

HIGH SAND, INC.





NOTES:

1. ENGINEERED SOIL MEDIA SHALL BE COMPRISED OF 85% MINERAL AND 15% ORGANIC COMPONENTS BY VOLUME, DRUM MIXED PRIOR TO PLACEMENT.
2. THE MINERAL COMPONENT SHALL BE CLASS A SANDY LOAM TOPSOIL MEETING THE RANGES BELOW:

70%-80%	SAND
15%-20%	SILT
5%-10%	CLAY

3. THE ORGANIC COMPONENT SHALL BE NITROGEN STABILIZED COMPOST, SUCH THAT THE NITROGEN DOES NOT LEACH FROM THE MEDIA.

BIO-RETENTION BASIN

SCALE: 1" = 20'

20 0 20 40

MTH2 engineering, inc

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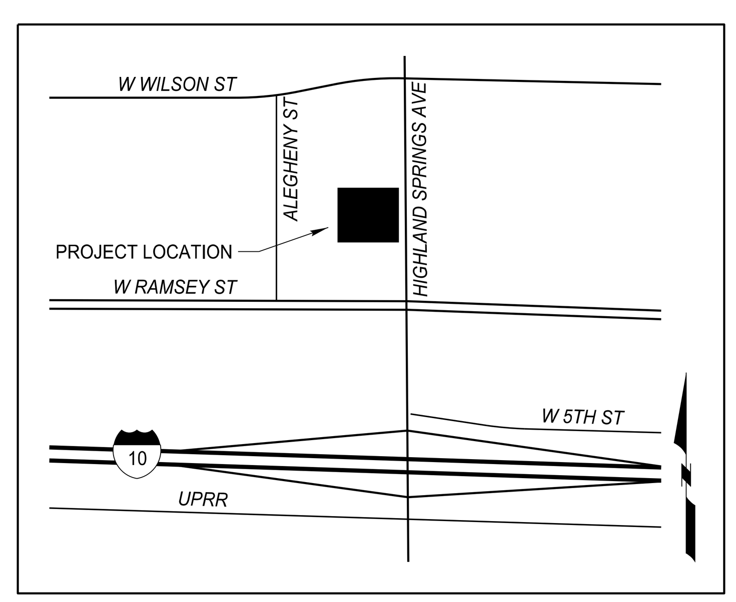
urban design and planning



VICINITY MAP
NOT TO SCALE

ABBREVIATIONS

ASSESSOR'S PARCEL NUMBER	APN
FINISHED FLOOR ELEVATION	FFE
FINISHED GRADE	FG
FLOW LINE	FL
FINISHED SURFACE	FS
GRADE BREAK	GB
HEIGHT	HT
PAD ELEVATION	PE
TOP OF CURB	TC
TOP OF WALL	TW
TOP OF WALL RETAINING	TWR
TYPICAL	TYP

LEGEND

EXISTING PROPERTY BOUNDARY	
EXISTING LOT LINE	
EXISTING INDEX CONTOUR	800
EXISTING INTERMEDIATE CONTOUR	799
EXISTING STRUCTURE	
EXISTING CONCRETE	
EXISTING CURB	
EXISTING ELECTRIC	E
EXISTING SEWER	S
EXISTING STORM DRAIN	SD
EXISTING WATER	W
EXISTING FIRE HYDRANT	
EXISTING SEWER MANHOLE	SMH
EXISTING TELEPHONE MANHOLE	TMH
EXISTING TELEPHONE RISER	TR
EXISTING TRAFFIC SIGNAL VAULT	TS
EXISTING TRAFFIC SIGNAL POLE	TSP
EXISTING ELECTRIC VAULT VENT	VENT
EXISTING LIGHT POLE	
EXISTING POWER POLE	
PROPOSED ADA PATH OF TRAVEL	
PROPOSED PHASE LINE	
PROPOSED CURB	
PROPOSED GUTTER	
PROPOSED BUILDING	
PROPOSED STORM DRAIN	SD
PROPOSED GRADIENT AND DIRECTION	2.00%
EXISTING ELEVATION	(27.50)
PROPOSED ELEVATION	27.50
PROPOSED BIO-RETENTION BASIN	
PROPOSED CONCRETE PAVEMENT	
PROPOSED LANDSCAPE AREA	

OWNER/APPLICANT/DEVELOPER

HIGH SAND, INC.
655 HIGHLAND SPRINGS AVENUE
BEAUMONT, CA 92223
CONTACT: ALI HARB
(951) 214-3333

ENGINEER/CONTACT PERSON

THIS PLAN WAS PREPARED UNDER THE DIRECTION OF MARTEN L. ANDERSON, A REGISTERED CIVIL ENGINEER IN THE STATE OF CALIFORNIA.

11-MAY-2020

MARTEN L. ANDERSON DATE
RCE 51313, EXPIRES 6-30-20
MTH2 ENGINEERING, INC.
639 LAKEWOOD DRIVE
RIVERSIDE, CA 92506
(951) 850-2190

REGISTERED PROFESSIONAL ENGINEER
MARTEN L. ANDERSON
No. 51313
Exp. 6-30-20
CIVIL
STATE OF CALIFORNIA

LEGAL DESCRIPTION

LOTS 25 THRU 27 INCLUSIVE OF SCENIC VIEW SUBDIVISION, UNIT NO. 1, IN THE CITY OF BEAUMONT, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 19, PAGE 41 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

BENCHMARK

NGS BENCHMARK DESIGNATION 400 PID DX5401
IN BANNING, AT THE NORTHWEST BRIDGE ABUTMENT FOR SOUTHERN PACIFIC RAILROAD OVER HIGHLAND SPRINGS AVE., 60 FEET (18.3 M) WEST OF THE CENTERLINE OF HIGHLAND SPRINGS AVE., 20 FEET (6.1 M) NORTH OF THE NORTH RAIL OF RAILROAD, FOUND 3 1/4 INCH MWD STANDARD ALUMINUM DISK SET FLUSH IN CONCRETE BRIDGE ABUTMENT.

ELEVATION = 2573.37 FEET NAVD 88 DATUM
JANUARY 1993 ADJUSTMENT

ASSESSOR'S PARCEL NUMBERS

419-150-026, -027 AND -046

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

March 16, 2020

Project No. 19137-01

TO: Ali Harb
Harkon, Inc.
18651 Van Buren Blvd.
Riverside, CA 92508

SUBJECT: Preliminary Soil Investigation and Infiltration Tests Report, Proposed Office Complex, 675 and 695 N. Highland Springs Ave (APN 419-150-026, & -027), City of Beaumont, California

Introduction

In accordance with your authorization, Soil Exploration Co., Inc. has performed a preliminary soil investigation and infiltration tests for the subject site (see Figure 1, Site Location Map). The accompanying report presents a summary of our findings, conclusions, recommendations and limitations of our work for construction of the proposed office complex and associated parking and driveway(s).

Scope of Work

- Review soils, geologic, seismic, groundwater data and maps in our files.
- Perform exploration of the site by means of four 8" diameter borings, 16.5 to 25 feet deep, at readily accessible locations.
- Field Engineer (California Registered RCE) for logging, sampling of select soils, observation of excavation resistance, record SPT blow counts and water seepage (if any).
- Perform basic laboratory testing on select soil samples, expected to include moisture, density, sand equivalent, expansion index and water soluble sulfates.
- Perform digitized search of known faults within a 50-mile radius of the site.
- Determine California Building Code (CBC) 2019 seismic parameters for the site.
- Consult with project architect/civil design engineer.
- Perform four shallow infiltration tests at locations suggested by you.
- Prepare a report of our findings, conclusions and recommendations for site preparation, including overexcavation/removal depth, allowable bearing value, foundation/slab-on-grade depth/thickness recommendations, excavation characteristics, lateral static/seismic earth pressures for retaining walls design, general grading and grading specifications, California Building Code (2019) seismic design coefficient, Cal/OSHA soil classification and infiltration rate in inches/hour.

Existing Site Condition

The rectangular shaped, relatively flat, vacant site is located on the east side of N. Highland Spring Ave. and north of E. 6th St. in the City of Beaumont, Riverside County, California. N. Highland Spring Ave. is a paved road with curbs and gutters. A chain link fence borders the site on the north and west side. A medical and dental building is located on adjacent property to the north, a car wash to the south and an existing house to the west. Vegetation consists of dense weeds, scattered trees and debris.

The approximate locations of the above and other features are shown on Exploratory Boring and Infiltration Tests Location Map (Plate 1).

Proposed Development

We understand that a two-story office complex and related improvements are proposed at the site. We understand that the proposed structures will be wood frame construction with concrete slabs supported on prepared subgrade. Based on the relatively flat topography of the site, modest cut or fill grading and no significant cut or fill slopes are proposed.

Field Work

Four exploratory borings were drilled on February 14, 2020, to a maximum depth of 20 feet below existing ground surface, utilizing a B-53 mobile drill rig equipped with 8-inch diameter hollow stem auger. Refer to Plate 1 for boring locations. Standard Penetration Tests (SPT) blow counts were recorded for the earth materials. Relatively undisturbed samples of the soils were also obtained by utilizing California Ring Sampler.

In general these borings revealed that the site area is underlain by alluvial soils consisting of silty sand (USCS "SM"). The earth materials are loose to very dense. Geologic Map of the Beaumont Quadrangle shows the site area is underlain with alluvial-fan deposits (see Figure 2). Detailed descriptions of the earth materials encountered are presented in the form of Geotechnical Boring Logs in Appendix B.

Laboratory Testing

Laboratory tests were performed for select soils samples. The tests consisted primarily of natural moisture contents, dry density and water soluble sulfates. . Laboratory test results are presented in Appendix C and with Geotechnical Boring Logs in Appendix B.

Groundwater/Liquefaction

Groundwater, seepage or wet soils were not encountered in our exploratory borings, drilled to a maximum depth of 20 feet, at the time this work was performed. Groundwater study is not within the scope of this work. However groundwater data from State well in the vicinity of the site is tabulated below (see Figure 1, Site Location Map, for location of well):

State Well No.	WSE* (ft)	Date Measured	Distance/Location Relative to Site	Estimated Depth of Water Below Site (ft)
03S01W01N00S	2300.09	12/3/1930	N/0.33 miles	308.3
	2240.89	10/26/1999		367.5
03S01W12E001S	2191.4	11/17/2000	SE/0.13 miles	401
	2189.27	11/06/2017		390.73

* WSE = Water Surface Elevation

Liquefaction occurs when loose, fine grained (poorly graded), saturated cohesionless soils are subject to ground shaking during an earthquake of large magnitude. Liquefaction potential in general is relatively high when the ground water table is less than thirty feet below ground surface. Based on the Riverside County GIS map, the site is located in a zone of low liquefaction potential (see Figure 3). Considering depth to groundwater (over 300 feet below ground surface), the potential for liquefaction at the site is very low.

Seismicity/Faulting

The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone or County of Riverside fault zone.

A computer search of known Quaternary major faults within 50 miles of the site from USGS National Seismic Hazard Maps is presented in Appendix D. Please note that it is probable that not all-active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Conclusions

- Any vegetable matter, existing structures, old foundations, seepage pits, leach lines, septic tanks, old fills, buried utilities/irrigation lines, etc. and deleterious materials associated with previous use of the site would require removal from the proposed building/grading areas.

- Overexcavation and recompaction of loose/porous surficial soils should be anticipated to provide adequate and uniform support for the proposed building(s), pavement and settlement sensitive improvements. All earth materials encountered during our exploration can be excavated with normal grading equipment in good working condition.

- Based on observations and soil classification, the expansion potential of the sandy foundation soils at the site is expected to be very low (EI<20).

- Subsequent to site preparation the use of shallow spread footings appears feasible for the proposed construction.

- Site is located approximately 6.70 miles from the San Jacinto fault. The site is located in a region of generally high seismicity, as is all of Southern California. During its design life, the site is expected to experience moderate to strong ground motions from earthquakes on regional and/or nearby causative faults.

- There is a 2 percent probability in 50 years (2475 year return period) that site modified peak ground acceleration (PGAm) at the site will be 0.917g (see Appendix D).

- Based on Riverside County GIS map, the site is in an area of low liquefaction potential (see Figure 3).

- Flooding potential of the site should be determined by the design civil engineer and considered in planning and construction.

- The potential for seismically induced dynamic settlement of the onsite sandy soils during a strong earthquake is low, however cannot be precluded. This would be partially mitigated by overexcavation and recompaction of the upper foundations soils.

- Groundwater and/or seepage were not encountered during our subsurface investigation. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. We have no way of predicting depth to the groundwater which may fluctuate with seasonal changes and from one year to the next due to precipitation, irrigation, land use, climatic conditions as well as other factors. Subdrains, horizontal drains or other devices may be recommended in future for graded areas that exhibit nuisance seepage conditions.

Recommendations

Site Preparation/Overexcavation

All grading and backfills should be performed in accordance with City of Beaumont Grading Ordinance and the attached General Earthwork and Grading Specifications (Appendix E), except as modified in the text of this report. The proposed grading area should be cleared of existing structures, vegetation and deleterious material which should be hauled off site.

New buildings/structures should be provided with a compacted fill mat that extends to at least 5 feet beyond the structure lines in plan (where practical) and to a depth of at least 3 feet below existing ground or proposed grade, whichever is deeper. The excavated bottoms should be cleaned of roots, soft spots, deleterious materials, old fills, etc. As a result, deeper excavations should not be precluded. After cleaning of the excavated bottom, the exposed surfaces should be further scarified to a depth of at least 6 inches, thoroughly watered and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557-12 Test Method, prior to placement of fill. All fills should be compacted to at least 90 percent of the maximum dry density.

Compacted Fills/Imported Soils

Any soil to be placed as fill, whether presently onsite or import, should be approved by the soil engineer or his representative prior to its placement. All onsite soils to be used as fill should be cleansed of any roots or other deleterious materials. Cobbles larger than 3 inches in diameter should not be placed in the vicinity of foundations and for utility line backfills. All fills should be placed in 6 to 8 inch loose lifts, thoroughly watered, mixed and compacted to at least 90 percent relative compaction. This is relative to the maximum dry density determined by ASTM 1557-12 Test Method.

Any imported soils should be sandy (preferably (USCS "SM" or "SW" and very low in expansion potential, EI<20) and approved by the soil engineer. The soil engineer or his representative should observe the placement of fill and take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained.

Foundation Design/Footings

Following site preparation, the use of shallow spread footings is feasible. A maximum allowable bearing value of 2000 psf is recommended. This bearing pressure has been established based on the assumption that the footings will be embedded at least 18 inches below lowest adjacent firm grade and into the onsite compacted soil mat, and measure at least 15 inches in width. Isolated column footings should be embedded at least 24 inches below lowest adjacent firm grade. This bearing value may be increased by one third for temporary (wind or seismic) loads. Reinforcement of the footings should be determined by qualified structural engineer, however minimum reinforcement of two No. 5 bars at top and two at bottom of continuous footings is recommended.

Concrete Slabs-On-Grade

Floor slabs-on-grade should be at least 4 inches thick and should be reinforced with at least No. 3 bars at 18-inches on-center both ways, properly centered in mid-thickness of slabs (structural recommendations govern). Thicker slabs (at least 8 inches thick and supported on 4-inch thick aggregate base) should be considered for canopy area and driveways by structural design engineer based on the use of facilities.

A moisture barrier comprised of 10-mil Visqueen underlain with 2-inches of sand below the Visqueen should be provided for office areas and where moisture intrusion from slabs-on-grade is objectionable. The Visqueen member should be lapped and sealed around all utility conduits. We recommend that a slipsheet (or equivalent) be utilized if grouted tiles or other crack sensitive flooring (such as marble tiles) is planned directly on concrete slabs.

Concrete Joints

The joints spacing for concrete slabs should be determined by the project architect. Joints should be laid out to form approximately square panels (equal transverse and longitudinal joint spacing). Rectangular panels, with the long dimension no more than one-and-one-half times the short, may be used when square panels are not feasible. The depth of longitudinal and transverse joints should be one-fourth the depth of the slab thickness.

Joint layout should be adjusted so that the joints will line up with the corners of structures, small foundations and other built-in structures. Acute angles or small pieces of slab curves as a result of joints layout should not be permitted.

Concrete Slump/Curing

The use of mechanically compacted/dense concrete with slump not exceeding 4 inches is recommended. Fresh concrete should be cured by protecting it against loss of moisture, rapid temperature change, and mechanical injury for at least 3 days after placement. Moist curing, waterproof paper, white polyethylene sheeting, white liquid membrane compound, or a combination thereof may be used. After finishing operations have been completed, the entire surface of the newly placed concrete should be covered by whatever curing medium is applicable to local conditions and approved by the engineer. The edges of concrete slabs exposed by the removal of forms should be protected immediately to provide these surfaces with continuous curing treatment equal to the method selected for curing the slab surfaces. The contractor should have at hand and ready to install before actual placement begins the equipment needed for adequate curing of the concrete.

Special Considerations/Excess Soils From Foundation Excavations

Excess soils generated from foundation excavations should not be placed on slabs and driveways without proper moisture and compaction. Slab subgrade should be verified to contain 1.2 times the soil optimum moisture content to a depth of 6 inches prior to placement of slab building materials. Moisture content must be tested in the field by the soil engineer. The addition of fiber mesh in the concrete and careful control of water/cement ratios may lessen the potential for slab cracking.

In hot or windy weather (80°F or 12 mph), the contractor must take appropriate curing precautions after the placement of concrete. The use of mechanically compacted low slump concrete (not exceeding 4 inches at the time of placement) is recommended.

Lateral Earth Pressures

The following lateral earth pressures and soil parameters in conjunction with the above recommended bearing value (2000 psf), may be used for design of canopy caissons and retaining walls with free draining compacted backfills. If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the following recommendations:

Active Earth Pressure with level backfill (P_a)	35 pcf (EFP), drained, yielding
At Rest Pressure (P_0)	55 pcf (EFP), drained, non-yielding (part of building wall)
Passive Earth Pressure (P_p)	250 pcf (EFP), drained, maximum of 2500 psf
Horizontal Coefficient of Friction (μ)	0.30
Unit Soil Weight (γ_t)	120 pcf
Skin Friction Value (caissons)	300 psf/foot of bounding area of caisson

We recommend drainage for retaining walls to be provided in accordance with Plate 2 of this report. Maximum precautions should be taken when placing drainage materials and during backfilling. Retaining walls should be waterproofed in accordance with project architect recommendations. All wall backfills should be properly compacted to at least 90 percent relative compaction.

Seismic Considerations

The site is located approximately 6.70 miles from the San Jacinto fault. The site soils class is D. Moderate to strong ground shaking can be expected at the site and there is a 2 percent probability in 50 years (2475 year return period) that site modified peak ground acceleration (PGAm) will be 0.917g. The site soil profile is Class D (stiff soils). The structural engineer should consider City/County local codes, California Building Code (CBC) 2019 seismic data presented in this report (Appendix D), the latest requirements of the Structural Engineers Association of Southern California and any other pertinent data in selecting design parameters.

Expansion Index and Soluble Sulfates

Based on observation and soil classification, the expansion potential of the onsite soils is anticipated to be very low (EI<20).

Results of tests also performed by Cal Land Engineering, Inc. of Brea, California on a select soil sample indicate moderate soluble sulfate exposure (0.18 percent water soluble sulfates by weight) (see Appendix C). Concrete, mix, placement and curing for concrete should comply with ACI guidelines. Based on sulfate test results, cement type II maximum water cement ration of 0.50 and minimum 4000psf compression strength should be used. Ferrous metal pipes should be protected in accordance with recommendations of your structural or corrosion engineer.

Surface Drainage/Groundwater

The surface of the site should be graded to provide positive drainage away from structures and foundations. Drainage should be directed to established swales and then to appropriate drainage structures to minimize the possibility of serious erosion. Surface drainage must be directed and maintained away from the foundations. Water, either natural or by irrigation, should not be permitted to pond or saturate the surface soils.

Pavement Design/Subgrade-Base Compaction

On the basis of laboratory classification, we are of the opinion that the tentative new pavement design may be based on an R-value on the order of 30 (or better) corresponding to near surface soils. Considering this and based on typical traffic indices, the recommended pavement sections are outlined as follows:

Location	TI	Recommended Tentative Pavement Thickness
Heavy Truck/Traffic	6.5	4" asphalt concrete over 8" Class II aggregate base
Concrete Pad Areas	---	8" PCC over 4" Class II aggregate base
Vehicle Drive Area	5.5	3" AC over 7" aggregate base
Parking Area	4.5	3" AC over 4" aggregate base

The upper at least 12 inches of pavement subgrade soils should be recompacted to at least 95 percent relative compaction per maximum dry density determined by ASTM D1557-12. The aggregate base should also be compacted to at least 95 percent relative compaction. All subgrade and base must be firm and unyielding without pumping condition prior to placement of asphalt concrete or PCC pavement. Reinforcement of the concrete pavement (with at least No. 3 bars at 18-inches on-center) and use of 4000 psi concrete should also be a consideration.

Cal/OSHA Classification/Trench Excavations/Backfills

In general Cal/OSHA classification of onsite soils appears to be Type B.

Temporary trench excavations deeper than 5 feet should be shored or sloped at 1:1 or flatter in compliance with Cal/OSHA requirements:

a.) The shoring should be designed by a qualified engineer experienced in the shoring design.

b.) The tops of any temporary unshored excavations should be barricaded to prevent vehicle and storage loads within a 1:1 line projected upward from the bottom of the excavation or a minimum of 5 feet, whichever is greater. If the temporary construction embankments, including shored excavations, are to be maintained during the rainy season, berms are suggested along the tops of the excavations where necessary to prevent runoff from entering the excavation and eroding the slope faces.

c.) The soils exposed in the excavations should be inspected during excavation by the soils engineer so that modifications can be made if variations in the soil conditions occur.

d.) All unshored excavations should be stabilized within 30 days of initial excavation.

Backfills in the utility trenches should be compacted to at least 90 percent relative compaction. Onsite earth materials will be suitable for backfills. Clean sandy materials with sand equivalent value of at least 30 must be utilized for the pipe bedding and shading zone. Placement of the trench backfill in lifts and compaction by mechanical effort should be anticipated.

Foundation Plan Review/Observations and Testing

The recommendations provided in this report are based on preliminary design information and subsurface conditions as interpreted from limited exploratory work. Soil Exploration Co., Inc. should review the foundation plans prior to construction. Our conclusions and recommendations should also be reviewed, verified during grading/construction and revised as necessary.

Soil Exploration Co., Inc. should observe and/or test at the following stages of construction:

- During all overexcavations and grading.
- Following footing excavation and prior to placement of footing materials.
- During wetting of slab subgrade and prior to placement of slab materials.
- During all trench and wall backfills.
- During subgrade and base compaction prior to paving.
- When any unusual conditions are encountered.

Final Compaction Report

A final report of compaction control should be prepared subsequent to the completion of grading. The report should include a summary of work performed, laboratory test results, and the results, locations and elevations of field density tests performed during grading.

Limitation of Investigation

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar locations. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The field and laboratory test data are believed representative of the project site; however, soil conditions can vary significantly. As in most projects, conditions revealed during grading may be at variance with preliminary findings. If this condition occurs, the possible variations must be evaluated by the Project Geotechnical Engineer and adjusted as required or alternate design recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractor carry out such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In additions, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

This report was prepared for the client based on client's needs, directions and requirements at the time. This report is not authorized for use by and is not to be relied upon by any party except the client with whom Soil Exploration Co., Inc. contracted for the work. Use of, or reliance on, this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Soil Exploration Co., Inc. from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Soil Exploration Co., Inc.

Closure

If you should have any questions or concerns regarding this report, please do not hesitate to call our office. We appreciate this opportunity to be of service.

Very truly yours,
Soil Exploration Co., Inc.

REGISTERED PROFESSIONAL ENGINEER
GENE KINH-TOAN LUU
C 53417
EXP. 6/30/21
CIVIL
STATE OF CALIFORNIA

Gene

Gene K. Luu, PE 53417
Project Engineer

Distribution:	[1] Addressee	
Attachments:	Figure 1	Site Location Map
	Figure 2	Geologic Map
	Figure 3	Riverside County GIS Map
	Figure 4	U.S. Geological Survey Faults Map
	Plate 1	Exploratory Boring and Infiltration Test Location Map
	Plate 2	Retaining Wall Backfill and Subdrain Detail
	Appendix A	References
	Appendix B	Geotechnical Boring Logs
	Appendix C	Laboratory Test Results
	Appendix D	National Seismic Hazard Maps-Source Parameters and CBC (2019) Seismic Parameters
	Appendix E	General Earthwork and Grading Specifications
	Appendix F	Infiltration Test Procedure and Test Results

Site Location Map

2/13/2020, 9:25:48 PM

N

1:36,112

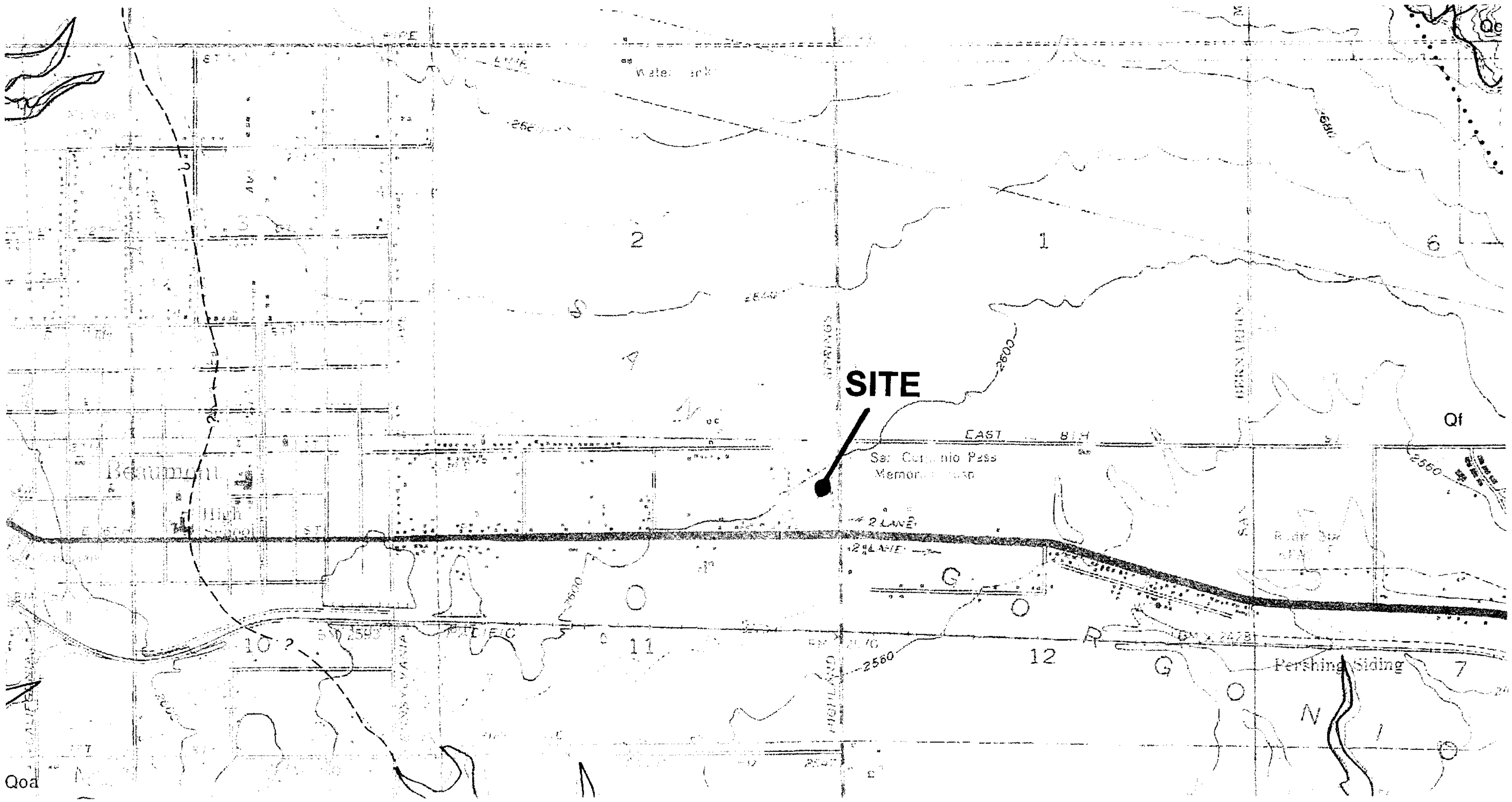
0 0.25 0.5 1 mi

0 0.4 0.8 1.6 km

Map data © OpenStreetMap contributors, Map layer by Esri

Figure 1

Map data © OpenStreetMap contributors, Map layer by Esri |



Base Map: USGS Geologic Map of the Beaumont Quadrangle, Riverside County, California.

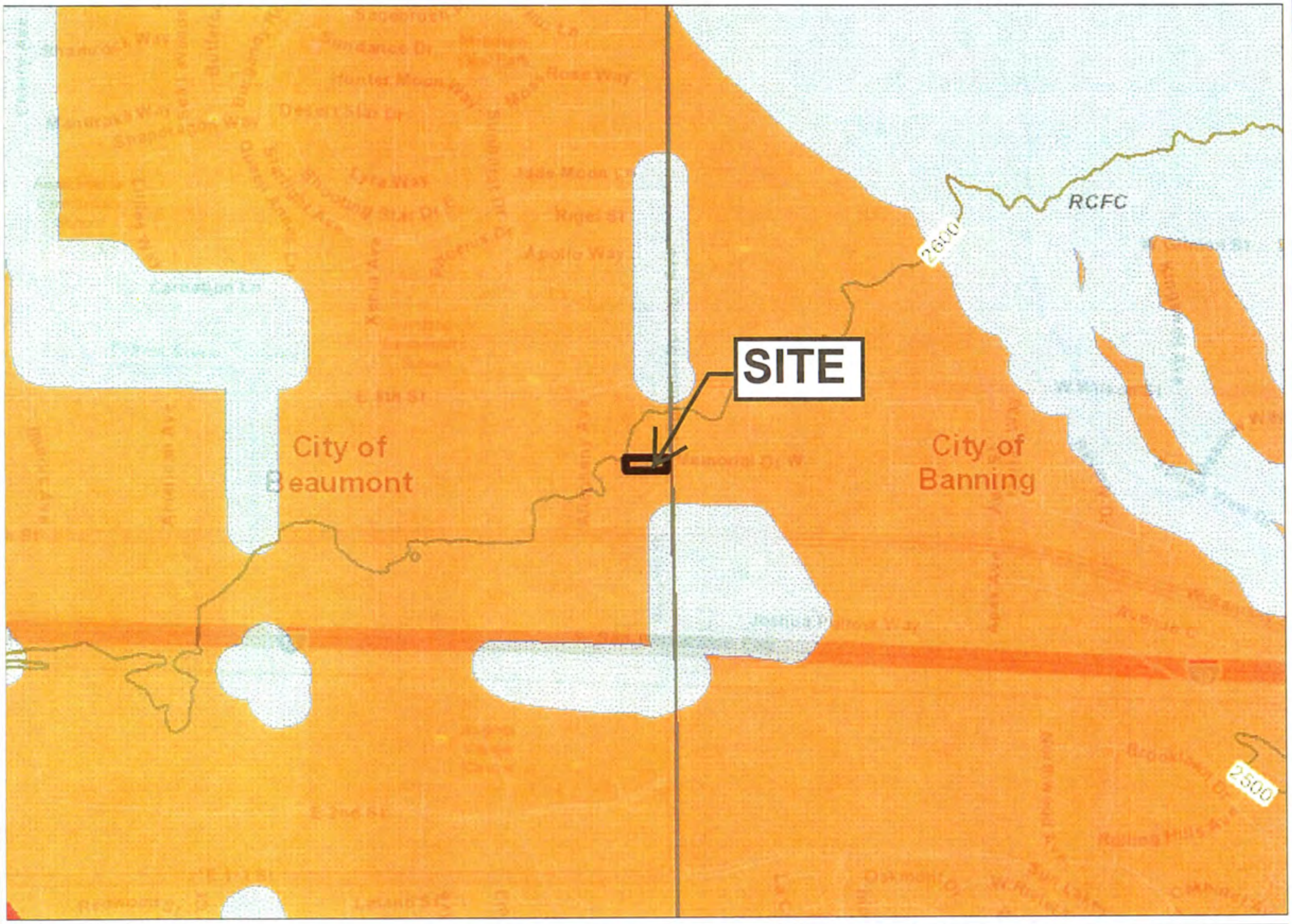
LEGEND:

Qf: Alluvial fan of San Gorgonio Pass, sand and gravel of plutonic and gneissic detritus derived from rising San Bernardino mountains to the north.

N. Highland Springs Ave.
City of Beaumont, California
92223

Soil Exploration Co., Inc.
Project No.: 19137-01
Date: March 16, 2020
Figure: 2

Map My County Map



Legend

- Contours100 ft interval (with 1(
- Faults
  - OTHER AUTHORITY
  - ALQUIST-PRIOLO
  - RIVERSIDE COUNTY
- Fault Zones
  - OTHER FAULT ZONE
  - COUNTY FAULT ZONE
  - ELSINORE FAULT ZONE
  - SAN ANDREAS FAULT ZONE
  - SAN JACINTO FAULT ZONE
- Flood
- Liquefaction
  - Other Susceptibility
  - High
  - Low
  - Moderate
  - Very High
  - Very low
- Blueline Streams
- City Areas
- World Street Map

0 1,505 3,009 Feet

IMPORTANT Maps and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

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Notes

APN 419-150-026, 027

Figure 3

U.S. Geological Survey 2014 Faults

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1:577,791

0 4 8 16 mi

0 5 10 20 km

NSHM 2014 Fault Sources

Thrust

Normal

Unassigned

Strike Slip

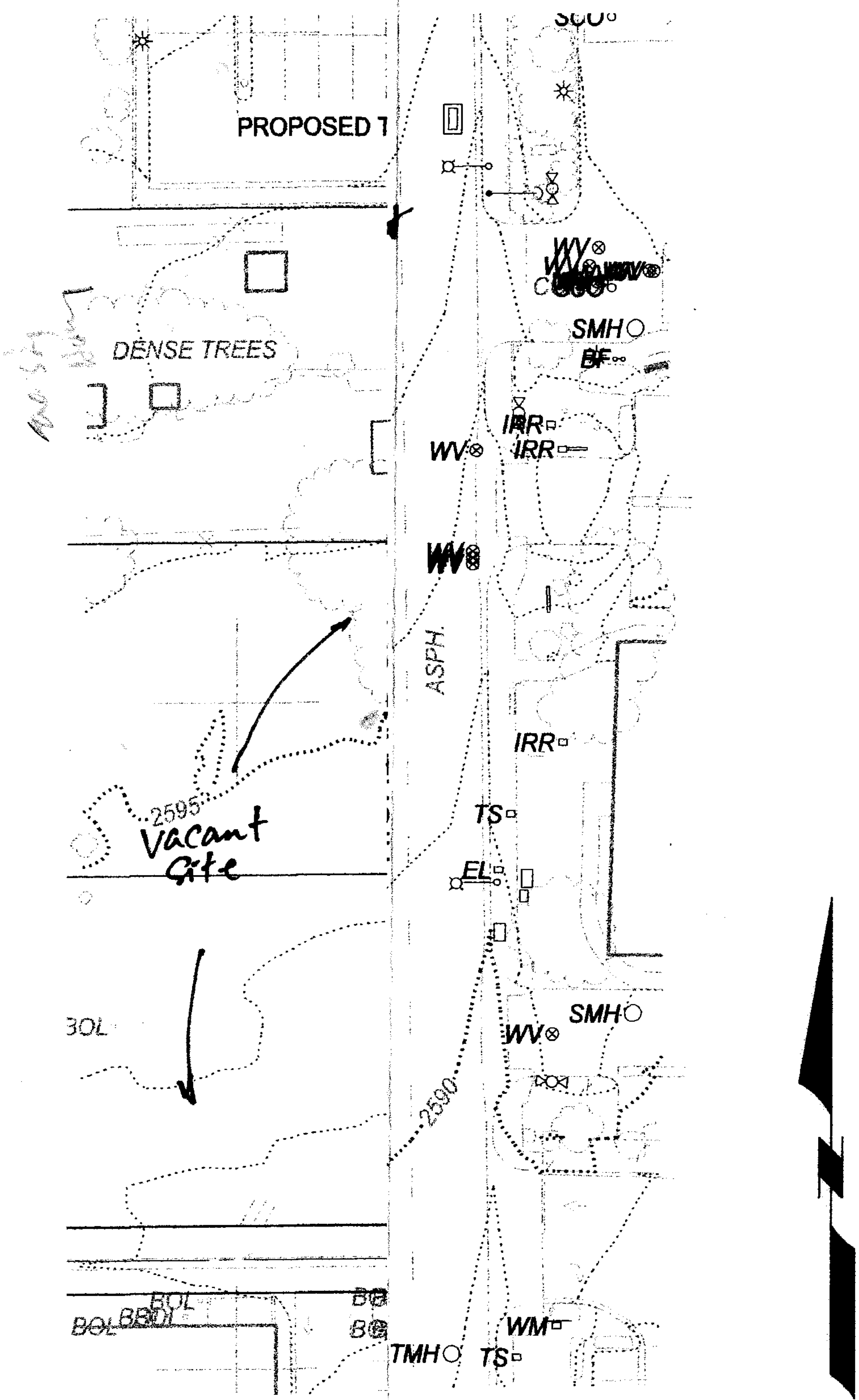
N

USGS, National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Figure 4

USGS

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. | USGS |



MTH2 engineering inc

639 Lakewood
Riverside, CA 92
(951) 850-2190
www.mth2engineering.com
civil • water resources • sto
urban design and planning

SCALE: 1" = 50'

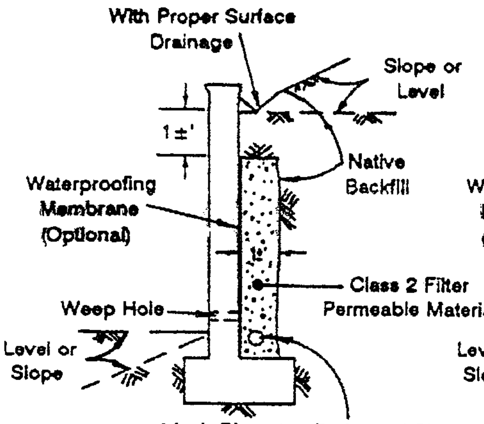
50 0 50 100

D:\MTH2\Engineering\2019_23 Beaumont\Civil\2019_23exb02_Infiltration_

JOB 2019_23 PLOTTED: 06-FEB-2020

SUBDRAIN OPTIONS FOR NATIVE MATERIAL BACKFILL

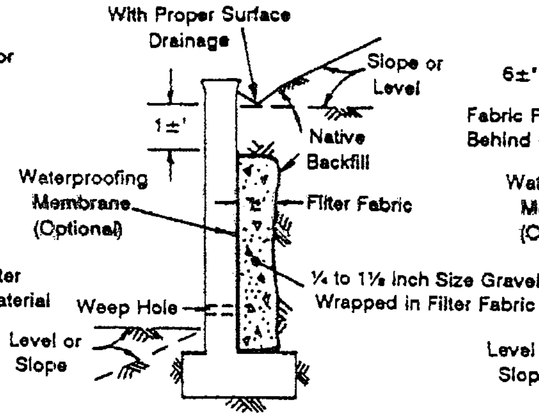
OPTION N2: Pipe Surrounded with Class 2 Material



Class 2 Filter Permeable Material Grading
Per Caltrans Specifications

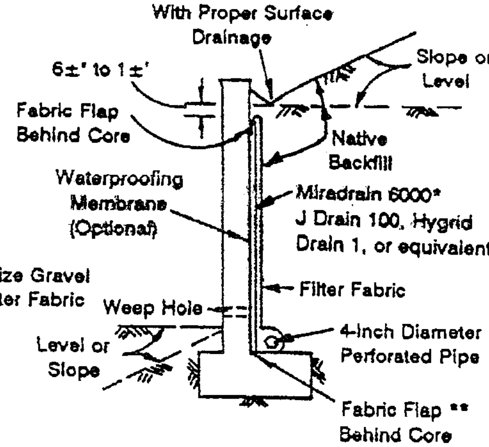
Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

OPTION N1: Gravel Wrapped in Filter Fabric



Proper Outlet Should be Provided for Gravel Subdrain (See Notes)

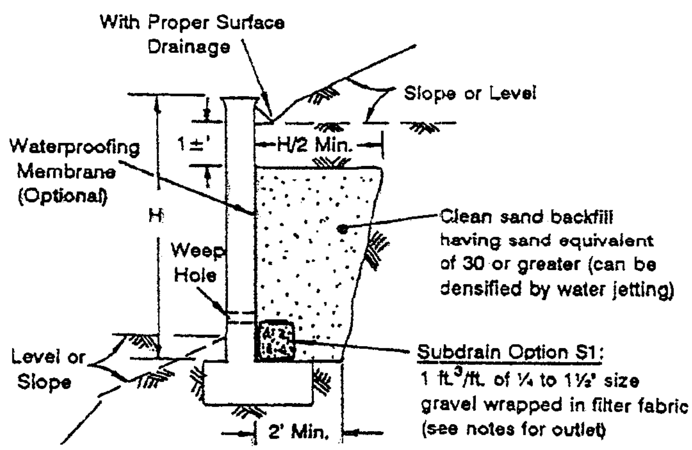
OPTION N3: Geotextile Drain

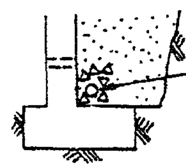


*Miradrain 6000 or J Drain 100 for non-waterproofed walls; Miradrain 6200 or J Drain 200 for completed waterproofed walls

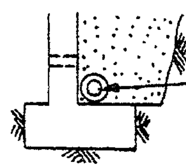
**Peel back the bottom fabric flap, place pipe next to core, wrap fabric around pipe and tuck behind core.

SUBDRAIN OPTIONS FOR CLEAN SAND BACKFILL





Subdrain Option S2:
4" diameter perforated pipe surrounded with 1 ft^3/ft. of Class 2 filter material per Caltrans specifications as above



Subdrain Option S3:
4" diameter perforated pipe wrapped in filter fabric

Notes:

- Pipe type should be ASTM D1527 Acrylonitrile Butediene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down.
- Filter fabric should be Mirafi 140N, 140NS, Supac 4NP, Amoco 4545, Trevira 1114, or approved equivalent.
- All drains should have a gradient of 1 percent minimum.
- Outlet portion for gravel subdrain should have a 4"-diameter pipe with the perforated portion inserted into the gravel approximately 2' minimum and the nonperforated portion extending approximately 1' outside the gravel. Proper sealing should be provided at the pipe insertion enabling water to run from the gravel portion into rather than outside the pipe.
- Waterproofing membrane may be required for a specific retaining wall such as a stucco or basement wall.
- Weephole should be 2" minimum diameter and provided at 25' minimum in length of wall. If exposure is permitted, weephole should be located at 3±" above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to discharge through the curb face or equivalent should be provided, or for a basement-type wall, a proper subdrain outlet system should be provided. Open vertical masonry joints (i.e., omit mortar from joints of first course above finished grade) at 32" maximum intervals may be substituted for weepholes. Screening such as with a filter fabric should be provided for weepholes/open joints to prevent earth materials from entering the holes/joints.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

Soil Exploration Co. Inc.

Plate: 2

APPENDIX A

REFERENCES

- CDMG, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, Dated February 1998.
- Riverside County GIS Map
- Geologic Map of the Beaumont Quadrangle, Riverside County, California, by Thomas W. Dibblee, Jr., 2003.
- U.S. Geological Survey Faults, 2014.
- Riverside County Stormwater Quality Best Management Practice, Design Handbook for Low Impact Development, Riverside County, June 2014.

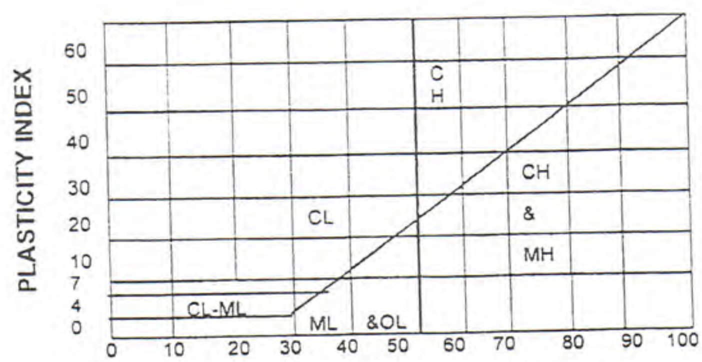
APPENDIX B

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS	(More than ½ of soil < No. 200 sieve)	GRAVELS (More than ½ of coarse fraction > No. 4 sieve size)	GW	Well-graded gravels or 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
			GC	Clayey gravels, gravel-sand-clay mixtures
		SANDS (More than ½ of coarse fraction < No. 4 sieve size)	SW	Well-graded sands or gravely sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-salt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS	(More than ½ of soil < No. 200 sieve)	SILTS & CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, 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.
		SILTS & CLAYS LL > 50	MH	Inorganic silts, caceous or diatonaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of medium to high plasticity, organic silty clays, organic silts
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
		HIGHLY ORGANIC SOILS	Pt	Peat and other highly organic soils

CLASSIFICATION CHART
(UNIFIED SOIL CLASSIFICATION SYSTEM)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDER	ABOVE 12"	ABOVE 305
COBBLES	3" to 12"	305 to 76.2
GRAVEL	3" to No. 4	762 to 4.76
COARSE	3" TO ¾"	76.2 to 19.1
FINE	¾"to No. 4	19.1 to 4.76
SAND	No. 4 to 200	4.76 to 0.074
COARSE	No. 4 to 10	4.76 to 2.00
MEDIUM	No. 10 to 40	2.00 to 0.420
FINE	No. 40 to 200	0.420 to 0.074
SILT & CLAY	BELOW No. 200	BELOW 0.074

GRAIN SIZE CHART



PLASTICITY CHART

Ring Sample	Bag Sample	NR No Recovery	Classification in accordance with ASTM D2487 Description and visual observation in accordance with ASTM D2488 All Sieve Sizes shown are US Standard SPT Refusal is defined as one of the following: 10 blows for no apparent displacement 50 blows for less than 6 inches advancement 100 blows for 6 to 18 inches advancement
SPT Sample	Seepage		

GEOTECHNICAL BORING LOGS

Drill Hole No. B-1

Date: 2/14/20
Drilling Company: Larry Harklerode
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 19137-01
Type of Rig: B-53
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Brown, fine to medium silty sand, slightly moist, loose
2							
3		X		4/5/5	11.6		Slightly moist, loose
4							
5							
6		X		7/8/9	7.8		Light brown, fine to medium, slightly moist, medium dense, porous
7							
8							
9							
10							
11		X		10/13/15			Slightly moist, medium dense
12							
13							
14							
15							
16		X		12/16/22			Yellowish light brown, slightly moist, dense
17							
18							
19		X		22/26/36			Slightly moist, very dense
20							Boring end at 20', no groundwater, no caving
21							
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-2

Date: 2/14/20 **Project No.** 19137-01
Drilling Company: Larry Harklerode **Type of Rig:** B-53
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Light brown, fine to medium silty sand, slightly moist, medium dense
2							
3			7/15/27	119.2	10.4		Slightly moist, medium dense
4							
5							
6			12/27/27	110.0	8.3		Slightly moist, dense
7							
8							
9							
10							
11			8/14/17				Slightly moist, dense
12							
13							
14							
15							
16			12/15/22				Slightly moist, dense
17							
18							
19			31/33				Yellowish light brown, fine to coarse grained, slightly moist, very dense
20							Boring end at 20', no groundwater, no caving
21							
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-3

Date: 2/14/20
Drilling Company: Larry Harklerode
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 19137-01
Type of Rig: B-53
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Light brown, fine to medium silty sand, slightly moist, loose
2							
3		X	5/5/10		8.9		Slightly moist, medium dense
4							
5							
6		X	12/15/15		9.2		Slightly moist, medium dense
7							
8							
9							
10							
11		X	17/21/22				Slightly moist, dense
12							
13							
14		X	30/50/3"				Slightly moist, dense
15							Boring end at 15', no groundwater, no caving
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-4

Date: 2/14/20 **Project No.** 19137-01

Drilling Company: Larry Harklerode **Type of Rig:** B-53

Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30" **Elevation:** Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	**SILTY SAND:** Light brown, fine to medium silty sand, slightly moist, medium dense
2							
3			10/14/31	109.2	6.6		Slightly moist, dense
4							
5							
6			21/23/40	102.2	6.9		Slightly moist, dense
7							
8							
9							
10							
11			21/28/30				Very dense
12							
13							
14			40/50/5"				Yellowish light brown, dry, very dense
15							Boring end at 15', no groundwater, no caving
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

APPENDIX C

Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental & Civil Engineering

February 19, 2020

Soil Exploration Company Inc.
7535 Jurupa Avenue, Unit C
Riverside, California 92504

Attn: Mr. Gene Luu

RE: LABORATORY TEST RESULTS/REPORT
Client: MTH2 Engineering
Project No.: 19137-01
QCI Job No.: 20-183-002i

Gentlemen:

We have completed the testing program conducted on sample for above project. The tests were performed in accordance with testing procedures as follows:

Sample ID	Sample Depth (ft)	Sulfate CT-417 % By Weight
B-1	0-5'	0.180

We appreciate the opportunity to provide testing services to Soil Exploration Company Inc. Should you have any questions, please call the undersigned.

Sincerely yours,

Cal Land Engineering, Inc. (CLE)
dba Quartech Consultants (QCI)

REGISTERED PROFESSIONAL ENGINEER
JACK C. S. LEE
2153
Exp. 3-31-21
GEOTECHNICAL
STATE OF CALIFORNIA

Jack C. Lee, GE 2153
Principle Engineer

Matthew Au
Project Engineer

Enclosure

576 E. Lambert Road, Brea, CA 92821; Tel: 714-671-1050, Fax: 714-671-1090

APPENDIX D

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)
6.70	San Jacinto;SBV+SJV	CA	n/a	90	V	strike slip	0	16
6.70	San Jacinto;SJV	CA	18	90	V	strike slip	0	16
6.82	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
6.82	S. San Andreas;SSB+BG	CA	n/a	71		strike slip	0	13
6.82	S. San Andreas;SSB+BG+CO	CA	n/a	77		strike slip	0.2	12
6.82	S. San Andreas;SSB	CA	16	90	V	strike slip	0	13
6.82	S. San Andreas;SM+NSB+SSB+BG+CO	CA	n/a	83		strike slip	0.1	13
6.82	S. San Andreas;SM+NSB+SSB+BG	CA	n/a	81		strike slip	0	13
6.82	S. San Andreas;SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13
6.82	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0.1	13
6.82	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14
6.82	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13
6.82	S. San Andreas;NM+SM+NSB+SSB+BG+CO	CA	n/a	84		strike slip	0.1	13
6.82	S. San Andreas;NM+SM+NSB+SSB+BG	CA	n/a	83		strike slip	0	14

6.82	S. San Andreas;NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13
6.82	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0	14
6.82	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
6.82	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
6.82	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	85		strike slip	0	14
6.82	S. San Andreas;CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
6.82	S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	85		strike slip	0.1	13
6.82	S. San Andreas;NSB+SSB+BG+CO	CA	n/a	79		strike slip	0.2	12
6.82	S. San Andreas;BB+NM+SM+NSB+SSB+BG	CA	n/a	84		strike slip	0	14
7.37	San Jacinto;SBV+SJV+A	CA	n/a	90	V	strike slip	0	16
7.37	San Jacinto;SBV+SJV+A+CC	CA	n/a	90	V	strike slip	0	16
7.37	San Jacinto;SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
7.37	San Jacinto;SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15
7.37	San Jacinto;SJV+A+CC	CA	n/a	90	V	strike slip	0	16
7.37	San Jacinto;SBV+SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15
7.37	San Jacinto;SBV+SJV+A+C	CA	n/a	90	V	strike slip	0	17
7.37	San Jacinto;SJV+A+C	CA	n/a	90	V	strike slip	0	17
7.37	San Jacinto;SJV+A	CA	n/a	90	V	strike slip	0	17
7.37	San Jacinto;SBV+SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
8.50	S. San Andreas;BG+CO	CA	n/a	72		strike slip	0.3	12
8.50	S. San Andreas;BG	CA	n/a	58		strike slip	0	13

8.61	San Jacinto;A+C	CA	n/a	90	V	strike slip	0	17
8.61	San Jacinto;A	CA	9	90	V	strike slip	0	17
8.61	San Jacinto;A+CC	CA	n/a	90	V	strike slip	0	16
8.61	San Jacinto;A+CC+B	CA	n/a	90	V	strike slip	0.1	15
8.61	San Jacinto;A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
15.56	Pinto Mtn	CA	2.5	90	V	strike slip	0	16
17.70	San Jacinto;SBV	CA	6	90	V	strike slip	0	16
21.87	S. San Andreas;NM+SM+NSB	CA	n/a	90	V	strike slip	0	13
21.87	S. San Andreas;SM+NSB	CA	n/a	90	V	strike slip	0	13
21.87	S. San Andreas;BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
21.87	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0.1	13
21.87	S. San Andreas;NSB	CA	22	90	V	strike slip	0	13
21.87	S. San Andreas;CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
21.87	S. San Andreas;CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
28.19	Elsinore;W+GI	CA	n/a	81	NE	strike slip	0	14
28.19	Elsinore;GI	CA	5	90	V	strike slip	0	13
28.21	Helendale-So Lockhart	CA	0.6	90	V	strike slip	0	13
28.42	Cleghorn	CA	3	90	V	strike slip	0	16
29.18	Elsinore;W+GI+T+J+CM	CA	n/a	84	NE	strike slip	0	16
29.18	Elsinore;GI+T	CA	5	90	V	strike slip	0	14
29.18	Elsinore;GI+T+J	CA	n/a	86	NE	strike slip	0	17

29.18	Elsinore;GI+T+J+CM	CA	n/a	86	NE	strike slip	0	16
29.18	Elsinore;W+GI+T+J	CA	n/a	84	NE	strike slip	0	16
29.18	Elsinore;W+GI+T	CA	n/a	84	NE	strike slip	0	14
29.20	Elsinore;T+J	CA	n/a	86	NE	strike slip	0	17
29.20	Elsinore;T	CA	5	90	V	strike slip	0	14
29.20	Elsinore;T+J+CM	CA	n/a	85	NE	strike slip	0	16
29.24	North Frontal (East)	CA	0.5	41	S	thrust	0	16
29.95	North Frontal (West)	CA	1	49	S	reverse	0	16
31.88	Burnt Mtn	CA	0.6	67	W	strike slip	0	16
33.20	Cucamonga	CA	5	45	N	thrust	0	8
33.74	Lenwood-Lockhart-Old Woman Springs	CA	0.9	90	V	strike slip	0	13
34.32	Landers	CA	0.6	90	V	strike slip	0	15
34.34	Eureka Peak	CA	0.6	90	V	strike slip	0	15
36.33	Chino, alt 2	CA	1	65	SW	strike slip	0	14
37.64	Elsinore;W	CA	2.5	75	NE	strike slip	0	14
37.77	Chino, alt 1	CA	1	50	SW	strike slip	0	9
38.47	Johnson Valley (No)	CA	0.6	90	V	strike slip	0	16
39.33	San Jacinto;C	CA	14	90	V	strike slip	0	17
39.41	San Jacinto;CC+B	CA	n/a	90	V	strike slip	0.2	14
39.41	San Jacinto;CC	CA	4	90	V	strike slip	0	16
39.41	San Jacinto;CC+B+SM	CA	n/a	90	V	strike slip	0.2	14
40.80	Elsinore;J	CA	3	84	NE	strike slip	0	19

40.80	Elsinore;J+CM	CA	3	84	NE	strike slip	0	17
41.45	S. San Andreas;CO	CA	20	90	V	strike slip	0.6	11
43.57	S. San Andreas;CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;BB+NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;PK+CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0.1	13
43.57	S. San Andreas;NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14
43.57	S. San Andreas;SM	CA	29	90	V	strike slip	0	13
44.04	So Emerson-Copper Mtn	CA	0.6	90	V	strike slip	0	14
44.49	San Jose	CA	0.5	74	NW	strike slip	0	15
47.42	Sierra Madre	CA	2	53	N	reverse	0	14
47.42	Sierra Madre Connected	CA	2	51		reverse	0	14
47.76	San Joaquin Hills	CA	0.5	23	SW	thrust	2	13
48.17	Calico-Hidalgo	CA	1.8	90	V	strike slip	0	14

2019 CBC – SEISMIC PARAMETERS		
Site Coordinates	**Latitude**	**Longitude**
	33.9306	**-116.9476**
Mapped Spectral Response Acceleration	S_s = **2.044**	S_1 = **0.701**
Site Coefficients (Class "D")	F_a = **1.00**	F_v = **1.70**
Maximum Considered Earthquake (MCE) Spectral Response Acceleration	S_{MS} = **2.044**	S_{M1} = **1.192**
Design Spectral Response Acceleration Parameters	S_{DS} = **1.363**	S_{D1} = **0.795**
Seismic Design Category	**D**	
Peak Ground Acceleration (PGA)	**0.834g**	
Site Amplification factor at PGA (F_{PGA})	**1.1**	
Site Modified Peak Ground Acceleration (PGA_m)	**0.917**	

References:

- Earthquake.usgs.gov/research/hazmaps/design
- 2019 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Section 1613, Earthquake Loads

APPENDIX E

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL INTENT

These specifications present general procedures and requirements for grading and earthwork as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installations of subdrains, and excavations. The recommendations contained in the geotechnical report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations which could supersede these specifications or the recommendations of the geotechnical report.

2.0 EARTHWORK OBSERVATIONS AND TESTING

Prior to the commencement of grading, a qualified geotechnical consultant (soils engineer and engineering geologist, and their representatives) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. It will be necessary that the consultant provide adequate testing and observations so that he may determine that the work was accomplished as specified. It shall be the responsibility of the contractor to assist the consultant and keep him apprised of work schedules and changes so that he may schedule his personnel accordingly.

It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and approved grading plans. If, in the opinion of the consultant, unsatisfactory conditions, such as questionable soil, poor moisture conditions, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the consultant will be empowered to reject the work and recommend that construction be stopped until the unsatisfactory conditions are rectified.

Maximum dry density tests used to determine the degree of compaction will be performed in accordance with the American Society of Testing and Materials, test method ASTM D1557-12.

3.0 PREPARATION OF AREAS TO BE FILLED

3.1 *Clearing and Grubbing*

All brush, vegetation, and debris shall be removed or piled and otherwise disposed of.

3.2 *Processing*

The existing ground which is determined to be satisfactory for support of fill shall be scarified to a minimum depth of 6 inches. Existing ground which is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until the soils are broken down and free of large clay lumps or clods and until the working surface is reasonably uniform and free of uneven features which would inhibit uniform compaction.

3.3 *Overexcavation*

Soft, dry, spongy, highly fractured or otherwise unsuitable ground, extending to such depth that surface processing cannot adequately improve the condition, shall be overexcavated down to firm ground, approved by the consultant.

3.4 *Moisture Conditioning*

Overexcavated and processed soils shall be watered, dried-back, blended, and/or mixed, as required to attain a uniform moisture content near optimum.

3.5 *Recompaction*

Overexcavation and processed soils which have been properly mixed and moisture-conditioned shall be recompacted to a minimum relative compaction of 90 percent.

3.6 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal : vertical), the ground shall be stepped or benched. The lowest bench shall be a minimum of 15 feet wide, shall be at least 2 feet deep, shall expose firm materials, and shall be approved by the consultant. Other benches shall be excavated in firm materials for a minimum width of 4 feet. Ground sloping flatter than 5:1 (horizontal : vertical) shall be benched or otherwise overexcavated when considered necessary by the consultant.

3.7 Approval

All areas to receive fill, including processed areas, removal areas and toe-of-fill benches shall be approved by the consultant prior to fill placement.

4.0 FILL MATERIAL

4.1 General

Material to be placed as fill shall be free of organic matter and other deleterious substances, and shall be approved by the consultant. Soils of poor gradation, expansion, or strength characteristics shall be placed in areas designated by consultant or shall be mixed with other soils to serve as satisfactory fill material.

4.2 Oversize

Oversize materials defined as rock, or other irreducible material with maximum dimension greater than 12 inches, shall not be buried or placed in fills, unless the location, materials, and disposal methods are specifically approved by the consultant. Oversize disposal operations shall be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet vertically of finish grade or within the range of future utilities or underground construction, unless specifically approved by the consultant.

4.3 Import

If importing of fill material is required for grading, the import material shall meet the requirements of Section 4.1.

5.0 FILL PLACEMENT and COMPACTION

5.1 Fill Lifts

Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding 6 inches in compacted thickness. The consultant may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

5.2 Fill Moisture

Fill layers at a moisture content less than optimum shall be watered and mixed, and wet fill layers shall be aerated by scarification or shall be blended with drier material. Moisture conditioning and mixing of fill layers shall continue until the fill material is at a uniform moisture content at or near optimum.

5.3 Compaction of Fill

After each layer has been evenly spread, moisture-conditioned, and mixed, it shall be uniformly compacted to not less than 90 percent of maximum dry density. Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

5.4 *Fill Slopes*

Compacting of slopes shall be accomplished, in addition to normal compacting procedures, by backrolling of slopes with sheepsfoot rollers at frequent increments of 2 to 3 feet in fill elevation gain, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be at least 90 percent.

5.5 *Compaction Testing*

Field-tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests shall be at the consultant's discretion. In general, the tests will be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of embankment.

6.0 SUBDRAIN INSTALLATION

Subdrain systems, if required, shall be installed in approved ground to conform to the approximate alignment and details shown on the plans or herein. The subdrain location or materials shall not be changed or modified without the approval of the consultant. The consultant, however, may recommend and upon approval, direct changes in subdrain line, grade or material. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to commencement of filling over the subdrain.

7.0 EXCAVATION

Excavations and cut slopes will be examined during grading. If directed by the consultant, further excavation or overexcavation and refilling of cut areas shall be performed, and/or remedial grading of cut slopes shall be performed. Where fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope shall be made and approved by the consultant prior to placement of materials for construction of the fill portion of the slope.

8.0 TRENCH BACKFILLS

Trench excavations for utility pipes shall be backfilled under engineering supervision.

After the utility pipe has been laid, the space under and around the pipe shall be backfilled with clean sand or approved granular soil to a depth of at least one foot over the top of the pipe. The sand backfill shall be uniformly jetted into place before the controlled backfill is placed over the sand.

The onsite materials, or other soils approved by the soil engineer, shall be watered and mixed as necessary prior to placement in lifts over the sand backfill.

The controlled backfill shall be compacted to at least 90 percent of the maximum dry density as determined by the ASTM D1557-12 test method.

Field density tests and inspection of the backfill procedures shall be made by the soil engineer during backfilling to see that proper moisture content and uniform compaction is being maintained. The contractor shall provide test holes and exploratory pits as required by the soil engineer to enable sampling and testing.

APPENDIX F

Infiltration Test (Percolation Test Procedure)

The tests were performed in accordance with Riverside County Stormwater Quality Best Management Practice Design Handbook for Low Impact Development, dated June 2014.

Four 8-inch diameter test holes (I-1, I-2, I-3 and I-4) were drilled at the suggested locations. The soil at the test locations was visually classified as silty sand. To mitigate any possible caving or sloughing of the test holes, a 6-inch diameter perforated pipe was placed in the hole. The bottom of the hole was covered with 2 inches of gravel.

The testing was conducted after presoaking. Two consecutive measurements showed that 6 inches of water seeped away in more than 25 minutes for I-1, I-2, I-3 and I-4. The tests for an additional six hours with measurements taken at 30 minute intervals. Water level was adjusted to 20 inches above the bottom of the test hole after each measurement. The drop that occurred during the final reading was used for design rate purposes.

Infiltration Test/Tabulated Test Results

Test No.	Depth of Test (feet)	Earth Material	Infiltration Rate (in/hr)
I-1	4	Silty Sand (SM)	0.05
I-2	4	Silty Sand (SM)	0.88
I-3	4	Silty Sand (SM)	0.67
I-4	4	Silty Sand (SM)	0.69

We recommend that a suitable factor of safety should be applied to the rate in design of the system.

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: MTH2 Engineering, INC. Project No.: 19137-01
Test Hole No.: I-1 Date Excavated: 2/14/20
Depth of Test Hole: 4' Soil Classification: SM
Diameter: 8" Presoak: 24 hrs
Tested By: ER Date: 12/28/20

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	8:35:09 9:00:09	25	28	28.75	0.75	N
2	9:03:20 9:28:20	25	"	28.5	0.5	N

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	9:33:19	10:03:19	30	28	28.375	0.375	
2	10:09:33	10:39:33	30	"	28.25	0.25	
3	10:43:05	11:13:05	30	"	"	"	
4	11:17:16	11:47:16	"	"	"	"	
5	11:50:27	12:20:27	"	"	"	"	
6	12:24:38	12:54:38	"	"	"	"	
7	12:57:49	1:27:49	"	"	"	"	
8	1:31:02	2:01:02	"	"	"	"	
9	2:05:13	2:35:13	"	"	"	"	
10	2:39:25	3:09:25	"	"	"	"	
11	3:12:37	3:42:37	"	"	"	"	
12	3:45:49	4:15:49	"	"	"	"	0.05

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 0.25}{30(4+(20+(20-0.25)))}$ = 0.05 in/hr

K

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: MT/H2 Engineering, INC Project No.: 19137-01
Test Hole No.: T-2 Date Excavated: 2/14/20
Depth of Test Hole: 4' Soil Classification: SM
Diameter: 8" Presoak: 24 hr
Tested By: TR Date: 12/23/20

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	8:36:38 9:01:38	25	28	32	4.0	N
2	9:05:49 9:30:49	25	"	31.5	3.5	N

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	9:34:37	10:04:37	30	28	32.375	4.375	
2	10:10:40	10:40:40	30	"	"	"	
3	10:44:30	11:14:30	30	"	"	"	
4	11:18:41	11:48:41	"	"	"	"	
5	11:52:52	12:22:52	"	"	"	"	
6	12:26:04	12:56:04	"	"	"	"	
7	1:00:16	1:30:16	"	"	"	"	
8	1:34:28	2:04:28	"	"	"	"	
9	2:08:40	2:38:40	"	"	"	"	
10	2:42:52	3:12:52	"	"	"	"	
11	3:16:05	3:46:05	"	"	"	"	
12	3:50:18	4:20:18	"	"	"	4.375	0.88

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 4.375}{30(4+(20+(20-4.375)))}$ = 0.88 in/hr

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: MTHD Engineering, Inc. Project No.: 19137-01
Test Hole No.: I-4 Date Excavated: 2/14/20
Depth of Test Hole: 4' Soil Classification: SM
Diameter: 8" Presoak: 24 hrs
Tested By: MR Date: 12/25/20

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1		25	28	32	4.0	N
2	9:10:01 9:35:01	25	〃	31.75	3.75	〃

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	9:39:40	10:09:40	30	28	31.5	3.5	
2	10:14:29	10:44:29	30	〃	〃	〃	
3	10:48:01	11:18:01	30	〃	〃	〃	
4	11:25:12	11:55:12	〃	〃	〃	〃	
5	11:59:23	12:29:23	〃	〃	〃	〃	
6	12:33:34	1:03:34	〃	〃	〃	〃	
7	1:07:45	1:37:45	〃	〃	〃	〃	
8	1:41:56	2:11:56	〃	〃	〃	〃	
9	2:16:08	2:46:08	〃	〃	〃	〃	
10	3:00:20	3:30:20	〃	〃	〃	〃	
11	3:35:32	4:05:32	〃	〃	〃	〃	
12	4:09:43	4:39:43	〃	〃	〃	〃	0.69

COMMENTS:

Infiltration Rate = $\frac{4 \times 60 \times 3.5}{30(4+(20+(20-3.5)))}$ = 0.69 in/hr

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Not applicable

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Not applicable

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name MTH2 Engineering, Inc. Date 5/8/2020

Designed by MTH2 Engineering, Inc. Case No

Company Project Number/Name Beaumont

BMP Identification

BMP NAME / ID DMA 2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E D_{85}= 0.85 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
2a	807.31	Concrete or Asphalt	1	0.89	720.1			
2b	3214.33	Roofs	1	0.89	2867.2			
2c	851.16	Ornamental Landscaping	0.1	0.11	94			
BR2	196	Ornamental Landscaping	0.1	0.11	21.6			
	5068.8	***Total***			**3702.9**	**0.85**	**262.3**	**284.2**

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	DMA2 BR 2		Calculated Cells

Company Name: MTH2 Engineering, Inc. Date: 8-May-20

Designed by: MTH2 Engineering, Inc. County/City Case No.:

Design Volume

Enter the area tributary to this feature $A_T =$ 0.1163636 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook $V_{BMP} =$ 262 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer $d_S =$ 2.0 ft

Top Width of Bioretention Facility, excluding curb $w_T =$ 9.0 ft

Total Effective Depth, d_E

$$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$$

$d_E =$ 1.42 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

$A_M =$ 185 ft^2

Proposed Surface Area $A =$ 203 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 1 %

6" Check Dam Spacing 25 feet

Describe Vegetation: Natural Grasses

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name MTH2 Engineering, Inc. Date 5/8/2020

Designed by MTH2 Engineering, Inc. Case No

Company Project Number/Name Beaumont

BMP Identification

BMP NAME / ID DMA 3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth,
from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.85 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
3a	*701.04*	*Concrete or Asphalt*	*1*	*0.89*	*625.3*			
3b	*3214.17*	*Roofs*	*1*	*0.89*	*2867*			
3c	*1096.35*	*Ornamental Landscaping*	*0.1*	*0.11*	*121.1*			
BR3	*180*	*Ornamental Landscaping*	*0.1*	*0.11*	*19.9*			
	5191.56	***Total***			**3633.3**	**0.85**	***257.4***	***275.4***

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	DMA 3 BR 3		Calculated Cells

Company Name:	MTH2 Engineering, Inc.	Date:	8-May-20
Designed by:	MTH2 Engineering, Inc.	County/City Case No.:	

Design Volume

Enter the area tributary to this feature — A_T = 0.1191816 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 257 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 2.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 6.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.38 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 187 ft^2

Proposed Surface Area — A= 198 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 1 %

6" Check Dam Spacing — 25 feet

Describe Vegetation: Natural Grasses

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	MTH2 Engineering, Inc.	Date	5/8/2020
Designed by	MTH2 Engineering, Inc.	Case No	
Company Project Number/Name	Beaumont		

BMP Identification

BMP NAME / ID DMA 4

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth,
from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.85 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
4a	*42451.43*	*Concrete or Asphalt*	*1*	*0.89*	*37866.7*			
4b	*3444.68*	*Roofs*	*1*	*0.89*	*3072.7*			
4c	*3755.5*	*Ornamental Landscaping*	*0.1*	*0.11*	*414.8*			
BR4	*1678.75*	*Ornamental Landscaping*	*0.1*	*0.11*	*185.4*			
	51330.36	***Total***			**41539.6**	**0.85**	***2942.4***	***2954.6***

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	DMA 4 BR 4		Calculated Cells

Company Name:	MTH2 Engineering, Inc.	Date:	8-May-20
Designed by:	MTH2 Engineering, Inc.	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	1.1783829	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	2,942	ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	17.8	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.76	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \dfrac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	1,672	ft^2
Proposed Surface Area	A=	1,679	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		1	%
6" Check Dam Spacing		25	feet

Describe Vegetation: Natural Grasses

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ A. **On-site storm drain inlets**	☑ **Locations of inlets.**	☑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☑ **Maintain and periodically repaint or replace inlet markings.** ☑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ D1. **Need for future indoor & structural pest control**		❑ **Note building design features that discourage entry of pests.**	❑ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☑ D2. **Landscape/ Outdoor Pesticide Use**	❑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ☑ **Show self-retaining landscape areas, if any.** ❑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ❑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ☑ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ☑ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ❑ **Consider using pest-resistant plants, especially adjacent to hardscape.** ☑ **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	☑ **Maintain landscaping using minimum or no pesticides.** ☑ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ☑ **Provide IPM information to new owners, lessees and operators.**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
☑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ☑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑**Car dealerships and similar may rinse cars with water only.**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

S T O R M W A T E R   P O L L U T A N T   S O U R C E S / S O U R C E   C O N T R O L   C H E C K L I S T

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ N. **Fire Sprinkler Test Water**		☑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	☑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ☐ **Boiler drain lines** ☐ **Condensate drain lines** ☑ **Rooftop equipment** ☑ **Drainage sumps** ☑ **Roofing, gutters, and trim.** ☐ **Other sources**		☐ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ☐ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ☑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ☑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ☑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** ☐ **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ P. **Plazas, sidewalks, and parking lots.**			☑ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

APPENDIX G
PRELIMINARY HYDROLOGY STUDY
AUGUST 31, 2020
REVISED JANUARY 14, 2021

Preliminary Hydrology Study

for

Highland Springs Remodel and Development

Prepared for:

High Sand, Inc.
655 Highland Springs Avenue
Beaumont, CA 92223

Prepared by:

MTH2 Engineering Inc.
639 Lakewood Drive
Riverside, CA 92506

Prepared: Aug 31, 2020
Revised: Jan 14, 2021

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Appendices

Appendix

- Vicinity Map
- Pre-Development Shortcut Unit Hydrograph Calculations
- Post-Development Shortcut Unit Hydrograph Calculations
- Detention Volume Calculations
- Detention Chamber Calculations
- Plate C-1.19 Soil Group Map
- Plate E-6.1 Runoff Index (RI) Numbers
- Plate E-6.2 Fp versus RI
- Plate E-6.3 Impervious Cover
- NOAA Atlas 14 Point Precipitation Frequency Estimate

Purpose
The purpose of this report is to develop the incremental volume increase in runoff for the proposed development to preliminarily design the proposed detention facilities.

Existing Condition
The project is proposed on 2 vacant parcels totaling 1.511 acres on the westerly side of Highland Springs Avenue, between W Ramsey Street to the south and W Wilson Street to the north. The site generally drains towards the east, and then south within the existing curb and gutter of Highland Springs Avenue.

Proposed Condition
The applicant is proposing to develop the site with 1 Office and 1 Restaurant building, vacuum parking and entry lanes for the existing car wash site immediately to the south, and includes associated parking and landscaping. Highland Springs Avenue will be widened along the project frontage to ultimate width per the Beaumont General Plan Circulation Element.

The project applicant proposes bio-retention trenches for Water Quality Management Plan (WQMP) purposes. An underground detention chamber system is proposed to detain the incremental increase in storm runoff. Runoff from the development will be directed to the bio-retention trenches, and overflow from the bio-retention trenches will be directed to the underground detention chamber systems. The detention chamber system will have an over flow outlet for storm events larger than the critical storm, and a low flow outlet to release the stored volume at or below the pre-development rate to an under sidewalk drain to Highland Springs Avenue thru the use of a sump and pump system.

Methodology
This study was performed under the guidelines of the Riverside County Flood Control and Water Conservation District's Hydrology Manual.

The Shortcut Unit Hydrograph Method was used to calculate pre- and post-development runoff volumes for the 2-, 5-, 10- and 100-year recurrence interval, 1-, 3-, 6-, and 24-hour storm events. The total project bio-retention trench storage volume is deducted from the critical Shortcut Unit Hydrograph Method volume to determine the minimum underground detention chamber volume required.

Calculations are provided in the Appendix.

Results and Conclusion
The Shortcut Unit Hydrograph Method resulted in a pre- to post-development runoff volume increase of 19,363 CF for the 100-year, 24-hour event. The total volume for the bio-retention trenches equates to 3,690 CF. The minimum underground chamber detention volume required is 15,673 CF, with the proposed detention chamber system providing 15,813 CF of storage.

APPENDIX

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.

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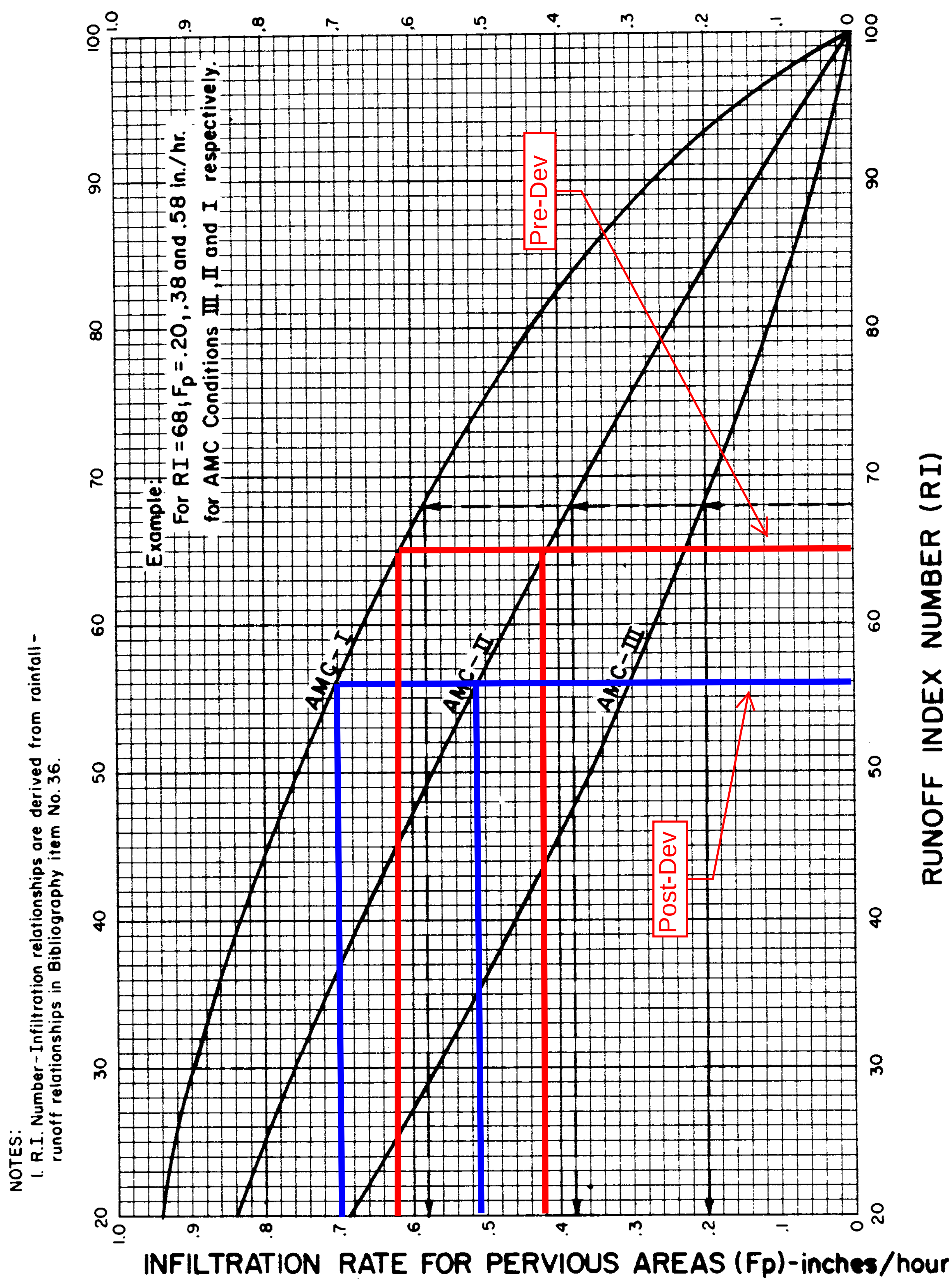
RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS



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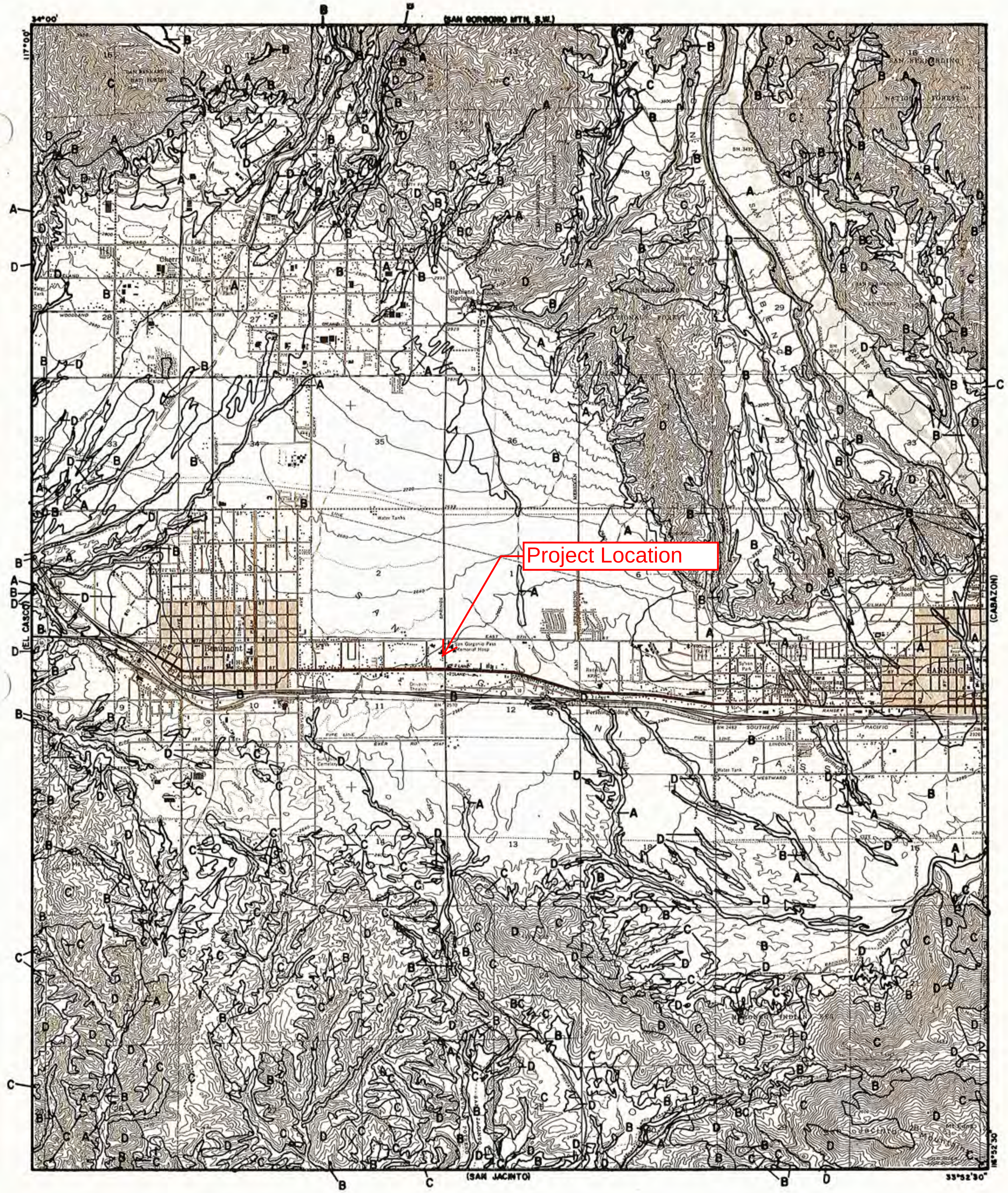
INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

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HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR BEAUMONT

PLATE C-1.19

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent (2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

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IMPERVIOUS COVER FOR DEVELOPED AREAS

NOAA Atlas 14, Volume 6, Version 2
Location name: Beaumont, California, USA*
Latitude: 33.9309°, Longitude: -116.9475°
Elevation: 2597.87 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.124 (0.103-0.150)	0.161 (0.134-0.196)	0.218 (0.181-0.265)	0.271 (0.223-0.333)	0.355 (0.282-0.451)	0.429 (0.334-0.557)	0.516 (0.391-0.686)	0.617 (0.455-0.845)	0.776 (0.549-1.11)	0.921 (0.628-1.36)
10-min	0.177 (0.148-0.215)	0.231 (0.192-0.281)	0.313 (0.259-0.380)	0.389 (0.320-0.477)	0.508 (0.404-0.646)	0.615 (0.479-0.799)	0.739 (0.561-0.984)	0.884 (0.652-1.21)	1.11 (0.786-1.59)	1.32 (0.900-1.95)
15-min	0.215 (0.179-0.260)	0.279 (0.233-0.339)	0.378 (0.314-0.460)	0.470 (0.387-0.577)	0.615 (0.489-0.781)	0.744 (0.579-0.966)	0.894 (0.678-1.19)	1.07 (0.788-1.46)	1.35 (0.951-1.92)	1.60 (1.09-2.36)
30-min	0.313 (0.261-0.379)	0.407 (0.339-0.494)	0.551 (0.457-0.670)	0.685 (0.563-0.840)	0.896 (0.712-1.14)	1.08 (0.844-1.41)	1.30 (0.988-1.73)	1.56 (1.15-2.13)	1.96 (1.39-2.80)	2.33 (1.59-3.44)
60-min	0.461 (0.384-0.558)	0.600 (0.499-0.728)	0.811 (0.673-0.988)	1.01 (0.830-1.24)	1.32 (1.05-1.68)	1.60 (1.24-2.07)	1.92 (1.46-2.55)	2.30 (1.69-3.14)	2.89 (2.04-4.13)	3.43 (2.34-5.07)
2-hr	0.660 (0.550-0.800)	0.822 (0.684-0.998)	1.06 (0.883-1.30)	1.29 (1.06-1.58)	1.63 (1.29-2.07)	1.93 (1.50-2.50)	2.27 (1.72-3.02)	2.66 (1.96-3.64)	3.26 (2.31-4.66)	3.80 (2.59-5.62)
3-hr	0.809 (0.674-0.980)	0.995 (0.828-1.21)	1.27 (1.05-1.54)	1.52 (1.25-1.86)	1.89 (1.50-2.40)	2.21 (1.72-2.87)	2.57 (1.95-3.42)	2.98 (2.20-4.09)	3.61 (2.55-5.15)	4.15 (2.83-6.14)
6-hr	1.18 (0.980-1.43)	1.44 (1.20-1.74)	1.81 (1.50-2.20)	2.13 (1.76-2.62)	2.62 (2.08-3.32)	3.02 (2.35-3.92)	3.46 (2.62-4.60)	3.94 (2.91-5.40)	4.65 (3.29-6.65)	5.26 (3.59-7.79)
12-hr	1.61 (1.34-1.95)	2.01 (1.68-2.44)	2.56 (2.13-3.12)	3.02 (2.49-3.71)	3.67 (2.92-4.67)	4.19 (3.26-5.44)	4.74 (3.59-6.30)	5.31 (3.92-7.28)	6.13 (4.33-8.76)	6.78 (4.63-10.0)
24-hr	2.15 (1.90-2.47)	2.78 (2.46-3.21)	3.62 (3.19-4.19)	4.31 (3.77-5.03)	5.25 (4.45-6.33)	5.98 (4.96-7.35)	6.73 (5.45-8.47)	7.50 (5.91-9.70)	8.55 (6.48-11.5)	9.37 (6.86-13.1)
2-day	2.60 (2.30-3.00)	3.46 (3.06-3.99)	4.63 (4.08-5.36)	5.61 (4.91-6.55)	7.01 (5.93-8.44)	8.12 (6.74-9.98)	9.28 (7.52-11.7)	10.5 (8.30-13.6)	12.3 (9.30-16.5)	13.7 (10.0-19.1)
3-day	2.82 (2.50-3.25)	3.79 (3.35-4.38)	5.15 (4.54-5.96)	6.33 (5.54-7.38)	8.05 (6.82-9.69)	9.46 (7.85-11.6)	11.0 (8.90-13.8)	12.6 (9.97-16.4)	15.0 (11.4-20.3)	17.0 (12.5-23.7)
4-day	3.06 (2.71-3.53)	4.14 (3.66-4.77)	5.65 (4.99-6.54)	6.98 (6.11-8.14)	8.92 (7.56-10.7)	10.5 (8.74-13.0)	12.3 (9.95-15.5)	14.2 (11.2-18.4)	17.0 (12.9-22.9)	19.3 (14.2-26.9)
7-day	3.56 (3.15-4.10)	4.79 (4.24-5.53)	6.53 (5.75-7.55)	8.03 (7.02-9.37)	10.2 (8.65-12.3)	12.0 (9.97-14.8)	13.9 (11.3-17.6)	16.1 (12.7-20.8)	19.1 (14.5-25.8)	21.7 (15.9-30.2)
10-day	3.91 (3.46-4.51)	5.26 (4.65-6.08)	7.15 (6.30-8.27)	8.77 (7.67-10.2)	11.1 (9.40-13.4)	13.0 (10.8-16.0)	15.1 (12.2-19.0)	17.3 (13.6-22.3)	20.4 (15.5-27.5)	23.1 (16.9-32.1)
20-day	4.89 (4.33-5.64)	6.65 (5.88-7.68)	9.04 (7.98-10.5)	11.1 (9.68-12.9)	13.9 (11.8-16.8)	16.2 (13.5-19.9)	18.6 (15.1-23.4)	21.2 (16.7-27.4)	24.8 (18.8-33.4)	27.7 (20.3-38.6)
30-day	5.77 (5.11-6.65)	7.89 (6.98-9.11)	10.7 (9.47-12.4)	13.1 (11.5-15.3)	16.4 (13.9-19.8)	19.0 (15.8-23.4)	21.7 (17.6-27.3)	24.6 (19.4-31.8)	28.5 (21.6-38.4)	31.7 (23.2-44.2)
45-day	6.96 (6.16-8.02)	9.55 (8.44-11.0)	13.0 (11.4-15.0)	15.8 (13.8-18.4)	19.6 (16.6-23.6)	22.6 (18.7-27.8)	25.6 (20.8-32.3)	28.8 (22.7-37.3)	33.2 (25.1-44.7)	36.6 (26.8-51.0)
60-day	8.14 (7.20-9.38)	11.2 (9.86-12.9)	15.1 (13.3-17.4)	18.3 (16.0-21.3)	22.6 (19.1-27.2)	25.9 (21.5-31.8)	29.2 (23.7-36.8)	32.7 (25.8-42.3)	37.4 (28.3-50.4)	41.1 (30.1-57.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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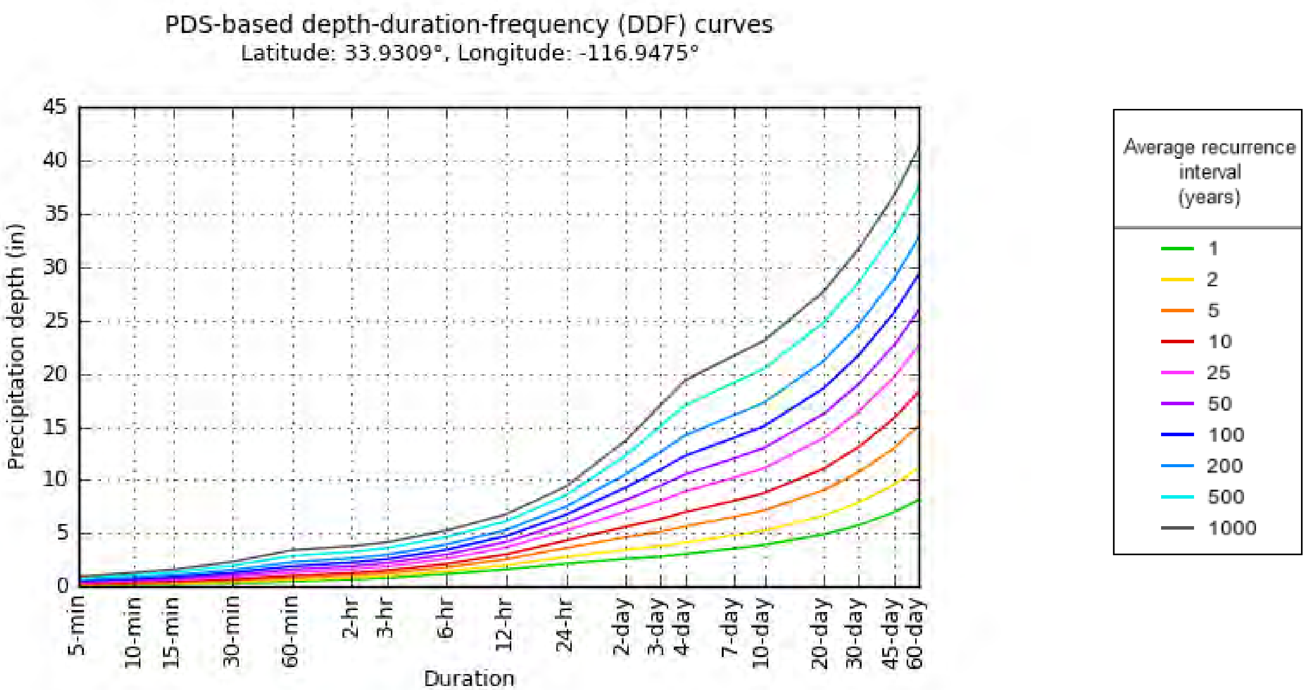
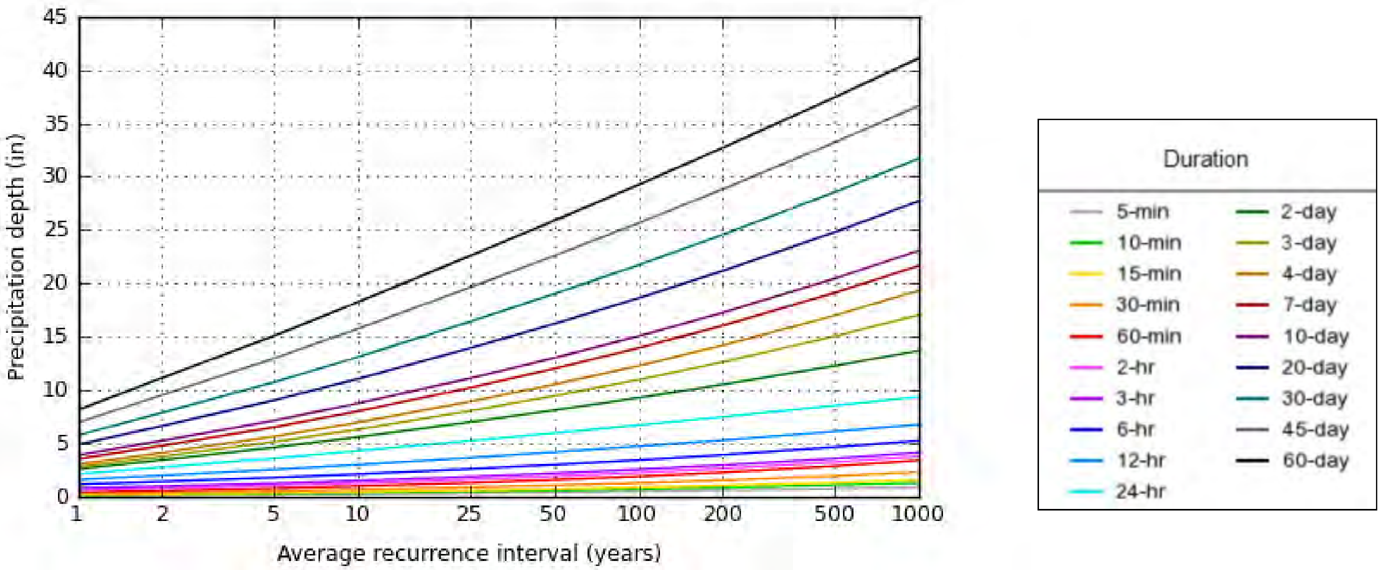
PF graphical





NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Aug 31 13:45:49 2020

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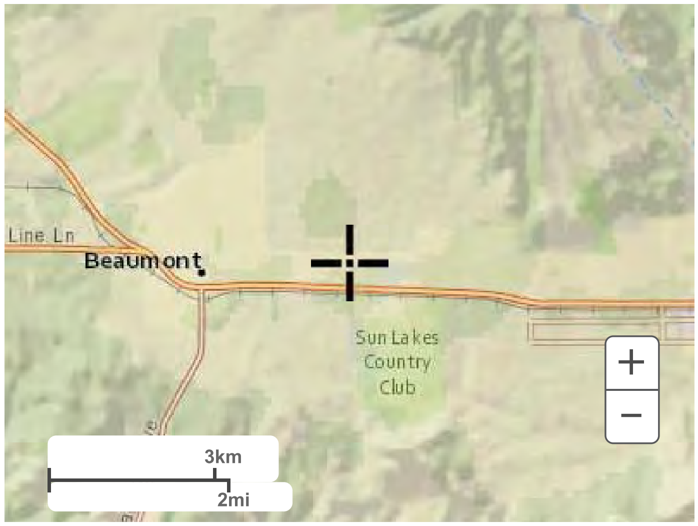
Maps & aerials

Small scale terrain



Large scale terrain

Large scale map

Large scale aerial


Lancaster
Palmdale
Victorville
Santa Clarita
Oxnard
Los Angeles
Riverside
Anaheim
Long Beach
Santa Ana
Cathedral City
Indio
Palm Desert
Murrieta
Oceanside
100km
60mi
Tijuana
Mexicali

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RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Pre-Development

Recurrence Interval	2	year		
Storm Duration (hrs)	1	3	6	24
2-year NOAA Atlas 14 Point Precipitation (in)	0.600	0.995	1.440	2.780
Unit time (minutes)	5	5	5	15
Drainage Area	65819	SF	*1.511*	Ac.
Soils Group	B			
AMC index Runoff Number (plate E-6.1)	65	Type:	Woodland, Grass; fair	
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.62	AMC I		
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	0			
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.62*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))		
Low Loss Rate Percent (%)	*90*			
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)		

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

2 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.27	0.62	0.24	0.027	0.041	12.18	0.00	0.00	0.00	0.00	0.00	12.18	0.00	0.00	0.00	0.00	12.18	0.04
0:10	4.8	0.35	0.62	0.31	0.035	0.053	15.80	0.00	0.00	0.00	0.00	0.00	15.80	0.00	0.00	0.00	0.00	15.80	0.05
0:15	5.1	0.37	0.62	0.33	0.037	0.056	16.78	0.00	0.00	0.00	0.00	0.00	16.78	0.00	0.00	0.00	0.00	16.78	0.06
0:20	4.9	0.35	0.62	0.32	0.035	0.054	16.13	0.00	0.00	0.00	0.00	0.00	16.13	0.00	0.00	0.00	0.00	16.13	0.05
0:25	6.6	0.48	0.62	0.43	0.048	0.072	21.72	0.00	0.00	0.00	0.00	0.00	21.72	0.00	0.00	0.00	0.00	21.72	0.07
0:30	7.3	0.53	0.62	0.47	0.053	0.080	24.02	0.00	0.00	0.00	0.00	0.00	24.02	0.00	0.00	0.00	0.00	24.02	0.08
0:35	8.4	0.60	0.62	0.54	0.060	0.092	27.64	0.00	0.00	0.00	0.00	0.00	27.64	0.00	0.00	0.00	0.00	27.64	0.09
0:40	9.0	0.65	0.62	0.58	0.065	0.099	29.62	0.00	0.00	0.00	0.00	0.00	29.62	0.00	0.00	0.00	0.00	29.62	0.10
0:45	12.3	0.89	0.62	N/A	0.266	0.405	121.40	0.00	0.00	0.00	0.00	0.00	121.40	0.00	0.00	0.00	0.00	121.40	0.40
0:50	17.6	1.27	0.62	N/A	0.647	**0.986**	295.82	0.00	0.00	0.00	0.00	0.00	295.82	0.00	0.00	0.00	0.00	295.82	0.99
0:55	16.1	1.16	0.62	N/A	0.539	0.822	246.46	0.00	0.00	0.00	0.00	0.00	246.46	0.00	0.00	0.00	0.00	246.46	0.82
1:00	4.2	0.30	0.62	0.27	0.030	0.046	13.82	0.00	0.00	0.00	0.00	0.00	13.82	0.00	0.00	0.00	0.00	13.82	0.05
					Total volume (CF)		**841.39**								**Total Overflow (CF)**			**841.39**	

2 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.16	0.62	0.14	0.016	0.024	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.02
0:10	1.3	0.16	0.62	0.14	0.016	0.024	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.02
0:15	1.1	0.13	0.62	0.12	0.013	0.020	6.00	0.00	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	6.00	0.02
0:20	1.5	0.18	0.62	0.16	0.018	0.027	8.19	0.00	0.00	0.00	0.00	0.00	8.19	0.00	0.00	0.00	0.00	8.19	0.03
0:25	1.5	0.18	0.62	0.16	0.018	0.027	8.19	0.00	0.00	0.00	0.00	0.00	8.19	0.00	0.00	0.00	0.00	8.19	0.03
0:30	1.8	0.21	0.62	0.19	0.021	0.033	9.82	0.00	0.00	0.00	0.00	0.00	9.82	0.00	0.00	0.00	0.00	9.82	0.03
0:35	1.5	0.18	0.62	0.16	0.018	0.027	8.19	0.00	0.00	0.00	0.00	0.00	8.19	0.00	0.00	0.00	0.00	8.19	0.03
0:40	1.8	0.21	0.62	0.19	0.021	0.033	9.82	0.00	0.00	0.00	0.00	0.00	9.82	0.00	0.00	0.00	0.00	9.82	0.03
0:45	1.8	0.21	0.62	0.19	0.021	0.033	9.82	0.00	0.00	0.00	0.00	0.00	9.82	0.00	0.00	0.00	0.00	9.82	0.03
0:50	1.5	0.18	0.62	0.16	0.018	0.027	8.19	0.00	0.00	0.00	0.00	0.00	8.19	0.00	0.00	0.00	0.00	8.19	0.03
0:55	1.6	0.19	0.62	0.17	0.019	0.029	8.73	0.00	0.00	0.00	0.00	0.00	8.73	0.00	0.00	0.00	0.00	8.73	0.03
1:00	1.8	0.21	0.62	0.19	0.021	0.033	9.82	0.00	0.00	0.00	0.00	0.00	9.82	0.00	0.00	0.00	0.00	9.82	0.03
1:05	2.2	0.26	0.62	0.24	0.026	0.040	12.01	0.00	0.00	0.00	0.00	0.00	12.01	0.00	0.00	0.00	0.00	12.01	0.04
1:10	2.2	0.26	0.62	0.24	0.026	0.040	12.01	0.00	0.00	0.00	0.00	0.00	12.01	0.00	0.00	0.00	0.00	12.01	0.04
1:15	2.2	0.26	0.62	0.24	0.026	0.040	12.01	0.00	0.00	0.00	0.00	0.00	12.01	0.00	0.00	0.00	0.00	12.01	0.04
1:20	2.0	0.24	0.62	0.21	0.024	0.036	10.91	0.00	0.00	0.00	0.00	0.00	10.91	0.00	0.00	0.00	0.00	10.91	0.04
1:25	2.6	0.31	0.62	0.28	0.031	0.047	14.19	0.00	0.00	0.00	0.00	0.00	14.19	0.00	0.00	0.00	0.00	14.19	0.05
1:30	2.7	0.32	0.62	0.29	0.032	0.049	14.74	0.00	0.00	0.00	0.00	0.00	14.74	0.00	0.00	0.00	0.00	14.74	0.05
1:35	2.4	0.29	0.62	0.26	0.029	0.044	13.10	0.00	0.00	0.00	0.00	0.00	13.10	0.00	0.00	0.00	0.00	13.10	0.04
1:40	2.7	0.32	0.62	0.29	0.032	0.049	14.74	0.00	0.00	0.00	0.00	0.00	14.74	0.00	0.00	0.00	0.00	14.74	0.05
1:45	3.3	0.39	0.62	0.35	0.039	0.060	18.01	0.00	0.00	0.00	0.00	0.00	18.01	0.00	0.00	0.00	0.00	18.01	0.06
1:50	3.1	0.37	0.62	0.33	0.037	0.056	16.92	0.00	0.00	0.00	0.00	0.00	16.92	0.00	0.00	0.00	0.00	16.92	0.06
1:55	2.9	0.35	0.62	0.31	0.035	0.053	15.83	0.00	0.00	0.00	0.00	0.00	15.83	0.00	0.00	0.00	0.00	15.83	0.05
2:00	3.0	0.36	0.62	0.32	0.036	0.055	16.37	0.00	0.00	0.00	0.00	0.00	16.37	0.00	0.00	0.00	0.00	16.37	0.05
2:05	3.1	0.37	0.62	0.33	0.037	0.056	16.92	0.00	0.00	0.00	0.00	0.00	16.92	0.00	0.00	0.00	0.00	16.92	0.06
2:10	4.2	0.50	0.62	0.45	0.050	0.076	22.92	0.00	0.00	0.00	0.00	0.00	22.92	0.00	0.00	0.00	0.00	22.92	0.08
2:15	5.0	0.60	0.62	0.54	0.060	0.091	27.29	0.00	0.00	0.00	0.00	0.00	27.29	0.00	0.00	0.00	0.00	27.29	0.09
2:20	3.5	0.42	0.62	0.38	0.042	0.064	19.10	0.00	0.00	0.00	0.00	0.00	19.10	0.00	0.00	0.00	0.00	19.10	0.06
2:25	6.8	0.81	0.62	N/A	0.192	0.292	87.72	0.00	0.00	0.00	0.00	0.00	87.72	0.00	0.00	0.00	0.00	87.72	0.29
2:30	7.3	0.87	0.62	N/A	0.252	0.383	115.01	0.00	0.00	0.00	0.00	0.00	115.01	0.00	0.00	0.00	0.00	115.01	0.38
2:35	8.2	0.98	0.62	N/A	0.359	**0.547**	164.13	0.00	0.00	0.00	0.00	0.00	164.13	0.00	0.00	0.00	0.00	164.13	0.55
2:40	5.9	0.70	0.62	N/A	0.084	0.129	38.60	0.00	0.00	0.00	0.00	0.00	38.60	0.00	0.00	0.00	0.00	38.60	0.13
2:45	2.0	0.24	0.62	0.21	0.024	0.036	10.91	0.00	0.00	0.00	0.00	0.00	10.91	0.00	0.00	0.00	0.00	10.91	0.04
2:50	1.8	0.21	0.62	0.19	0.021	0.033	9.82	0.00	0.00	0.00	0.00	0.00	9.82	0.00	0.00	0.00	0.00	9.82	0.03
2:55	1.8	0.21	0.62	0.19	0.021	0.033	9.82	0.00	0.00	0.00	0.00	0.00	9.82	0.00	0.00	0.00	0.00	9.82	0.03
3:00	0.6	0.07	0.62	0.06	0.007	0.011	3.27	0.00	0.00	0.00	0.00	0.00	3.27	0.00	0.00	0.00	0.00	3.27	0.01
					Total volume (CF)		**797.31**								**Total Overflow (CF)**			**797.31**	

2 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.09	0.62	0.08	0.009	0.013	3.95	0.00	0.00	0.00	0.00	0.00	3.95	0.00	0.00	0.00	0.00	3.95	0.01
0:10	0.6	0.10	0.62	0.09	0.010	0.016	4.74	0.00	0.00	0.00	0.00	0.00	4.74	0.00	0.00	0.00	0.00	4.74	0.02
0:15	0.6	0.10	0.62	0.09	0.010	0.016	4.74	0.00	0.00	0.00	0.00	0.00	4.74	0.00	0.00	0.00	0.00	4.74	0.02
0:20	0.6	0.10	0.62	0.09	0.010	0.016	4.74	0.00	0.00	0.00	0.00	0.00	4.74	0.00	0.00	0.00	0.00	4.74	0.02
0:25	0.6	0.10	0.62	0.09	0.010	0.016	4.74	0.00	0.00	0.00	0.00	0.00	4.74	0.00	0.00	0.00	0.00	4.74	0.02
0:30	0.7	0.12	0.62	0.11	0.012	0.018	5.53	0.00	0.00	0.00	0.00	0.00	5.53	0.00	0.00	0.00	0.00	5.53	0.02
0:35	0.7	0.12	0.62	0.11	0.012	0.018	5.53	0.00	0.00	0.00	0.00	0.00	5.53	0.00	0.00	0.00	0.00	5.53	0.02
0:40	0.7	0.12	0.62	0.11	0.012	0.018	5.53	0.00	0.00	0.00	0.00	0.00	5.53	0.00	0.00	0.00	0.00	5.53	0.02
0:45	0.7	0.12	0.62	0.11	0.012	0.018	5.53	0.00	0.00	0.00	0.00	0.00	5.53	0.00	0.00	0.00	0.00	5.53	0.02
0:50	0.7	0.12	0.62	0.11	0.012	0.018	5.53	0.00	0.00	0.00	0.00	0.00	5.53	0.00	0.00	0.00	0.00	5.53	0.02
0:55	0.7	0.12	0.62	0.11	0.012	0.018	5.53	0.00	0.00	0.00	0.00	0.00	5.53	0.00	0.00	0.00	0.00	5.53	0.02
1:00	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:05	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:10	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:15	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:20	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:25	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:30	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:35	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:40	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:45	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:50	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
1:55	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
2:00	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:05	0.8	0.14	0.62	0.12	0.014	0.021	6.32	0.00	0.00	0.00	0.00	0.00	6.32	0.00	0.00	0.00	0.00	6.32	0.02
2:10	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:15	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:20	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:25	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:30	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:35	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:40	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
2:45	1.0	0.17	0.62	0.16	0.017	0.026	7.90	0.00	0.00	0.00	0.00	0.00	7.90	0.00	0.00	0.00	0.00	7.90	0.03
2:50	1.0	0.17	0.62	0.16	0.017	0.026	7.90	0.00	0.00	0.00	0.00	0.00	7.90	0.00	0.00	0.00	0.00	7.90	0.03
2:55	1.0	0.17	0.62	0.16	0.017	0.026	7.90	0.00	0.00	0.00	0.00	0.00	7.90	0.00	0.00	0.00	0.00	7.90	0.03
3:00	1.0	0.17	0.62	0.16	0.017	0.026	7.90	0.00	0.00	0.00	0.00	0.00	7.90	0.00	0.00	0.00	0.00	7.90	0.03
3:05	1.0	0.17	0.62	0.16	0.017	0.026	7.90	0.00	0.00	0.00	0.00	0.00	7.90	0.00	0.00	0.00	0.00	7.90	0.03
3:10	1.1	0.19	0.62	0.17	0.019	0.029	8.69	0.00	0.00	0.00	0.00	0.00	8.69	0.00	0.00	0.00	0.00	8.69	0.03
3:15	1.1	0.19	0.62	0.17	0.019	0.029	8.69	0.00	0.00	0.00	0.00	0.00	8.69	0.00	0.00	0.00	0.00	8.69	0.03
3:20	1.1	0.19	0.62	0.17	0.019	0.029	8.69	0.00	0.00	0.00	0.00	0.00	8.69	0.00	0.00	0.00	0.00	8.69	0.03
3:25	1.2	0.21	0.62	0.19	0.021	0.032	9.48	0.00	0.00	0.00	0.00	0.00	9.48	0.00	0.00	0.00	0.00	9.48	0.03
3:30	1.3	0.22	0.62	0.20	0.022	0.034	10.27	0.00	0.00	0.00	0.00	0.00	10.27	0.00	0.00	0.00	0.00	10.27	0.03
3:35	1.4	0.24	0.62	0.22	0.024	0.037	11.06	0.00	0.00	0.00	0.00	0.00	11.06	0.00	0.00	0.00	0.00	11.06	0.04
3:40	1.4	0.24	0.62	0.22	0.024	0.037	11.06	0.00	0.00	0.00	0.00	0.00	11.06	0.00	0.00	0.00	0.00	11.06	0.04
3:45	1.5	0.26	0.62	0.23	0.026	0.039	11.85	0.00	0.00	0.00	0.00	0.00	11.85	0.00	0.00	0.00	0.00	11.85	0.04
3:50	1.5	0.26	0.62	0.23	0.026	0.039	11.85	0.00	0.00	0.00	0.00	0.00	11.85	0.00	0.00	0.00	0.00	11.85	0.04
3:55	1.6	0.28	0.62	0.25	0.028	0.042	12.64	0.00	0.00	0.00	0.00	0.00	12.64	0.00	0.00	0.00	0.00	12.64	0.04
4:00	1.6	0.28	0.62	0.25	0.028	0.042	12.64	0.00	0.00	0.00	0.00	0.00	12.64	0.00	0.00	0.00	0.00	12.64	0.04
4:05	1.7	0.29	0.62	0.26	0.029	0.045	13.43	0.00	0.00	0.00	0.00	0.00	13.43	0.00	0.00	0.00	0.00	13.43	0.04

4:10	1.8	0.31	0.62	0.28	0.031	0.047	14.22	0.00	0.00	0.00	0.00	0.00	14.22	0.00	0.00	0.00	0.00	14.22	0.05
4:15	1.9	0.33	0.62	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
4:20	2.0	0.35	0.62	0.31	0.035	0.053	15.80	0.00	0.00	0.00	0.00	0.00	15.80	0.00	0.00	0.00	0.00	15.80	0.05
4:25	2.1	0.36	0.62	0.33	0.036	0.055	16.59	0.00	0.00	0.00	0.00	0.00	16.59	0.00	0.00	0.00	0.00	16.59	0.06
4:30	2.1	0.36	0.62	0.33	0.036	0.055	16.59	0.00	0.00	0.00	0.00	0.00	16.59	0.00	0.00	0.00	0.00	16.59	0.06
4:35	2.2	0.38	0.62	0.34	0.038	0.058	17.38	0.00	0.00	0.00	0.00	0.00	17.38	0.00	0.00	0.00	0.00	17.38	0.06
4:40	2.3	0.40	0.62	0.36	0.040	0.061	18.17	0.00	0.00	0.00	0.00	0.00	18.17	0.00	0.00	0.00	0.00	18.17	0.06
4:45	2.4	0.41	0.62	0.37	0.041	0.063	18.96	0.00	0.00	0.00	0.00	0.00	18.96	0.00	0.00	0.00	0.00	18.96	0.06
4:50	2.4	0.41	0.62	0.37	0.041	0.063	18.96	0.00	0.00	0.00	0.00	0.00	18.96	0.00	0.00	0.00	0.00	18.96	0.06
4:55	2.5	0.43	0.62	0.39	0.043	0.066	19.75	0.00	0.00	0.00	0.00	0.00	19.75	0.00	0.00	0.00	0.00	19.75	0.07
5:00	2.6	0.45	0.62	0.40	0.045	0.068	20.54	0.00	0.00	0.00	0.00	0.00	20.54	0.00	0.00	0.00	0.00	20.54	0.07
5:05	3.1	0.54	0.62	0.48	0.054	0.082	24.48	0.00	0.00	0.00	0.00	0.00	24.48	0.00	0.00	0.00	0.00	24.48	0.08
5:10	3.6	0.62	0.62	0.56	0.062	0.095	28.43	0.00	0.00	0.00	0.00	0.00	28.43	0.00	0.00	0.00	0.00	28.43	0.09
5:15	3.9	0.67	0.62	0.61	0.067	0.103	30.80	0.00	0.00	0.00	0.00	0.00	30.80	0.00	0.00	0.00	0.00	30.80	0.10
5:20	4.2	0.73	0.62	N/A	0.106	0.161	48.34	0.00	0.00	0.00	0.00	0.00	48.34	0.00	0.00	0.00	0.00	48.34	0.16
5:25	4.7	0.81	0.62	N/A	0.192	0.293	87.83	0.00	0.00	0.00	0.00	0.00	87.83	0.00	0.00	0.00	0.00	87.83	0.29
5:30	5.6	0.97	0.62	N/A	0.348	**0.530**	158.92	0.00	0.00	0.00	0.00	0.00	158.92	0.00	0.00	0.00	0.00	158.92	0.53
5:35	1.9	0.33	0.62	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
5:40	0.9	0.16	0.62	0.14	0.016	0.024	7.11	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	0.00	0.00	7.11	0.02
5:45	0.6	0.10	0.62	0.09	0.010	0.016	4.74	0.00	0.00	0.00	0.00	0.00	4.74	0.00	0.00	0.00	0.00	4.74	0.02
5:50	0.5	0.09	0.62	0.08	0.009	0.013	3.95	0.00	0.00	0.00	0.00	0.00	3.95	0.00	0.00	0.00	0.00	3.95	0.01
5:55	0.3	0.05	0.62	0.05	0.005	0.008	2.37	0.00	0.00	0.00	0.00	0.00	2.37	0.00	0.00	0.00	0.00	2.37	0.01
6:00	0.2	0.03	0.62	0.03	0.003	0.005	1.58	0.00	0.00	0.00	0.00	0.00	1.58	0.00	0.00	0.00	0.00	1.58	0.01
					Total volume (CF)		**970.39**								**Total Overflow (CF)**			**970.39**	

2 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.02	1.09	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
0:30	0.3	0.03	1.08	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
0:45	0.3	0.03	1.06	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
1:00	0.4	0.04	1.05	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
1:15	0.3	0.03	1.04	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
1:30	0.3	0.03	1.03	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
1:45	0.3	0.03	1.01	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
2:00	0.4	0.04	1.00	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
2:15	0.4	0.04	0.99	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
2:30	0.4	0.04	0.98	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
2:45	0.5	0.06	0.97	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
3:00	0.5	0.06	0.95	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
3:15	0.5	0.06	0.94	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
3:30	0.5	0.06	0.93	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
3:45	0.5	0.06	0.92	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
4:00	0.6	0.07	0.91	0.06	0.007	0.010	9.15	0.00	0.00	0.00	0.00	0.00	9.15	0.00	0.00	0.00	0.00	9.15	0.01
4:15	0.6	0.07	0.89	0.06	0.007	0.010	9.15	0.00	0.00	0.00	0.00	0.00	9.15	0.00	0.00	0.00	0.00	9.15	0.01
4:30	0.7	0.08	0.88	0.07	0.008	0.012	10.67	0.00	0.00	0.00	0.00	0.00	10.67	0.00	0.00	0.00	0.00	10.67	0.01
4:45	0.7	0.08	0.87	0.07	0.008	0.012	10.67	0.00	0.00	0.00	0.00	0.00	10.67	0.00	0.00	0.00	0.00	10.67	0.01
5:00	0.8	0.09	0.86	0.08	0.009	0.014	12.20	0.00	0.00	0.00	0.00	0.00	12.20	0.00	0.00	0.00	0.00	12.20	0.01
5:15	0.6	0.07	0.85	0.06	0.007	0.010	9.15	0.00	0.00	0.00	0.00	0.00	9.15	0.00	0.00	0.00	0.00	9.15	0.01
5:30	0.7	0.08	0.84	0.07	0.008	0.012	10.67	0.00	0.00	0.00	0.00	0.00	10.67	0.00	0.00	0.00	0.00	10.67	0.01
5:45	0.8	0.09	0.83	0.08	0.009	0.014	12.20	0.00	0.00	0.00	0.00	0.00	12.20	0.00	0.00	0.00	0.00	12.20	0.01
6:00	0.8	0.09	0.82	0.08	0.009	0.014	12.20	0.00	0.00	0.00	0.00	0.00	12.20	0.00	0.00	0.00	0.00	12.20	0.01
6:15	0.9	0.10	0.81	0.09	0.010	0.015	13.72	0.00	0.00	0.00	0.00	0.00	13.72	0.00	0.00	0.00	0.00	13.72	0.02
6:30	0.9	0.10	0.79	0.09	0.010	0.015	13.72	0.00	0.00	0.00	0.00	0.00	13.72	0.00	0.00	0.00	0.00	13.72	0.02
6:45	1.0	0.11	0.78	0.10	0.011	0.017	15.25	0.00	0.00	0.00	0.00	0.00	15.25	0.00	0.00	0.00	0.00	15.25	0.02
7:00	1.0	0.11	0.77	0.10	0.011	0.017	15.25	0.00	0.00	0.00	0.00	0.00	15.25	0.00	0.00	0.00	0.00	15.25	0.02
7:15	1.0	0.11	0.76	0.10	0.011	0.017	15.25	0.00	0.00	0.00	0.00	0.00	15.25	0.00	0.00	0.00	0.00	15.25	0.02
7:30	1.1	0.12	0.75	0.11	0.012	0.019	16.77	0.00	0.00	0.00	0.00	0.00	16.77	0.00	0.00	0.00	0.00	16.77	0.02
7:45	1.2	0.13	0.74	0.12	0.013	0.020	18.30	0.00	0.00	0.00	0.00	0.00	18.30	0.00	0.00	0.00	0.00	18.30	0.02
8:00	1.3	0.14	0.73	0.13	0.014	0.022	19.82	0.00	0.00	0.00	0.00	0.00	19.82	0.00	0.00	0.00	0.00	19.82	0.02
8:15	1.5	0.17	0.72	0.15	0.017	0.025	22.87	0.00	0.00	0.00	0.00	0.00	22.87	0.00	0.00	0.00	0.00	22.87	0.03
8:30	1.5	0.17	0.71	0.15	0.017	0.025	22.87	0.00	0.00	0.00	0.00	0.00	22.87	0.00	0.00	0.00	0.00	22.87	0.03
8:45	1.6	0.18	0.70	0.16	0.018	0.027	24.40	0.00	0.00	0.00	0.00	0.00	24.40	0.00	0.00	0.00	0.00	24.40	0.03
9:00	1.7	0.19	0.69	0.17	0.019	0.029	25.92	0.00	0.00	0.00	0.00	0.00	25.92	0.00	0.00	0.00	0.00	25.92	0.03
9:15	1.9	0.21	0.68	0.19	0.021	0.032	28.97	0.00	0.00	0.00	0.00	0.00	28.97	0.00	0.00	0.00	0.00	28.97	0.03
9:30	2.0	0.22	0.67	0.20	0.022	0.034	30.50	0.00	0.00	0.00	0.00	0.00	30.50	0.00	0.00	0.00	0.00	30.50	0.03
9:45	2.1	0.23	0.66	0.21	0.023	0.036	32.02	0.00	0.00	0.00	0.00	0.00	32.02	0.00	0.00	0.00	0.00	32.02	0.04
10:00	2.2	0.24	0.65	0.22	0.024	0.037	33.55	0.00	0.00	0.00	0.00	0.00	33.55	0.00	0.00	0.00	0.00	33.55	0.04
10:15	1.5	0.17	0.64	0.15	0.017	0.025	22.87	0.00	0.00	0.00	0.00	0.00	22.87	0.00	0.00	0.00	0.00	22.87	0.03
10:30	1.5	0.17	0.63	0.15	0.017	0.025	22.87	0.00	0.00	0.00	0.00	0.00	22.87	0.00	0.00	0.00	0.00	22.87	0.03
10:45	2.0	0.22	0.63	0.20	0.022	0.034	30.50	0.00	0.00	0.00	0.00	0.00	30.50	0.00	0.00	0.00	0.00	30.50	0.03
11:00	2.0	0.22	0.62	0.20	0.022	0.034	30.50	0.00	0.00	0.00	0.00	0.00	30.50	0.00	0.00	0.00	0.00	30.50	0.03
11:15	1.9	0.21	0.61	0.19	0.021	0.032	28.97	0.00	0.00	0.00	0.00	0.00	28.97	0.00	0.00	0.00	0.00	28.97	0.03
11:30	1.9	0.21	0.60	0.19	0.021	0.032	28.97	0.00	0.00	0.00	0.00	0.00	28.97	0.00	0.00	0.00	0.00	28.97	0.03
11:45	1.7	0.19	0.59	0.17	0.019	0.029	25.92	0.00	0.00	0.00	0.00	0.00	25.92	0.00	0.00	0.00	0.00	25.92	0.03
12:00	1.8	0.20	0.58	0.18	0.020	0.030	27.45	0.00	0.00	0.00	0.00	0.00	27.45	0.00	0.00	0.00	0.00	27.45	0.03
12:15	2.5	0.28	0.57	0.25	0.028	0.042	38.12	0.00	0.00	0.00	0.00	0.00	38.12	0.00	0.00	0.00	0.00	38.12	0.04

12:30	2.6	0.29	0.56	0.26	0.029	0.044	39.65	0.00	0.00	0.00	0.00	0.00	39.65	0.00	0.00	0.00	0.00	39.64	0.04
12:45	2.8	0.31	0.55	0.28	0.031	0.047	42.69	0.00	0.00	0.00	0.00	0.00	42.69	0.00	0.00	0.00	0.00	42.69	0.05
13:00	2.9	0.32	0.55	0.29	0.032	0.049	44.22	0.00	0.00	0.00	0.00	0.00	44.22	0.00	0.00	0.00	0.00	44.22	0.05
13:15	3.4	0.38	0.54	0.34	0.038	**0.058**	51.84	0.00	0.00	0.00	0.00	0.00	51.84	0.00	0.00	0.00	0.00	51.84	0.06
13:30	3.4	0.38	0.53	0.34	0.038	**0.058**	51.84	0.00	0.00	0.00	0.00	0.00	51.84	0.00	0.00	0.00	0.00	51.84	0.06
13:45	2.3	0.26	0.52	0.23	0.026	0.039	35.07	0.00	0.00	0.00	0.00	0.00	35.07	0.00	0.00	0.00	0.00	35.07	0.04
14:00	2.3	0.26	0.51	0.23	0.026	0.039	35.07	0.00	0.00	0.00	0.00	0.00	35.07	0.00	0.00	0.00	0.00	35.07	0.04
14:15	2.7	0.30	0.51	0.27	0.030	0.046	41.17	0.00	0.00	0.00	0.00	0.00	41.17	0.00	0.00	0.00	0.00	41.17	0.05
14:30	2.6	0.29	0.50	0.26	0.029	0.044	39.65	0.00	0.00	0.00	0.00	0.00	39.65	0.00	0.00	0.00	0.00	39.64	0.04
14:45	2.6	0.29	0.49	0.26	0.029	0.044	39.65	0.00	0.00	0.00	0.00	0.00	39.65	0.00	0.00	0.00	0.00	39.64	0.04
15:00	2.5	0.28	0.48	0.25	0.028	0.042	38.12	0.00	0.00	0.00	0.00	0.00	38.12	0.00	0.00	0.00	0.00	38.12	0.04
15:15	2.4	0.27	0.48	0.24	0.027	0.041	36.60	0.00	0.00	0.00	0.00	0.00	36.60	0.00	0.00	0.00	0.00	36.60	0.04
15:30	2.3	0.26	0.47	0.23	0.026	0.039	35.07	0.00	0.00	0.00	0.00	0.00	35.07	0.00	0.00	0.00	0.00	35.07	0.04
15:45	1.9	0.21	0.46	0.19	0.021	0.032	28.97	0.00	0.00	0.00	0.00	0.00	28.97	0.00	0.00	0.00	0.00	28.97	0.03
16:00	1.9	0.21	0.45	0.19	0.021	0.032	28.97	0.00	0.00	0.00	0.00	0.00	28.97	0.00	0.00	0.00	0.00	28.97	0.03
16:15	0.4	0.04	0.45	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
16:30	0.4	0.04	0.44	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
16:45	0.3	0.03	0.43	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
17:00	0.3	0.03	0.43	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
17:15	0.5	0.06	0.42	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
17:30	0.5	0.06	0.41	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
17:45	0.5	0.06	0.41	0.05	0.006	0.008	7.62	0.00	0.00	0.00	0.00	0.00	7.62	0.00	0.00	0.00	0.00	7.62	0.01
18:00	0.4	0.04	0.40	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
18:15	0.4	0.04	0.40	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
18:30	0.4	0.04	0.39	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
18:45	0.3	0.03	0.39	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
19:00	0.2	0.02	0.38	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
19:15	0.3	0.03	0.37	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
19:30	0.4	0.04	0.37	0.04	0.004	0.007	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	6.10	0.01
19:45	0.3	0.03	0.36	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
20:00	0.2	0.02	0.36	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
20:15	0.3	0.03	0.35	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
20:30	0.3	0.03	0.35	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
20:45	0.3	0.03	0.35	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
21:00	0.2	0.02	0.34	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
21:15	0.3	0.03	0.34	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
21:30	0.2	0.02	0.33	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
21:45	0.3	0.03	0.33	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
22:00	0.2	0.02	0.33	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
22:15	0.3	0.03	0.32	0.03	0.003	0.005	4.57	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	0.00	0.00	4.57	0.01
22:30	0.2	0.02	0.32	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
22:45	0.2	0.02	0.32	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
23:00	0.2	0.02	0.32	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
23:15	0.2	0.02	0.31	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
23:30	0.2	0.02	0.31	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
23:45	0.2	0.02	0.31	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
24:00	0.2	0.02	0.31	0.02	0.002	0.003	3.05	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	3.05	0.00
					Total volume (CF)		**1524.81**								**Total Overflow (CF)**			**1524.81**	

RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Pre-Development

Recurrence Interval	5	year			
Storm Duration (hrs)	1	3	6	24	
5-year NOAA Atlas 14 Point Precipitation (in)	0.811	1.270	1.810	3.620	
Unit time (minutes)	5	5	5	15	
Drainage Area	65819	SF	*1.511*	Ac.	
Soils Group	B				
AMC index Runoff Number (plate E-6.1)	65	Type:	Woodland, Grass; fair		
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.62	AMC I			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	0				
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.62*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	*90*				
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

5 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.36	0.62	0.32	0.036	0.055	16.46	0.00	0.00	0.00	0.00	0.00	16.46	0.00	0.00	0.00	0.00	16.46	0.05
0:10	4.8	0.47	0.62	0.42	0.047	0.071	21.35	0.00	0.00	0.00	0.00	0.00	21.35	0.00	0.00	0.00	0.00	21.35	0.07
0:15	5.1	0.50	0.62	0.45	0.050	0.076	22.69	0.00	0.00	0.00	0.00	0.00	22.69	0.00	0.00	0.00	0.00	22.69	0.08
0:20	4.9	0.48	0.62	0.43	0.048	0.073	21.80	0.00	0.00	0.00	0.00	0.00	21.80	0.00	0.00	0.00	0.00	21.80	0.07
0:25	6.6	0.64	0.62	0.58	0.064	0.098	29.36	0.00	0.00	0.00	0.00	0.00	29.36	0.00	0.00	0.00	0.00	29.36	0.10
0:30	7.3	0.71	0.62	N/A	0.090	0.138	41.34	0.00	0.00	0.00	0.00	0.00	41.34	0.00	0.00	0.00	0.00	41.34	0.14
0:35	8.4	0.82	0.62	N/A	0.197	0.301	90.27	0.00	0.00	0.00	0.00	0.00	90.27	0.00	0.00	0.00	0.00	90.27	0.30
0:40	9.0	0.88	0.62	N/A	0.256	0.390	116.96	0.00	0.00	0.00	0.00	0.00	116.96	0.00	0.00	0.00	0.00	116.96	0.39
0:45	12.3	1.20	0.62	N/A	0.577	0.879	263.75	0.00	0.00	0.00	0.00	0.00	263.75	0.00	0.00	0.00	0.00	263.75	0.88
0:50	17.6	1.71	0.62	N/A	1.093	**1.665**	499.51	0.00	0.00	0.00	0.00	0.00	499.51	0.00	0.00	0.00	0.00	499.51	1.67
0:55	16.1	1.57	0.62	N/A	0.947	1.443	432.78	0.00	0.00	0.00	0.00	0.00	432.78	0.00	0.00	0.00	0.00	432.78	1.44
1:00	4.2	0.41	0.62	0.37	0.041	0.062	18.68	0.00	0.00	0.00	0.00	0.00	18.68	0.00	0.00	0.00	0.00	18.68	0.06
					Total volume (CF)		**1574.94**								**Total Overflow (CF)**			**1574.94**	

5 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.20	0.62	0.18	0.020	0.030	9.06	0.00	0.00	0.00	0.00	0.00	9.06	0.00	0.00	0.00	0.00	9.06	0.03
0:10	1.3	0.20	0.62	0.18	0.020	0.030	9.06	0.00	0.00	0.00	0.00	0.00	9.06	0.00	0.00	0.00	0.00	9.06	0.03
0:15	1.1	0.17	0.62	0.15	0.017	0.026	7.66	0.00	0.00	0.00	0.00	0.00	7.66	0.00	0.00	0.00	0.00	7.66	0.03
0:20	1.5	0.23	0.62	0.21	0.023	0.035	10.45	0.00	0.00	0.00	0.00	0.00	10.45	0.00	0.00	0.00	0.00	10.45	0.03
0:25	1.5	0.23	0.62	0.21	0.023	0.035	10.45	0.00	0.00	0.00	0.00	0.00	10.45	0.00	0.00	0.00	0.00	10.45	0.03
0:30	1.8	0.27	0.62	0.25	0.027	0.042	12.54	0.00	0.00	0.00	0.00	0.00	12.54	0.00	0.00	0.00	0.00	12.54	0.04
0:35	1.5	0.23	0.62	0.21	0.023	0.035	10.45	0.00	0.00	0.00	0.00	0.00	10.45	0.00	0.00	0.00	0.00	10.45	0.03
0:40	1.8	0.27	0.62	0.25	0.027	0.042	12.54	0.00	0.00	0.00	0.00	0.00	12.54	0.00	0.00	0.00	0.00	12.54	0.04
0:45	1.8	0.27	0.62	0.25	0.027	0.042	12.54	0.00	0.00	0.00	0.00	0.00	12.54	0.00	0.00	0.00	0.00	12.54	0.04
0:50	1.5	0.23	0.62	0.21	0.023	0.035	10.45	0.00	0.00	0.00	0.00	0.00	10.45	0.00	0.00	0.00	0.00	10.45	0.03
0:55	1.6	0.24	0.62	0.22	0.024	0.037	11.15	0.00	0.00	0.00	0.00	0.00	11.15	0.00	0.00	0.00	0.00	11.15	0.04
1:00	1.8	0.27	0.62	0.25	0.027	0.042	12.54	0.00	0.00	0.00	0.00	0.00	12.54	0.00	0.00	0.00	0.00	12.54	0.04
1:05	2.2	0.34	0.62	0.30	0.034	0.051	15.32	0.00	0.00	0.00	0.00	0.00	15.32	0.00	0.00	0.00	0.00	15.32	0.05
1:10	2.2	0.34	0.62	0.30	0.034	0.051	15.32	0.00	0.00	0.00	0.00	0.00	15.32	0.00	0.00	0.00	0.00	15.32	0.05
1:15	2.2	0.34	0.62	0.30	0.034	0.051	15.32	0.00	0.00	0.00	0.00	0.00	15.32	0.00	0.00	0.00	0.00	15.32	0.05
1:20	2.0	0.30	0.62	0.27	0.030	0.046	13.93	0.00	0.00	0.00	0.00	0.00	13.93	0.00	0.00	0.00	0.00	13.93	0.05
1:25	2.6	0.40	0.62	0.36	0.040	0.060	18.11	0.00	0.00	0.00	0.00	0.00	18.11	0.00	0.00	0.00	0.00	18.11	0.06
1:30	2.7	0.41	0.62	0.37	0.041	0.063	18.81	0.00	0.00	0.00	0.00	0.00	18.81	0.00	0.00	0.00	0.00	18.81	0.06
1:35	2.4	0.37	0.62	0.33	0.037	0.056	16.72	0.00	0.00	0.00	0.00	0.00	16.72	0.00	0.00	0.00	0.00	16.72	0.06
1:40	2.7	0.41	0.62	0.37	0.041	0.063	18.81	0.00	0.00	0.00	0.00	0.00	18.81	0.00	0.00	0.00	0.00	18.81	0.06
1:45	3.3	0.50	0.62	0.45	0.050	0.077	22.99	0.00	0.00	0.00	0.00	0.00	22.99	0.00	0.00	0.00	0.00	22.99	0.08
1:50	3.1	0.47	0.62	0.43	0.047	0.072	21.59	0.00	0.00	0.00	0.00	0.00	21.59	0.00	0.00	0.00	0.00	21.59	0.07
1:55	2.9	0.44	0.62	0.40	0.044	0.067	20.20	0.00	0.00	0.00	0.00	0.00	20.20	0.00	0.00	0.00	0.00	20.20	0.07
2:00	3.0	0.46	0.62	0.41	0.046	0.070	20.90	0.00	0.00	0.00	0.00	0.00	20.90	0.00	0.00	0.00	0.00	20.90	0.07
2:05	3.1	0.47	0.62	0.43	0.047	0.072	21.59	0.00	0.00	0.00	0.00	0.00	21.59	0.00	0.00	0.00	0.00	21.59	0.07
2:10	4.2	0.64	0.62	0.58	0.064	0.098	29.26	0.00	0.00	0.00	0.00	0.00	29.26	0.00	0.00	0.00	0.00	29.26	0.10
2:15	5.0	0.76	0.62	N/A	0.142	0.216	64.90	0.00	0.00	0.00	0.00	0.00	64.90	0.00	0.00	0.00	0.00	64.90	0.22
2:20	3.5	0.53	0.62	0.48	0.053	0.081	24.38	0.00	0.00	0.00	0.00	0.00	24.38	0.00	0.00	0.00	0.00	24.38	0.08
2:25	6.8	1.04	0.62	N/A	0.416	0.634	190.29	0.00	0.00	0.00	0.00	0.00	190.29	0.00	0.00	0.00	0.00	190.29	0.63
2:30	7.3	1.11	0.62	N/A	0.493	0.750	225.12	0.00	0.00	0.00	0.00	0.00	225.12	0.00	0.00	0.00	0.00	225.12	0.75
2:35	8.2	1.25	0.62	N/A	0.630	**0.959**	287.81	0.00	0.00	0.00	0.00	0.00	287.81	0.00	0.00	0.00	0.00	287.81	0.96
2:40	5.9	0.90	0.62	N/A	0.279	0.425	127.60	0.00	0.00	0.00	0.00	0.00	127.60	0.00	0.00	0.00	0.00	127.60	0.43
2:45	2.0	0.30	0.62	0.27	0.030	0.046	13.93	0.00	0.00	0.00	0.00	0.00	13.93	0.00	0.00	0.00	0.00	13.93	0.05
2:50	1.8	0.27	0.62	0.25	0.027	0.042	12.54	0.00	0.00	0.00	0.00	0.00	12.54	0.00	0.00	0.00	0.00	12.54	0.04
2:55	1.8	0.27	0.62	0.25	0.027	0.042	12.54	0.00	0.00	0.00	0.00	0.00	12.54	0.00	0.00	0.00	0.00	12.54	0.04
3:00	0.6	0.09	0.62	0.08	0.009	0.014	4.18	0.00	0.00	0.00	0.00	0.00	4.18	0.00	0.00	0.00	0.00	4.18	0.01
					Total volume (CF)		**1361.04**								**Total Overflow (CF)**			**1361.04**	

5 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.11	0.62	0.10	0.011	0.017	4.96	0.00	0.00	0.00	0.00	0.00	4.96	0.00	0.00	0.00	0.00	4.96	0.02
0:10	0.6	0.13	0.62	0.12	0.013	0.020	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.02
0:15	0.6	0.13	0.62	0.12	0.013	0.020	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.02
0:20	0.6	0.13	0.62	0.12	0.013	0.020	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.02
0:25	0.6	0.13	0.62	0.12	0.013	0.020	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.02
0:30	0.7	0.15	0.62	0.14	0.015	0.023	6.95	0.00	0.00	0.00	0.00	0.00	6.95	0.00	0.00	0.00	0.00	6.95	0.02
0:35	0.7	0.15	0.62	0.14	0.015	0.023	6.95	0.00	0.00	0.00	0.00	0.00	6.95	0.00	0.00	0.00	0.00	6.95	0.02
0:40	0.7	0.15	0.62	0.14	0.015	0.023	6.95	0.00	0.00	0.00	0.00	0.00	6.95	0.00	0.00	0.00	0.00	6.95	0.02
0:45	0.7	0.15	0.62	0.14	0.015	0.023	6.95	0.00	0.00	0.00	0.00	0.00	6.95	0.00	0.00	0.00	0.00	6.95	0.02
0:50	0.7	0.15	0.62	0.14	0.015	0.023	6.95	0.00	0.00	0.00	0.00	0.00	6.95	0.00	0.00	0.00	0.00	6.95	0.02
0:55	0.7	0.15	0.62	0.14	0.015	0.023	6.95	0.00	0.00	0.00	0.00	0.00	6.95	0.00	0.00	0.00	0.00	6.95	0.02
1:00	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:05	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:10	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:15	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:20	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:25	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:30	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:35	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:40	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:45	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:50	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
1:55	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
2:00	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:05	0.8	0.17	0.62	0.16	0.017	0.026	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.03
2:10	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:15	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:20	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:25	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:30	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:35	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:40	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
2:45	1.0	0.22	0.62	0.20	0.022	0.033	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.03
2:50	1.0	0.22	0.62	0.20	0.022	0.033	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.03
2:55	1.0	0.22	0.62	0.20	0.022	0.033	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.03
3:00	1.0	0.22	0.62	0.20	0.022	0.033	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.03
3:05	1.0	0.22	0.62	0.20	0.022	0.033	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.03
3:10	1.1	0.24	0.62	0.22	0.024	0.036	10.92	0.00	0.00	0.00	0.00	0.00	10.92	0.00	0.00	0.00	0.00	10.92	0.04
3:15	1.1	0.24	0.62	0.22	0.024	0.036	10.92	0.00	0.00	0.00	0.00	0.00	10.92	0.00	0.00	0.00	0.00	10.92	0.04
3:20	1.1	0.24	0.62	0.22	0.024	0.036	10.92	0.00	0.00	0.00	0.00	0.00	10.92	0.00	0.00	0.00	0.00	10.92	0.04
3:25	1.2	0.26	0.62	0.23	0.026	0.040	11.91	0.00	0.00	0.00	0.00	0.00	11.91	0.00	0.00	0.00	0.00	11.91	0.04
3:30	1.3	0.28	0.62	0.25	0.028	0.043	12.91	0.00	0.00	0.00	0.00	0.00	12.91	0.00	0.00	0.00	0.00	12.91	0.04
3:35	1.4	0.30	0.62	0.27	0.030	0.046	13.90	0.00	0.00	0.00	0.00	0.00	13.90	0.00	0.00	0.00	0.00	13.90	0.05
3:40	1.4	0.30	0.62	0.27	0.030	0.046	13.90	0.00	0.00	0.00	0.00	0.00	13.90	0.00	0.00	0.00	0.00	13.90	0.05
3:45	1.5	0.33	0.62	0.29	0.033	0.050	14.89	0.00	0.00	0.00	0.00	0.00	14.89	0.00	0.00	0.00	0.00	14.89	0.05
3:50	1.5	0.33	0.62	0.29	0.033	0.050	14.89	0.00	0.00	0.00	0.00	0.00	14.89	0.00	0.00	0.00	0.00	14.89	0.05
3:55	1.6	0.35	0.62	0.31	0.035	0.053	15.88	0.00	0.00	0.00	0.00	0.00	15.88	0.00	0.00	0.00	0.00	15.88	0.05
4:00	1.6	0.35	0.62	0.31	0.035	0.053	15.88	0.00	0.00	0.00	0.00	0.00	15.88	0.00	0.00	0.00	0.00	15.88	0.05
4:05	1.7	0.37	0.62	0.33	0.037	0.056	16.88	0.00	0.00	0.00	0.00	0.00	16.88	0.00	0.00	0.00	0.00	16.88	0.06

4:10	1.8	0.39	0.62	0.35	0.039	0.060	17.87	0.00	0.00	0.00	0.00	0.00	17.87	0.00	0.00	0.00	0.00	17.87	0.06
4:15	1.9	0.41	0.62	0.37	0.041	0.063	18.86	0.00	0.00	0.00	0.00	0.00	18.86	0.00	0.00	0.00	0.00	18.86	0.06
4:20	2.0	0.43	0.62	0.39	0.043	0.066	19.86	0.00	0.00	0.00	0.00	0.00	19.86	0.00	0.00	0.00	0.00	19.86	0.07
4:25	2.1	0.46	0.62	0.41	0.046	0.069	20.85	0.00	0.00	0.00	0.00	0.00	20.85	0.00	0.00	0.00	0.00	20.85	0.07
4:30	2.1	0.46	0.62	0.41	0.046	0.069	20.85	0.00	0.00	0.00	0.00	0.00	20.85	0.00	0.00	0.00	0.00	20.85	0.07
4:35	2.2	0.48	0.62	0.43	0.048	0.073	21.84	0.00	0.00	0.00	0.00	0.00	21.84	0.00	0.00	0.00	0.00	21.84	0.07
4:40	2.3	0.50	0.62	0.45	0.050	0.076	22.83	0.00	0.00	0.00	0.00	0.00	22.83	0.00	0.00	0.00	0.00	22.83	0.08
4:45	2.4	0.52	0.62	0.47	0.052	0.079	23.83	0.00	0.00	0.00	0.00	0.00	23.83	0.00	0.00	0.00	0.00	23.83	0.08
4:50	2.4	0.52	0.62	0.47	0.052	0.079	23.83	0.00	0.00	0.00	0.00	0.00	23.83	0.00	0.00	0.00	0.00	23.83	0.08
4:55	2.5	0.54	0.62	0.49	0.054	0.083	24.82	0.00	0.00	0.00	0.00	0.00	24.82	0.00	0.00	0.00	0.00	24.82	0.08
5:00	2.6	0.56	0.62	0.51	0.056	0.086	25.81	0.00	0.00	0.00	0.00	0.00	25.81	0.00	0.00	0.00	0.00	25.81	0.09
5:05	3.1	0.67	0.62	0.61	0.067	0.103	30.78	0.00	0.00	0.00	0.00	0.00	30.78	0.00	0.00	0.00	0.00	30.78	0.10
5:10	3.6	0.78	0.62	N/A	0.162	0.247	74.01	0.00	0.00	0.00	0.00	0.00	74.01	0.00	0.00	0.00	0.00	74.01	0.25
5:15	3.9	0.85	0.62	N/A	0.227	0.346	103.79	0.00	0.00	0.00	0.00	0.00	103.79	0.00	0.00	0.00	0.00	103.79	0.35
5:20	4.2	0.91	0.62	N/A	0.292	0.445	133.58	0.00	0.00	0.00	0.00	0.00	133.58	0.00	0.00	0.00	0.00	133.58	0.45
5:25	4.7	1.02	0.62	N/A	0.401	0.611	183.21	0.00	0.00	0.00	0.00	0.00	183.21	0.00	0.00	0.00	0.00	183.21	0.61
5:30	5.6	1.22	0.62	N/A	0.596	**0.909**	272.56	0.00	0.00	0.00	0.00	0.00	272.56	0.00	0.00	0.00	0.00	272.56	0.91
5:35	1.9	0.41	0.62	0.37	0.041	0.063	18.86	0.00	0.00	0.00	0.00	0.00	18.86	0.00	0.00	0.00	0.00	18.86	0.06
5:40	0.9	0.20	0.62	0.18	0.020	0.030	8.93	0.00	0.00	0.00	0.00	0.00	8.93	0.00	0.00	0.00	0.00	8.93	0.03
5:45	0.6	0.13	0.62	0.12	0.013	0.020	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.02
5:50	0.5	0.11	0.62	0.10	0.011	0.017	4.96	0.00	0.00	0.00	0.00	0.00	4.96	0.00	0.00	0.00	0.00	4.96	0.02
5:55	0.3	0.07	0.62	0.06	0.007	0.010	2.98	0.00	0.00	0.00	0.00	0.00	2.98	0.00	0.00	0.00	0.00	2.98	0.01
6:00	0.2	0.04	0.62	0.04	0.004	0.007	1.99	0.00	0.00	0.00	0.00	0.00	1.99	0.00	0.00	0.00	0.00	1.99	0.01
					Total volume (CF)		**1541.52**								**Total Overflow (CF)**			**1541.52**	

5 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.03	1.09	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
0:30	0.3	0.04	1.08	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
0:45	0.3	0.04	1.06	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
1:00	0.4	0.06	1.05	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
1:15	0.3	0.04	1.04	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
1:30	0.3	0.04	1.03	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
1:45	0.3	0.04	1.01	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
2:00	0.4	0.06	1.00	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
2:15	0.4	0.06	0.99	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
2:30	0.4	0.06	0.98	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
2:45	0.5	0.07	0.97	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
3:00	0.5	0.07	0.95	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
3:15	0.5	0.07	0.94	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
3:30	0.5	0.07	0.93	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
3:45	0.5	0.07	0.92	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
4:00	0.6	0.09	0.91	0.08	0.009	0.013	11.91	0.00	0.00	0.00	0.00	0.00	11.91	0.00	0.00	0.00	0.00	11.91	0.01
4:15	0.6	0.09	0.89	0.08	0.009	0.013	11.91	0.00	0.00	0.00	0.00	0.00	11.91	0.00	0.00	0.00	0.00	11.91	0.01
4:30	0.7	0.10	0.88	0.09	0.010	0.015	13.90	0.00	0.00	0.00	0.00	0.00	13.90	0.00	0.00	0.00	0.00	13.90	0.02
4:45	0.7	0.10	0.87	0.09	0.010	0.015	13.90	0.00	0.00	0.00	0.00	0.00	13.90	0.00	0.00	0.00	0.00	13.90	0.02
5:00	0.8	0.12	0.86	0.10	0.012	0.018	15.88	0.00	0.00	0.00	0.00	0.00	15.88	0.00	0.00	0.00	0.00	15.88	0.02
5:15	0.6	0.09	0.85	0.08	0.009	0.013	11.91	0.00	0.00	0.00	0.00	0.00	11.91	0.00	0.00	0.00	0.00	11.91	0.01
5:30	0.7	0.10	0.84	0.09	0.010	0.015	13.90	0.00	0.00	0.00	0.00	0.00	13.90	0.00	0.00	0.00	0.00	13.90	0.02
5:45	0.8	0.12	0.83	0.10	0.012	0.018	15.88	0.00	0.00	0.00	0.00	0.00	15.88	0.00	0.00	0.00	0.00	15.88	0.02
6:00	0.8	0.12	0.82	0.10	0.012	0.018	15.88	0.00	0.00	0.00	0.00	0.00	15.88	0.00	0.00	0.00	0.00	15.88	0.02
6:15	0.9	0.13	0.81	0.12	0.013	0.020	17.87	0.00	0.00	0.00	0.00	0.00	17.87	0.00	0.00	0.00	0.00	17.87	0.02
6:30	0.9	0.13	0.79	0.12	0.013	0.020	17.87	0.00	0.00	0.00	0.00	0.00	17.87	0.00	0.00	0.00	0.00	17.87	0.02
6:45	1.0	0.14	0.78	0.13	0.014	0.022	19.86	0.00	0.00	0.00	0.00	0.00	19.86	0.00	0.00	0.00	0.00	19.86	0.02
7:00	1.0	0.14	0.77	0.13	0.014	0.022	19.86	0.00	0.00	0.00	0.00	0.00	19.86	0.00	0.00	0.00	0.00	19.86	0.02
7:15	1.0	0.14	0.76	0.13	0.014	0.022	19.86	0.00	0.00	0.00	0.00	0.00	19.86	0.00	0.00	0.00	0.00	19.86	0.02
7:30	1.1	0.16	0.75	0.14	0.016	0.024	21.84	0.00	0.00	0.00	0.00	0.00	21.84	0.00	0.00	0.00	0.00	21.84	0.02
7:45	1.2	0.17	0.74	0.16	0.017	0.026	23.83	0.00	0.00	0.00	0.00	0.00	23.83	0.00	0.00	0.00	0.00	23.83	0.03
8:00	1.3	0.19	0.73	0.17	0.019	0.029	25.81	0.00	0.00	0.00	0.00	0.00	25.81	0.00	0.00	0.00	0.00	25.81	0.03
8:15	1.5	0.22	0.72	0.20	0.022	0.033	29.78	0.00	0.00	0.00	0.00	0.00	29.78	0.00	0.00	0.00	0.00	29.78	0.03
8:30	1.5	0.22	0.71	0.20	0.022	0.033	29.78	0.00	0.00	0.00	0.00	0.00	29.78	0.00	0.00	0.00	0.00	29.78	0.03
8:45	1.6	0.23	0.70	0.21	0.023	0.035	31.77	0.00	0.00	0.00	0.00	0.00	31.77	0.00	0.00	0.00	0.00	31.77	0.04
9:00	1.7	0.25	0.69	0.22	0.025	0.038	33.75	0.00	0.00	0.00	0.00	0.00	33.75	0.00	0.00	0.00	0.00	33.75	0.04
9:15	1.9	0.28	0.68	0.25	0.028	0.042	37.73	0.00	0.00	0.00	0.00	0.00	37.73	0.00	0.00	0.00	0.00	37.73	0.04
9:30	2.0	0.29	0.67	0.26	0.029	0.044	39.71	0.00	0.00	0.00	0.00	0.00	39.71	0.00	0.00	0.00	0.00	39.71	0.04
9:45	2.1	0.30	0.66	0.27	0.030	0.046	41.70	0.00	0.00	0.00	0.00	0.00	41.70	0.00	0.00	0.00	0.00	41.70	0.05
10:00	2.2	0.32	0.65	0.29	0.032	0.049	43.68	0.00	0.00	0.00	0.00	0.00	43.68	0.00	0.00	0.00	0.00	43.68	0.05
10:15	1.5	0.22	0.64	0.20	0.022	0.033	29.78	0.00	0.00	0.00	0.00	0.00	29.78	0.00	0.00	0.00	0.00	29.78	0.03
10:30	1.5	0.22	0.63	0.20	0.022	0.033	29.78	0.00	0.00	0.00	0.00	0.00	29.78	0.00	0.00	0.00	0.00	29.78	0.03
10:45	2.0	0.29	0.63	0.26	0.029	0.044	39.71	0.00	0.00	0.00	0.00	0.00	39.71	0.00	0.00	0.00	0.00	39.71	0.04
11:00	2.0	0.29	0.62	0.26	0.029	0.044	39.71	0.00	0.00	0.00	0.00	0.00	39.71	0.00	0.00	0.00	0.00	39.71	0.04
11:15	1.9	0.28	0.61	0.25	0.028	0.042	37.73	0.00	0.00	0.00	0.00	0.00	37.73	0.00	0.00	0.00	0.00	37.73	0.04
11:30	1.9	0.28	0.60	0.25	0.028	0.042	37.73	0.00	0.00	0.00	0.00	0.00	37.73	0.00	0.00	0.00	0.00	37.73	0.04
11:45	1.7	0.25	0.59	0.22	0.025	0.038	33.75	0.00	0.00	0.00	0.00	0.00	33.75	0.00	0.00	0.00	0.00	33.75	0.04
12:00	1.8	0.26	0.58	0.23	0.026	0.040	35.74	0.00	0.00	0.00	0.00	0.00	35.74	0.00	0.00	0.00	0.00	35.74	0.04
12:15	2.5	0.36	0.57	0.33	0.036	0.055	49.64	0.00	0.00	0.00	0.00	0.00	49.64	0.00	0.00	0.00	0.00	49.64	0.06

12:30	2.6	0.38	0.56	0.34	0.038	0.057	51.62	0.00	0.00	0.00	0.00	0.00	51.62	0.00	0.00	0.00	0.00	51.62	0.06
12:45	2.8	0.41	0.55	0.36	0.041	0.062	55.60	0.00	0.00	0.00	0.00	0.00	55.60	0.00	0.00	0.00	0.00	55.60	0.06
13:00	2.9	0.42	0.55	0.38	0.042	0.064	57.58	0.00	0.00	0.00	0.00	0.00	57.58	0.00	0.00	0.00	0.00	57.58	0.06
13:15	3.4	0.49	0.54	0.44	0.049	**0.075**	67.51	0.00	0.00	0.00	0.00	0.00	67.51	0.00	0.00	0.00	0.00	67.51	0.08
13:30	3.4	0.49	0.53	0.44	0.049	**0.075**	67.51	0.00	0.00	0.00	0.00	0.00	67.51	0.00	0.00	0.00	0.00	67.51	0.08
13:45	2.3	0.33	0.52	0.30	0.033	0.051	45.67	0.00	0.00	0.00	0.00	0.00	45.67	0.00	0.00	0.00	0.00	45.67	0.05
14:00	2.3	0.33	0.51	0.30	0.033	0.051	45.67	0.00	0.00	0.00	0.00	0.00	45.67	0.00	0.00	0.00	0.00	45.67	0.05
14:15	2.7	0.39	0.51	0.35	0.039	0.060	53.61	0.00	0.00	0.00	0.00	0.00	53.61	0.00	0.00	0.00	0.00	53.61	0.06
14:30	2.6	0.38	0.50	0.34	0.038	0.057	51.62	0.00	0.00	0.00	0.00	0.00	51.62	0.00	0.00	0.00	0.00	51.62	0.06
14:45	2.6	0.38	0.49	0.34	0.038	0.057	51.62	0.00	0.00	0.00	0.00	0.00	51.62	0.00	0.00	0.00	0.00	51.62	0.06
15:00	2.5	0.36	0.48	0.33	0.036	0.055	49.64	0.00	0.00	0.00	0.00	0.00	49.64	0.00	0.00	0.00	0.00	49.64	0.06
15:15	2.4	0.35	0.48	0.31	0.035	0.053	47.65	0.00	0.00	0.00	0.00	0.00	47.65	0.00	0.00	0.00	0.00	47.65	0.05
15:30	2.3	0.33	0.47	0.30	0.033	0.051	45.67	0.00	0.00	0.00	0.00	0.00	45.67	0.00	0.00	0.00	0.00	45.67	0.05
15:45	1.9	0.28	0.46	0.25	0.028	0.042	37.73	0.00	0.00	0.00	0.00	0.00	37.73	0.00	0.00	0.00	0.00	37.73	0.04
16:00	1.9	0.28	0.45	0.25	0.028	0.042	37.73	0.00	0.00	0.00	0.00	0.00	37.73	0.00	0.00	0.00	0.00	37.73	0.04
16:15	0.4	0.06	0.45	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
16:30	0.4	0.06	0.44	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
16:45	0.3	0.04	0.43	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
17:00	0.3	0.04	0.43	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
17:15	0.5	0.07	0.42	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
17:30	0.5	0.07	0.41	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
17:45	0.5	0.07	0.41	0.07	0.007	0.011	9.93	0.00	0.00	0.00	0.00	0.00	9.93	0.00	0.00	0.00	0.00	9.93	0.01
18:00	0.4	0.06	0.40	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
18:15	0.4	0.06	0.40	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
18:30	0.4	0.06	0.39	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
18:45	0.3	0.04	0.39	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
19:00	0.2	0.03	0.38	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
19:15	0.3	0.04	0.37	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
19:30	0.4	0.06	0.37	0.05	0.006	0.009	7.94	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	0.00	0.00	7.94	0.01
19:45	0.3	0.04	0.36	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
20:00	0.2	0.03	0.36	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
20:15	0.3	0.04	0.35	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
20:30	0.3	0.04	0.35	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
20:45	0.3	0.04	0.35	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
21:00	0.2	0.03	0.34	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
21:15	0.3	0.04	0.34	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
21:30	0.2	0.03	0.33	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
21:45	0.3	0.04	0.33	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
22:00	0.2	0.03	0.33	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
22:15	0.3	0.04	0.32	0.04	0.004	0.007	5.96	0.00	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	5.96	0.01
22:30	0.2	0.03	0.32	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
22:45	0.2	0.03	0.32	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
23:00	0.2	0.03	0.32	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
23:15	0.2	0.03	0.31	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
23:30	0.2	0.03	0.31	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
23:45	0.2	0.03	0.31	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
24:00	0.2	0.03	0.31	0.03	0.003	0.004	3.97	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	0.00	0.00	3.97	0.00
					Total volume (CF)		**1985.54**								**Total Overflow (CF)**			**1985.54**	

RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Pre-Development

Recurrence Interval	10	year			
Storm Duration (hrs)	1	3	6	24	
10-year NOAA Atlas 14 Point Precipitation (in)	1.010	1.520	2.130	4.310	
Unit time (minutes)	5	5	5	15	
Drainage Area	65819	SF	*1.511*	Ac.	
Soils Group	B				
AMC index Runoff Number (plate E-6.1)	65	Type: Woodland, Grass; fair			
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.42	AMC II			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	0				
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.42*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	*90*				
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

10 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.45	0.42	0.40	0.045	0.068	20.50	0.00	0.00	0.00	0.00	0.00	20.50	0.00	0.00	0.00	0.00	20.50	0.07
0:10	4.8	0.58	0.42	N/A	0.162	0.246	73.94	0.00	0.00	0.00	0.00	0.00	73.94	0.00	0.00	0.00	0.00	73.94	0.25
0:15	5.1	0.62	0.42	N/A	0.198	0.302	90.56	0.00	0.00	0.00	0.00	0.00	90.56	0.00	0.00	0.00	0.00	90.56	0.30
0:20	4.9	0.59	0.42	N/A	0.174	0.265	79.48	0.00	0.00	0.00	0.00	0.00	79.48	0.00	0.00	0.00	0.00	79.48	0.26
0:25	6.6	0.80	0.42	N/A	0.380	0.579	173.65	0.00	0.00	0.00	0.00	0.00	173.65	0.00	0.00	0.00	0.00	173.65	0.58
0:30	7.3	0.88	0.42	N/A	0.465	0.708	212.43	0.00	0.00	0.00	0.00	0.00	212.43	0.00	0.00	0.00	0.00	212.43	0.71
0:35	8.4	1.02	0.42	N/A	0.598	0.911	273.37	0.00	0.00	0.00	0.00	0.00	273.37	0.00	0.00	0.00	0.00	273.37	0.91
0:40	9.0	1.09	0.42	N/A	0.671	1.022	306.61	0.00	0.00	0.00	0.00	0.00	306.61	0.00	0.00	0.00	0.00	306.61	1.02
0:45	12.3	1.49	0.42	N/A	1.071	1.631	489.42	0.00	0.00	0.00	0.00	0.00	489.42	0.00	0.00	0.00	0.00	489.42	1.63
0:50	17.6	2.13	0.42	N/A	1.713	**2.610**	783.03	0.00	0.00	0.00	0.00	0.00	783.03	0.00	0.00	0.00	0.00	783.03	2.61
0:55	16.1	1.95	0.42	N/A	1.531	2.333	699.93	0.00	0.00	0.00	0.00	0.00	699.93	0.00	0.00	0.00	0.00	699.93	2.33
1:00	4.2	0.51	0.42	N/A	0.089	0.136	40.70	0.00	0.00	0.00	0.00	0.00	40.70	0.00	0.00	0.00	0.00	40.70	0.14
					Total volume (CF)		**3243.60**								**Total Overflow (CF)**			**3243.60**	

10 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.24	0.42	0.21	0.024	0.036	10.84	0.00	0.00	0.00	0.00	0.00	10.84	0.00	0.00	0.00	0.00	10.84	0.04
0:10	1.3	0.24	0.42	0.21	0.024	0.036	10.84	0.00	0.00	0.00	0.00	0.00	10.84	0.00	0.00	0.00	0.00	10.84	0.04
0:15	1.1	0.20	0.42	0.18	0.020	0.031	9.17	0.00	0.00	0.00	0.00	0.00	9.17	0.00	0.00	0.00	0.00	9.17	0.03
0:20	1.5	0.27	0.42	0.25	0.027	0.042	12.51	0.00	0.00	0.00	0.00	0.00	12.51	0.00	0.00	0.00	0.00	12.51	0.04
0:25	1.5	0.27	0.42	0.25	0.027	0.042	12.51	0.00	0.00	0.00	0.00	0.00	12.51	0.00	0.00	0.00	0.00	12.51	0.04
0:30	1.8	0.33	0.42	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
0:35	1.5	0.27	0.42	0.25	0.027	0.042	12.51	0.00	0.00	0.00	0.00	0.00	12.51	0.00	0.00	0.00	0.00	12.51	0.04
0:40	1.8	0.33	0.42	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
0:45	1.8	0.33	0.42	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
0:50	1.5	0.27	0.42	0.25	0.027	0.042	12.51	0.00	0.00	0.00	0.00	0.00	12.51	0.00	0.00	0.00	0.00	12.51	0.04
0:55	1.6	0.29	0.42	0.26	0.029	0.044	13.34	0.00	0.00	0.00	0.00	0.00	13.34	0.00	0.00	0.00	0.00	13.34	0.04
1:00	1.8	0.33	0.42	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
1:05	2.2	0.40	0.42	0.36	0.040	0.061	18.34	0.00	0.00	0.00	0.00	0.00	18.34	0.00	0.00	0.00	0.00	18.34	0.06
1:10	2.2	0.40	0.42	0.36	0.040	0.061	18.34	0.00	0.00	0.00	0.00	0.00	18.34	0.00	0.00	0.00	0.00	18.34	0.06
1:15	2.2	0.40	0.42	0.36	0.040	0.061	18.34	0.00	0.00	0.00	0.00	0.00	18.34	0.00	0.00	0.00	0.00	18.34	0.06
1:20	2.0	0.36	0.42	0.33	0.036	0.056	16.67	0.00	0.00	0.00	0.00	0.00	16.67	0.00	0.00	0.00	0.00	16.67	0.06
1:25	2.6	0.47	0.42	N/A	0.054	0.083	24.79	0.00	0.00	0.00	0.00	0.00	24.79	0.00	0.00	0.00	0.00	24.79	0.08
1:30	2.7	0.49	0.42	N/A	0.072	0.110	33.13	0.00	0.00	0.00	0.00	0.00	33.13	0.00	0.00	0.00	0.00	33.13	0.11
1:35	2.4	0.44	0.42	0.39	0.044	0.067	20.01	0.00	0.00	0.00	0.00	0.00	20.01	0.00	0.00	0.00	0.00	20.01	0.07
1:40	2.7	0.49	0.42	N/A	0.072	0.110	33.13	0.00	0.00	0.00	0.00	0.00	33.13	0.00	0.00	0.00	0.00	33.13	0.11
1:45	3.3	0.60	0.42	N/A	0.182	0.277	83.15	0.00	0.00	0.00	0.00	0.00	83.15	0.00	0.00	0.00	0.00	83.15	0.28
1:50	3.1	0.57	0.42	N/A	0.145	0.222	66.48	0.00	0.00	0.00	0.00	0.00	66.48	0.00	0.00	0.00	0.00	66.48	0.22
1:55	2.9	0.53	0.42	N/A	0.109	0.166	49.80	0.00	0.00	0.00	0.00	0.00	49.80	0.00	0.00	0.00	0.00	49.80	0.17
2:00	3.0	0.55	0.42	N/A	0.127	0.194	58.14	0.00	0.00	0.00	0.00	0.00	58.14	0.00	0.00	0.00	0.00	58.14	0.19
2:05	3.1	0.57	0.42	N/A	0.145	0.222	66.48	0.00	0.00	0.00	0.00	0.00	66.48	0.00	0.00	0.00	0.00	66.48	0.22
2:10	4.2	0.77	0.42	N/A	0.346	0.527	158.19	0.00	0.00	0.00	0.00	0.00	158.19	0.00	0.00	0.00	0.00	158.19	0.53
2:15	5.0	0.91	0.42	N/A	0.492	0.750	224.88	0.00	0.00	0.00	0.00	0.00	224.88	0.00	0.00	0.00	0.00	224.88	0.75
2:20	3.5	0.64	0.42	N/A	0.218	0.333	99.83	0.00	0.00	0.00	0.00	0.00	99.83	0.00	0.00	0.00	0.00	99.83	0.33
2:25	6.8	1.24	0.42	N/A	0.820	1.250	374.95	0.00	0.00	0.00	0.00	0.00	374.95	0.00	0.00	0.00	0.00	374.95	1.25
2:30	7.3	1.33	0.42	N/A	0.912	1.389	416.63	0.00	0.00	0.00	0.00	0.00	416.63	0.00	0.00	0.00	0.00	416.63	1.39
2:35	8.2	1.50	0.42	N/A	1.076	**1.639**	491.67	0.00	0.00	0.00	0.00	0.00	491.67	0.00	0.00	0.00	0.00	491.67	1.64
2:40	5.9	1.08	0.42	N/A	0.656	1.000	299.92	0.00	0.00	0.00	0.00	0.00	299.92	0.00	0.00	0.00	0.00	299.92	1.00
2:45	2.0	0.36	0.42	0.33	0.036	0.056	16.67	0.00	0.00	0.00	0.00	0.00	16.67	0.00	0.00	0.00	0.00	16.67	0.06
2:50	1.8	0.33	0.42	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
2:55	1.8	0.33	0.42	0.30	0.033	0.050	15.01	0.00	0.00	0.00	0.00	0.00	15.01	0.00	0.00	0.00	0.00	15.01	0.05
3:00	0.6	0.11	0.42	0.10	0.011	0.017	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	5.00	0.02
					Total volume (CF)		**2778.79**								**Total Overflow (CF)**			**2778.79**	

10 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.13	0.42	0.12	0.013	0.019	5.84	0.00	0.00	0.00	0.00	0.00	5.84	0.00	0.00	0.00	0.00	5.84	0.02
0:10	0.6	0.15	0.42	0.14	0.015	0.023	7.01	0.00	0.00	0.00	0.00	0.00	7.01	0.00	0.00	0.00	0.00	7.01	0.02
0:15	0.6	0.15	0.42	0.14	0.015	0.023	7.01	0.00	0.00	0.00	0.00	0.00	7.01	0.00	0.00	0.00	0.00	7.01	0.02
0:20	0.6	0.15	0.42	0.14	0.015	0.023	7.01	0.00	0.00	0.00	0.00	0.00	7.01	0.00	0.00	0.00	0.00	7.01	0.02
0:25	0.6	0.15	0.42	0.14	0.015	0.023	7.01	0.00	0.00	0.00	0.00	0.00	7.01	0.00	0.00	0.00	0.00	7.01	0.02
0:30	0.7	0.18	0.42	0.16	0.018	0.027	8.18	0.00	0.00	0.00	0.00	0.00	8.18	0.00	0.00	0.00	0.00	8.18	0.03
0:35	0.7	0.18	0.42	0.16	0.018	0.027	8.18	0.00	0.00	0.00	0.00	0.00	8.18	0.00	0.00	0.00	0.00	8.18	0.03
0:40	0.7	0.18	0.42	0.16	0.018	0.027	8.18	0.00	0.00	0.00	0.00	0.00	8.18	0.00	0.00	0.00	0.00	8.18	0.03
0:45	0.7	0.18	0.42	0.16	0.018	0.027	8.18	0.00	0.00	0.00	0.00	0.00	8.18	0.00	0.00	0.00	0.00	8.18	0.03
0:50	0.7	0.18	0.42	0.16	0.018	0.027	8.18	0.00	0.00	0.00	0.00	0.00	8.18	0.00	0.00	0.00	0.00	8.18	0.03
0:55	0.7	0.18	0.42	0.16	0.018	0.027	8.18	0.00	0.00	0.00	0.00	0.00	8.18	0.00	0.00	0.00	0.00	8.18	0.03
1:00	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:05	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:10	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:15	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:20	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:25	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:30	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:35	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:40	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:45	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:50	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
1:55	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
2:00	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:05	0.8	0.20	0.42	0.18	0.020	0.031	9.35	0.00	0.00	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	9.35	0.03
2:10	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:15	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:20	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:25	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:30	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:35	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:40	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
2:45	1.0	0.26	0.42	0.23	0.026	0.039	11.68	0.00	0.00	0.00	0.00	0.00	11.68	0.00	0.00	0.00	0.00	11.68	0.04
2:50	1.0	0.26	0.42	0.23	0.026	0.039	11.68	0.00	0.00	0.00	0.00	0.00	11.68	0.00	0.00	0.00	0.00	11.68	0.04
2:55	1.0	0.26	0.42	0.23	0.026	0.039	11.68	0.00	0.00	0.00	0.00	0.00	11.68	0.00	0.00	0.00	0.00	11.68	0.04
3:00	1.0	0.26	0.42	0.23	0.026	0.039	11.68	0.00	0.00	0.00	0.00	0.00	11.68	0.00	0.00	0.00	0.00	11.68	0.04
3:05	1.0	0.26	0.42	0.23	0.026	0.039	11.68	0.00	0.00	0.00	0.00	0.00	11.68	0.00	0.00	0.00	0.00	11.68	0.04
3:10	1.1	0.28	0.42	0.25	0.028	0.043	12.85	0.00	0.00	0.00	0.00	0.00	12.85	0.00	0.00	0.00	0.00	12.85	0.04
3:15	1.1	0.28	0.42	0.25	0.028	0.043	12.85	0.00	0.00	0.00	0.00	0.00	12.85	0.00	0.00	0.00	0.00	12.85	0.04
3:20	1.1	0.28	0.42	0.25	0.028	0.043	12.85	0.00	0.00	0.00	0.00	0.00	12.85	0.00	0.00	0.00	0.00	12.85	0.04
3:25	1.2	0.31	0.42	0.28	0.031	0.047	14.02	0.00	0.00	0.00	0.00	0.00	14.02	0.00	0.00	0.00	0.00	14.02	0.05
3:30	1.3	0.33	0.42	0.30	0.033	0.051	15.19	0.00	0.00	0.00	0.00	0.00	15.19	0.00	0.00	0.00	0.00	15.19	0.05
3:35	1.4	0.36	0.42	0.32	0.036	0.055	16.36	0.00	0.00	0.00	0.00	0.00	16.36	0.00	0.00	0.00	0.00	16.36	0.05
3:40	1.4	0.36	0.42	0.32	0.036	0.055	16.36	0.00	0.00	0.00	0.00	0.00	16.36	0.00	0.00	0.00	0.00	16.36	0.05
3:45	1.5	0.38	0.42	0.35	0.038	0.058	17.52	0.00	0.00	0.00	0.00	0.00	17.52	0.00	0.00	0.00	0.00	17.52	0.06
3:50	1.5	0.38	0.42	0.35	0.038	0.058	17.52	0.00	0.00	0.00	0.00	0.00	17.52	0.00	0.00	0.00	0.00	17.52	0.06
3:55	1.6	0.41	0.42	0.37	0.041	0.062	18.69	0.00	0.00	0.00	0.00	0.00	18.69	0.00	0.00	0.00	0.00	18.69	0.06
4:00	1.6	0.41	0.42	0.37	0.041	0.062	18.69	0.00	0.00	0.00	0.00	0.00	18.69	0.00	0.00	0.00	0.00	18.69	0.06
4:05	1.7	0.43	0.42	0.39	0.043	0.066	19.86	0.00	0.00	0.00	0.00	0.00	19.86	0.00	0.00	0.00	0.00	19.86	0.07

4:10	1.8	0.46	0.42	0.41	0.046	0.070	21.03	0.00	0.00	0.00	0.00	0.00	21.03	0.00	0.00	0.00	0.00	21.03	0.07
4:15	1.9	0.49	0.42	N/A	0.066	0.100	30.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00	30.00	0.10
4:20	2.0	0.51	0.42	N/A	0.091	0.139	41.69	0.00	0.00	0.00	0.00	0.00	41.69	0.00	0.00	0.00	0.00	41.69	0.14
4:25	2.1	0.54	0.42	N/A	0.117	0.178	53.37	0.00	0.00	0.00	0.00	0.00	53.37	0.00	0.00	0.00	0.00	53.37	0.18
4:30	2.1	0.54	0.42	N/A	0.117	0.178	53.37	0.00	0.00	0.00	0.00	0.00	53.37	0.00	0.00	0.00	0.00	53.37	0.18
4:35	2.2	0.56	0.42	N/A	0.142	0.217	65.05	0.00	0.00	0.00	0.00	0.00	65.05	0.00	0.00	0.00	0.00	65.05	0.22
4:40	2.3	0.59	0.42	N/A	0.168	0.256	76.73	0.00	0.00	0.00	0.00	0.00	76.73	0.00	0.00	0.00	0.00	76.73	0.26
4:45	2.4	0.61	0.42	N/A	0.193	0.295	88.42	0.00	0.00	0.00	0.00	0.00	88.42	0.00	0.00	0.00	0.00	88.42	0.29
4:50	2.4	0.61	0.42	N/A	0.193	0.295	88.42	0.00	0.00	0.00	0.00	0.00	88.42	0.00	0.00	0.00	0.00	88.42	0.29
4:55	2.5	0.64	0.42	N/A	0.219	0.334	100.10	0.00	0.00	0.00	0.00	0.00	100.10	0.00	0.00	0.00	0.00	100.10	0.33
5:00	2.6	0.66	0.42	N/A	0.245	0.373	111.78	0.00	0.00	0.00	0.00	0.00	111.78	0.00	0.00	0.00	0.00	111.78	0.37
5:05	3.1	0.79	0.42	N/A	0.372	0.567	170.20	0.00	0.00	0.00	0.00	0.00	170.20	0.00	0.00	0.00	0.00	170.20	0.57
5:10	3.6	0.92	0.42	N/A	0.500	0.762	228.61	0.00	0.00	0.00	0.00	0.00	228.61	0.00	0.00	0.00	0.00	228.61	0.76
5:15	3.9	1.00	0.42	N/A	0.577	0.879	263.66	0.00	0.00	0.00	0.00	0.00	263.66	0.00	0.00	0.00	0.00	263.66	0.88
5:20	4.2	1.07	0.42	N/A	0.654	0.996	298.71	0.00	0.00	0.00	0.00	0.00	298.71	0.00	0.00	0.00	0.00	298.71	1.00
5:25	4.7	1.20	0.42	N/A	0.781	1.190	357.12	0.00	0.00	0.00	0.00	0.00	357.12	0.00	0.00	0.00	0.00	357.12	1.19
5:30	5.6	1.43	0.42	N/A	1.011	**1.541**	462.27	0.00	0.00	0.00	0.00	0.00	462.27	0.00	0.00	0.00	0.00	462.27	1.54
5:35	1.9	0.49	0.42	N/A	0.066	0.100	30.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00	30.00	0.10
5:40	0.9	0.23	0.42	0.21	0.023	0.035	10.51	0.00	0.00	0.00	0.00	0.00	10.51	0.00	0.00	0.00	0.00	10.51	0.04
5:45	0.6	0.15	0.42	0.14	0.015	0.023	7.01	0.00	0.00	0.00	0.00	0.00	7.01	0.00	0.00	0.00	0.00	7.01	0.02
5:50	0.5	0.13	0.42	0.12	0.013	0.019	5.84	0.00	0.00	0.00	0.00	0.00	5.84	0.00	0.00	0.00	0.00	5.84	0.02
5:55	0.3	0.08	0.42	0.07	0.008	0.012	3.50	0.00	0.00	0.00	0.00	0.00	3.50	0.00	0.00	0.00	0.00	3.50	0.01
6:00	0.2	0.05	0.42	0.05	0.005	0.008	2.34	0.00	0.00	0.00	0.00	0.00	2.34	0.00	0.00	0.00	0.00	2.34	0.01
					Total volume (CF)		**3109.48**								**Total Overflow (CF)**			**3109.48**	

10 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.03	0.74	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
0:30	0.3	0.05	0.73	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
0:45	0.3	0.05	0.72	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
1:00	0.4	0.07	0.71	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
1:15	0.3	0.05	0.70	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
1:30	0.3	0.05	0.69	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
1:45	0.3	0.05	0.69	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
2:00	0.4	0.07	0.68	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
2:15	0.4	0.07	0.67	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
2:30	0.4	0.07	0.66	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
2:45	0.5	0.09	0.65	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
3:00	0.5	0.09	0.65	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
3:15	0.5	0.09	0.64	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
3:30	0.5	0.09	0.63	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
3:45	0.5	0.09	0.62	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
4:00	0.6	0.10	0.61	0.09	0.010	0.016	14.18	0.00	0.00	0.00	0.00	0.00	14.18	0.00	0.00	0.00	0.00	14.18	0.02
4:15	0.6	0.10	0.61	0.09	0.010	0.016	14.18	0.00	0.00	0.00	0.00	0.00	14.18	0.00	0.00	0.00	0.00	14.18	0.02
4:30	0.7	0.12	0.60	0.11	0.012	0.018	16.55	0.00	0.00	0.00	0.00	0.00	16.55	0.00	0.00	0.00	0.00	16.55	0.02
4:45	0.7	0.12	0.59	0.11	0.012	0.018	16.55	0.00	0.00	0.00	0.00	0.00	16.55	0.00	0.00	0.00	0.00	16.55	0.02
5:00	0.8	0.14	0.58	0.12	0.014	0.021	18.91	0.00	0.00	0.00	0.00	0.00	18.91	0.00	0.00	0.00	0.00	18.91	0.02
5:15	0.6	0.10	0.58	0.09	0.010	0.016	14.18	0.00	0.00	0.00	0.00	0.00	14.18	0.00	0.00	0.00	0.00	14.18	0.02
5:30	0.7	0.12	0.57	0.11	0.012	0.018	16.55	0.00	0.00	0.00	0.00	0.00	16.55	0.00	0.00	0.00	0.00	16.55	0.02
5:45	0.8	0.14	0.56	0.12	0.014	0.021	18.91	0.00	0.00	0.00	0.00	0.00	18.91	0.00	0.00	0.00	0.00	18.91	0.02
6:00	0.8	0.14	0.55	0.12	0.014	0.021	18.91	0.00	0.00	0.00	0.00	0.00	18.91	0.00	0.00	0.00	0.00	18.91	0.02
6:15	0.9	0.16	0.55	0.14	0.016	0.024	21.28	0.00	0.00	0.00	0.00	0.00	21.28	0.00	0.00	0.00	0.00	21.28	0.02
6:30	0.9	0.16	0.54	0.14	0.016	0.024	21.28	0.00	0.00	0.00	0.00	0.00	21.28	0.00	0.00	0.00	0.00	21.28	0.02
6:45	1.0	0.17	0.53	0.16	0.017	0.026	23.64	0.00	0.00	0.00	0.00	0.00	23.64	0.00	0.00	0.00	0.00	23.64	0.03
7:00	1.0	0.17	0.52	0.16	0.017	0.026	23.64	0.00	0.00	0.00	0.00	0.00	23.64	0.00	0.00	0.00	0.00	23.64	0.03
7:15	1.0	0.17	0.52	0.16	0.017	0.026	23.64	0.00	0.00	0.00	0.00	0.00	23.64	0.00	0.00	0.00	0.00	23.64	0.03
7:30	1.1	0.19	0.51	0.17	0.019	0.029	26.00	0.00	0.00	0.00	0.00	0.00	26.00	0.00	0.00	0.00	0.00	26.00	0.03
7:45	1.2	0.21	0.50	0.19	0.021	0.032	28.37	0.00	0.00	0.00	0.00	0.00	28.37	0.00	0.00	0.00	0.00	28.37	0.03
8:00	1.3	0.22	0.50	0.20	0.022	0.034	30.73	0.00	0.00	0.00	0.00	0.00	30.73	0.00	0.00	0.00	0.00	30.73	0.03
8:15	1.5	0.26	0.49	0.23	0.026	0.039	35.46	0.00	0.00	0.00	0.00	0.00	35.46	0.00	0.00	0.00	0.00	35.46	0.04
8:30	1.5	0.26	0.48	0.23	0.026	0.039	35.46	0.00	0.00	0.00	0.00	0.00	35.46	0.00	0.00	0.00	0.00	35.46	0.04
8:45	1.6	0.28	0.48	0.25	0.028	0.042	37.82	0.00	0.00	0.00	0.00	0.00	37.82	0.00	0.00	0.00	0.00	37.82	0.04
9:00	1.7	0.29	0.47	0.26	0.029	0.045	40.19	0.00	0.00	0.00	0.00	0.00	40.19	0.00	0.00	0.00	0.00	40.19	0.04
9:15	1.9	0.33	0.46	0.29	0.033	0.050	44.92	0.00	0.00	0.00	0.00	0.00	44.92	0.00	0.00	0.00	0.00	44.92	0.05
9:30	2.0	0.34	0.46	0.31	0.034	0.053	47.28	0.00	0.00	0.00	0.00	0.00	47.28	0.00	0.00	0.00	0.00	47.28	0.05
9:45	2.1	0.36	0.45	0.33	0.036	0.055	49.64	0.00	0.00	0.00	0.00	0.00	49.64	0.00	0.00	0.00	0.00	49.64	0.06
10:00	2.2	0.38	0.44	0.34	0.038	0.058	52.01	0.00	0.00	0.00	0.00	0.00	52.01	0.00	0.00	0.00	0.00	52.01	0.06
10:15	1.5	0.26	0.44	0.23	0.026	0.039	35.46	0.00	0.00	0.00	0.00	0.00	35.46	0.00	0.00	0.00	0.00	35.46	0.04
10:30	1.5	0.26	0.43	0.23	0.026	0.039	35.46	0.00	0.00	0.00	0.00	0.00	35.46	0.00	0.00	0.00	0.00	35.46	0.04
10:45	2.0	0.34	0.42	0.31	0.034	0.053	47.28	0.00	0.00	0.00	0.00	0.00	47.28	0.00	0.00	0.00	0.00	47.28	0.05
11:00	2.0	0.34	0.42	0.31	0.034	0.053	47.28	0.00	0.00	0.00	0.00	0.00	47.28	0.00	0.00	0.00	0.00	47.28	0.05
11:15	1.9	0.33	0.41	0.29	0.033	0.050	44.92	0.00	0.00	0.00	0.00	0.00	44.92	0.00	0.00	0.00	0.00	44.92	0.05
11:30	1.9	0.33	0.41	0.29	0.033	0.050	44.92	0.00	0.00	0.00	0.00	0.00	44.92	0.00	0.00	0.00	0.00	44.92	0.05
11:45	1.7	0.29	0.40	0.26	0.029	0.045	40.19	0.00	0.00	0.00	0.00	0.00	40.19	0.00	0.00	0.00	0.00	40.19	0.04
12:00	1.8	0.31	0.39	0.28	0.031	0.047	42.55	0.00	0.00	0.00	0.00	0.00	42.55	0.00	0.00	0.00	0.00	42.55	0.05
12:15	2.5	0.43	0.39	N/A	0.044	0.067	60.10	0.00	0.00	0.00	0.00	0.00	60.10	0.00	0.00	0.00	0.00	60.10	0.07

12:30	2.6	0.45	0.38	N/A	0.067	0.102	91.71	0.00	0.00	0.00	0.00	0.00	91.71	0.00	0.00	0.00	0.00	91.71	0.10
12:45	2.8	0.48	0.38	N/A	0.107	0.163	146.86	0.00	0.00	0.00	0.00	0.00	146.86	0.00	0.00	0.00	0.00	146.86	0.16
13:00	2.9	0.50	0.37	N/A	0.130	0.198	178.27	0.00	0.00	0.00	0.00	0.00	178.27	0.00	0.00	0.00	0.00	178.27	0.20
13:15	3.4	0.59	0.36	N/A	0.222	0.338	304.15	0.00	0.00	0.00	0.00	0.00	304.15	0.00	0.00	0.00	0.00	304.15	0.34
13:30	3.4	0.59	0.36	N/A	0.227	**0.346**	311.73	0.00	0.00	0.00	0.00	0.00	311.73	0.00	0.00	0.00	0.00	311.73	0.35
13:45	2.3	0.40	0.35	N/A	0.043	0.066	59.17	0.00	0.00	0.00	0.00	0.00	59.17	0.00	0.00	0.00	0.00	59.17	0.07
14:00	2.3	0.40	0.35	N/A	0.049	0.074	66.56	0.00	0.00	0.00	0.00	0.00	66.56	0.00	0.00	0.00	0.00	66.56	0.07
14:15	2.7	0.47	0.34	N/A	0.123	0.187	168.40	0.00	0.00	0.00	0.00	0.00	168.40	0.00	0.00	0.00	0.00	168.40	0.19
14:30	2.6	0.45	0.34	N/A	0.111	0.169	151.94	0.00	0.00	0.00	0.00	0.00	151.94	0.00	0.00	0.00	0.00	151.94	0.17
14:45	2.6	0.45	0.33	N/A	0.116	0.177	159.01	0.00	0.00	0.00	0.00	0.00	159.01	0.00	0.00	0.00	0.00	159.01	0.18
15:00	2.5	0.43	0.33	N/A	0.104	0.158	142.34	0.00	0.00	0.00	0.00	0.00	142.34	0.00	0.00	0.00	0.00	142.34	0.16
15:15	2.4	0.41	0.32	N/A	0.092	0.140	125.57	0.00	0.00	0.00	0.00	0.00	125.57	0.00	0.00	0.00	0.00	125.57	0.14
15:30	2.3	0.40	0.32	N/A	0.079	0.121	108.69	0.00	0.00	0.00	0.00	0.00	108.69	0.00	0.00	0.00	0.00	108.69	0.12
15:45	1.9	0.33	0.31	0.29	0.033	0.050	44.92	0.00	0.00	0.00	0.00	0.00	44.92	0.00	0.00	0.00	0.00	44.92	0.05
16:00	1.9	0.33	0.31	0.29	0.033	0.050	44.92	0.00	0.00	0.00	0.00	0.00	44.92	0.00	0.00	0.00	0.00	44.92	0.05
16:15	0.4	0.07	0.30	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
16:30	0.4	0.07	0.30	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
16:45	0.3	0.05	0.29	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
17:00	0.3	0.05	0.29	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
17:15	0.5	0.09	0.29	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
17:30	0.5	0.09	0.28	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
17:45	0.5	0.09	0.28	0.08	0.009	0.013	11.82	0.00	0.00	0.00	0.00	0.00	11.82	0.00	0.00	0.00	0.00	11.82	0.01
18:00	0.4	0.07	0.27	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
18:15	0.4	0.07	0.27	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
18:30	0.4	0.07	0.26	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
18:45	0.3	0.05	0.26	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
19:00	0.2	0.03	0.26	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
19:15	0.3	0.05	0.25	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
19:30	0.4	0.07	0.25	0.06	0.007	0.011	9.46	0.00	0.00	0.00	0.00	0.00	9.46	0.00	0.00	0.00	0.00	9.46	0.01
19:45	0.3	0.05	0.25	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
20:00	0.2	0.03	0.24	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
20:15	0.3	0.05	0.24	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
20:30	0.3	0.05	0.24	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
20:45	0.3	0.05	0.23	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
21:00	0.2	0.03	0.23	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
21:15	0.3	0.05	0.23	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
21:30	0.2	0.03	0.23	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
21:45	0.3	0.05	0.22	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
22:00	0.2	0.03	0.22	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
22:15	0.3	0.05	0.22	0.05	0.005	0.008	7.09	0.00	0.00	0.00	0.00	0.00	7.09	0.00	0.00	0.00	0.00	7.09	0.01
22:30	0.2	0.03	0.22	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
22:45	0.2	0.03	0.22	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
23:00	0.2	0.03	0.21	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
23:15	0.2	0.03	0.21	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
23:30	0.2	0.03	0.21	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
23:45	0.2	0.03	0.21	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
24:00	0.2	0.03	0.21	0.03	0.003	0.005	4.73	0.00	0.00	0.00	0.00	0.00	4.73	0.00	0.00	0.00	0.00	4.73	0.01
					Total volume (CF)		**3556.73**								**Total Overflow (CF)**			**3556.73**	

RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Pre-Development

Recurrence Interval	100	year			
Storm Duration (hrs)	1	3	6	24	
100-year NOAA Atlas 14 Point Precipitation (in)	1.920	2.570	3.460	6.730	
Unit time (minutes)	5	5	5	15	
Drainage Area	65819	SF	*1.511*	Ac.	
Soils Group	B				
AMC index Runoff Number (plate E-6.1)	65	Type:	Woodland, Grass; fair		
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.42	AMC II			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	0				
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.42*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	*90*				
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

100 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.85	0.42	N/A	0.432	0.659	197.68	0.00	0.00	0.00	0.00	0.00	197.68	0.00	0.00	0.00	0.00	197.68	0.66
0:10	4.8	1.11	0.42	N/A	0.686	1.045	313.52	0.00	0.00	0.00	0.00	0.00	313.52	0.00	0.00	0.00	0.00	313.52	1.05
0:15	5.1	1.18	0.42	N/A	0.755	1.150	345.11	0.00	0.00	0.00	0.00	0.00	345.11	0.00	0.00	0.00	0.00	345.11	1.15
0:20	4.9	1.13	0.42	N/A	0.709	1.080	324.05	0.00	0.00	0.00	0.00	0.00	324.05	0.00	0.00	0.00	0.00	324.05	1.08
0:25	6.6	1.52	0.42	N/A	1.101	1.677	503.08	0.00	0.00	0.00	0.00	0.00	503.08	0.00	0.00	0.00	0.00	503.08	1.68
0:30	7.3	1.68	0.42	N/A	1.262	1.923	576.79	0.00	0.00	0.00	0.00	0.00	576.79	0.00	0.00	0.00	0.00	576.79	1.92
0:35	8.4	1.94	0.42	N/A	1.515	2.309	692.64	0.00	0.00	0.00	0.00	0.00	692.64	0.00	0.00	0.00	0.00	692.64	2.31
0:40	9.0	2.07	0.42	N/A	1.654	2.519	755.82	0.00	0.00	0.00	0.00	0.00	755.82	0.00	0.00	0.00	0.00	755.82	2.52
0:45	12.3	2.83	0.42	N/A	2.414	3.678	1103.35	0.00	0.00	0.00	0.00	0.00	1103.35	0.00	0.00	0.00	0.00	1103.35	3.68
0:50	17.6	4.06	0.42	N/A	3.635	**5.538**	1661.49	0.00	0.00	0.00	0.00	0.00	1661.49	0.00	0.00	0.00	0.00	1661.49	5.54
0:55	16.1	3.71	0.42	N/A	3.289	5.012	1503.53	0.00	0.00	0.00	0.00	0.00	1503.53	0.00	0.00	0.00	0.00	1503.53	5.01
1:00	4.2	0.97	0.42	N/A	0.548	0.834	250.33	0.00	0.00	0.00	0.00	0.00	250.33	0.00	0.00	0.00	0.00	250.33	0.83
					Total volume (CF)		**8227.38**								**Total Overflow (CF)**			**8227.38**	

100 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.40	0.42	0.36	0.040	0.061	18.33	0.00	0.00	0.00	0.00	0.00	18.33	0.00	0.00	0.00	0.00	18.33	0.06
0:10	1.3	0.40	0.42	0.36	0.040	0.061	18.33	0.00	0.00	0.00	0.00	0.00	18.33	0.00	0.00	0.00	0.00	18.33	0.06
0:15	1.1	0.34	0.42	0.31	0.034	0.052	15.51	0.00	0.00	0.00	0.00	0.00	15.51	0.00	0.00	0.00	0.00	15.51	0.05
0:20	1.5	0.46	0.42	0.42	0.046	0.070	21.14	0.00	0.00	0.00	0.00	0.00	21.14	0.00	0.00	0.00	0.00	21.14	0.07
0:25	1.5	0.46	0.42	0.42	0.046	0.070	21.14	0.00	0.00	0.00	0.00	0.00	21.14	0.00	0.00	0.00	0.00	21.14	0.07
0:30	1.8	0.56	0.42	N/A	0.135	0.206	61.76	0.00	0.00	0.00	0.00	0.00	61.76	0.00	0.00	0.00	0.00	61.76	0.21
0:35	1.5	0.46	0.42	0.42	0.046	0.070	21.14	0.00	0.00	0.00	0.00	0.00	21.14	0.00	0.00	0.00	0.00	21.14	0.07
0:40	1.8	0.56	0.42	N/A	0.135	0.206	61.76	0.00	0.00	0.00	0.00	0.00	61.76	0.00	0.00	0.00	0.00	61.76	0.21
0:45	1.8	0.56	0.42	N/A	0.135	0.206	61.76	0.00	0.00	0.00	0.00	0.00	61.76	0.00	0.00	0.00	0.00	61.76	0.21
0:50	1.5	0.46	0.42	0.42	0.046	0.070	21.14	0.00	0.00	0.00	0.00	0.00	21.14	0.00	0.00	0.00	0.00	21.14	0.07
0:55	1.6	0.49	0.42	N/A	0.073	0.112	33.57	0.00	0.00	0.00	0.00	0.00	33.57	0.00	0.00	0.00	0.00	33.57	0.11
1:00	1.8	0.56	0.42	N/A	0.135	0.206	61.76	0.00	0.00	0.00	0.00	0.00	61.76	0.00	0.00	0.00	0.00	61.76	0.21
1:05	2.2	0.68	0.42	N/A	0.258	0.394	118.15	0.00	0.00	0.00	0.00	0.00	118.15	0.00	0.00	0.00	0.00	118.15	0.39
1:10	2.2	0.68	0.42	N/A	0.258	0.394	118.15	0.00	0.00	0.00	0.00	0.00	118.15	0.00	0.00	0.00	0.00	118.15	0.39
1:15	2.2	0.68	0.42	N/A	0.258	0.394	118.15	0.00	0.00	0.00	0.00	0.00	118.15	0.00	0.00	0.00	0.00	118.15	0.39
1:20	2.0	0.62	0.42	N/A	0.197	0.300	89.95	0.00	0.00	0.00	0.00	0.00	89.95	0.00	0.00	0.00	0.00	89.95	0.30
1:25	2.6	0.80	0.42	N/A	0.382	0.582	174.53	0.00	0.00	0.00	0.00	0.00	174.53	0.00	0.00	0.00	0.00	174.53	0.58
1:30	2.7	0.83	0.42	N/A	0.413	0.629	188.63	0.00	0.00	0.00	0.00	0.00	188.63	0.00	0.00	0.00	0.00	188.63	0.63
1:35	2.4	0.74	0.42	N/A	0.320	0.488	146.34	0.00	0.00	0.00	0.00	0.00	146.34	0.00	0.00	0.00	0.00	146.34	0.49
1:40	2.7	0.83	0.42	N/A	0.413	0.629	188.63	0.00	0.00	0.00	0.00	0.00	188.63	0.00	0.00	0.00	0.00	188.63	0.63
1:45	3.3	1.02	0.42	N/A	0.598	0.911	273.20	0.00	0.00	0.00	0.00	0.00	273.20	0.00	0.00	0.00	0.00	273.20	0.91
1:50	3.1	0.96	0.42	N/A	0.536	0.817	245.01	0.00	0.00	0.00	0.00	0.00	245.01	0.00	0.00	0.00	0.00	245.01	0.82
1:55	2.9	0.89	0.42	N/A	0.474	0.723	216.82	0.00	0.00	0.00	0.00	0.00	216.82	0.00	0.00	0.00	0.00	216.82	0.72
2:00	3.0	0.93	0.42	N/A	0.505	0.770	230.92	0.00	0.00	0.00	0.00	0.00	230.92	0.00	0.00	0.00	0.00	230.92	0.77
2:05	3.1	0.96	0.42	N/A	0.536	0.817	245.01	0.00	0.00	0.00	0.00	0.00	245.01	0.00	0.00	0.00	0.00	245.01	0.82
2:10	4.2	1.30	0.42	N/A	0.875	1.334	400.07	0.00	0.00	0.00	0.00	0.00	400.07	0.00	0.00	0.00	0.00	400.07	1.33
2:15	5.0	1.54	0.42	N/A	1.122	1.709	512.84	0.00	0.00	0.00	0.00	0.00	512.84	0.00	0.00	0.00	0.00	512.84	1.71
2:20	3.5	1.08	0.42	N/A	0.659	1.005	301.40	0.00	0.00	0.00	0.00	0.00	301.40	0.00	0.00	0.00	0.00	301.40	1.00
2:25	6.8	2.10	0.42	N/A	1.677	2.555	766.57	0.00	0.00	0.00	0.00	0.00	766.57	0.00	0.00	0.00	0.00	766.57	2.56
2:30	7.3	2.25	0.42	N/A	1.831	2.790	837.05	0.00	0.00	0.00	0.00	0.00	837.05	0.00	0.00	0.00	0.00	837.05	2.79
2:35	8.2	2.53	0.42	N/A	2.109	**3.213**	963.92	0.00	0.00	0.00	0.00	0.00	963.92	0.00	0.00	0.00	0.00	963.92	3.21
2:40	5.9	1.82	0.42	N/A	1.400	2.132	639.71	0.00	0.00	0.00	0.00	0.00	639.71	0.00	0.00	0.00	0.00	639.71	2.13
2:45	2.0	0.62	0.42	N/A	0.197	0.300	89.95	0.00	0.00	0.00	0.00	0.00	89.95	0.00	0.00	0.00	0.00	89.95	0.30
2:50	1.8	0.56	0.42	N/A	0.135	0.206	61.76	0.00	0.00	0.00	0.00	0.00	61.76	0.00	0.00	0.00	0.00	61.76	0.21
2:55	1.8	0.56	0.42	N/A	0.135	0.206	61.76	0.00	0.00	0.00	0.00	0.00	61.76	0.00	0.00	0.00	0.00	61.76	0.21
3:00	0.6	0.19	0.42	0.17	0.019	0.028	8.46	0.00	0.00	0.00	0.00	0.00	8.46	0.00	0.00	0.00	0.00	8.46	0.03
					Total volume (CF)		**7414.30**								**Total Overflow (CF)**			**7414.30**	

100 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.21	0.42	0.19	0.021	0.032	9.49	0.00	0.00	0.00	0.00	0.00	9.49	0.00	0.00	0.00	0.00	9.49	0.03
0:10	0.6	0.25	0.42	0.22	0.025	0.038	11.39	0.00	0.00	0.00	0.00	0.00	11.39	0.00	0.00	0.00	0.00	11.39	0.04
0:15	0.6	0.25	0.42	0.22	0.025	0.038	11.39	0.00	0.00	0.00	0.00	0.00	11.39	0.00	0.00	0.00	0.00	11.39	0.04
0:20	0.6	0.25	0.42	0.22	0.025	0.038	11.39	0.00	0.00	0.00	0.00	0.00	11.39	0.00	0.00	0.00	0.00	11.39	0.04
0:25	0.6	0.25	0.42	0.22	0.025	0.038	11.39	0.00	0.00	0.00	0.00	0.00	11.39	0.00	0.00	0.00	0.00	11.39	0.04
0:30	0.7	0.29	0.42	0.26	0.029	0.044	13.28	0.00	0.00	0.00	0.00	0.00	13.28	0.00	0.00	0.00	0.00	13.28	0.04
0:35	0.7	0.29	0.42	0.26	0.029	0.044	13.28	0.00	0.00	0.00	0.00	0.00	13.28	0.00	0.00	0.00	0.00	13.28	0.04
0:40	0.7	0.29	0.42	0.26	0.029	0.044	13.28	0.00	0.00	0.00	0.00	0.00	13.28	0.00	0.00	0.00	0.00	13.28	0.04
0:45	0.7	0.29	0.42	0.26	0.029	0.044	13.28	0.00	0.00	0.00	0.00	0.00	13.28	0.00	0.00	0.00	0.00	13.28	0.04
0:50	0.7	0.29	0.42	0.26	0.029	0.044	13.28	0.00	0.00	0.00	0.00	0.00	13.28	0.00	0.00	0.00	0.00	13.28	0.04
0:55	0.7	0.29	0.42	0.26	0.029	0.044	13.28	0.00	0.00	0.00	0.00	0.00	13.28	0.00	0.00	0.00	0.00	13.28	0.04
1:00	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:05	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:10	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:15	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:20	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:25	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:30	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:35	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:40	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:45	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:50	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
1:55	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
2:00	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:05	0.8	0.33	0.42	0.30	0.033	0.051	15.18	0.00	0.00	0.00	0.00	0.00	15.18	0.00	0.00	0.00	0.00	15.18	0.05
2:10	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:15	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:20	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:25	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:30	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:35	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:40	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
2:45	1.0	0.42	0.42	0.37	0.042	0.063	18.98	0.00	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	0.00	18.98	0.06
2:50	1.0	0.42	0.42	0.37	0.042	0.063	18.98	0.00	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	0.00	18.98	0.06
2:55	1.0	0.42	0.42	0.37	0.042	0.063	18.98	0.00	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	0.00	18.98	0.06
3:00	1.0	0.42	0.42	0.37	0.042	0.063	18.98	0.00	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	0.00	18.98	0.06
3:05	1.0	0.42	0.42	0.37	0.042	0.063	18.98	0.00	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	0.00	18.98	0.06
3:10	1.1	0.46	0.42	0.41	0.046	0.070	20.88	0.00	0.00	0.00	0.00	0.00	20.88	0.00	0.00	0.00	0.00	20.88	0.07
3:15	1.1	0.46	0.42	0.41	0.046	0.070	20.88	0.00	0.00	0.00	0.00	0.00	20.88	0.00	0.00	0.00	0.00	20.88	0.07
3:20	1.1	0.46	0.42	0.41	0.046	0.070	20.88	0.00	0.00	0.00	0.00	0.00	20.88	0.00	0.00	0.00	0.00	20.88	0.07
3:25	1.2	0.50	0.42	N/A	0.078	0.119	35.76	0.00	0.00	0.00	0.00	0.00	35.76	0.00	0.00	0.00	0.00	35.76	0.12
3:30	1.3	0.54	0.42	N/A	0.120	0.182	54.74	0.00	0.00	0.00	0.00	0.00	54.74	0.00	0.00	0.00	0.00	54.74	0.18
3:35	1.4	0.58	0.42	N/A	0.161	0.246	73.72	0.00	0.00	0.00	0.00	0.00	73.72	0.00	0.00	0.00	0.00	73.72	0.25
3:40	1.4	0.58	0.42	N/A	0.161	0.246	73.72	0.00	0.00	0.00	0.00	0.00	73.72	0.00	0.00	0.00	0.00	73.72	0.25
3:45	1.5	0.62	0.42	N/A	0.203	0.309	92.70	0.00	0.00	0.00	0.00	0.00	92.70	0.00	0.00	0.00	0.00	92.70	0.31
3:50	1.5	0.62	0.42	N/A	0.203	0.309	92.70	0.00	0.00	0.00	0.00	0.00	92.70	0.00	0.00	0.00	0.00	92.70	0.31
3:55	1.6	0.66	0.42	N/A	0.244	0.372	111.67	0.00	0.00	0.00	0.00	0.00	111.67	0.00	0.00	0.00	0.00	111.67	0.37
4:00	1.6	0.66	0.42	N/A	0.244	0.372	111.67	0.00	0.00	0.00	0.00	0.00	111.67	0.00	0.00	0.00	0.00	111.67	0.37
4:05	1.7	0.71	0.42	N/A	0.286	0.436	130.65	0.00	0.00	0.00	0.00	0.00	130.65	0.00	0.00	0.00	0.00	130.65	0.44

4:10	1.8	0.75	0.42	N/A	0.327	0.499	149.63	0.00	0.00	0.00	0.00	0.00	149.63	0.00	0.00	0.00	0.00	149.63	0.50
4:15	1.9	0.79	0.42	N/A	0.369	0.562	168.61	0.00	0.00	0.00	0.00	0.00	168.61	0.00	0.00	0.00	0.00	168.61	0.56
4:20	2.0	0.83	0.42	N/A	0.410	0.625	187.58	0.00	0.00	0.00	0.00	0.00	187.58	0.00	0.00	0.00	0.00	187.58	0.63
4:25	2.1	0.87	0.42	N/A	0.452	0.689	206.56	0.00	0.00	0.00	0.00	0.00	206.56	0.00	0.00	0.00	0.00	206.56	0.69
4:30	2.1	0.87	0.42	N/A	0.452	0.689	206.56	0.00	0.00	0.00	0.00	0.00	206.56	0.00	0.00	0.00	0.00	206.56	0.69
4:35	2.2	0.91	0.42	N/A	0.493	0.752	225.54	0.00	0.00	0.00	0.00	0.00	225.54	0.00	0.00	0.00	0.00	225.54	0.75
4:40	2.3	0.95	0.42	N/A	0.535	0.815	244.52	0.00	0.00	0.00	0.00	0.00	244.52	0.00	0.00	0.00	0.00	244.52	0.82
4:45	2.4	1.00	0.42	N/A	0.576	0.878	263.50	0.00	0.00	0.00	0.00	0.00	263.50	0.00	0.00	0.00	0.00	263.50	0.88
4:50	2.4	1.00	0.42	N/A	0.576	0.878	263.50	0.00	0.00	0.00	0.00	0.00	263.50	0.00	0.00	0.00	0.00	263.50	0.88
4:55	2.5	1.04	0.42	N/A	0.618	0.942	282.47	0.00	0.00	0.00	0.00	0.00	282.47	0.00	0.00	0.00	0.00	282.47	0.94
5:00	2.6	1.08	0.42	N/A	0.660	1.005	301.45	0.00	0.00	0.00	0.00	0.00	301.45	0.00	0.00	0.00	0.00	301.45	1.00
5:05	3.1	1.29	0.42	N/A	0.867	1.321	396.34	0.00	0.00	0.00	0.00	0.00	396.34	0.00	0.00	0.00	0.00	396.34	1.32
5:10	3.6	1.49	0.42	N/A	1.075	1.637	491.23	0.00	0.00	0.00	0.00	0.00	491.23	0.00	0.00	0.00	0.00	491.23	1.64
5:15	3.9	1.62	0.42	N/A	1.199	1.827	548.16	0.00	0.00	0.00	0.00	0.00	548.16	0.00	0.00	0.00	0.00	548.16	1.83
5:20	4.2	1.74	0.42	N/A	1.324	2.017	605.10	0.00	0.00	0.00	0.00	0.00	605.10	0.00	0.00	0.00	0.00	605.10	2.02
5:25	4.7	1.95	0.42	N/A	1.531	2.333	699.99	0.00	0.00	0.00	0.00	0.00	699.99	0.00	0.00	0.00	0.00	699.99	2.33
5:30	5.6	2.33	0.42	N/A	1.905	**2.903**	870.79	0.00	0.00	0.00	0.00	0.00	870.79	0.00	0.00	0.00	0.00	870.79	2.90
5:35	1.9	0.79	0.42	N/A	0.369	0.562	168.61	0.00	0.00	0.00	0.00	0.00	168.61	0.00	0.00	0.00	0.00	168.61	0.56
5:40	0.9	0.37	0.42	0.34	0.037	0.057	17.08	0.00	0.00	0.00	0.00	0.00	17.08	0.00	0.00	0.00	0.00	17.08	0.06
5:45	0.6	0.25	0.42	0.22	0.025	0.038	11.39	0.00	0.00	0.00	0.00	0.00	11.39	0.00	0.00	0.00	0.00	11.39	0.04
5:50	0.5	0.21	0.42	0.19	0.021	0.032	9.49	0.00	0.00	0.00	0.00	0.00	9.49	0.00	0.00	0.00	0.00	9.49	0.03
5:55	0.3	0.12	0.42	0.11	0.012	0.019	5.69	0.00	0.00	0.00	0.00	0.00	5.69	0.00	0.00	0.00	0.00	5.69	0.02
6:00	0.2	0.08	0.42	0.07	0.008	0.013	3.80	0.00	0.00	0.00	0.00	0.00	3.80	0.00	0.00	0.00	0.00	3.80	0.01
					Total volume (CF)		**7731.16**								**Total Overflow (CF)**			**7731.16**	

100 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.05	0.74	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
0:30	0.3	0.08	0.73	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
0:45	0.3	0.08	0.72	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
1:00	0.4	0.11	0.71	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
1:15	0.3	0.08	0.70	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
1:30	0.3	0.08	0.69	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
1:45	0.3	0.08	0.69	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
2:00	0.4	0.11	0.68	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
2:15	0.4	0.11	0.67	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
2:30	0.4	0.11	0.66	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
2:45	0.5	0.13	0.65	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
3:00	0.5	0.13	0.65	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
3:15	0.5	0.13	0.64	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
3:30	0.5	0.13	0.63	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
3:45	0.5	0.13	0.62	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
4:00	0.6	0.16	0.61	0.15	0.016	0.025	22.15	0.00	0.00	0.00	0.00	0.00	22.15	0.00	0.00	0.00	0.00	22.15	0.02
4:15	0.6	0.16	0.61	0.15	0.016	0.025	22.15	0.00	0.00	0.00	0.00	0.00	22.15	0.00	0.00	0.00	0.00	22.15	0.02
4:30	0.7	0.19	0.60	0.17	0.019	0.029	25.84	0.00	0.00	0.00	0.00	0.00	25.84	0.00	0.00	0.00	0.00	25.84	0.03
4:45	0.7	0.19	0.59	0.17	0.019	0.029	25.84	0.00	0.00	0.00	0.00	0.00	25.84	0.00	0.00	0.00	0.00	25.84	0.03
5:00	0.8	0.22	0.58	0.19	0.022	0.033	29.53	0.00	0.00	0.00	0.00	0.00	29.53	0.00	0.00	0.00	0.00	29.53	0.03
5:15	0.6	0.16	0.58	0.15	0.016	0.025	22.15	0.00	0.00	0.00	0.00	0.00	22.15	0.00	0.00	0.00	0.00	22.15	0.02
5:30	0.7	0.19	0.57	0.17	0.019	0.029	25.84	0.00	0.00	0.00	0.00	0.00	25.84	0.00	0.00	0.00	0.00	25.84	0.03
5:45	0.8	0.22	0.56	0.19	0.022	0.033	29.53	0.00	0.00	0.00	0.00	0.00	29.53	0.00	0.00	0.00	0.00	29.53	0.03
6:00	0.8	0.22	0.55	0.19	0.022	0.033	29.53	0.00	0.00	0.00	0.00	0.00	29.53	0.00	0.00	0.00	0.00	29.53	0.03
6:15	0.9	0.24	0.55	0.22	0.024	0.037	33.22	0.00	0.00	0.00	0.00	0.00	33.22	0.00	0.00	0.00	0.00	33.22	0.04
6:30	0.9	0.24	0.54	0.22	0.024	0.037	33.22	0.00	0.00	0.00	0.00	0.00	33.22	0.00	0.00	0.00	0.00	33.22	0.04
6:45	1.0	0.27	0.53	0.24	0.027	0.041	36.91	0.00	0.00	0.00	0.00	0.00	36.91	0.00	0.00	0.00	0.00	36.91	0.04
7:00	1.0	0.27	0.52	0.24	0.027	0.041	36.91	0.00	0.00	0.00	0.00	0.00	36.91	0.00	0.00	0.00	0.00	36.91	0.04
7:15	1.0	0.27	0.52	0.24	0.027	0.041	36.91	0.00	0.00	0.00	0.00	0.00	36.91	0.00	0.00	0.00	0.00	36.91	0.04
7:30	1.1	0.30	0.51	0.27	0.030	0.045	40.60	0.00	0.00	0.00	0.00	0.00	40.60	0.00	0.00	0.00	0.00	40.60	0.05
7:45	1.2	0.32	0.50	0.29	0.032	0.049	44.30	0.00	0.00	0.00	0.00	0.00	44.30	0.00	0.00	0.00	0.00	44.30	0.05
8:00	1.3	0.35	0.50	0.31	0.035	0.053	47.99	0.00	0.00	0.00	0.00	0.00	47.99	0.00	0.00	0.00	0.00	47.99	0.05
8:15	1.5	0.40	0.49	0.36	0.040	0.062	55.37	0.00	0.00	0.00	0.00	0.00	55.37	0.00	0.00	0.00	0.00	55.37	0.06
8:30	1.5	0.40	0.48	0.36	0.040	0.062	55.37	0.00	0.00	0.00	0.00	0.00	55.37	0.00	0.00	0.00	0.00	55.37	0.06
8:45	1.6	0.43	0.48	0.39	0.043	0.066	59.06	0.00	0.00	0.00	0.00	0.00	59.06	0.00	0.00	0.00	0.00	59.06	0.07
9:00	1.7	0.46	0.47	0.41	0.046	0.070	62.75	0.00	0.00	0.00	0.00	0.00	62.75	0.00	0.00	0.00	0.00	62.75	0.07
9:15	1.9	0.51	0.46	0.46	0.051	0.078	70.14	0.00	0.00	0.00	0.00	0.00	70.14	0.00	0.00	0.00	0.00	70.14	0.08
9:30	2.0	0.54	0.46	N/A	0.083	0.126	113.76	0.00	0.00	0.00	0.00	0.00	113.76	0.00	0.00	0.00	0.00	113.76	0.13
9:45	2.1	0.57	0.45	N/A	0.116	0.177	159.62	0.00	0.00	0.00	0.00	0.00	159.62	0.00	0.00	0.00	0.00	159.62	0.18
10:00	2.2	0.59	0.44	N/A	0.150	0.228	205.40	0.00	0.00	0.00	0.00	0.00	205.40	0.00	0.00	0.00	0.00	205.40	0.23
10:15	1.5	0.40	0.44	0.36	0.040	0.062	55.37	0.00	0.00	0.00	0.00	0.00	55.37	0.00	0.00	0.00	0.00	55.37	0.06
10:30	1.5	0.40	0.43	0.36	0.040	0.062	55.37	0.00	0.00	0.00	0.00	0.00	55.37	0.00	0.00	0.00	0.00	55.37	0.06
10:45	2.0	0.54	0.42	N/A	0.115	0.175	157.65	0.00	0.00	0.00	0.00	0.00	157.65	0.00	0.00	0.00	0.00	157.65	0.18
11:00	2.0	0.54	0.42	N/A	0.121	0.185	166.16	0.00	0.00	0.00	0.00	0.00	166.16	0.00	0.00	0.00	0.00	166.16	0.18
11:15	1.9	0.51	0.41	N/A	0.100	0.153	137.67	0.00	0.00	0.00	0.00	0.00	137.67	0.00	0.00	0.00	0.00	137.67	0.15
11:30	1.9	0.51	0.41	N/A	0.106	0.162	146.01	0.00	0.00	0.00	0.00	0.00	146.01	0.00	0.00	0.00	0.00	146.01	0.16
11:45	1.7	0.46	0.40	N/A	0.059	0.089	80.42	0.00	0.00	0.00	0.00	0.00	80.42	0.00	0.00	0.00	0.00	80.42	0.09
12:00	1.8	0.48	0.39	N/A	0.092	0.139	125.49	0.00	0.00	0.00	0.00	0.00	125.49	0.00	0.00	0.00	0.00	125.49	0.14
12:15	2.5	0.67	0.39	N/A	0.286	0.435	391.94	0.00	0.00	0.00	0.00	0.00	391.94	0.00	0.00	0.00	0.00	391.94	0.44

12:30	2.6	0.70	0.38	N/A	0.319	0.485	436.82	0.00	0.00	0.00	0.00	0.00	436.82	0.00	0.00	0.00	0.00	436.82	0.49
12:45	2.8	0.75	0.38	N/A	0.378	0.576	518.52	0.00	0.00	0.00	0.00	0.00	518.52	0.00	0.00	0.00	0.00	518.52	0.58
13:00	2.9	0.78	0.37	N/A	0.411	0.626	563.21	0.00	0.00	0.00	0.00	0.00	563.21	0.00	0.00	0.00	0.00	563.21	0.63
13:15	3.4	0.92	0.36	N/A	0.551	0.839	755.45	0.00	0.00	0.00	0.00	0.00	755.45	0.00	0.00	0.00	0.00	755.45	0.84
13:30	3.4	0.92	0.36	N/A	0.556	**0.848**	763.03	0.00	0.00	0.00	0.00	0.00	763.03	0.00	0.00	0.00	0.00	763.03	0.85
13:45	2.3	0.62	0.35	N/A	0.266	0.405	364.46	0.00	0.00	0.00	0.00	0.00	364.46	0.00	0.00	0.00	0.00	364.46	0.40
14:00	2.3	0.62	0.35	N/A	0.271	0.413	371.85	0.00	0.00	0.00	0.00	0.00	371.85	0.00	0.00	0.00	0.00	371.85	0.41
14:15	2.7	0.73	0.34	N/A	0.384	0.585	526.78	0.00	0.00	0.00	0.00	0.00	526.78	0.00	0.00	0.00	0.00	526.78	0.59
14:30	2.6	0.70	0.34	N/A	0.362	0.552	497.05	0.00	0.00	0.00	0.00	0.00	497.05	0.00	0.00	0.00	0.00	497.05	0.55
14:45	2.6	0.70	0.33	N/A	0.368	0.560	504.12	0.00	0.00	0.00	0.00	0.00	504.12	0.00	0.00	0.00	0.00	504.12	0.56
15:00	2.5	0.67	0.33	N/A	0.346	0.527	474.18	0.00	0.00	0.00	0.00	0.00	474.18	0.00	0.00	0.00	0.00	474.18	0.53
15:15	2.4	0.65	0.32	N/A	0.324	0.493	444.13	0.00	0.00	0.00	0.00	0.00	444.13	0.00	0.00	0.00	0.00	444.13	0.49
15:30	2.3	0.62	0.32	N/A	0.302	0.460	413.98	0.00	0.00	0.00	0.00	0.00	413.98	0.00	0.00	0.00	0.00	413.98	0.46
15:45	1.9	0.51	0.31	N/A	0.199	0.303	272.98	0.00	0.00	0.00	0.00	0.00	272.98	0.00	0.00	0.00	0.00	272.98	0.30
16:00	1.9	0.51	0.31	N/A	0.204	0.311	279.52	0.00	0.00	0.00	0.00	0.00	279.52	0.00	0.00	0.00	0.00	279.52	0.31
16:15	0.4	0.11	0.30	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
16:30	0.4	0.11	0.30	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
16:45	0.3	0.08	0.29	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
17:00	0.3	0.08	0.29	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
17:15	0.5	0.13	0.29	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
17:30	0.5	0.13	0.28	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
17:45	0.5	0.13	0.28	0.12	0.013	0.021	18.46	0.00	0.00	0.00	0.00	0.00	18.46	0.00	0.00	0.00	0.00	18.46	0.02
18:00	0.4	0.11	0.27	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
18:15	0.4	0.11	0.27	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
18:30	0.4	0.11	0.26	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
18:45	0.3	0.08	0.26	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
19:00	0.2	0.05	0.26	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
19:15	0.3	0.08	0.25	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
19:30	0.4	0.11	0.25	0.10	0.011	0.016	14.77	0.00	0.00	0.00	0.00	0.00	14.77	0.00	0.00	0.00	0.00	14.77	0.02
19:45	0.3	0.08	0.25	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
20:00	0.2	0.05	0.24	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
20:15	0.3	0.08	0.24	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
20:30	0.3	0.08	0.24	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
20:45	0.3	0.08	0.23	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
21:00	0.2	0.05	0.23	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
21:15	0.3	0.08	0.23	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
21:30	0.2	0.05	0.23	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
21:45	0.3	0.08	0.22	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
22:00	0.2	0.05	0.22	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
22:15	0.3	0.08	0.22	0.07	0.008	0.012	11.07	0.00	0.00	0.00	0.00	0.00	11.07	0.00	0.00	0.00	0.00	11.07	0.01
22:30	0.2	0.05	0.22	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
22:45	0.2	0.05	0.22	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
23:00	0.2	0.05	0.21	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
23:15	0.2	0.05	0.21	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
23:30	0.2	0.05	0.21	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
23:45	0.2	0.05	0.21	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
24:00	0.2	0.05	0.21	0.05	0.005	0.008	7.38	0.00	0.00	0.00	0.00	0.00	7.38	0.00	0.00	0.00	0.00	7.38	0.01
					Total volume (CF)		**10394.72**								**Total Overflow (CF)**			**10394.72**	

RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Post-Development

Recurrence Interval	2	year			
Storm Duration (hrs)	1	3	6	24	
2-year NOAA Atlas 14 Point Precipitation (in)	0.600	0.995	1.440	2.780	
Unit time (minutes)	5	5	5	15	
Drainage Area	65819	SF	*1.511*	Ac.	
Soils Group	B				
AMC index Runoff Number (plate E-6.1)	56	Type:	Urban Covers; good		
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.70	AMC I			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	84				
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.17*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	*23*				
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

2 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.27	0.17	0.06	0.206	0.314	94.18	0.00	0.00	0.00	0.00	0.00	94.18	0.00	0.00	0.00	0.00	94.18	0.31
0:10	4.8	0.35	0.17	0.08	0.267	0.407	122.18	0.00	0.00	0.00	0.00	0.00	122.18	0.00	0.00	0.00	0.00	122.18	0.41
0:15	5.1	0.37	0.17	0.08	0.284	0.433	129.81	0.00	0.00	0.00	0.00	0.00	129.81	0.00	0.00	0.00	0.00	129.81	0.43
0:20	4.9	0.35	0.17	0.08	0.273	0.416	124.72	0.00	0.00	0.00	0.00	0.00	124.72	0.00	0.00	0.00	0.00	124.72	0.42
0:25	6.6	0.48	0.17	0.11	0.368	0.560	167.99	0.00	0.00	0.00	0.00	0.00	167.99	0.00	0.00	0.00	0.00	167.99	0.56
0:30	7.3	0.53	0.17	0.12	0.407	0.619	185.81	0.00	0.00	0.00	0.00	0.00	185.81	0.00	0.00	0.00	0.00	185.81	0.62
0:35	8.4	0.60	0.17	0.14	0.468	0.713	213.81	0.00	0.00	0.00	0.00	0.00	213.81	0.00	0.00	0.00	0.00	213.81	0.71
0:40	9.0	0.65	0.17	0.15	0.501	0.764	229.08	0.00	0.00	0.00	0.00	0.00	229.08	0.00	0.00	0.00	0.00	229.08	0.76
0:45	12.3	0.89	0.17	N/A	0.716	1.091	327.24	0.00	0.00	0.00	0.00	0.00	327.24	0.00	0.00	0.00	0.00	327.24	1.09
0:50	17.6	1.27	0.17	N/A	1.098	**1.672**	501.66	0.00	0.00	0.00	0.00	0.00	501.66	0.00	0.00	0.00	0.00	501.66	1.67
0:55	16.1	1.16	0.17	N/A	0.990	1.508	452.29	0.00	0.00	0.00	0.00	0.00	452.29	0.00	0.00	0.00	0.00	452.29	1.51
1:00	4.2	0.30	0.17	0.07	0.234	0.356	106.90	0.00	0.00	0.00	0.00	0.00	106.90	0.00	0.00	0.00	0.00	106.90	0.36
					Total volume (CF)		**2655.68**								**Total Overflow (CF)**			**2655.68**	

2 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.16	0.17	0.04	0.120	0.183	54.87	0.00	0.00	0.00	0.00	0.00	54.87	0.00	0.00	0.00	0.00	54.87	0.18
0:10	1.3	0.16	0.17	0.04	0.120	0.183	54.87	0.00	0.00	0.00	0.00	0.00	54.87	0.00	0.00	0.00	0.00	54.87	0.18
0:15	1.1	0.13	0.17	0.03	0.102	0.155	46.43	0.00	0.00	0.00	0.00	0.00	46.43	0.00	0.00	0.00	0.00	46.43	0.15
0:20	1.5	0.18	0.17	0.04	0.139	0.211	63.32	0.00	0.00	0.00	0.00	0.00	63.32	0.00	0.00	0.00	0.00	63.32	0.21
0:25	1.5	0.18	0.17	0.04	0.139	0.211	63.32	0.00	0.00	0.00	0.00	0.00	63.32	0.00	0.00	0.00	0.00	63.32	0.21
0:30	1.8	0.21	0.17	0.05	0.166	0.253	75.98	0.00	0.00	0.00	0.00	0.00	75.98	0.00	0.00	0.00	0.00	75.98	0.25
0:35	1.5	0.18	0.17	0.04	0.139	0.211	63.32	0.00	0.00	0.00	0.00	0.00	63.32	0.00	0.00	0.00	0.00	63.32	0.21
0:40	1.8	0.21	0.17	0.05	0.166	0.253	75.98	0.00	0.00	0.00	0.00	0.00	75.98	0.00	0.00	0.00	0.00	75.98	0.25
0:45	1.8	0.21	0.17	0.05	0.166	0.253	75.98	0.00	0.00	0.00	0.00	0.00	75.98	0.00	0.00	0.00	0.00	75.98	0.25
0:50	1.5	0.18	0.17	0.04	0.139	0.211	63.32	0.00	0.00	0.00	0.00	0.00	63.32	0.00	0.00	0.00	0.00	63.32	0.21
0:55	1.6	0.19	0.17	0.04	0.148	0.225	67.54	0.00	0.00	0.00	0.00	0.00	67.54	0.00	0.00	0.00	0.00	67.54	0.23
1:00	1.8	0.21	0.17	0.05	0.166	0.253	75.98	0.00	0.00	0.00	0.00	0.00	75.98	0.00	0.00	0.00	0.00	75.98	0.25
1:05	2.2	0.26	0.17	0.06	0.203	0.310	92.86	0.00	0.00	0.00	0.00	0.00	92.86	0.00	0.00	0.00	0.00	92.86	0.31
1:10	2.2	0.26	0.17	0.06	0.203	0.310	92.86	0.00	0.00	0.00	0.00	0.00	92.86	0.00	0.00	0.00	0.00	92.86	0.31
1:15	2.2	0.26	0.17	0.06	0.203	0.310	92.86	0.00	0.00	0.00	0.00	0.00	92.86	0.00	0.00	0.00	0.00	92.86	0.31
1:20	2.0	0.24	0.17	0.05	0.185	0.281	84.42	0.00	0.00	0.00	0.00	0.00	84.42	0.00	0.00	0.00	0.00	84.42	0.28
1:25	2.6	0.31	0.17	0.07	0.240	0.366	109.75	0.00	0.00	0.00	0.00	0.00	109.75	0.00	0.00	0.00	0.00	109.75	0.37
1:30	2.7	0.32	0.17	0.07	0.249	0.380	113.97	0.00	0.00	0.00	0.00	0.00	113.97	0.00	0.00	0.00	0.00	113.97	0.38
1:35	2.4	0.29	0.17	0.06	0.222	0.338	101.31	0.00	0.00	0.00	0.00	0.00	101.31	0.00	0.00	0.00	0.00	101.31	0.34
1:40	2.7	0.32	0.17	0.07	0.249	0.380	113.97	0.00	0.00	0.00	0.00	0.00	113.97	0.00	0.00	0.00	0.00	113.97	0.38
1:45	3.3	0.39	0.17	0.09	0.305	0.464	139.29	0.00	0.00	0.00	0.00	0.00	139.29	0.00	0.00	0.00	0.00	139.29	0.46
1:50	3.1	0.37	0.17	0.08	0.286	0.436	130.85	0.00	0.00	0.00	0.00	0.00	130.85	0.00	0.00	0.00	0.00	130.85	0.44
1:55	2.9	0.35	0.17	0.08	0.268	0.408	122.41	0.00	0.00	0.00	0.00	0.00	122.41	0.00	0.00	0.00	0.00	122.41	0.41
2:00	3.0	0.36	0.17	0.08	0.277	0.422	126.63	0.00	0.00	0.00	0.00	0.00	126.63	0.00	0.00	0.00	0.00	126.63	0.42
2:05	3.1	0.37	0.17	0.08	0.286	0.436	130.85	0.00	0.00	0.00	0.00	0.00	130.85	0.00	0.00	0.00	0.00	130.85	0.44
2:10	4.2	0.50	0.17	0.11	0.388	0.591	177.28	0.00	0.00	0.00	0.00	0.00	177.28	0.00	0.00	0.00	0.00	177.28	0.59
2:15	5.0	0.60	0.17	0.14	0.462	0.704	211.05	0.00	0.00	0.00	0.00	0.00	211.05	0.00	0.00	0.00	0.00	211.05	0.70
2:20	3.5	0.42	0.17	0.09	0.323	0.492	147.74	0.00	0.00	0.00	0.00	0.00	147.74	0.00	0.00	0.00	0.00	147.74	0.49
2:25	6.8	0.81	0.17	N/A	0.642	0.979	293.56	0.00	0.00	0.00	0.00	0.00	293.56	0.00	0.00	0.00	0.00	293.56	0.98
2:30	7.3	0.87	0.17	N/A	0.702	1.069	320.85	0.00	0.00	0.00	0.00	0.00	320.85	0.00	0.00	0.00	0.00	320.85	1.07
2:35	8.2	0.98	0.17	N/A	0.809	**1.233**	369.96	0.00	0.00	0.00	0.00	0.00	369.96	0.00	0.00	0.00	0.00	369.96	1.23
2:40	5.9	0.70	0.17	0.16	0.545	0.830	249.04	0.00	0.00	0.00	0.00	0.00	249.04	0.00	0.00	0.00	0.00	249.04	0.83
2:45	2.0	0.24	0.17	0.05	0.185	0.281	84.42	0.00	0.00	0.00	0.00	0.00	84.42	0.00	0.00	0.00	0.00	84.42	0.28
2:50	1.8	0.21	0.17	0.05	0.166	0.253	75.98	0.00	0.00	0.00	0.00	0.00	75.98	0.00	0.00	0.00	0.00	75.98	0.25
2:55	1.8	0.21	0.17	0.05	0.166	0.253	75.98	0.00	0.00	0.00	0.00	0.00	75.98	0.00	0.00	0.00	0.00	75.98	0.25
3:00	0.6	0.07	0.17	0.02	0.055	0.084	25.33	0.00	0.00	0.00	0.00	0.00	25.33	0.00	0.00	0.00	0.00	25.33	0.08
					Total volume (CF)		**4264.12**								**Total Overflow (CF)**			**4264.12**	

2 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.09	0.17	0.02	0.067	0.102	30.54	0.00	0.00	0.00	0.00	0.00	30.54	0.00	0.00	0.00	0.00	30.54	0.10
0:10	0.6	0.10	0.17	0.02	0.080	0.122	36.65	0.00	0.00	0.00	0.00	0.00	36.65	0.00	0.00	0.00	0.00	36.65	0.12
0:15	0.6	0.10	0.17	0.02	0.080	0.122	36.65	0.00	0.00	0.00	0.00	0.00	36.65	0.00	0.00	0.00	0.00	36.65	0.12
0:20	0.6	0.10	0.17	0.02	0.080	0.122	36.65	0.00	0.00	0.00	0.00	0.00	36.65	0.00	0.00	0.00	0.00	36.65	0.12
0:25	0.6	0.10	0.17	0.02	0.080	0.122	36.65	0.00	0.00	0.00	0.00	0.00	36.65	0.00	0.00	0.00	0.00	36.65	0.12
0:30	0.7	0.12	0.17	0.03	0.094	0.143	42.76	0.00	0.00	0.00	0.00	0.00	42.76	0.00	0.00	0.00	0.00	42.76	0.14
0:35	0.7	0.12	0.17	0.03	0.094	0.143	42.76	0.00	0.00	0.00	0.00	0.00	42.76	0.00	0.00	0.00	0.00	42.76	0.14
0:40	0.7	0.12	0.17	0.03	0.094	0.143	42.76	0.00	0.00	0.00	0.00	0.00	42.76	0.00	0.00	0.00	0.00	42.76	0.14
0:45	0.7	0.12	0.17	0.03	0.094	0.143	42.76	0.00	0.00	0.00	0.00	0.00	42.76	0.00	0.00	0.00	0.00	42.76	0.14
0:50	0.7	0.12	0.17	0.03	0.094	0.143	42.76	0.00	0.00	0.00	0.00	0.00	42.76	0.00	0.00	0.00	0.00	42.76	0.14
0:55	0.7	0.12	0.17	0.03	0.094	0.143	42.76	0.00	0.00	0.00	0.00	0.00	42.76	0.00	0.00	0.00	0.00	42.76	0.14
1:00	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:05	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:10	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:15	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:20	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:25	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:30	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:35	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:40	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:45	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:50	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
1:55	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
2:00	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:05	0.8	0.14	0.17	0.03	0.107	0.163	48.87	0.00	0.00	0.00	0.00	0.00	48.87	0.00	0.00	0.00	0.00	48.87	0.16
2:10	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:15	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:20	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:25	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:30	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:35	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:40	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
2:45	1.0	0.17	0.17	0.04	0.134	0.204	61.09	0.00	0.00	0.00	0.00	0.00	61.09	0.00	0.00	0.00	0.00	61.09	0.20
2:50	1.0	0.17	0.17	0.04	0.134	0.204	61.09	0.00	0.00	0.00	0.00	0.00	61.09	0.00	0.00	0.00	0.00	61.09	0.20
2:55	1.0	0.17	0.17	0.04	0.134	0.204	61.09	0.00	0.00	0.00	0.00	0.00	61.09	0.00	0.00	0.00	0.00	61.09	0.20
3:00	1.0	0.17	0.17	0.04	0.134	0.204	61.09	0.00	0.00	0.00	0.00	0.00	61.09	0.00	0.00	0.00	0.00	61.09	0.20
3:05	1.0	0.17	0.17	0.04	0.134	0.204	61.09	0.00	0.00	0.00	0.00	0.00	61.09	0.00	0.00	0.00	0.00	61.09	0.20
3:10	1.1	0.19	0.17	0.04	0.147	0.224	67.20	0.00	0.00	0.00	0.00	0.00	67.20	0.00	0.00	0.00	0.00	67.20	0.22
3:15	1.1	0.19	0.17	0.04	0.147	0.224	67.20	0.00	0.00	0.00	0.00	0.00	67.20	0.00	0.00	0.00	0.00	67.20	0.22
3:20	1.1	0.19	0.17	0.04	0.147	0.224	67.20	0.00	0.00	0.00	0.00	0.00	67.20	0.00	0.00	0.00	0.00	67.20	0.22
3:25	1.2	0.21	0.17	0.05	0.160	0.244	73.31	0.00	0.00	0.00	0.00	0.00	73.31	0.00	0.00	0.00	0.00	73.31	0.24
3:30	1.3	0.22	0.17	0.05	0.174	0.265	79.42	0.00	0.00	0.00	0.00	0.00	79.42	0.00	0.00	0.00	0.00	79.42	0.26
3:35	1.4	0.24	0.17	0.05	0.187	0.285	85.52	0.00	0.00	0.00	0.00	0.00	85.52	0.00	0.00	0.00	0.00	85.52	0.29
3:40	1.4	0.24	0.17	0.05	0.187	0.285	85.52	0.00	0.00	0.00	0.00	0.00	85.52	0.00	0.00	0.00	0.00	85.52	0.29
3:45	1.5	0.26	0.17	0.06	0.200	0.305	91.63	0.00	0.00	0.00	0.00	0.00	91.63	0.00	0.00	0.00	0.00	91.63	0.31
3:50	1.5	0.26	0.17	0.06	0.200	0.305	91.63	0.00	0.00	0.00	0.00	0.00	91.63	0.00	0.00	0.00	0.00	91.63	0.31
3:55	1.6	0.28	0.17	0.06	0.214	0.326	97.74	0.00	0.00	0.00	0.00	0.00	97.74	0.00	0.00	0.00	0.00	97.74	0.33
4:00	1.6	0.28	0.17	0.06	0.214	0.326	97.74	0.00	0.00	0.00	0.00	0.00	97.74	0.00	0.00	0.00	0.00	97.74	0.33
4:05	1.7	0.29	0.17	0.07	0.227	0.346	103.85	0.00	0.00	0.00	0.00	0.00	103.85	0.00	0.00	0.00	0.00	103.85	0.35

4:10	1.8	0.31	0.17	0.07	0.241	0.367	109.96	0.00	0.00	0.00	0.00	0.00	109.96	0.00	0.00	0.00	0.00	109.96	0.37
4:15	1.9	0.33	0.17	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
4:20	2.0	0.35	0.17	0.08	0.267	0.407	122.18	0.00	0.00	0.00	0.00	0.00	122.18	0.00	0.00	0.00	0.00	122.18	0.41
4:25	2.1	0.36	0.17	0.08	0.281	0.428	128.29	0.00	0.00	0.00	0.00	0.00	128.29	0.00	0.00	0.00	0.00	128.29	0.43
4:30	2.1	0.36	0.17	0.08	0.281	0.428	128.29	0.00	0.00	0.00	0.00	0.00	128.29	0.00	0.00	0.00	0.00	128.29	0.43
4:35	2.2	0.38	0.17	0.09	0.294	0.448	134.39	0.00	0.00	0.00	0.00	0.00	134.39	0.00	0.00	0.00	0.00	134.39	0.45
4:40	2.3	0.40	0.17	0.09	0.307	0.468	140.50	0.00	0.00	0.00	0.00	0.00	140.50	0.00	0.00	0.00	0.00	140.50	0.47
4:45	2.4	0.41	0.17	0.09	0.321	0.489	146.61	0.00	0.00	0.00	0.00	0.00	146.61	0.00	0.00	0.00	0.00	146.61	0.49
4:50	2.4	0.41	0.17	0.09	0.321	0.489	146.61	0.00	0.00	0.00	0.00	0.00	146.61	0.00	0.00	0.00	0.00	146.61	0.49
4:55	2.5	0.43	0.17	0.10	0.334	0.509	152.72	0.00	0.00	0.00	0.00	0.00	152.72	0.00	0.00	0.00	0.00	152.72	0.51
5:00	2.6	0.45	0.17	0.10	0.347	0.529	158.83	0.00	0.00	0.00	0.00	0.00	158.83	0.00	0.00	0.00	0.00	158.83	0.53
5:05	3.1	0.54	0.17	0.12	0.414	0.631	189.37	0.00	0.00	0.00	0.00	0.00	189.37	0.00	0.00	0.00	0.00	189.37	0.63
5:10	3.6	0.62	0.17	0.14	0.481	0.733	219.92	0.00	0.00	0.00	0.00	0.00	219.92	0.00	0.00	0.00	0.00	219.92	0.73
5:15	3.9	0.67	0.17	0.15	0.521	0.794	238.25	0.00	0.00	0.00	0.00	0.00	238.25	0.00	0.00	0.00	0.00	238.25	0.79
5:20	4.2	0.73	0.17	0.16	0.561	0.855	256.57	0.00	0.00	0.00	0.00	0.00	256.57	0.00	0.00	0.00	0.00	256.57	0.86
5:25	4.7	0.81	0.17	N/A	0.642	0.979	293.67	0.00	0.00	0.00	0.00	0.00	293.67	0.00	0.00	0.00	0.00	293.67	0.98
5:30	5.6	0.97	0.17	N/A	0.798	**1.216**	364.75	0.00	0.00	0.00	0.00	0.00	364.75	0.00	0.00	0.00	0.00	364.75	1.22
5:35	1.9	0.33	0.17	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
5:40	0.9	0.16	0.17	0.04	0.120	0.183	54.98	0.00	0.00	0.00	0.00	0.00	54.98	0.00	0.00	0.00	0.00	54.98	0.18
5:45	0.6	0.10	0.17	0.02	0.080	0.122	36.65	0.00	0.00	0.00	0.00	0.00	36.65	0.00	0.00	0.00	0.00	36.65	0.12
5:50	0.5	0.09	0.17	0.02	0.067	0.102	30.54	0.00	0.00	0.00	0.00	0.00	30.54	0.00	0.00	0.00	0.00	30.54	0.10
5:55	0.3	0.05	0.17	0.01	0.040	0.061	18.33	0.00	0.00	0.00	0.00	0.00	18.33	0.00	0.00	0.00	0.00	18.33	0.06
6:00	0.2	0.03	0.17	0.01	0.027	0.041	12.22	0.00	0.00	0.00	0.00	0.00	12.22	0.00	0.00	0.00	0.00	12.22	0.04
					Total volume (CF)		**6138.06**								**Total Overflow (CF)**			**6138.06**	

2 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.02	0.30	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
0:30	0.3	0.03	0.29	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
0:45	0.3	0.03	0.29	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
1:00	0.4	0.04	0.29	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
1:15	0.3	0.03	0.28	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
1:30	0.3	0.03	0.28	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
1:45	0.3	0.03	0.28	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
2:00	0.4	0.04	0.27	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
2:15	0.4	0.04	0.27	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
2:30	0.4	0.04	0.27	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
2:45	0.5	0.06	0.26	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
3:00	0.5	0.06	0.26	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
3:15	0.5	0.06	0.26	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
3:30	0.5	0.06	0.25	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
3:45	0.5	0.06	0.25	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
4:00	0.6	0.07	0.25	0.02	0.052	0.079	70.76	0.00	0.00	0.00	0.00	0.00	70.76	0.00	0.00	0.00	0.00	70.76	0.08
4:15	0.6	0.07	0.24	0.02	0.052	0.079	70.76	0.00	0.00	0.00	0.00	0.00	70.76	0.00	0.00	0.00	0.00	70.76	0.08
4:30	0.7	0.08	0.24	0.02	0.060	0.092	82.55	0.00	0.00	0.00	0.00	0.00	82.55	0.00	0.00	0.00	0.00	82.55	0.09
4:45	0.7	0.08	0.24	0.02	0.060	0.092	82.55	0.00	0.00	0.00	0.00	0.00	82.55	0.00	0.00	0.00	0.00	82.55	0.09
5:00	0.8	0.09	0.24	0.02	0.069	0.105	94.35	0.00	0.00	0.00	0.00	0.00	94.35	0.00	0.00	0.00	0.00	94.35	0.10
5:15	0.6	0.07	0.23	0.02	0.052	0.079	70.76	0.00	0.00	0.00	0.00	0.00	70.76	0.00	0.00	0.00	0.00	70.76	0.08
5:30	0.7	0.08	0.23	0.02	0.060	0.092	82.55	0.00	0.00	0.00	0.00	0.00	82.55	0.00	0.00	0.00	0.00	82.55	0.09
5:45	0.8	0.09	0.23	0.02	0.069	0.105	94.35	0.00	0.00	0.00	0.00	0.00	94.35	0.00	0.00	0.00	0.00	94.35	0.10
6:00	0.8	0.09	0.22	0.02	0.069	0.105	94.35	0.00	0.00	0.00	0.00	0.00	94.35	0.00	0.00	0.00	0.00	94.35	0.10
6:15	0.9	0.10	0.22	0.02	0.077	0.118	106.14	0.00	0.00	0.00	0.00	0.00	106.14	0.00	0.00	0.00	0.00	106.14	0.12
6:30	0.9	0.10	0.22	0.02	0.077	0.118	106.14	0.00	0.00	0.00	0.00	0.00	106.14	0.00	0.00	0.00	0.00	106.14	0.12
6:45	1.0	0.11	0.21	0.03	0.086	0.131	117.93	0.00	0.00	0.00	0.00	0.00	117.93	0.00	0.00	0.00	0.00	117.93	0.13
7:00	1.0	0.11	0.21	0.03	0.086	0.131	117.93	0.00	0.00	0.00	0.00	0.00	117.93	0.00	0.00	0.00	0.00	117.93	0.13
7:15	1.0	0.11	0.21	0.03	0.086	0.131	117.93	0.00	0.00	0.00	0.00	0.00	117.93	0.00	0.00	0.00	0.00	117.93	0.13
7:30	1.1	0.12	0.21	0.03	0.095	0.144	129.73	0.00	0.00	0.00	0.00	0.00	129.73	0.00	0.00	0.00	0.00	129.73	0.14
7:45	1.2	0.13	0.20	0.03	0.103	0.157	141.52	0.00	0.00	0.00	0.00	0.00	141.52	0.00	0.00	0.00	0.00	141.52	0.16
8:00	1.3	0.14	0.20	0.03	0.112	0.170	153.32	0.00	0.00	0.00	0.00	0.00	153.32	0.00	0.00	0.00	0.00	153.32	0.17
8:15	1.5	0.17	0.20	0.04	0.129	0.197	176.90	0.00	0.00	0.00	0.00	0.00	176.90	0.00	0.00	0.00	0.00	176.90	0.20
8:30	1.5	0.17	0.19	0.04	0.129	0.197	176.90	0.00	0.00	0.00	0.00	0.00	176.90	0.00	0.00	0.00	0.00	176.90	0.20
8:45	1.6	0.18	0.19	0.04	0.138	0.210	188.70	0.00	0.00	0.00	0.00	0.00	188.70	0.00	0.00	0.00	0.00	188.70	0.21
9:00	1.7	0.19	0.19	0.04	0.146	0.223	200.49	0.00	0.00	0.00	0.00	0.00	200.49	0.00	0.00	0.00	0.00	200.49	0.22
9:15	1.9	0.21	0.19	0.05	0.163	0.249	224.08	0.00	0.00	0.00	0.00	0.00	224.08	0.00	0.00	0.00	0.00	224.08	0.25
9:30	2.0	0.22	0.18	0.05	0.172	0.262	235.87	0.00	0.00	0.00	0.00	0.00	235.87	0.00	0.00	0.00	0.00	235.87	0.26
9:45	2.1	0.23	0.18	0.05	0.181	0.275	247.66	0.00	0.00	0.00	0.00	0.00	247.66	0.00	0.00	0.00	0.00	247.66	0.28
10:00	2.2	0.24	0.18	0.06	0.189	0.288	259.46	0.00	0.00	0.00	0.00	0.00	259.46	0.00	0.00	0.00	0.00	259.46	0.29
10:15	1.5	0.17	0.18	0.04	0.129	0.197	176.90	0.00	0.00	0.00	0.00	0.00	176.90	0.00	0.00	0.00	0.00	176.90	0.20
10:30	1.5	0.17	0.17	0.04	0.129	0.197	176.90	0.00	0.00	0.00	0.00	0.00	176.90	0.00	0.00	0.00	0.00	176.90	0.20
10:45	2.0	0.22	0.17	0.05	0.172	0.262	235.87	0.00	0.00	0.00	0.00	0.00	235.87	0.00	0.00	0.00	0.00	235.87	0.26
11:00	2.0	0.22	0.17	0.05	0.172	0.262	235.87	0.00	0.00	0.00	0.00	0.00	235.87	0.00	0.00	0.00	0.00	235.87	0.26
11:15	1.9	0.21	0.17	0.05	0.163	0.249	224.08	0.00	0.00	0.00	0.00	0.00	224.08	0.00	0.00	0.00	0.00	224.08	0.25
11:30	1.9	0.21	0.16	0.05	0.163	0.249	224.08	0.00	0.00	0.00	0.00	0.00	224.08	0.00	0.00	0.00	0.00	224.08	0.25
11:45	1.7	0.19	0.16	0.04	0.146	0.223	200.49	0.00	0.00	0.00	0.00	0.00	200.49	0.00	0.00	0.00	0.00	200.49	0.22
12:00	1.8	0.20	0.16	0.05	0.155	0.236	212.28	0.00	0.00	0.00	0.00	0.00	212.28	0.00	0.00	0.00	0.00	212.28	0.24
12:15	2.5	0.28	0.16	0.06	0.215	0.328	294.84	0.00	0.00	0.00	0.00	0.00	294.84	0.00	0.00	0.00	0.00	294.84	0.33

12:30	2.6	0.29	0.15	0.07	0.224	0.341	306.63	0.00	0.00	0.00	0.00	0.00	306.63	0.00	0.00	0.00	0.00	306.63	0.34
12:45	2.8	0.31	0.15	0.07	0.241	0.367	330.22	0.00	0.00	0.00	0.00	0.00	330.22	0.00	0.00	0.00	0.00	330.22	0.37
13:00	2.9	0.32	0.15	0.07	0.249	0.380	342.01	0.00	0.00	0.00	0.00	0.00	342.01	0.00	0.00	0.00	0.00	342.01	0.38
13:15	3.4	0.38	0.15	0.09	0.292	**0.446**	400.98	0.00	0.00	0.00	0.00	0.00	400.98	0.00	0.00	0.00	0.00	400.98	0.45
13:30	3.4	0.38	0.14	0.09	0.292	**0.446**	400.98	0.00	0.00	0.00	0.00	0.00	400.98	0.00	0.00	0.00	0.00	400.98	0.45
13:45	2.3	0.26	0.14	0.06	0.198	0.301	271.25	0.00	0.00	0.00	0.00	0.00	271.25	0.00	0.00	0.00	0.00	271.25	0.30
14:00	2.3	0.26	0.14	0.06	0.198	0.301	271.25	0.00	0.00	0.00	0.00	0.00	271.25	0.00	0.00	0.00	0.00	271.25	0.30
14:15	2.7	0.30	0.14	0.07	0.232	0.354	318.42	0.00	0.00	0.00	0.00	0.00	318.42	0.00	0.00	0.00	0.00	318.42	0.35
14:30	2.6	0.29	0.14	0.07	0.224	0.341	306.63	0.00	0.00	0.00	0.00	0.00	306.63	0.00	0.00	0.00	0.00	306.63	0.34
14:45	2.6	0.29	0.13	0.07	0.224	0.341	306.63	0.00	0.00	0.00	0.00	0.00	306.63	0.00	0.00	0.00	0.00	306.63	0.34
15:00	2.5	0.28	0.13	0.06	0.215	0.328	294.84	0.00	0.00	0.00	0.00	0.00	294.84	0.00	0.00	0.00	0.00	294.84	0.33
15:15	2.4	0.27	0.13	0.06	0.206	0.314	283.04	0.00	0.00	0.00	0.00	0.00	283.04	0.00	0.00	0.00	0.00	283.04	0.31
15:30	2.3	0.26	0.13	0.06	0.198	0.301	271.25	0.00	0.00	0.00	0.00	0.00	271.25	0.00	0.00	0.00	0.00	271.25	0.30
15:45	1.9	0.21	0.13	0.05	0.163	0.249	224.08	0.00	0.00	0.00	0.00	0.00	224.08	0.00	0.00	0.00	0.00	224.08	0.25
16:00	1.9	0.21	0.12	0.05	0.163	0.249	224.08	0.00	0.00	0.00	0.00	0.00	224.08	0.00	0.00	0.00	0.00	224.08	0.25
16:15	0.4	0.04	0.12	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
16:30	0.4	0.04	0.12	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
16:45	0.3	0.03	0.12	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
17:00	0.3	0.03	0.12	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
17:15	0.5	0.06	0.12	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
17:30	0.5	0.06	0.11	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
17:45	0.5	0.06	0.11	0.01	0.043	0.066	58.97	0.00	0.00	0.00	0.00	0.00	58.97	0.00	0.00	0.00	0.00	58.97	0.07
18:00	0.4	0.04	0.11	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
18:15	0.4	0.04	0.11	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
18:30	0.4	0.04	0.11	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
18:45	0.3	0.03	0.11	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
19:00	0.2	0.02	0.10	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
19:15	0.3	0.03	0.10	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
19:30	0.4	0.04	0.10	0.01	0.034	0.052	47.17	0.00	0.00	0.00	0.00	0.00	47.17	0.00	0.00	0.00	0.00	47.17	0.05
19:45	0.3	0.03	0.10	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
20:00	0.2	0.02	0.10	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
20:15	0.3	0.03	0.10	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
20:30	0.3	0.03	0.10	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
20:45	0.3	0.03	0.09	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
21:00	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
21:15	0.3	0.03	0.09	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
21:30	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
21:45	0.3	0.03	0.09	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
22:00	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
22:15	0.3	0.03	0.09	0.01	0.026	0.039	35.38	0.00	0.00	0.00	0.00	0.00	35.38	0.00	0.00	0.00	0.00	35.38	0.04
22:30	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
22:45	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
23:00	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
23:15	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
23:30	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
23:45	0.2	0.02	0.09	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
24:00	0.2	0.02	0.08	0.01	0.017	0.026	23.59	0.00	0.00	0.00	0.00	0.00	23.59	0.00	0.00	0.00	0.00	23.59	0.03
					Total volume (CF)		**11793.47**								**Total Overflow (CF)**			**11793.47**	

RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Post-Development

Recurrence Interval	5	year			
Storm Duration (hrs)	1	3	6	24	
5-year NOAA Atlas 14 Point Precipitation (in)	0.811	1.270	1.810	3.620	
Unit time (minutes)	5	5	5	15	
Drainage Area	65819	SF	*1.511*	Ac.	
Soils Group	B				
AMC index Runoff Number (plate E-6.1)	56	Type:	Urban Covers; good		
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.70	AMC I			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	84				
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.17*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	*23*				
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

5 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.36	0.17	0.08	0.279	0.424	127.30	0.00	0.00	0.00	0.00	0.00	127.30	0.00	0.00	0.00	0.00	127.30	0.42
0:10	4.8	0.47	0.17	0.11	0.361	0.550	165.14	0.00	0.00	0.00	0.00	0.00	165.14	0.00	0.00	0.00	0.00	165.14	0.55
0:15	5.1	0.50	0.17	0.11	0.384	0.585	175.46	0.00	0.00	0.00	0.00	0.00	175.46	0.00	0.00	0.00	0.00	175.46	0.58
0:20	4.9	0.48	0.17	0.11	0.369	0.562	168.58	0.00	0.00	0.00	0.00	0.00	168.58	0.00	0.00	0.00	0.00	168.58	0.56
0:25	6.6	0.64	0.17	0.15	0.497	0.757	227.07	0.00	0.00	0.00	0.00	0.00	227.07	0.00	0.00	0.00	0.00	227.07	0.76
0:30	7.3	0.71	0.17	0.16	0.549	0.837	251.15	0.00	0.00	0.00	0.00	0.00	251.15	0.00	0.00	0.00	0.00	251.15	0.84
0:35	8.4	0.82	0.17	N/A	0.648	0.987	296.10	0.00	0.00	0.00	0.00	0.00	296.10	0.00	0.00	0.00	0.00	296.10	0.99
0:40	9.0	0.88	0.17	N/A	0.706	1.076	322.79	0.00	0.00	0.00	0.00	0.00	322.79	0.00	0.00	0.00	0.00	322.79	1.08
0:45	12.3	1.20	0.17	N/A	1.027	1.565	469.59	0.00	0.00	0.00	0.00	0.00	469.59	0.00	0.00	0.00	0.00	469.59	1.57
0:50	17.6	1.71	0.17	N/A	1.543	**2.351**	705.35	0.00	0.00	0.00	0.00	0.00	705.35	0.00	0.00	0.00	0.00	705.35	2.35
0:55	16.1	1.57	0.17	N/A	1.397	2.129	638.62	0.00	0.00	0.00	0.00	0.00	638.62	0.00	0.00	0.00	0.00	638.62	2.13
1:00	4.2	0.41	0.17	0.09	0.316	0.482	144.50	0.00	0.00	0.00	0.00	0.00	144.50	0.00	0.00	0.00	0.00	144.50	0.48
					Total volume (CF)		**3691.66**								**Total Overflow (CF)**			**3691.66**	

5 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.20	0.17	0.04	0.153	0.233	70.04	0.00	0.00	0.00	0.00	0.00	70.04	0.00	0.00	0.00	0.00	70.04	0.23
0:10	1.3	0.20	0.17	0.04	0.153	0.233	70.04	0.00	0.00	0.00	0.00	0.00	70.04	0.00	0.00	0.00	0.00	70.04	0.23
0:15	1.1	0.17	0.17	0.04	0.130	0.198	59.26	0.00	0.00	0.00	0.00	0.00	59.26	0.00	0.00	0.00	0.00	59.26	0.20
0:20	1.5	0.23	0.17	0.05	0.177	0.269	80.81	0.00	0.00	0.00	0.00	0.00	80.81	0.00	0.00	0.00	0.00	80.81	0.27
0:25	1.5	0.23	0.17	0.05	0.177	0.269	80.81	0.00	0.00	0.00	0.00	0.00	80.81	0.00	0.00	0.00	0.00	80.81	0.27
0:30	1.8	0.27	0.17	0.06	0.212	0.323	96.98	0.00	0.00	0.00	0.00	0.00	96.98	0.00	0.00	0.00	0.00	96.98	0.32
0:35	1.5	0.23	0.17	0.05	0.177	0.269	80.81	0.00	0.00	0.00	0.00	0.00	80.81	0.00	0.00	0.00	0.00	80.81	0.27
0:40	1.8	0.27	0.17	0.06	0.212	0.323	96.98	0.00	0.00	0.00	0.00	0.00	96.98	0.00	0.00	0.00	0.00	96.98	0.32
0:45	1.8	0.27	0.17	0.06	0.212	0.323	96.98	0.00	0.00	0.00	0.00	0.00	96.98	0.00	0.00	0.00	0.00	96.98	0.32
0:50	1.5	0.23	0.17	0.05	0.177	0.269	80.81	0.00	0.00	0.00	0.00	0.00	80.81	0.00	0.00	0.00	0.00	80.81	0.27
0:55	1.6	0.24	0.17	0.06	0.189	0.287	86.20	0.00	0.00	0.00	0.00	0.00	86.20	0.00	0.00	0.00	0.00	86.20	0.29
1:00	1.8	0.27	0.17	0.06	0.212	0.323	96.98	0.00	0.00	0.00	0.00	0.00	96.98	0.00	0.00	0.00	0.00	96.98	0.32
1:05	2.2	0.34	0.17	0.08	0.259	0.395	118.53	0.00	0.00	0.00	0.00	0.00	118.53	0.00	0.00	0.00	0.00	118.53	0.40
1:10	2.2	0.34	0.17	0.08	0.259	0.395	118.53	0.00	0.00	0.00	0.00	0.00	118.53	0.00	0.00	0.00	0.00	118.53	0.40
1:15	2.2	0.34	0.17	0.08	0.259	0.395	118.53	0.00	0.00	0.00	0.00	0.00	118.53	0.00	0.00	0.00	0.00	118.53	0.40
1:20	2.0	0.30	0.17	0.07	0.236	0.359	107.75	0.00	0.00	0.00	0.00	0.00	107.75	0.00	0.00	0.00	0.00	107.75	0.36
1:25	2.6	0.40	0.17	0.09	0.306	0.467	140.08	0.00	0.00	0.00	0.00	0.00	140.08	0.00	0.00	0.00	0.00	140.08	0.47
1:30	2.7	0.41	0.17	0.09	0.318	0.485	145.47	0.00	0.00	0.00	0.00	0.00	145.47	0.00	0.00	0.00	0.00	145.47	0.48
1:35	2.4	0.37	0.17	0.08	0.283	0.431	129.30	0.00	0.00	0.00	0.00	0.00	129.30	0.00	0.00	0.00	0.00	129.30	0.43
1:40	2.7	0.41	0.17	0.09	0.318	0.485	145.47	0.00	0.00	0.00	0.00	0.00	145.47	0.00	0.00	0.00	0.00	145.47	0.48
1:45	3.3	0.50	0.17	0.11	0.389	0.593	177.79	0.00	0.00	0.00	0.00	0.00	177.79	0.00	0.00	0.00	0.00	177.79	0.59
1:50	3.1	0.47	0.17	0.11	0.365	0.557	167.02	0.00	0.00	0.00	0.00	0.00	167.02	0.00	0.00	0.00	0.00	167.02	0.56
1:55	2.9	0.44	0.17	0.10	0.342	0.521	156.24	0.00	0.00	0.00	0.00	0.00	156.24	0.00	0.00	0.00	0.00	156.24	0.52
2:00	3.0	0.46	0.17	0.10	0.354	0.539	161.63	0.00	0.00	0.00	0.00	0.00	161.63	0.00	0.00	0.00	0.00	161.63	0.54
2:05	3.1	0.47	0.17	0.11	0.365	0.557	167.02	0.00	0.00	0.00	0.00	0.00	167.02	0.00	0.00	0.00	0.00	167.02	0.56
2:10	4.2	0.64	0.17	0.15	0.495	0.754	226.28	0.00	0.00	0.00	0.00	0.00	226.28	0.00	0.00	0.00	0.00	226.28	0.75
2:15	5.0	0.76	0.17	N/A	0.592	0.902	270.74	0.00	0.00	0.00	0.00	0.00	270.74	0.00	0.00	0.00	0.00	270.74	0.90
2:20	3.5	0.53	0.17	0.12	0.413	0.629	188.57	0.00	0.00	0.00	0.00	0.00	188.57	0.00	0.00	0.00	0.00	188.57	0.63
2:25	6.8	1.04	0.17	N/A	0.867	1.320	396.13	0.00	0.00	0.00	0.00	0.00	396.13	0.00	0.00	0.00	0.00	396.13	1.32
2:30	7.3	1.11	0.17	N/A	0.943	1.437	430.96	0.00	0.00	0.00	0.00	0.00	430.96	0.00	0.00	0.00	0.00	430.96	1.44
2:35	8.2	1.25	0.17	N/A	1.080	**1.645**	493.65	0.00	0.00	0.00	0.00	0.00	493.65	0.00	0.00	0.00	0.00	493.65	1.65
2:40	5.9	0.90	0.17	N/A	0.729	1.111	333.43	0.00	0.00	0.00	0.00	0.00	333.43	0.00	0.00	0.00	0.00	333.43	1.11
2:45	2.0	0.30	0.17	0.07	0.236	0.359	107.75	0.00	0.00	0.00	0.00	0.00	107.75	0.00	0.00	0.00	0.00	107.75	0.36
2:50	1.8	0.27	0.17	0.06	0.212	0.323	96.98	0.00	0.00	0.00	0.00	0.00	96.98	0.00	0.00	0.00	0.00	96.98	0.32
2:55	1.8	0.27	0.17	0.06	0.212	0.323	96.98	0.00	0.00	0.00	0.00	0.00	96.98	0.00	0.00	0.00	0.00	96.98	0.32
3:00	0.6	0.09	0.17	0.02	0.071	0.108	32.33	0.00	0.00	0.00	0.00	0.00	32.33	0.00	0.00	0.00	0.00	32.33	0.11
					Total volume (CF)		**5523.87**								**Total Overflow (CF)**			**5523.87**	

5 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.11	0.17	0.02	0.084	0.128	38.39	0.00	0.00	0.00	0.00	0.00	38.39	0.00	0.00	0.00	0.00	38.39	0.13
0:10	0.6	0.13	0.17	0.03	0.101	0.154	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.15
0:15	0.6	0.13	0.17	0.03	0.101	0.154	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.15
0:20	0.6	0.13	0.17	0.03	0.101	0.154	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.15
0:25	0.6	0.13	0.17	0.03	0.101	0.154	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.15
0:30	0.7	0.15	0.17	0.03	0.118	0.179	53.75	0.00	0.00	0.00	0.00	0.00	53.75	0.00	0.00	0.00	0.00	53.75	0.18
0:35	0.7	0.15	0.17	0.03	0.118	0.179	53.75	0.00	0.00	0.00	0.00	0.00	53.75	0.00	0.00	0.00	0.00	53.75	0.18
0:40	0.7	0.15	0.17	0.03	0.118	0.179	53.75	0.00	0.00	0.00	0.00	0.00	53.75	0.00	0.00	0.00	0.00	53.75	0.18
0:45	0.7	0.15	0.17	0.03	0.118	0.179	53.75	0.00	0.00	0.00	0.00	0.00	53.75	0.00	0.00	0.00	0.00	53.75	0.18
0:50	0.7	0.15	0.17	0.03	0.118	0.179	53.75	0.00	0.00	0.00	0.00	0.00	53.75	0.00	0.00	0.00	0.00	53.75	0.18
0:55	0.7	0.15	0.17	0.03	0.118	0.179	53.75	0.00	0.00	0.00	0.00	0.00	53.75	0.00	0.00	0.00	0.00	53.75	0.18
1:00	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:05	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:10	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:15	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:20	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:25	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:30	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:35	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:40	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:45	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:50	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
1:55	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
2:00	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:05	0.8	0.17	0.17	0.04	0.134	0.205	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.20
2:10	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:15	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:20	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:25	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:30	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:35	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:40	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
2:45	1.0	0.22	0.17	0.05	0.168	0.256	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.26
2:50	1.0	0.22	0.17	0.05	0.168	0.256	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.26
2:55	1.0	0.22	0.17	0.05	0.168	0.256	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.26
3:00	1.0	0.22	0.17	0.05	0.168	0.256	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.26
3:05	1.0	0.22	0.17	0.05	0.168	0.256	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.26
3:10	1.1	0.24	0.17	0.05	0.185	0.282	84.46	0.00	0.00	0.00	0.00	0.00	84.46	0.00	0.00	0.00	0.00	84.46	0.28
3:15	1.1	0.24	0.17	0.05	0.185	0.282	84.46	0.00	0.00	0.00	0.00	0.00	84.46	0.00	0.00	0.00	0.00	84.46	0.28
3:20	1.1	0.24	0.17	0.05	0.185	0.282	84.46	0.00	0.00	0.00	0.00	0.00	84.46	0.00	0.00	0.00	0.00	84.46	0.28
3:25	1.2	0.26	0.17	0.06	0.202	0.307	92.14	0.00	0.00	0.00	0.00	0.00	92.14	0.00	0.00	0.00	0.00	92.14	0.31
3:30	1.3	0.28	0.17	0.06	0.218	0.333	99.82	0.00	0.00	0.00	0.00	0.00	99.82	0.00	0.00	0.00	0.00	99.82	0.33
3:35	1.4	0.30	0.17	0.07	0.235	0.358	107.50	0.00	0.00	0.00	0.00	0.00	107.50	0.00	0.00	0.00	0.00	107.50	0.36
3:40	1.4	0.30	0.17	0.07	0.235	0.358	107.50	0.00	0.00	0.00	0.00	0.00	107.50	0.00	0.00	0.00	0.00	107.50	0.36
3:45	1.5	0.33	0.17	0.07	0.252	0.384	115.18	0.00	0.00	0.00	0.00	0.00	115.18	0.00	0.00	0.00	0.00	115.18	0.38
3:50	1.5	0.33	0.17	0.07	0.252	0.384	115.18	0.00	0.00	0.00	0.00	0.00	115.18	0.00	0.00	0.00	0.00	115.18	0.38
3:55	1.6	0.35	0.17	0.08	0.269	0.410	122.86	0.00	0.00	0.00	0.00	0.00	122.86	0.00	0.00	0.00	0.00	122.86	0.41
4:00	1.6	0.35	0.17	0.08	0.269	0.410	122.86	0.00	0.00	0.00	0.00	0.00	122.86	0.00	0.00	0.00	0.00	122.86	0.41
4:05	1.7	0.37	0.17	0.08	0.286	0.435	130.53	0.00	0.00	0.00	0.00	0.00	130.53	0.00	0.00	0.00	0.00	130.53	0.44

4:10	1.8	0.39	0.17	0.09	0.302	0.461	138.21	0.00	0.00	0.00	0.00	0.00	138.21	0.00	0.00	0.00	0.00	138.21	0.46
4:15	1.9	0.41	0.17	0.09	0.319	0.486	145.89	0.00	0.00	0.00	0.00	0.00	145.89	0.00	0.00	0.00	0.00	145.89	0.49
4:20	2.0	0.43	0.17	0.10	0.336	0.512	153.57	0.00	0.00	0.00	0.00	0.00	153.57	0.00	0.00	0.00	0.00	153.57	0.51
4:25	2.1	0.46	0.17	0.10	0.353	0.537	161.25	0.00	0.00	0.00	0.00	0.00	161.25	0.00	0.00	0.00	0.00	161.25	0.54
4:30	2.1	0.46	0.17	0.10	0.353	0.537	161.25	0.00	0.00	0.00	0.00	0.00	161.25	0.00	0.00	0.00	0.00	161.25	0.54
4:35	2.2	0.48	0.17	0.11	0.370	0.563	168.93	0.00	0.00	0.00	0.00	0.00	168.93	0.00	0.00	0.00	0.00	168.93	0.56
4:40	2.3	0.50	0.17	0.11	0.386	0.589	176.61	0.00	0.00	0.00	0.00	0.00	176.61	0.00	0.00	0.00	0.00	176.61	0.59
4:45	2.4	0.52	0.17	0.12	0.403	0.614	184.28	0.00	0.00	0.00	0.00	0.00	184.28	0.00	0.00	0.00	0.00	184.28	0.61
4:50	2.4	0.52	0.17	0.12	0.403	0.614	184.28	0.00	0.00	0.00	0.00	0.00	184.28	0.00	0.00	0.00	0.00	184.28	0.61
4:55	2.5	0.54	0.17	0.12	0.420	0.640	191.96	0.00	0.00	0.00	0.00	0.00	191.96	0.00	0.00	0.00	0.00	191.96	0.64
5:00	2.6	0.56	0.17	0.13	0.437	0.665	199.64	0.00	0.00	0.00	0.00	0.00	199.64	0.00	0.00	0.00	0.00	199.64	0.67
5:05	3.1	0.67	0.17	0.15	0.521	0.793	238.03	0.00	0.00	0.00	0.00	0.00	238.03	0.00	0.00	0.00	0.00	238.03	0.79
5:10	3.6	0.78	0.17	N/A	0.612	0.933	279.85	0.00	0.00	0.00	0.00	0.00	279.85	0.00	0.00	0.00	0.00	279.85	0.93
5:15	3.9	0.85	0.17	N/A	0.677	1.032	309.63	0.00	0.00	0.00	0.00	0.00	309.63	0.00	0.00	0.00	0.00	309.63	1.03
5:20	4.2	0.91	0.17	N/A	0.743	1.131	339.41	0.00	0.00	0.00	0.00	0.00	339.41	0.00	0.00	0.00	0.00	339.41	1.13
5:25	4.7	1.02	0.17	N/A	0.851	1.297	389.05	0.00	0.00	0.00	0.00	0.00	389.05	0.00	0.00	0.00	0.00	389.05	1.30
5:30	5.6	1.22	0.17	N/A	1.047	**1.595**	478.40	0.00	0.00	0.00	0.00	0.00	478.40	0.00	0.00	0.00	0.00	478.40	1.59
5:35	1.9	0.41	0.17	0.09	0.319	0.486	145.89	0.00	0.00	0.00	0.00	0.00	145.89	0.00	0.00	0.00	0.00	145.89	0.49
5:40	0.9	0.20	0.17	0.04	0.151	0.230	69.11	0.00	0.00	0.00	0.00	0.00	69.11	0.00	0.00	0.00	0.00	69.11	0.23
5:45	0.6	0.13	0.17	0.03	0.101	0.154	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.15
5:50	0.5	0.11	0.17	0.02	0.084	0.128	38.39	0.00	0.00	0.00	0.00	0.00	38.39	0.00	0.00	0.00	0.00	38.39	0.13
5:55	0.3	0.07	0.17	0.01	0.050	0.077	23.04	0.00	0.00	0.00	0.00	0.00	23.04	0.00	0.00	0.00	0.00	23.04	0.08
6:00	0.2	0.04	0.17	0.01	0.034	0.051	15.36	0.00	0.00	0.00	0.00	0.00	15.36	0.00	0.00	0.00	0.00	15.36	0.05
					Total volume (CF)		**7785.56**								**Total Overflow (CF)**			**7785.56**	

5 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.03	0.30	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
0:30	0.3	0.04	0.29	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
0:45	0.3	0.04	0.29	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
1:00	0.4	0.06	0.29	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
1:15	0.3	0.04	0.28	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
1:30	0.3	0.04	0.28	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
1:45	0.3	0.04	0.28	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
2:00	0.4	0.06	0.27	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
2:15	0.4	0.06	0.27	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
2:30	0.4	0.06	0.27	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
2:45	0.5	0.07	0.26	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
3:00	0.5	0.07	0.26	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
3:15	0.5	0.07	0.26	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
3:30	0.5	0.07	0.25	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
3:45	0.5	0.07	0.25	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
4:00	0.6	0.09	0.25	0.02	0.067	0.102	92.14	0.00	0.00	0.00	0.00	0.00	92.14	0.00	0.00	0.00	0.00	92.14	0.10
4:15	0.6	0.09	0.24	0.02	0.067	0.102	92.14	0.00	0.00	0.00	0.00	0.00	92.14	0.00	0.00	0.00	0.00	92.14	0.10
4:30	0.7	0.10	0.24	0.02	0.078	0.119	107.50	0.00	0.00	0.00	0.00	0.00	107.50	0.00	0.00	0.00	0.00	107.50	0.12
4:45	0.7	0.10	0.24	0.02	0.078	0.119	107.50	0.00	0.00	0.00	0.00	0.00	107.50	0.00	0.00	0.00	0.00	107.50	0.12
5:00	0.8	0.12	0.24	0.03	0.090	0.137	122.86	0.00	0.00	0.00	0.00	0.00	122.86	0.00	0.00	0.00	0.00	122.86	0.14
5:15	0.6	0.09	0.23	0.02	0.067	0.102	92.14	0.00	0.00	0.00	0.00	0.00	92.14	0.00	0.00	0.00	0.00	92.14	0.10
5:30	0.7	0.10	0.23	0.02	0.078	0.119	107.50	0.00	0.00	0.00	0.00	0.00	107.50	0.00	0.00	0.00	0.00	107.50	0.12
5:45	0.8	0.12	0.23	0.03	0.090	0.137	122.86	0.00	0.00	0.00	0.00	0.00	122.86	0.00	0.00	0.00	0.00	122.86	0.14
6:00	0.8	0.12	0.22	0.03	0.090	0.137	122.86	0.00	0.00	0.00	0.00	0.00	122.86	0.00	0.00	0.00	0.00	122.86	0.14
6:15	0.9	0.13	0.22	0.03	0.101	0.154	138.21	0.00	0.00	0.00	0.00	0.00	138.21	0.00	0.00	0.00	0.00	138.21	0.15
6:30	0.9	0.13	0.22	0.03	0.101	0.154	138.21	0.00	0.00	0.00	0.00	0.00	138.21	0.00	0.00	0.00	0.00	138.21	0.15
6:45	1.0	0.14	0.21	0.03	0.112	0.171	153.57	0.00	0.00	0.00	0.00	0.00	153.57	0.00	0.00	0.00	0.00	153.57	0.17
7:00	1.0	0.14	0.21	0.03	0.112	0.171	153.57	0.00	0.00	0.00	0.00	0.00	153.57	0.00	0.00	0.00	0.00	153.57	0.17
7:15	1.0	0.14	0.21	0.03	0.112	0.171	153.57	0.00	0.00	0.00	0.00	0.00	153.57	0.00	0.00	0.00	0.00	153.57	0.17
7:30	1.1	0.16	0.21	0.04	0.123	0.188	168.93	0.00	0.00	0.00	0.00	0.00	168.93	0.00	0.00	0.00	0.00	168.93	0.19
7:45	1.2	0.17	0.20	0.04	0.134	0.205	184.28	0.00	0.00	0.00	0.00	0.00	184.28	0.00	0.00	0.00	0.00	184.28	0.20
8:00	1.3	0.19	0.20	0.04	0.146	0.222	199.64	0.00	0.00	0.00	0.00	0.00	199.64	0.00	0.00	0.00	0.00	199.64	0.22
8:15	1.5	0.22	0.20	0.05	0.168	0.256	230.35	0.00	0.00	0.00	0.00	0.00	230.35	0.00	0.00	0.00	0.00	230.35	0.26
8:30	1.5	0.22	0.19	0.05	0.168	0.256	230.35	0.00	0.00	0.00	0.00	0.00	230.35	0.00	0.00	0.00	0.00	230.35	0.26
8:45	1.6	0.23	0.19	0.05	0.179	0.273	245.71	0.00	0.00	0.00	0.00	0.00	245.71	0.00	0.00	0.00	0.00	245.71	0.27
9:00	1.7	0.25	0.19	0.06	0.190	0.290	261.07	0.00	0.00	0.00	0.00	0.00	261.07	0.00	0.00	0.00	0.00	261.07	0.29
9:15	1.9	0.28	0.19	0.06	0.213	0.324	291.78	0.00	0.00	0.00	0.00	0.00	291.78	0.00	0.00	0.00	0.00	291.78	0.32
9:30	2.0	0.29	0.18	0.07	0.224	0.341	307.14	0.00	0.00	0.00	0.00	0.00	307.14	0.00	0.00	0.00	0.00	307.14	0.34
9:45	2.1	0.30	0.18	0.07	0.235	0.358	322.50	0.00	0.00	0.00	0.00	0.00	322.50	0.00	0.00	0.00	0.00	322.50	0.36
10:00	2.2	0.32	0.18	0.07	0.246	0.375	337.85	0.00	0.00	0.00	0.00	0.00	337.85	0.00	0.00	0.00	0.00	337.85	0.38
10:15	1.5	0.22	0.18	0.05	0.168	0.256	230.35	0.00	0.00	0.00	0.00	0.00	230.35	0.00	0.00	0.00	0.00	230.35	0.26
10:30	1.5	0.22	0.17	0.05	0.168	0.256	230.35	0.00	0.00	0.00	0.00	0.00	230.35	0.00	0.00	0.00	0.00	230.35	0.26
10:45	2.0	0.29	0.17	0.07	0.224	0.341	307.14	0.00	0.00	0.00	0.00	0.00	307.14	0.00	0.00	0.00	0.00	307.14	0.34
11:00	2.0	0.29	0.17	0.07	0.224	0.341	307.14	0.00	0.00	0.00	0.00	0.00	307.14	0.00	0.00	0.00	0.00	307.14	0.34
11:15	1.9	0.28	0.17	0.06	0.213	0.324	291.78	0.00	0.00	0.00	0.00	0.00	291.78	0.00	0.00	0.00	0.00	291.78	0.32
11:30	1.9	0.28	0.16	0.06	0.213	0.324	291.78	0.00	0.00	0.00	0.00	0.00	291.78	0.00	0.00	0.00	0.00	291.78	0.32
11:45	1.7	0.25	0.16	0.06	0.190	0.290	261.07	0.00	0.00	0.00	0.00	0.00	261.07	0.00	0.00	0.00	0.00	261.07	0.29
12:00	1.8	0.26	0.16	0.06	0.202	0.307	276.43	0.00	0.00	0.00	0.00	0.00	276.43	0.00	0.00	0.00	0.00	276.43	0.31
12:15	2.5	0.36	0.16	0.08	0.280	0.427	383.92	0.00	0.00	0.00	0.00	0.00	383.92	0.00	0.00	0.00	0.00	383.92	0.43

12:30	2.6	0.38	0.15	0.09	0.291	0.444	399.28	0.00	0.00	0.00	0.00	0.00	399.28	0.00	0.00	0.00	0.00	399.28	0.44
12:45	2.8	0.41	0.15	0.09	0.314	0.478	430.00	0.00	0.00	0.00	0.00	0.00	430.00	0.00	0.00	0.00	0.00	430.00	0.48
13:00	2.9	0.42	0.15	0.10	0.325	0.495	445.35	0.00	0.00	0.00	0.00	0.00	445.35	0.00	0.00	0.00	0.00	445.35	0.49
13:15	3.4	0.49	0.15	0.11	0.381	**0.580**	522.14	0.00	0.00	0.00	0.00	0.00	522.14	0.00	0.00	0.00	0.00	522.14	0.58
13:30	3.4	0.49	0.14	0.11	0.381	**0.580**	522.14	0.00	0.00	0.00	0.00	0.00	522.14	0.00	0.00	0.00	0.00	522.14	0.58
13:45	2.3	0.33	0.14	0.08	0.258	0.392	353.21	0.00	0.00	0.00	0.00	0.00	353.21	0.00	0.00	0.00	0.00	353.21	0.39
14:00	2.3	0.33	0.14	0.08	0.258	0.392	353.21	0.00	0.00	0.00	0.00	0.00	353.21	0.00	0.00	0.00	0.00	353.21	0.39
14:15	2.7	0.39	0.14	0.09	0.302	0.461	414.64	0.00	0.00	0.00	0.00	0.00	414.64	0.00	0.00	0.00	0.00	414.64	0.46
14:30	2.6	0.38	0.14	0.09	0.291	0.444	399.28	0.00	0.00	0.00	0.00	0.00	399.28	0.00	0.00	0.00	0.00	399.28	0.44
14:45	2.6	0.38	0.13	0.09	0.291	0.444	399.28	0.00	0.00	0.00	0.00	0.00	399.28	0.00	0.00	0.00	0.00	399.28	0.44
15:00	2.5	0.36	0.13	0.08	0.280	0.427	383.92	0.00	0.00	0.00	0.00	0.00	383.92	0.00	0.00	0.00	0.00	383.92	0.43
15:15	2.4	0.35	0.13	0.08	0.269	0.410	368.57	0.00	0.00	0.00	0.00	0.00	368.57	0.00	0.00	0.00	0.00	368.57	0.41
15:30	2.3	0.33	0.13	0.08	0.258	0.392	353.21	0.00	0.00	0.00	0.00	0.00	353.21	0.00	0.00	0.00	0.00	353.21	0.39
15:45	1.9	0.28	0.13	0.06	0.213	0.324	291.78	0.00	0.00	0.00	0.00	0.00	291.78	0.00	0.00	0.00	0.00	291.78	0.32
16:00	1.9	0.28	0.12	0.06	0.213	0.324	291.78	0.00	0.00	0.00	0.00	0.00	291.78	0.00	0.00	0.00	0.00	291.78	0.32
16:15	0.4	0.06	0.12	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
16:30	0.4	0.06	0.12	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
16:45	0.3	0.04	0.12	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
17:00	0.3	0.04	0.12	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
17:15	0.5	0.07	0.12	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
17:30	0.5	0.07	0.11	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
17:45	0.5	0.07	0.11	0.02	0.056	0.085	76.78	0.00	0.00	0.00	0.00	0.00	76.78	0.00	0.00	0.00	0.00	76.78	0.09
18:00	0.4	0.06	0.11	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
18:15	0.4	0.06	0.11	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
18:30	0.4	0.06	0.11	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
18:45	0.3	0.04	0.11	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
19:00	0.2	0.03	0.10	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
19:15	0.3	0.04	0.10	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
19:30	0.4	0.06	0.10	0.01	0.045	0.068	61.43	0.00	0.00	0.00	0.00	0.00	61.43	0.00	0.00	0.00	0.00	61.43	0.07
19:45	0.3	0.04	0.10	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
20:00	0.2	0.03	0.10	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
20:15	0.3	0.04	0.10	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
20:30	0.3	0.04	0.10	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
20:45	0.3	0.04	0.09	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
21:00	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
21:15	0.3	0.04	0.09	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
21:30	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
21:45	0.3	0.04	0.09	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
22:00	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
22:15	0.3	0.04	0.09	0.01	0.034	0.051	46.07	0.00	0.00	0.00	0.00	0.00	46.07	0.00	0.00	0.00	0.00	46.07	0.05
22:30	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
22:45	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
23:00	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
23:15	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
23:30	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
23:45	0.2	0.03	0.09	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
24:00	0.2	0.03	0.08	0.01	0.022	0.034	30.71	0.00	0.00	0.00	0.00	0.00	30.71	0.00	0.00	0.00	0.00	30.71	0.03
					Total volume (CF)		**15356.97**								**Total Overflow (CF)**			**15356.97**	

RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Post-Development

Recurrence Interval	10	year			
Storm Duration (hrs)	1	3	6	24	
10-year NOAA Atlas 14 Point Precipitation (in)	1.010	1.520	2.130	4.310	
Unit time (minutes)	5	5	5	15	
Drainage Area	65819	SF	*1.511*	Ac.	
Soils Group	B				
AMC index Runoff Number (plate E-6.1)	65	Type:	Urban Covers; good		
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.51	AMC II			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	84				
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.12*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	*23*				
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

10 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.45	0.12	0.10	0.347	0.528	158.53	0.00	0.00	0.00	0.00	0.00	158.53	0.00	0.00	0.00	0.00	158.53	0.53
0:10	4.8	0.58	0.12	N/A	0.458	0.698	209.41	0.00	0.00	0.00	0.00	0.00	209.41	0.00	0.00	0.00	0.00	209.41	0.70
0:15	5.1	0.62	0.12	N/A	0.495	0.753	226.03	0.00	0.00	0.00	0.00	0.00	226.03	0.00	0.00	0.00	0.00	226.03	0.75
0:20	4.9	0.59	0.12	N/A	0.470	0.716	214.95	0.00	0.00	0.00	0.00	0.00	214.95	0.00	0.00	0.00	0.00	214.95	0.72
0:25	6.6	0.80	0.12	N/A	0.676	1.030	309.12	0.00	0.00	0.00	0.00	0.00	309.12	0.00	0.00	0.00	0.00	309.12	1.03
0:30	7.3	0.88	0.12	N/A	0.761	1.160	347.90	0.00	0.00	0.00	0.00	0.00	347.90	0.00	0.00	0.00	0.00	347.90	1.16
0:35	8.4	1.02	0.12	N/A	0.894	1.363	408.84	0.00	0.00	0.00	0.00	0.00	408.84	0.00	0.00	0.00	0.00	408.84	1.36
0:40	9.0	1.09	0.12	N/A	0.967	1.474	442.08	0.00	0.00	0.00	0.00	0.00	442.08	0.00	0.00	0.00	0.00	442.08	1.47
0:45	12.3	1.49	0.12	N/A	1.367	2.083	624.89	0.00	0.00	0.00	0.00	0.00	624.89	0.00	0.00	0.00	0.00	624.89	2.08
0:50	17.6	2.13	0.12	N/A	2.010	**3.062**	918.50	0.00	0.00	0.00	0.00	0.00	918.50	0.00	0.00	0.00	0.00	918.50	3.06
0:55	16.1	1.95	0.12	N/A	1.828	2.785	835.40	0.00	0.00	0.00	0.00	0.00	835.40	0.00	0.00	0.00	0.00	835.40	2.78
1:00	4.2	0.51	0.12	0.12	0.394	0.600	179.96	0.00	0.00	0.00	0.00	0.00	179.96	0.00	0.00	0.00	0.00	179.96	0.60
					Total volume (CF)		**4875.61**								**Total Overflow (CF)**			**4875.61**	

10 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.24	0.12	0.05	0.183	0.279	83.83	0.00	0.00	0.00	0.00	0.00	83.83	0.00	0.00	0.00	0.00	83.83	0.28
0:10	1.3	0.24	0.12	0.05	0.183	0.279	83.83	0.00	0.00	0.00	0.00	0.00	83.83	0.00	0.00	0.00	0.00	83.83	0.28
0:15	1.1	0.20	0.12	0.05	0.155	0.236	70.93	0.00	0.00	0.00	0.00	0.00	70.93	0.00	0.00	0.00	0.00	70.93	0.24
0:20	1.5	0.27	0.12	0.06	0.212	0.322	96.72	0.00	0.00	0.00	0.00	0.00	96.72	0.00	0.00	0.00	0.00	96.72	0.32
0:25	1.5	0.27	0.12	0.06	0.212	0.322	96.72	0.00	0.00	0.00	0.00	0.00	96.72	0.00	0.00	0.00	0.00	96.72	0.32
0:30	1.8	0.33	0.12	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
0:35	1.5	0.27	0.12	0.06	0.212	0.322	96.72	0.00	0.00	0.00	0.00	0.00	96.72	0.00	0.00	0.00	0.00	96.72	0.32
0:40	1.8	0.33	0.12	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
0:45	1.8	0.33	0.12	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
0:50	1.5	0.27	0.12	0.06	0.212	0.322	96.72	0.00	0.00	0.00	0.00	0.00	96.72	0.00	0.00	0.00	0.00	96.72	0.32
0:55	1.6	0.29	0.12	0.07	0.226	0.344	103.17	0.00	0.00	0.00	0.00	0.00	103.17	0.00	0.00	0.00	0.00	103.17	0.34
1:00	1.8	0.33	0.12	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
1:05	2.2	0.40	0.12	0.09	0.310	0.473	141.86	0.00	0.00	0.00	0.00	0.00	141.86	0.00	0.00	0.00	0.00	141.86	0.47
1:10	2.2	0.40	0.12	0.09	0.310	0.473	141.86	0.00	0.00	0.00	0.00	0.00	141.86	0.00	0.00	0.00	0.00	141.86	0.47
1:15	2.2	0.40	0.12	0.09	0.310	0.473	141.86	0.00	0.00	0.00	0.00	0.00	141.86	0.00	0.00	0.00	0.00	141.86	0.47
1:20	2.0	0.36	0.12	0.08	0.282	0.430	128.96	0.00	0.00	0.00	0.00	0.00	128.96	0.00	0.00	0.00	0.00	128.96	0.43
1:25	2.6	0.47	0.12	0.11	0.367	0.559	167.65	0.00	0.00	0.00	0.00	0.00	167.65	0.00	0.00	0.00	0.00	167.65	0.56
1:30	2.7	0.49	0.12	0.11	0.381	0.580	174.10	0.00	0.00	0.00	0.00	0.00	174.10	0.00	0.00	0.00	0.00	174.10	0.58
1:35	2.4	0.44	0.12	0.10	0.339	0.516	154.76	0.00	0.00	0.00	0.00	0.00	154.76	0.00	0.00	0.00	0.00	154.76	0.52
1:40	2.7	0.49	0.12	0.11	0.381	0.580	174.10	0.00	0.00	0.00	0.00	0.00	174.10	0.00	0.00	0.00	0.00	174.10	0.58
1:45	3.3	0.60	0.12	N/A	0.478	0.729	218.62	0.00	0.00	0.00	0.00	0.00	218.62	0.00	0.00	0.00	0.00	218.62	0.73
1:50	3.1	0.57	0.12	N/A	0.442	0.673	201.95	0.00	0.00	0.00	0.00	0.00	201.95	0.00	0.00	0.00	0.00	201.95	0.67
1:55	2.9	0.53	0.12	0.12	0.409	0.623	187.00	0.00	0.00	0.00	0.00	0.00	187.00	0.00	0.00	0.00	0.00	187.00	0.62
2:00	3.0	0.55	0.12	N/A	0.424	0.645	193.61	0.00	0.00	0.00	0.00	0.00	193.61	0.00	0.00	0.00	0.00	193.61	0.65
2:05	3.1	0.57	0.12	N/A	0.442	0.673	201.95	0.00	0.00	0.00	0.00	0.00	201.95	0.00	0.00	0.00	0.00	201.95	0.67
2:10	4.2	0.77	0.12	N/A	0.642	0.979	293.66	0.00	0.00	0.00	0.00	0.00	293.66	0.00	0.00	0.00	0.00	293.66	0.98
2:15	5.0	0.91	0.12	N/A	0.788	1.201	360.35	0.00	0.00	0.00	0.00	0.00	360.35	0.00	0.00	0.00	0.00	360.35	1.20
2:20	3.5	0.64	0.12	N/A	0.515	0.784	235.30	0.00	0.00	0.00	0.00	0.00	235.30	0.00	0.00	0.00	0.00	235.30	0.78
2:25	6.8	1.24	0.12	N/A	1.117	1.701	510.42	0.00	0.00	0.00	0.00	0.00	510.42	0.00	0.00	0.00	0.00	510.42	1.70
2:30	7.3	1.33	0.12	N/A	1.208	1.840	552.11	0.00	0.00	0.00	0.00	0.00	552.11	0.00	0.00	0.00	0.00	552.11	1.84
2:35	8.2	1.50	0.12	N/A	1.372	**2.090**	627.14	0.00	0.00	0.00	0.00	0.00	627.14	0.00	0.00	0.00	0.00	627.14	2.09
2:40	5.9	1.08	0.12	N/A	0.953	1.451	435.39	0.00	0.00	0.00	0.00	0.00	435.39	0.00	0.00	0.00	0.00	435.39	1.45
2:45	2.0	0.36	0.12	0.08	0.282	0.430	128.96	0.00	0.00	0.00	0.00	0.00	128.96	0.00	0.00	0.00	0.00	128.96	0.43
2:50	1.8	0.33	0.12	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
2:55	1.8	0.33	0.12	0.07	0.254	0.387	116.07	0.00	0.00	0.00	0.00	0.00	116.07	0.00	0.00	0.00	0.00	116.07	0.39
3:00	0.6	0.11	0.12	0.02	0.085	0.129	38.69	0.00	0.00	0.00	0.00	0.00	38.69	0.00	0.00	0.00	0.00	38.69	0.13
					Total volume (CF)		**6835.36**								**Total Overflow (CF)**			**6835.36**	

10 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.13	0.12	0.03	0.099	0.151	45.18	0.00	0.00	0.00	0.00	0.00	45.18	0.00	0.00	0.00	0.00	45.18	0.15
0:10	0.6	0.15	0.12	0.03	0.119	0.181	54.22	0.00	0.00	0.00	0.00	0.00	54.22	0.00	0.00	0.00	0.00	54.22	0.18
0:15	0.6	0.15	0.12	0.03	0.119	0.181	54.22	0.00	0.00	0.00	0.00	0.00	54.22	0.00	0.00	0.00	0.00	54.22	0.18
0:20	0.6	0.15	0.12	0.03	0.119	0.181	54.22	0.00	0.00	0.00	0.00	0.00	54.22	0.00	0.00	0.00	0.00	54.22	0.18
0:25	0.6	0.15	0.12	0.03	0.119	0.181	54.22	0.00	0.00	0.00	0.00	0.00	54.22	0.00	0.00	0.00	0.00	54.22	0.18
0:30	0.7	0.18	0.12	0.04	0.138	0.211	63.25	0.00	0.00	0.00	0.00	0.00	63.25	0.00	0.00	0.00	0.00	63.25	0.21
0:35	0.7	0.18	0.12	0.04	0.138	0.211	63.25	0.00	0.00	0.00	0.00	0.00	63.25	0.00	0.00	0.00	0.00	63.25	0.21
0:40	0.7	0.18	0.12	0.04	0.138	0.211	63.25	0.00	0.00	0.00	0.00	0.00	63.25	0.00	0.00	0.00	0.00	63.25	0.21
0:45	0.7	0.18	0.12	0.04	0.138	0.211	63.25	0.00	0.00	0.00	0.00	0.00	63.25	0.00	0.00	0.00	0.00	63.25	0.21
0:50	0.7	0.18	0.12	0.04	0.138	0.211	63.25	0.00	0.00	0.00	0.00	0.00	63.25	0.00	0.00	0.00	0.00	63.25	0.21
0:55	0.7	0.18	0.12	0.04	0.138	0.211	63.25	0.00	0.00	0.00	0.00	0.00	63.25	0.00	0.00	0.00	0.00	63.25	0.21
1:00	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:05	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:10	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:15	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:20	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:25	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:30	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:35	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:40	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:45	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:50	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
1:55	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
2:00	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:05	0.8	0.20	0.12	0.05	0.158	0.241	72.29	0.00	0.00	0.00	0.00	0.00	72.29	0.00	0.00	0.00	0.00	72.29	0.24
2:10	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:15	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:20	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:25	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:30	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:35	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:40	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
2:45	1.0	0.26	0.12	0.06	0.198	0.301	90.36	0.00	0.00	0.00	0.00	0.00	90.36	0.00	0.00	0.00	0.00	90.36	0.30
2:50	1.0	0.26	0.12	0.06	0.198	0.301	90.36	0.00	0.00	0.00	0.00	0.00	90.36	0.00	0.00	0.00	0.00	90.36	0.30
2:55	1.0	0.26	0.12	0.06	0.198	0.301	90.36	0.00	0.00	0.00	0.00	0.00	90.36	0.00	0.00	0.00	0.00	90.36	0.30
3:00	1.0	0.26	0.12	0.06	0.198	0.301	90.36	0.00	0.00	0.00	0.00	0.00	90.36	0.00	0.00	0.00	0.00	90.36	0.30
3:05	1.0	0.26	0.12	0.06	0.198	0.301	90.36	0.00	0.00	0.00	0.00	0.00	90.36	0.00	0.00	0.00	0.00	90.36	0.30
3:10	1.1	0.28	0.12	0.06	0.217	0.331	99.40	0.00	0.00	0.00	0.00	0.00	99.40	0.00	0.00	0.00	0.00	99.40	0.33
3:15	1.1	0.28	0.12	0.06	0.217	0.331	99.40	0.00	0.00	0.00	0.00	0.00	99.40	0.00	0.00	0.00	0.00	99.40	0.33
3:20	1.1	0.28	0.12	0.06	0.217	0.331	99.40	0.00	0.00	0.00	0.00	0.00	99.40	0.00	0.00	0.00	0.00	99.40	0.33
3:25	1.2	0.31	0.12	0.07	0.237	0.361	108.43	0.00	0.00	0.00	0.00	0.00	108.43	0.00	0.00	0.00	0.00	108.43	0.36
3:30	1.3	0.33	0.12	0.08	0.257	0.392	117.47	0.00	0.00	0.00	0.00	0.00	117.47	0.00	0.00	0.00	0.00	117.47	0.39
3:35	1.4	0.36	0.12	0.08	0.277	0.422	126.50	0.00	0.00	0.00	0.00	0.00	126.50	0.00	0.00	0.00	0.00	126.50	0.42
3:40	1.4	0.36	0.12	0.08	0.277	0.422	126.50	0.00	0.00	0.00	0.00	0.00	126.50	0.00	0.00	0.00	0.00	126.50	0.42
3:45	1.5	0.38	0.12	0.09	0.297	0.452	135.54	0.00	0.00	0.00	0.00	0.00	135.54	0.00	0.00	0.00	0.00	135.54	0.45
3:50	1.5	0.38	0.12	0.09	0.297	0.452	135.54	0.00	0.00	0.00	0.00	0.00	135.54	0.00	0.00	0.00	0.00	135.54	0.45
3:55	1.6	0.41	0.12	0.09	0.316	0.482	144.58	0.00	0.00	0.00	0.00	0.00	144.58	0.00	0.00	0.00	0.00	144.58	0.48
4:00	1.6	0.41	0.12	0.09	0.316	0.482	144.58	0.00	0.00	0.00	0.00	0.00	144.58	0.00	0.00	0.00	0.00	144.58	0.48
4:05	1.7	0.43	0.12	0.10	0.336	0.512	153.61	0.00	0.00	0.00	0.00	0.00	153.61	0.00	0.00	0.00	0.00	153.61	0.51

4:10	1.8	0.46	0.12	0.10	0.356	0.542	162.65	0.00	0.00	0.00	0.00	0.00	162.65	0.00	0.00	0.00	0.00	162.65	0.54
4:15	1.9	0.49	0.12	0.11	0.376	0.572	171.68	0.00	0.00	0.00	0.00	0.00	171.68	0.00	0.00	0.00	0.00	171.68	0.57
4:20	2.0	0.51	0.12	0.12	0.395	0.602	180.72	0.00	0.00	0.00	0.00	0.00	180.72	0.00	0.00	0.00	0.00	180.72	0.60
4:25	2.1	0.54	0.12	0.12	0.415	0.633	189.76	0.00	0.00	0.00	0.00	0.00	189.76	0.00	0.00	0.00	0.00	189.76	0.63
4:30	2.1	0.54	0.12	0.12	0.415	0.633	189.76	0.00	0.00	0.00	0.00	0.00	189.76	0.00	0.00	0.00	0.00	189.76	0.63
4:35	2.2	0.56	0.12	N/A	0.439	0.668	200.52	0.00	0.00	0.00	0.00	0.00	200.52	0.00	0.00	0.00	0.00	200.52	0.67
4:40	2.3	0.59	0.12	N/A	0.464	0.707	212.21	0.00	0.00	0.00	0.00	0.00	212.21	0.00	0.00	0.00	0.00	212.21	0.71
4:45	2.4	0.61	0.12	N/A	0.490	0.746	223.89	0.00	0.00	0.00	0.00	0.00	223.89	0.00	0.00	0.00	0.00	223.89	0.75
4:50	2.4	0.61	0.12	N/A	0.490	0.746	223.89	0.00	0.00	0.00	0.00	0.00	223.89	0.00	0.00	0.00	0.00	223.89	0.75
4:55	2.5	0.64	0.12	N/A	0.515	0.785	235.57	0.00	0.00	0.00	0.00	0.00	235.57	0.00	0.00	0.00	0.00	235.57	0.79
5:00	2.6	0.66	0.12	N/A	0.541	0.824	247.25	0.00	0.00	0.00	0.00	0.00	247.25	0.00	0.00	0.00	0.00	247.25	0.82
5:05	3.1	0.79	0.12	N/A	0.669	1.019	305.67	0.00	0.00	0.00	0.00	0.00	305.67	0.00	0.00	0.00	0.00	305.67	1.02
5:10	3.6	0.92	0.12	N/A	0.797	1.214	364.08	0.00	0.00	0.00	0.00	0.00	364.08	0.00	0.00	0.00	0.00	364.08	1.21
5:15	3.9	1.00	0.12	N/A	0.873	1.330	399.13	0.00	0.00	0.00	0.00	0.00	399.13	0.00	0.00	0.00	0.00	399.13	1.33
5:20	4.2	1.07	0.12	N/A	0.950	1.447	434.18	0.00	0.00	0.00	0.00	0.00	434.18	0.00	0.00	0.00	0.00	434.18	1.45
5:25	4.7	1.20	0.12	N/A	1.078	1.642	492.59	0.00	0.00	0.00	0.00	0.00	492.59	0.00	0.00	0.00	0.00	492.59	1.64
5:30	5.6	1.43	0.12	N/A	1.308	**1.992**	597.74	0.00	0.00	0.00	0.00	0.00	597.74	0.00	0.00	0.00	0.00	597.74	1.99
5:35	1.9	0.49	0.12	0.11	0.376	0.572	171.68	0.00	0.00	0.00	0.00	0.00	171.68	0.00	0.00	0.00	0.00	171.68	0.57
5:40	0.9	0.23	0.12	0.05	0.178	0.271	81.32	0.00	0.00	0.00	0.00	0.00	81.32	0.00	0.00	0.00	0.00	81.32	0.27
5:45	0.6	0.15	0.12	0.03	0.119	0.181	54.22	0.00	0.00	0.00	0.00	0.00	54.22	0.00	0.00	0.00	0.00	54.22	0.18
5:50	0.5	0.13	0.12	0.03	0.099	0.151	45.18	0.00	0.00	0.00	0.00	0.00	45.18	0.00	0.00	0.00	0.00	45.18	0.15
5:55	0.3	0.08	0.12	0.02	0.059	0.090	27.11	0.00	0.00	0.00	0.00	0.00	27.11	0.00	0.00	0.00	0.00	27.11	0.09
6:00	0.2	0.05	0.12	0.01	0.040	0.060	18.07	0.00	0.00	0.00	0.00	0.00	18.07	0.00	0.00	0.00	0.00	18.07	0.06
					Total volume (CF)		**9403.51**								**Total Overflow (CF)**			**9403.51**	

10 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.03	0.22	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
0:30	0.3	0.05	0.21	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
0:45	0.3	0.05	0.21	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
1:00	0.4	0.07	0.21	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
1:15	0.3	0.05	0.21	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
1:30	0.3	0.05	0.20	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
1:45	0.3	0.05	0.20	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
2:00	0.4	0.07	0.20	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
2:15	0.4	0.07	0.20	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
2:30	0.4	0.07	0.19	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
2:45	0.5	0.09	0.19	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
3:00	0.5	0.09	0.19	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
3:15	0.5	0.09	0.19	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
3:30	0.5	0.09	0.19	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
3:45	0.5	0.09	0.18	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
4:00	0.6	0.10	0.18	0.02	0.080	0.122	109.70	0.00	0.00	0.00	0.00	0.00	109.70	0.00	0.00	0.00	0.00	109.70	0.12
4:15	0.6	0.10	0.18	0.02	0.080	0.122	109.70	0.00	0.00	0.00	0.00	0.00	109.70	0.00	0.00	0.00	0.00	109.70	0.12
4:30	0.7	0.12	0.18	0.03	0.093	0.142	127.99	0.00	0.00	0.00	0.00	0.00	127.99	0.00	0.00	0.00	0.00	127.99	0.14
4:45	0.7	0.12	0.17	0.03	0.093	0.142	127.99	0.00	0.00	0.00	0.00	0.00	127.99	0.00	0.00	0.00	0.00	127.99	0.14
5:00	0.8	0.14	0.17	0.03	0.107	0.163	146.27	0.00	0.00	0.00	0.00	0.00	146.27	0.00	0.00	0.00	0.00	146.27	0.16
5:15	0.6	0.10	0.17	0.02	0.080	0.122	109.70	0.00	0.00	0.00	0.00	0.00	109.70	0.00	0.00	0.00	0.00	109.70	0.12
5:30	0.7	0.12	0.17	0.03	0.093	0.142	127.99	0.00	0.00	0.00	0.00	0.00	127.99	0.00	0.00	0.00	0.00	127.99	0.14
5:45	0.8	0.14	0.16	0.03	0.107	0.163	146.27	0.00	0.00	0.00	0.00	0.00	146.27	0.00	0.00	0.00	0.00	146.27	0.16
6:00	0.8	0.14	0.16	0.03	0.107	0.163	146.27	0.00	0.00	0.00	0.00	0.00	146.27	0.00	0.00	0.00	0.00	146.27	0.16
6:15	0.9	0.16	0.16	0.04	0.120	0.183	164.56	0.00	0.00	0.00	0.00	0.00	164.56	0.00	0.00	0.00	0.00	164.56	0.18
6:30	0.9	0.16	0.16	0.04	0.120	0.183	164.56	0.00	0.00	0.00	0.00	0.00	164.56	0.00	0.00	0.00	0.00	164.56	0.18
6:45	1.0	0.17	0.16	0.04	0.133	0.203	182.84	0.00	0.00	0.00	0.00	0.00	182.84	0.00	0.00	0.00	0.00	182.84	0.20
7:00	1.0	0.17	0.15	0.04	0.133	0.203	182.84	0.00	0.00	0.00	0.00	0.00	182.84	0.00	0.00	0.00	0.00	182.84	0.20
7:15	1.0	0.17	0.15	0.04	0.133	0.203	182.84	0.00	0.00	0.00	0.00	0.00	182.84	0.00	0.00	0.00	0.00	182.84	0.20
7:30	1.1	0.19	0.15	0.04	0.147	0.223	201.13	0.00	0.00	0.00	0.00	0.00	201.13	0.00	0.00	0.00	0.00	201.13	0.22
7:45	1.2	0.21	0.15	0.05	0.160	0.244	219.41	0.00	0.00	0.00	0.00	0.00	219.41	0.00	0.00	0.00	0.00	219.41	0.24
8:00	1.3	0.22	0.15	0.05	0.173	0.264	237.69	0.00	0.00	0.00	0.00	0.00	237.69	0.00	0.00	0.00	0.00	237.69	0.26
8:15	1.5	0.26	0.14	0.06	0.200	0.305	274.26	0.00	0.00	0.00	0.00	0.00	274.26	0.00	0.00	0.00	0.00	274.26	0.30
8:30	1.5	0.26	0.14	0.06	0.200	0.305	274.26	0.00	0.00	0.00	0.00	0.00	274.26	0.00	0.00	0.00	0.00	274.26	0.30
8:45	1.6	0.28	0.14	0.06	0.213	0.325	292.55	0.00	0.00	0.00	0.00	0.00	292.55	0.00	0.00	0.00	0.00	292.55	0.33
9:00	1.7	0.29	0.14	0.07	0.227	0.345	310.83	0.00	0.00	0.00	0.00	0.00	310.83	0.00	0.00	0.00	0.00	310.83	0.35
9:15	1.9	0.33	0.14	0.07	0.253	0.386	347.40	0.00	0.00	0.00	0.00	0.00	347.40	0.00	0.00	0.00	0.00	347.40	0.39
9:30	2.0	0.34	0.13	0.08	0.267	0.406	365.68	0.00	0.00	0.00	0.00	0.00	365.68	0.00	0.00	0.00	0.00	365.68	0.41
9:45	2.1	0.36	0.13	0.08	0.280	0.427	383.97	0.00	0.00	0.00	0.00	0.00	383.97	0.00	0.00	0.00	0.00	383.97	0.43
10:00	2.2	0.38	0.13	0.09	0.293	0.447	402.25	0.00	0.00	0.00	0.00	0.00	402.25	0.00	0.00	0.00	0.00	402.25	0.45
10:15	1.5	0.26	0.13	0.06	0.200	0.305	274.26	0.00	0.00	0.00	0.00	0.00	274.26	0.00	0.00	0.00	0.00	274.26	0.30
10:30	1.5	0.26	0.13	0.06	0.200	0.305	274.26	0.00	0.00	0.00	0.00	0.00	274.26	0.00	0.00	0.00	0.00	274.26	0.30
10:45	2.0	0.34	0.12	0.08	0.267	0.406	365.68	0.00	0.00	0.00	0.00	0.00	365.68	0.00	0.00	0.00	0.00	365.68	0.41
11:00	2.0	0.34	0.12	0.08	0.267	0.406	365.68	0.00	0.00	0.00	0.00	0.00	365.68	0.00	0.00	0.00	0.00	365.68	0.41
11:15	1.9	0.33	0.12	0.07	0.253	0.386	347.40	0.00	0.00	0.00	0.00	0.00	347.40	0.00	0.00	0.00	0.00	347.40	0.39
11:30	1.9	0.33	0.12	0.07	0.253	0.386	347.40	0.00	0.00	0.00	0.00	0.00	347.40	0.00	0.00	0.00	0.00	347.40	0.39
11:45	1.7	0.29	0.12	0.07	0.227	0.345	310.83	0.00	0.00	0.00	0.00	0.00	310.83	0.00	0.00	0.00	0.00	310.83	0.35
12:00	1.8	0.31	0.12	0.07	0.240	0.366	329.11	0.00	0.00	0.00	0.00	0.00	329.11	0.00	0.00	0.00	0.00	329.11	0.37
12:15	2.5	0.43	0.11	0.10	0.333	0.508	457.10	0.00	0.00	0.00	0.00	0.00	457.10	0.00	0.00	0.00	0.00	457.10	0.51

12:30	2.6	0.45	0.11	0.10	0.347	0.528	475.39	0.00	0.00	0.00	0.00	0.00	475.39	0.00	0.00	0.00	0.00	475.39	0.53
12:45	2.8	0.48	0.11	0.11	0.373	0.569	511.96	0.00	0.00	0.00	0.00	0.00	511.96	0.00	0.00	0.00	0.00	511.96	0.57
13:00	2.9	0.50	0.11	N/A	0.391	0.596	536.26	0.00	0.00	0.00	0.00	0.00	536.26	0.00	0.00	0.00	0.00	536.26	0.60
13:15	3.4	0.59	0.11	N/A	0.479	0.730	656.72	0.00	0.00	0.00	0.00	0.00	656.72	0.00	0.00	0.00	0.00	656.72	0.73
13:30	3.4	0.59	0.11	N/A	0.481	**0.732**	658.95	0.00	0.00	0.00	0.00	0.00	658.95	0.00	0.00	0.00	0.00	658.95	0.73
13:45	2.3	0.40	0.10	0.09	0.307	0.467	420.53	0.00	0.00	0.00	0.00	0.00	420.53	0.00	0.00	0.00	0.00	420.53	0.47
14:00	2.3	0.40	0.10	0.09	0.307	0.467	420.53	0.00	0.00	0.00	0.00	0.00	420.53	0.00	0.00	0.00	0.00	420.53	0.47
14:15	2.7	0.47	0.10	N/A	0.365	0.556	499.98	0.00	0.00	0.00	0.00	0.00	499.98	0.00	0.00	0.00	0.00	499.98	0.56
14:30	2.6	0.45	0.10	N/A	0.349	0.532	478.46	0.00	0.00	0.00	0.00	0.00	478.46	0.00	0.00	0.00	0.00	478.46	0.53
14:45	2.6	0.45	0.10	N/A	0.350	0.534	480.54	0.00	0.00	0.00	0.00	0.00	480.54	0.00	0.00	0.00	0.00	480.54	0.53
15:00	2.5	0.43	0.10	N/A	0.335	0.510	458.95	0.00	0.00	0.00	0.00	0.00	458.95	0.00	0.00	0.00	0.00	458.95	0.51
15:15	2.4	0.41	0.09	0.09	0.320	0.488	438.82	0.00	0.00	0.00	0.00	0.00	438.82	0.00	0.00	0.00	0.00	438.82	0.49
15:30	2.3	0.40	0.09	0.09	0.307	0.467	420.53	0.00	0.00	0.00	0.00	0.00	420.53	0.00	0.00	0.00	0.00	420.53	0.47
15:45	1.9	0.33	0.09	0.07	0.253	0.386	347.40	0.00	0.00	0.00	0.00	0.00	347.40	0.00	0.00	0.00	0.00	347.40	0.39
16:00	1.9	0.33	0.09	0.07	0.253	0.386	347.40	0.00	0.00	0.00	0.00	0.00	347.40	0.00	0.00	0.00	0.00	347.40	0.39
16:15	0.4	0.07	0.09	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
16:30	0.4	0.07	0.09	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
16:45	0.3	0.05	0.09	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
17:00	0.3	0.05	0.09	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
17:15	0.5	0.09	0.08	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
17:30	0.5	0.09	0.08	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
17:45	0.5	0.09	0.08	0.02	0.067	0.102	91.42	0.00	0.00	0.00	0.00	0.00	91.42	0.00	0.00	0.00	0.00	91.42	0.10
18:00	0.4	0.07	0.08	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
18:15	0.4	0.07	0.08	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
18:30	0.4	0.07	0.08	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
18:45	0.3	0.05	0.08	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
19:00	0.2	0.03	0.08	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
19:15	0.3	0.05	0.07	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
19:30	0.4	0.07	0.07	0.02	0.053	0.081	73.14	0.00	0.00	0.00	0.00	0.00	73.14	0.00	0.00	0.00	0.00	73.14	0.08
19:45	0.3	0.05	0.07	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
20:00	0.2	0.03	0.07	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
20:15	0.3	0.05	0.07	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
20:30	0.3	0.05	0.07	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
20:45	0.3	0.05	0.07	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
21:00	0.2	0.03	0.07	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
21:15	0.3	0.05	0.07	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
21:30	0.2	0.03	0.07	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
21:45	0.3	0.05	0.07	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
22:00	0.2	0.03	0.07	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
22:15	0.3	0.05	0.06	0.01	0.040	0.061	54.85	0.00	0.00	0.00	0.00	0.00	54.85	0.00	0.00	0.00	0.00	54.85	0.06
22:30	0.2	0.03	0.06	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
22:45	0.2	0.03	0.06	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
23:00	0.2	0.03	0.06	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
23:15	0.2	0.03	0.06	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
23:30	0.2	0.03	0.06	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
23:45	0.2	0.03	0.06	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
24:00	0.2	0.03	0.06	0.01	0.027	0.041	36.57	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	36.57	0.04
					Total volume (CF)		**18378.87**								**Total Overflow (CF)**			**18378.87**	

RCFC&WCD Short Cut Unit Hydrograph Method

Project: Beaumont Post-Development

Recurrence Interval	100	year			
Storm Duration (hrs)	1	3	6	24	
100-year NOAA Atlas 14 Point Precipitation (in)	1.920	2.570	3.460	6.730	
Unit time (minutes)	5	5	5	15	
Drainage Area	65819	SF	*1.511*	Ac.	
Soils Group	B				
AMC index Runoff Number (plate E-6.1)	65	Type:	Urban Covers; good		
Pervious Area Loss Rate (Fp)(in/hr) (plate E-6.2)	0.51	AMC II			
Percentage of Impervious Cover (Ai)(%) (plate E-6.3)	84				
Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.)	*0.12*	(used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))			
Low Loss Rate Percent (%)	*23*				
Percolation Rate (in/hr)	1.00	(Used for retention basin and drywell)			

Percolation is taken incrementally.
Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used
(Drywell can be "zeroed out" by reducing numbers to less than .001, but should not entered as zeros or program chokes.)
*Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)^2+(lower)*PI()*((diam/2)^2+0.4*((diam/2+(grav+0.4166))^2-(diam/2+0.4166)^2))*
The drywell wall thickness is assumed at 5" (0.4166) and the gravel bed width is variable "grav"

Drywell design factors

Upper sec. (FT)=	0.0001	Lower sec. (FT)=	0.0001	Ring diam. (FT) =	0.0001	Gravel bed width around drywell=	0.0001
Drywell lower max. (CF)=	0.00	Upper max.(CF)=	0.00	Drywell total(CF)=	0.00		

Retention Basin design factors

Top (SF)=	0.0001	Bot. (SF)=	0.0001	Max. Depth (FT)=	0.0001
Max. storage (CF)=	0.00	(d/3)*(bottom+top+(bottom*top)^0.50)			

Formulas vol=(h/3)*(bottom+top+(bottom*top)^0.50) area=bottom+(h/d)*(top-bottom) h=(vol*3)/(bottom+top+(bottom*top)^0.5)

100 -year 1 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	3.7	0.85	0.12	N/A	0.729	1.110	333.15	0.00	0.00	0.00	0.00	0.00	333.15	0.00	0.00	0.00	0.00	333.15	1.11
0:10	4.8	1.11	0.12	N/A	0.982	1.497	448.99	0.00	0.00	0.00	0.00	0.00	448.99	0.00	0.00	0.00	0.00	448.99	1.50
0:15	5.1	1.18	0.12	N/A	1.051	1.602	480.58	0.00	0.00	0.00	0.00	0.00	480.58	0.00	0.00	0.00	0.00	480.58	1.60
0:20	4.9	1.13	0.12	N/A	1.005	1.532	459.52	0.00	0.00	0.00	0.00	0.00	459.52	0.00	0.00	0.00	0.00	459.52	1.53
0:25	6.6	1.52	0.12	N/A	1.397	2.128	638.55	0.00	0.00	0.00	0.00	0.00	638.55	0.00	0.00	0.00	0.00	638.55	2.13
0:30	7.3	1.68	0.12	N/A	1.558	2.374	712.27	0.00	0.00	0.00	0.00	0.00	712.27	0.00	0.00	0.00	0.00	712.27	2.37
0:35	8.4	1.94	0.12	N/A	1.812	2.760	828.11	0.00	0.00	0.00	0.00	0.00	828.11	0.00	0.00	0.00	0.00	828.11	2.76
0:40	9.0	2.07	0.12	N/A	1.950	2.971	891.29	0.00	0.00	0.00	0.00	0.00	891.29	0.00	0.00	0.00	0.00	891.29	2.97
0:45	12.3	2.83	0.12	N/A	2.710	4.129	1238.82	0.00	0.00	0.00	0.00	0.00	1238.82	0.00	0.00	0.00	0.00	1238.82	4.13
0:50	17.6	4.06	0.12	N/A	3.931	**5.990**	1796.96	0.00	0.00	0.00	0.00	0.00	1796.96	0.00	0.00	0.00	0.00	1796.96	5.99
0:55	16.1	3.71	0.12	N/A	3.586	5.463	1639.00	0.00	0.00	0.00	0.00	0.00	1639.00	0.00	0.00	0.00	0.00	1639.00	5.46
1:00	4.2	0.97	0.12	N/A	0.844	1.286	385.80	0.00	0.00	0.00	0.00	0.00	385.80	0.00	0.00	0.00	0.00	385.80	1.29
					Total volume (CF)		**9853.03**								**Total Overflow (CF)**			**9853.03**	

100 -year 3 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	1.3	0.40	0.12	0.09	0.310	0.472	141.73	0.00	0.00	0.00	0.00	0.00	141.73	0.00	0.00	0.00	0.00	141.73	0.47
0:10	1.3	0.40	0.12	0.09	0.310	0.472	141.73	0.00	0.00	0.00	0.00	0.00	141.73	0.00	0.00	0.00	0.00	141.73	0.47
0:15	1.1	0.34	0.12	0.08	0.262	0.400	119.93	0.00	0.00	0.00	0.00	0.00	119.93	0.00	0.00	0.00	0.00	119.93	0.40
0:20	1.5	0.46	0.12	0.10	0.358	0.545	163.54	0.00	0.00	0.00	0.00	0.00	163.54	0.00	0.00	0.00	0.00	163.54	0.55
0:25	1.5	0.46	0.12	0.10	0.358	0.545	163.54	0.00	0.00	0.00	0.00	0.00	163.54	0.00	0.00	0.00	0.00	163.54	0.55
0:30	1.8	0.56	0.12	N/A	0.432	0.657	197.23	0.00	0.00	0.00	0.00	0.00	197.23	0.00	0.00	0.00	0.00	197.23	0.66
0:35	1.5	0.46	0.12	0.10	0.358	0.545	163.54	0.00	0.00	0.00	0.00	0.00	163.54	0.00	0.00	0.00	0.00	163.54	0.55
0:40	1.8	0.56	0.12	N/A	0.432	0.657	197.23	0.00	0.00	0.00	0.00	0.00	197.23	0.00	0.00	0.00	0.00	197.23	0.66
0:45	1.8	0.56	0.12	N/A	0.432	0.657	197.23	0.00	0.00	0.00	0.00	0.00	197.23	0.00	0.00	0.00	0.00	197.23	0.66
0:50	1.5	0.46	0.12	0.10	0.358	0.545	163.54	0.00	0.00	0.00	0.00	0.00	163.54	0.00	0.00	0.00	0.00	163.54	0.55
0:55	1.6	0.49	0.12	0.11	0.382	0.581	174.44	0.00	0.00	0.00	0.00	0.00	174.44	0.00	0.00	0.00	0.00	174.44	0.58
1:00	1.8	0.56	0.12	N/A	0.432	0.657	197.23	0.00	0.00	0.00	0.00	0.00	197.23	0.00	0.00	0.00	0.00	197.23	0.66
1:05	2.2	0.68	0.12	N/A	0.555	0.845	253.62	0.00	0.00	0.00	0.00	0.00	253.62	0.00	0.00	0.00	0.00	253.62	0.85
1:10	2.2	0.68	0.12	N/A	0.555	0.845	253.62	0.00	0.00	0.00	0.00	0.00	253.62	0.00	0.00	0.00	0.00	253.62	0.85
1:15	2.2	0.68	0.12	N/A	0.555	0.845	253.62	0.00	0.00	0.00	0.00	0.00	253.62	0.00	0.00	0.00	0.00	253.62	0.85
1:20	2.0	0.62	0.12	N/A	0.493	0.751	225.42	0.00	0.00	0.00	0.00	0.00	225.42	0.00	0.00	0.00	0.00	225.42	0.75
1:25	2.6	0.80	0.12	N/A	0.678	1.033	310.00	0.00	0.00	0.00	0.00	0.00	310.00	0.00	0.00	0.00	0.00	310.00	1.03
1:30	2.7	0.83	0.12	N/A	0.709	1.080	324.10	0.00	0.00	0.00	0.00	0.00	324.10	0.00	0.00	0.00	0.00	324.10	1.08
1:35	2.4	0.74	0.12	N/A	0.617	0.939	281.81	0.00	0.00	0.00	0.00	0.00	281.81	0.00	0.00	0.00	0.00	281.81	0.94
1:40	2.7	0.83	0.12	N/A	0.709	1.080	324.10	0.00	0.00	0.00	0.00	0.00	324.10	0.00	0.00	0.00	0.00	324.10	1.08
1:45	3.3	1.02	0.12	N/A	0.894	1.362	408.68	0.00	0.00	0.00	0.00	0.00	408.68	0.00	0.00	0.00	0.00	408.68	1.36
1:50	3.1	0.96	0.12	N/A	0.832	1.268	380.48	0.00	0.00	0.00	0.00	0.00	380.48	0.00	0.00	0.00	0.00	380.48	1.27
1:55	2.9	0.89	0.12	N/A	0.771	1.174	352.29	0.00	0.00	0.00	0.00	0.00	352.29	0.00	0.00	0.00	0.00	352.29	1.17
2:00	3.0	0.93	0.12	N/A	0.802	1.221	366.39	0.00	0.00	0.00	0.00	0.00	366.39	0.00	0.00	0.00	0.00	366.39	1.22
2:05	3.1	0.96	0.12	N/A	0.832	1.268	380.48	0.00	0.00	0.00	0.00	0.00	380.48	0.00	0.00	0.00	0.00	380.48	1.27
2:10	4.2	1.30	0.12	N/A	1.172	1.785	535.54	0.00	0.00	0.00	0.00	0.00	535.54	0.00	0.00	0.00	0.00	535.54	1.79
2:15	5.0	1.54	0.12	N/A	1.418	2.161	648.31	0.00	0.00	0.00	0.00	0.00	648.31	0.00	0.00	0.00	0.00	648.31	2.16
2:20	3.5	1.08	0.12	N/A	0.956	1.456	436.87	0.00	0.00	0.00	0.00	0.00	436.87	0.00	0.00	0.00	0.00	436.87	1.46
2:25	6.8	2.10	0.12	N/A	1.974	3.007	902.04	0.00	0.00	0.00	0.00	0.00	902.04	0.00	0.00	0.00	0.00	902.04	3.01
2:30	7.3	2.25	0.12	N/A	2.128	3.242	972.52	0.00	0.00	0.00	0.00	0.00	972.52	0.00	0.00	0.00	0.00	972.52	3.24
2:35	8.2	2.53	0.12	N/A	2.405	**3.665**	1099.39	0.00	0.00	0.00	0.00	0.00	1099.39	0.00	0.00	0.00	0.00	1099.39	3.66
2:40	5.9	1.82	0.12	N/A	1.696	2.584	775.18	0.00	0.00	0.00	0.00	0.00	775.18	0.00	0.00	0.00	0.00	775.18	2.58
2:45	2.0	0.62	0.12	N/A	0.493	0.751	225.42	0.00	0.00	0.00	0.00	0.00	225.42	0.00	0.00	0.00	0.00	225.42	0.75
2:50	1.8	0.56	0.12	N/A	0.432	0.657	197.23	0.00	0.00	0.00	0.00	0.00	197.23	0.00	0.00	0.00	0.00	197.23	0.66
2:55	1.8	0.56	0.12	N/A	0.432	0.657	197.23	0.00	0.00	0.00	0.00	0.00	197.23	0.00	0.00	0.00	0.00	197.23	0.66
3:00	0.6	0.19	0.12	0.04	0.143	0.218	65.42	0.00	0.00	0.00	0.00	0.00	65.42	0.00	0.00	0.00	0.00	65.42	0.22
					Total volume (CF)		**12190.67**								**Total Overflow (CF)**			**12190.67**	

100 -year 6 Hour Storm in 5 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:05	0.5	0.21	0.12	0.05	0.161	0.245	73.39	0.00	0.00	0.00	0.00	0.00	73.39	0.00	0.00	0.00	0.00	73.39	0.24
0:10	0.6	0.25	0.12	0.06	0.193	0.294	88.07	0.00	0.00	0.00	0.00	0.00	88.07	0.00	0.00	0.00	0.00	88.07	0.29
0:15	0.6	0.25	0.12	0.06	0.193	0.294	88.07	0.00	0.00	0.00	0.00	0.00	88.07	0.00	0.00	0.00	0.00	88.07	0.29
0:20	0.6	0.25	0.12	0.06	0.193	0.294	88.07	0.00	0.00	0.00	0.00	0.00	88.07	0.00	0.00	0.00	0.00	88.07	0.29
0:25	0.6	0.25	0.12	0.06	0.193	0.294	88.07	0.00	0.00	0.00	0.00	0.00	88.07	0.00	0.00	0.00	0.00	88.07	0.29
0:30	0.7	0.29	0.12	0.07	0.225	0.342	102.75	0.00	0.00	0.00	0.00	0.00	102.75	0.00	0.00	0.00	0.00	102.75	0.34
0:35	0.7	0.29	0.12	0.07	0.225	0.342	102.75	0.00	0.00	0.00	0.00	0.00	102.75	0.00	0.00	0.00	0.00	102.75	0.34
0:40	0.7	0.29	0.12	0.07	0.225	0.342	102.75	0.00	0.00	0.00	0.00	0.00	102.75	0.00	0.00	0.00	0.00	102.75	0.34
0:45	0.7	0.29	0.12	0.07	0.225	0.342	102.75	0.00	0.00	0.00	0.00	0.00	102.75	0.00	0.00	0.00	0.00	102.75	0.34
0:50	0.7	0.29	0.12	0.07	0.225	0.342	102.75	0.00	0.00	0.00	0.00	0.00	102.75	0.00	0.00	0.00	0.00	102.75	0.34
0:55	0.7	0.29	0.12	0.07	0.225	0.342	102.75	0.00	0.00	0.00	0.00	0.00	102.75	0.00	0.00	0.00	0.00	102.75	0.34
1:00	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:05	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:10	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:15	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:20	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:25	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:30	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:35	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:40	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:45	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:50	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
1:55	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
2:00	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:05	0.8	0.33	0.12	0.08	0.257	0.391	117.43	0.00	0.00	0.00	0.00	0.00	117.43	0.00	0.00	0.00	0.00	117.43	0.39
2:10	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:15	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:20	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:25	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:30	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:35	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:40	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
2:45	1.0	0.42	0.12	0.09	0.321	0.489	146.78	0.00	0.00	0.00	0.00	0.00	146.78	0.00	0.00	0.00	0.00	146.78	0.49
2:50	1.0	0.42	0.12	0.09	0.321	0.489	146.78	0.00	0.00	0.00	0.00	0.00	146.78	0.00	0.00	0.00	0.00	146.78	0.49
2:55	1.0	0.42	0.12	0.09	0.321	0.489	146.78	0.00	0.00	0.00	0.00	0.00	146.78	0.00	0.00	0.00	0.00	146.78	0.49
3:00	1.0	0.42	0.12	0.09	0.321	0.489	146.78	0.00	0.00	0.00	0.00	0.00	146.78	0.00	0.00	0.00	0.00	146.78	0.49
3:05	1.0	0.42	0.12	0.09	0.321	0.489	146.78	0.00	0.00	0.00	0.00	0.00	146.78	0.00	0.00	0.00	0.00	146.78	0.49
3:10	1.1	0.46	0.12	0.10	0.353	0.538	161.46	0.00	0.00	0.00	0.00	0.00	161.46	0.00	0.00	0.00	0.00	161.46	0.54
3:15	1.1	0.46	0.12	0.10	0.353	0.538	161.46	0.00	0.00	0.00	0.00	0.00	161.46	0.00	0.00	0.00	0.00	161.46	0.54
3:20	1.1	0.46	0.12	0.10	0.353	0.538	161.46	0.00	0.00	0.00	0.00	0.00	161.46	0.00	0.00	0.00	0.00	161.46	0.54
3:25	1.2	0.50	0.12	0.11	0.385	0.587	176.14	0.00	0.00	0.00	0.00	0.00	176.14	0.00	0.00	0.00	0.00	176.14	0.59
3:30	1.3	0.54	0.12	0.12	0.417	0.636	190.82	0.00	0.00	0.00	0.00	0.00	190.82	0.00	0.00	0.00	0.00	190.82	0.64
3:35	1.4	0.58	0.12	N/A	0.458	0.697	209.19	0.00	0.00	0.00	0.00	0.00	209.19	0.00	0.00	0.00	0.00	209.19	0.70
3:40	1.4	0.58	0.12	N/A	0.458	0.697	209.19	0.00	0.00	0.00	0.00	0.00	209.19	0.00	0.00	0.00	0.00	209.19	0.70
3:45	1.5	0.62	0.12	N/A	0.499	0.761	228.17	0.00	0.00	0.00	0.00	0.00	228.17	0.00	0.00	0.00	0.00	228.17	0.76
3:50	1.5	0.62	0.12	N/A	0.499	0.761	228.17	0.00	0.00	0.00	0.00	0.00	228.17	0.00	0.00	0.00	0.00	228.17	0.76
3:55	1.6	0.66	0.12	N/A	0.541	0.824	247.14	0.00	0.00	0.00	0.00	0.00	247.14	0.00	0.00	0.00	0.00	247.14	0.82
4:00	1.6	0.66	0.12	N/A	0.541	0.824	247.14	0.00	0.00	0.00	0.00	0.00	247.14	0.00	0.00	0.00	0.00	247.14	0.82
4:05	1.7	0.71	0.12	N/A	0.582	0.887	266.12	0.00	0.00	0.00	0.00	0.00	266.12	0.00	0.00	0.00	0.00	266.12	0.89

4:10	1.8	0.75	0.12	N/A	0.624	0.950	285.10	0.00	0.00	0.00	0.00	0.00	285.10	0.00	0.00	0.00	0.00	285.10	0.95
4:15	1.9	0.79	0.12	N/A	0.665	1.014	304.08	0.00	0.00	0.00	0.00	0.00	304.08	0.00	0.00	0.00	0.00	304.08	1.01
4:20	2.0	0.83	0.12	N/A	0.707	1.077	323.06	0.00	0.00	0.00	0.00	0.00	323.06	0.00	0.00	0.00	0.00	323.06	1.08
4:25	2.1	0.87	0.12	N/A	0.748	1.140	342.03	0.00	0.00	0.00	0.00	0.00	342.03	0.00	0.00	0.00	0.00	342.03	1.14
4:30	2.1	0.87	0.12	N/A	0.748	1.140	342.03	0.00	0.00	0.00	0.00	0.00	342.03	0.00	0.00	0.00	0.00	342.03	1.14
4:35	2.2	0.91	0.12	N/A	0.790	1.203	361.01	0.00	0.00	0.00	0.00	0.00	361.01	0.00	0.00	0.00	0.00	361.01	1.20
4:40	2.3	0.95	0.12	N/A	0.831	1.267	379.99	0.00	0.00	0.00	0.00	0.00	379.99	0.00	0.00	0.00	0.00	379.99	1.27
4:45	2.4	1.00	0.12	N/A	0.873	1.330	398.97	0.00	0.00	0.00	0.00	0.00	398.97	0.00	0.00	0.00	0.00	398.97	1.33
4:50	2.4	1.00	0.12	N/A	0.873	1.330	398.97	0.00	0.00	0.00	0.00	0.00	398.97	0.00	0.00	0.00	0.00	398.97	1.33
4:55	2.5	1.04	0.12	N/A	0.914	1.393	417.94	0.00	0.00	0.00	0.00	0.00	417.94	0.00	0.00	0.00	0.00	417.94	1.39
5:00	2.6	1.08	0.12	N/A	0.956	1.456	436.92	0.00	0.00	0.00	0.00	0.00	436.92	0.00	0.00	0.00	0.00	436.92	1.46
5:05	3.1	1.29	0.12	N/A	1.164	1.773	531.81	0.00	0.00	0.00	0.00	0.00	531.81	0.00	0.00	0.00	0.00	531.81	1.77
5:10	3.6	1.49	0.12	N/A	1.371	2.089	626.70	0.00	0.00	0.00	0.00	0.00	626.70	0.00	0.00	0.00	0.00	626.70	2.09
5:15	3.9	1.62	0.12	N/A	1.496	2.279	683.63	0.00	0.00	0.00	0.00	0.00	683.63	0.00	0.00	0.00	0.00	683.63	2.28
5:20	4.2	1.74	0.12	N/A	1.620	2.469	740.57	0.00	0.00	0.00	0.00	0.00	740.57	0.00	0.00	0.00	0.00	740.57	2.47
5:25	4.7	1.95	0.12	N/A	1.828	2.785	835.46	0.00	0.00	0.00	0.00	0.00	835.46	0.00	0.00	0.00	0.00	835.46	2.78
5:30	5.6	2.33	0.12	N/A	2.202	**3.354**	1006.26	0.00	0.00	0.00	0.00	0.00	1006.26	0.00	0.00	0.00	0.00	1006.26	3.35
5:35	1.9	0.79	0.12	N/A	0.665	1.014	304.08	0.00	0.00	0.00	0.00	0.00	304.08	0.00	0.00	0.00	0.00	304.08	1.01
5:40	0.9	0.37	0.12	0.08	0.289	0.440	132.10	0.00	0.00	0.00	0.00	0.00	132.10	0.00	0.00	0.00	0.00	132.10	0.44
5:45	0.6	0.25	0.12	0.06	0.193	0.294	88.07	0.00	0.00	0.00	0.00	0.00	88.07	0.00	0.00	0.00	0.00	88.07	0.29
5:50	0.5	0.21	0.12	0.05	0.161	0.245	73.39	0.00	0.00	0.00	0.00	0.00	73.39	0.00	0.00	0.00	0.00	73.39	0.24
5:55	0.3	0.12	0.12	0.03	0.096	0.147	44.03	0.00	0.00	0.00	0.00	0.00	44.03	0.00	0.00	0.00	0.00	44.03	0.15
6:00	0.2	0.08	0.12	0.02	0.064	0.098	29.36	0.00	0.00	0.00	0.00	0.00	29.36	0.00	0.00	0.00	0.00	29.36	0.10
					Total volume (CF)		**15931.44**								**Total Overflow (CF)**			**15931.44**	

100 -year 24 Hour Storm in 15 minute increments

Time	Pattern %	Storm Rain (in/hr)	Loss Rate Value Max.	Min.	Effective Rain (in/hr)	Flow Rate (CFS)	Flow Vol. (CF)	Outside Input (CF)	Drywell Retention Area (sf)	Drywell Period Perc. (CF)	Drywell Storage Vol. (CF)	Drywell Storage Depth (ft)	Overflow To Basin (CF)	Retention Area (sf)	Basin Period Perc. (CF)	Basin Storage Vol. (CF)	Basin Storage Depth (ft)	Overflow Vol. (CF)	Overflow Rate (CFS)
0:15	0.2	0.05	0.22	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
0:30	0.3	0.08	0.21	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
0:45	0.3	0.08	0.21	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
1:00	0.4	0.11	0.21	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
1:15	0.3	0.08	0.21	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
1:30	0.3	0.08	0.20	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
1:45	0.3	0.08	0.20	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
2:00	0.4	0.11	0.20	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
2:15	0.4	0.11	0.20	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
2:30	0.4	0.11	0.19	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
2:45	0.5	0.13	0.19	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
3:00	0.5	0.13	0.19	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
3:15	0.5	0.13	0.19	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
3:30	0.5	0.13	0.19	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
3:45	0.5	0.13	0.18	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
4:00	0.6	0.16	0.18	0.04	0.125	0.190	171.30	0.00	0.00	0.00	0.00	0.00	171.30	0.00	0.00	0.00	0.00	171.30	0.19
4:15	0.6	0.16	0.18	0.04	0.125	0.190	171.30	0.00	0.00	0.00	0.00	0.00	171.30	0.00	0.00	0.00	0.00	171.30	0.19
4:30	0.7	0.19	0.18	0.04	0.146	0.222	199.85	0.00	0.00	0.00	0.00	0.00	199.85	0.00	0.00	0.00	0.00	199.85	0.22
4:45	0.7	0.19	0.17	0.04	0.146	0.222	199.85	0.00	0.00	0.00	0.00	0.00	199.85	0.00	0.00	0.00	0.00	199.85	0.22
5:00	0.8	0.22	0.17	0.05	0.167	0.254	228.40	0.00	0.00	0.00	0.00	0.00	228.40	0.00	0.00	0.00	0.00	228.40	0.25
5:15	0.6	0.16	0.17	0.04	0.125	0.190	171.30	0.00	0.00	0.00	0.00	0.00	171.30	0.00	0.00	0.00	0.00	171.30	0.19
5:30	0.7	0.19	0.17	0.04	0.146	0.222	199.85	0.00	0.00	0.00	0.00	0.00	199.85	0.00	0.00	0.00	0.00	199.85	0.22
5:45	0.8	0.22	0.16	0.05	0.167	0.254	228.40	0.00	0.00	0.00	0.00	0.00	228.40	0.00	0.00	0.00	0.00	228.40	0.25
6:00	0.8	0.22	0.16	0.05	0.167	0.254	228.40	0.00	0.00	0.00	0.00	0.00	228.40	0.00	0.00	0.00	0.00	228.40	0.25
6:15	0.9	0.24	0.16	0.05	0.187	0.286	256.95	0.00	0.00	0.00	0.00	0.00	256.95	0.00	0.00	0.00	0.00	256.95	0.29
6:30	0.9	0.24	0.16	0.05	0.187	0.286	256.95	0.00	0.00	0.00	0.00	0.00	256.95	0.00	0.00	0.00	0.00	256.95	0.29
6:45	1.0	0.27	0.16	0.06	0.208	0.317	285.50	0.00	0.00	0.00	0.00	0.00	285.50	0.00	0.00	0.00	0.00	285.50	0.32
7:00	1.0	0.27	0.15	0.06	0.208	0.317	285.50	0.00	0.00	0.00	0.00	0.00	285.50	0.00	0.00	0.00	0.00	285.50	0.32
7:15	1.0	0.27	0.15	0.06	0.208	0.317	285.50	0.00	0.00	0.00	0.00	0.00	285.50	0.00	0.00	0.00	0.00	285.50	0.32
7:30	1.1	0.30	0.15	0.07	0.229	0.349	314.05	0.00	0.00	0.00	0.00	0.00	314.05	0.00	0.00	0.00	0.00	314.05	0.35
7:45	1.2	0.32	0.15	0.07	0.250	0.381	342.60	0.00	0.00	0.00	0.00	0.00	342.60	0.00	0.00	0.00	0.00	342.60	0.38
8:00	1.3	0.35	0.15	0.08	0.271	0.412	371.16	0.00	0.00	0.00	0.00	0.00	371.16	0.00	0.00	0.00	0.00	371.16	0.41
8:15	1.5	0.40	0.14	0.09	0.312	0.476	428.26	0.00	0.00	0.00	0.00	0.00	428.26	0.00	0.00	0.00	0.00	428.26	0.48
8:30	1.5	0.40	0.14	0.09	0.312	0.476	428.26	0.00	0.00	0.00	0.00	0.00	428.26	0.00	0.00	0.00	0.00	428.26	0.48
8:45	1.6	0.43	0.14	0.10	0.333	0.508	456.81	0.00	0.00	0.00	0.00	0.00	456.81	0.00	0.00	0.00	0.00	456.81	0.51
9:00	1.7	0.46	0.14	0.10	0.354	0.539	485.36	0.00	0.00	0.00	0.00	0.00	485.36	0.00	0.00	0.00	0.00	485.36	0.54
9:15	1.9	0.51	0.14	0.12	0.396	0.603	542.46	0.00	0.00	0.00	0.00	0.00	542.46	0.00	0.00	0.00	0.00	542.46	0.60
9:30	2.0	0.54	0.13	0.12	0.416	0.634	571.01	0.00	0.00	0.00	0.00	0.00	571.01	0.00	0.00	0.00	0.00	571.01	0.63
9:45	2.1	0.57	0.13	0.13	0.437	0.666	599.56	0.00	0.00	0.00	0.00	0.00	599.56	0.00	0.00	0.00	0.00	599.56	0.67
10:00	2.2	0.59	0.13	N/A	0.462	0.704	633.54	0.00	0.00	0.00	0.00	0.00	633.54	0.00	0.00	0.00	0.00	633.54	0.70
10:15	1.5	0.40	0.13	0.09	0.312	0.476	428.26	0.00	0.00	0.00	0.00	0.00	428.26	0.00	0.00	0.00	0.00	428.26	0.48
10:30	1.5	0.40	0.13	0.09	0.312	0.476	428.26	0.00	0.00	0.00	0.00	0.00	428.26	0.00	0.00	0.00	0.00	428.26	0.48
10:45	2.0	0.54	0.12	0.12	0.416	0.634	571.01	0.00	0.00	0.00	0.00	0.00	571.01	0.00	0.00	0.00	0.00	571.01	0.63
11:00	2.0	0.54	0.12	0.12	0.416	0.634	571.01	0.00	0.00	0.00	0.00	0.00	571.01	0.00	0.00	0.00	0.00	571.01	0.63
11:15	1.9	0.51	0.12	0.12	0.396	0.603	542.46	0.00	0.00	0.00	0.00	0.00	542.46	0.00	0.00	0.00	0.00	542.46	0.60
11:30	1.9	0.51	0.12	0.12	0.396	0.603	542.46	0.00	0.00	0.00	0.00	0.00	542.46	0.00	0.00	0.00	0.00	542.46	0.60
11:45	1.7	0.46	0.12	0.10	0.354	0.539	485.36	0.00	0.00	0.00	0.00	0.00	485.36	0.00	0.00	0.00	0.00	485.36	0.54
12:00	1.8	0.48	0.12	0.11	0.375	0.571	513.91	0.00	0.00	0.00	0.00	0.00	513.91	0.00	0.00	0.00	0.00	513.91	0.57
12:15	2.5	0.67	0.11	N/A	0.559	0.852	766.59	0.00	0.00	0.00	0.00	0.00	766.59	0.00	0.00	0.00	0.00	766.59	0.85

12:30	2.6	0.70	0.11	N/A	0.588	0.895	805.84	0.00	0.00	0.00	0.00	0.00	805.84	0.00	0.00	0.00	0.00	805.84	0.90
12:45	2.8	0.75	0.11	N/A	0.643	0.980	881.99	0.00	0.00	0.00	0.00	0.00	881.99	0.00	0.00	0.00	0.00	881.99	0.98
13:00	2.9	0.78	0.11	N/A	0.672	1.024	921.19	0.00	0.00	0.00	0.00	0.00	921.19	0.00	0.00	0.00	0.00	921.19	1.02
13:15	3.4	0.92	0.11	N/A	0.808	1.231	1108.02	0.00	0.00	0.00	0.00	0.00	1108.02	0.00	0.00	0.00	0.00	1108.02	1.23
13:30	3.4	0.92	0.11	N/A	0.810	**1.234**	1110.25	0.00	0.00	0.00	0.00	0.00	1110.25	0.00	0.00	0.00	0.00	1110.25	1.23
13:45	2.3	0.62	0.10	N/A	0.515	0.785	706.40	0.00	0.00	0.00	0.00	0.00	706.40	0.00	0.00	0.00	0.00	706.40	0.78
14:00	2.3	0.62	0.10	N/A	0.517	0.787	708.57	0.00	0.00	0.00	0.00	0.00	708.57	0.00	0.00	0.00	0.00	708.57	0.79
14:15	2.7	0.73	0.10	N/A	0.626	0.954	858.37	0.00	0.00	0.00	0.00	0.00	858.37	0.00	0.00	0.00	0.00	858.37	0.95
14:30	2.6	0.70	0.10	N/A	0.601	0.915	823.57	0.00	0.00	0.00	0.00	0.00	823.57	0.00	0.00	0.00	0.00	823.57	0.92
14:45	2.6	0.70	0.10	N/A	0.602	0.917	825.65	0.00	0.00	0.00	0.00	0.00	825.65	0.00	0.00	0.00	0.00	825.65	0.92
15:00	2.5	0.67	0.10	N/A	0.577	0.879	790.79	0.00	0.00	0.00	0.00	0.00	790.79	0.00	0.00	0.00	0.00	790.79	0.88
15:15	2.4	0.65	0.09	N/A	0.551	0.840	755.90	0.00	0.00	0.00	0.00	0.00	755.90	0.00	0.00	0.00	0.00	755.90	0.84
15:30	2.3	0.62	0.09	N/A	0.526	0.801	720.97	0.00	0.00	0.00	0.00	0.00	720.97	0.00	0.00	0.00	0.00	720.97	0.80
15:45	1.9	0.51	0.09	N/A	0.420	0.639	575.28	0.00	0.00	0.00	0.00	0.00	575.28	0.00	0.00	0.00	0.00	575.28	0.64
16:00	1.9	0.51	0.09	N/A	0.421	0.641	577.20	0.00	0.00	0.00	0.00	0.00	577.20	0.00	0.00	0.00	0.00	577.20	0.64
16:15	0.4	0.11	0.09	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
16:30	0.4	0.11	0.09	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
16:45	0.3	0.08	0.09	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
17:00	0.3	0.08	0.09	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
17:15	0.5	0.13	0.08	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
17:30	0.5	0.13	0.08	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
17:45	0.5	0.13	0.08	0.03	0.104	0.159	142.75	0.00	0.00	0.00	0.00	0.00	142.75	0.00	0.00	0.00	0.00	142.75	0.16
18:00	0.4	0.11	0.08	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
18:15	0.4	0.11	0.08	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
18:30	0.4	0.11	0.08	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
18:45	0.3	0.08	0.08	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
19:00	0.2	0.05	0.08	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
19:15	0.3	0.08	0.07	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
19:30	0.4	0.11	0.07	0.02	0.083	0.127	114.20	0.00	0.00	0.00	0.00	0.00	114.20	0.00	0.00	0.00	0.00	114.20	0.13
19:45	0.3	0.08	0.07	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
20:00	0.2	0.05	0.07	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
20:15	0.3	0.08	0.07	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
20:30	0.3	0.08	0.07	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
20:45	0.3	0.08	0.07	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
21:00	0.2	0.05	0.07	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
21:15	0.3	0.08	0.07	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
21:30	0.2	0.05	0.07	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
21:45	0.3	0.08	0.07	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
22:00	0.2	0.05	0.07	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
22:15	0.3	0.08	0.06	0.02	0.062	0.095	85.65	0.00	0.00	0.00	0.00	0.00	85.65	0.00	0.00	0.00	0.00	85.65	0.10
22:30	0.2	0.05	0.06	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
22:45	0.2	0.05	0.06	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
23:00	0.2	0.05	0.06	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
23:15	0.2	0.05	0.06	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
23:30	0.2	0.05	0.06	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
23:45	0.2	0.05	0.06	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
24:00	0.2	0.05	0.06	0.01	0.042	0.063	57.10	0.00	0.00	0.00	0.00	0.00	57.10	0.00	0.00	0.00	0.00	57.10	0.06
					Total volume (CF)		**29758.17**								**Total Overflow (CF)**			**29758.17**	

Pre-Dev Runoff Volume

	2	5	10	100
1	841.39	1574.94	3243.60	8227.38
3	797.31	1361.04	2778.79	7414.30
6	970.39	1541.52	3109.48	7731.16
24	1524.81	1985.54	3556.73	10394.72

Post-Dev Runoff Volume

	2	5	10	100
1	2655.68	3691.66	4875.61	9853.03
3	4264.12	5523.87	6835.36	12190.67
6	6138.06	7785.56	9403.51	15391.44
24	11793.47	15356.97	18378.87	29758.17

BMP Storage Volume

DMA 1	0.00	cf
DMA 2	284.20	cf
DMA 3	275.40	cf
DMA 4	2954.60	cf
DMA 5	176.20	cf

BMP Volume *3690.4* cf

Runoff Volume Increase

	2	5	10	100
1	*1814.29*	*2116.72*	*1632.01*	*1625.65*
3	*3466.81*	*4162.83*	*4056.57*	*4776.37*
6	*5167.67*	*6244.04*	*6294.03*	*7660.28*
24	*10268.66*	*13371.43*	*14822.14*	**19363.45**

Detention Volume Required

15673.1 **cf**

Outlet Flowrate to Empty

24 hrs duration

0.224 **cfs**

PRINSCO WATER MANAGEMENT SOLUTIONS

*Ensure correct unit type is selected

HydroStor

PROJECT DESCRIPTION

Project Name: Harb-Beaumont

Date: ____ / ____ / ____

City/State: ____ / ____

Phone #: ____

Engineer: MTH2 Engineering, Inc

Contractor: ____

Designed By: MLA

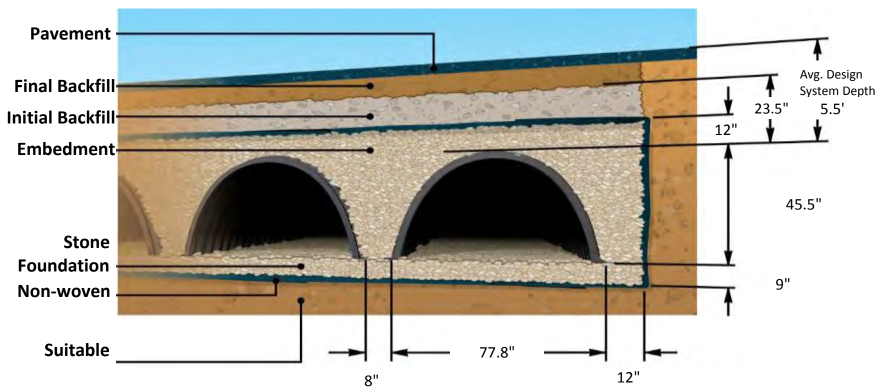
Prinsco Rep: ____

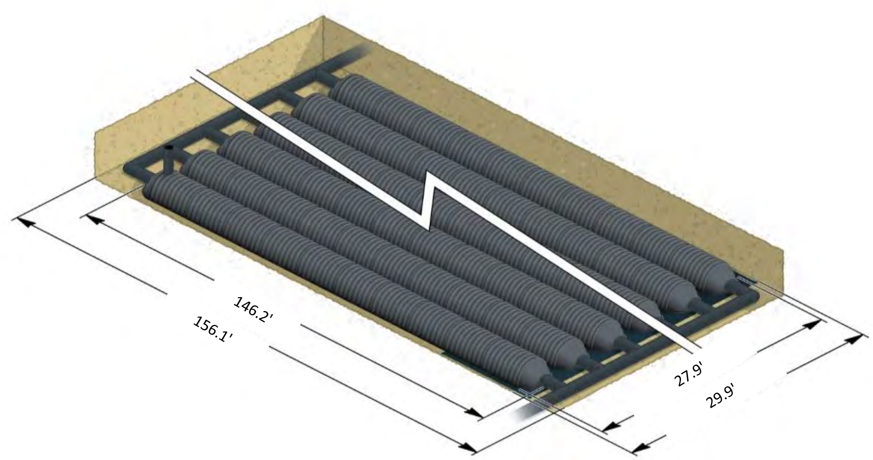
DESIGN CRITERIA - BASED ON STORAGE VOLUME

Chamber Size	HS180	Constraint on System Dimensions	Width	Number of Manifolds	2	Manifold Diameter	24 (in)	Include Manifold Volume?	Yes
*Units	Standard								
Target Storage Volume	15673 (cf)	Constraint Limit	35 (ft)	Stone Porosity	40 %	Bottom of Stone Elevation	0 (ft)	Max. Pavement Elevation	10 (ft)
Min. Pavement Elevation	10 (ft)								
Additional Stone Above Chamber*	0 (in)	Additional Stone Below Chamber*	0 (in)	Additional Stone Side of Chamber*	0 (in)	Additional Stone Between Chambers*	0 (in)		

* Minimum recommended values are already included in calculations

SYSTEM LAYOUT





NOTES ON COVER ABOVE CHAMBER:

Min. Burial Depth: 23.5"

Max. Burial Depth: 8'

SYSTEM STORAGE & QUANTITIES

System Layout

3	of	20	&	1	of	19
rows		chambers		rows		chambers

System Footprint	Stone Storage	Manifold Storage	Chamber Storage	Total System Storage
4622 (sf)	6550 (cf)	169 (cf)	9094 (cf)	15813 (cf)

Number of Chambers	Number of End Caps	Required Stone (For Embedment Backfill)	Non-Woven Geotextile (Includes 20% Overlap)	Woven Geotextile - Scour	Woven Geotextile - Sediment Row
79	8	606 (cy)	1520 (sy)	78 (sy)	247 (sy)

ASSISTANCE: For assistance with design, drawings or pricing please have your completed system design aid ready, and contact your Prinsco sales representative

This tool is intended to assist in sizing stormwater management systems using Prinsco products. It should be used for estimating purposes only and is not intended to be a final design tool. The design engineer needs to verify all the values and ensure they meet all project design criteria.

APPENDIX H
NOISE IMPACT ANALYSIS
MARCH 12, 2021

655 HIGHLAND SPRINGS OFFICE-COMMERCIAL PROJECT NOISE IMPACT ANALYSIS

City of Beaumont

March 12, 2021

ganddini

Traffic Engineering ● Transportation Planning ● Parking ● Noise & Vibration
Air Quality ● Global Climate Change ● Health Risk Assessment

655 HIGHLAND SPRINGS OFFICE-COMMERCIAL PROJECT NOISE IMPACT ANALYSIS

City of Beaumont

March 12, 2021

prepared by
Catherine Howe, MS
Katie Wilson, MS

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Santa Ana, CA 92705
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Project No. 19300

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EXECUTIVE SUMMARY

Project Location

The approximately 2.3-acre project site is located on the west side of Highland Springs Avenue between 8th Street and 6th Street, addressed at 655, 675 and 695 Highland Springs Avenue in the City of Beaumont.

Project Description

The proposed project consists of developing the currently vacant portion of the site with an approximately 6,400 square foot office building and 2,480 square foot fast-food restaurant with drive through window, and an addition of approximately 429 square-feet to the existing car wash building, remodel of the car wash, removal of an existing perimeter wall, relocation of existing curb, relocation of an existing trash enclosure, and addition of a new driveway. No renovation of the existing auto service building is proposed. The proposed project is consistent with the existing zoning (Commercial General). The proposed project is anticipated to be constructed and fully operational by year 2022.

Construction Impacts

Modeled unmitigated construction noise levels reached 66.8 dBA L_{eq} at the building façade of the nursing home to the northwest, 69.5 dBA L_{eq} at the building façade of the hospital use to the northeast, 68 dBA L_{eq} at the nearest single-family residential dwelling unit to the west, and up to 65.5 dBA L_{eq} at the nearest multi-family residential dwelling unit to the west of the project site.

Construction noise sources are regulated within Section 9.02.110(F) of the City of Beaumont Municipal Code which prohibits construction activities within one-quarter mile of an occupied residence or residences other than between the hours of 6:00 AM and 6:00 PM during the months of June through September and between the hours of 7:00 AM and 6:00 PM during the months of October through May. Furthermore, Section 9.02.110(F) prohibits sound levels at any time to exceed fifty-five dB(A) for intervals of more than fifteen minutes per hour as measured in the interior of the nearest occupied residence or school.

The interior noise level is the difference between the projected exterior noise level at the structure's facade and the noise reduction provided by the structure itself. Typical buildings generally provide a conservative 20 dBA noise level reduction with "windows closed". The projected interior noise level can be estimated by subtracting the building shell design from the predicted exterior noise level. A "windows closed" condition requires mechanical fresh air ventilation (e.g., air conditioning) be provided in habitable dwelling units. Therefore, project construction noise would be significant if it occurs outside of the hours of 6:00 AM and 6:00 PM during the months of June through September or the hours of 7:00 AM and 6:00 PM during the months of October through May; or if it results in an exterior noise level at an occupied residence or school that exceeds 75 dBA for any 15-minute period.

All modeled unmitigated construction noise levels were below 69.5 dBA L_{eq}. Therefore, project construction would not be anticipated to exceed the exterior construction noise threshold of 75 dBA at residential or school uses. Furthermore, the project would be required to comply with the hours of construction specified in the City's Code.

Impacts related to construction noise will be further minimized with adherence to applicable Municipal Ordinances and implementation of the recommended reduction measures presented in Section 7 of this report. Impacts would be less than significant**.**

Noise Impacts to Off-Site Receptors Due to Project Generated Trips

Existing and Existing Plus project traffic noise levels were modeled for roadways affected by project generated traffic utilizing the FHWA Traffic Noise Prediction Model FHWA-RD-77-108 in order to quantify the proposed project's contribution to increases in ambient noise levels.

For off-site project generated noise, increases in ambient noise along affected roadways due to project generated vehicle traffic is considered substantial if they result in an increase of at least 5 dBA CNEL and: (1) the existing noise levels already exceed the applicable land use compatibility standard for the affected sensitive receptors set forth in the Safety Element of the City's General Plan; or (2) the project increases noise levels by at least 5 dBA CNEL and raises the ambient noise level from below the applicable standard to above the applicable standard.

Per the noise modeling, all of the modeled roadway segments are anticipated to change the noise a nominal amount (approximately 0.02 to 0.33 dBA CNEL). Therefore, a change in noise level would not be audible and would be considered less than significant.

Noise Impacts to Off-Site Receptors Due to On-Site Operational Noise

The proposed project would generate onsite noise from stationary sources such as rooftop mechanical equipment, parking lot areas, drive-through (including speaker and queuing lane), car wash vacuum equipment, and the car wash tunnel. The nearest sensitive receptors to the project site are the existing single-family detached residential property line located adjacent to the west of the project site, the hospital property line located approximately 90 feet northeast of the project site, and the nursing home property line located approximately 100 feet northwest of the project site. In addition, multi-family residential property lines are located approximately 380 feet to the west of the project site.

Per the City of Beaumont Municipal Code Section 9.02.050, the exterior residential noise level thresholds are 55 dBA L_{eq} during the daytime (7:00 AM to 10:00 PM) and 45 dBA L_{eq} during the nighttime (10:00 PM to 7:00 AM) and, per Section 9.02.090, the maximum non-residential exterior thresholds are 75 dBA L_{eq} during the daytime and 50 dBA L_{eq} during the nighttime.

With incorporation of attenuation due to proposed buildings and proposed and existing walls, when combined operational noise levels generated by the drive-through, car wash and HVAC equipment would reach up to 54 dBA L_{eq} during the daytime and 42.2 dBA L_{eq} during the nighttime at the property line of the single-family residential use to the west; 52.3 dBA L_{eq} during the daytime and 38.2 dBA L_{eq} during the nighttime at the hospital property line to the northeast; 48.1 dBA L_{eq} during the daytime and 38.7 dBA L_{eq} during the nighttime at the nursing home property line to the northwest; and 46.8 dBA L_{eq} during the daytime and 29.5 dBA L_{eq} during the nighttime at the multi-family residential property line to the west. Operational noise levels would not exceed the City's daytime or nighttime exterior standards.

Typical buildings generally provide a conservative 20 dBA noise level reduction with "windows closed". Per Section 9.02.080 of the City's Municipal Code, maximum residential interior noise level standards are 45 dBA L_{eq} during the daytime and 35 dBA L_{eq} during the nighttime and the maximum interior noise level standards for hospitals is 45 dBA L_{eq}. Therefore, as operational noise levels generated by the project reached up to approximately 54 dBA L_{eq} during the daytime and 42.2 dBA L_{eq} during the nighttime at residential property lines and up to approximately 52.3 dBA L_{eq} at hospital property lines, with incorporation of an approximate 20 dBA noise level reduction with "windows closed," interior noise levels would not exceed City interior noise standards.

Furthermore, the existing ambient noise levels within the project vicinity range between 63.7 dBA L_{max} to 78.7 dBA L_{max} and 52.4 dBA L_{eq} to 69.1 dBA L_{eq}. Therefore, project operational noise would also not result in substantially greater noise levels than currently exist at the project site. Project operation is not expected to result in violations of the City of Beaumont Municipal Code and project operational noise levels would be considered less than significant.

Groundborne Vibration Impacts

Use of vibratory roller equipment could cause annoyance at nearby sensitive receptors. Annoyance is expected to be short-term, occurring only during site grading and preparation. Furthermore, use of a vibratory roller within 10 feet or a large bulldozer within two feet of the portion of the western property line that lies adjacent to existing residential structures could result in architectural damage. A mitigation measure restricting the use of vibratory rollers within 10 feet and large bulldozers within two feet of portion of the western property line that lies adjacent to existing residential structure would reduce temporary vibration levels associated with project construction to less than significant. Mitigation measures to reduce potential vibration impacts related to construction activities are presented below and in Section 7 of this report.

As the proposed project consists of an approximately 6,400 square foot office building and 2,480 square foot fast-food restaurant with drive through window as well as renovations to an existing car wash use, the project does not include any sources of operational vibration; no impacts are anticipated.

Construction Noise Reduction Measures

In addition to adherence to the City of Beaumont Municipal Code, which limits the construction hours of operation, the following measures are recommended to reduce construction noise and vibrations, emanating from the proposed project:

1. During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards.

2. The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

3. As applicable, all equipment shall be shut off and not left to idle when not in use.

4. The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

5. Jackhammers, pneumatic equipment and all other portable stationary noise sources shall be shielded and noise shall be directed away from sensitive receptors.

6. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

7. The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment.

8. Vibratory rollers, or any other equivalent vibratory equipment, shall not be utilized within 10 feet and large bulldozers within two feet of the portion of the western property line that lies adjacent to existing residential structures.

1. INTRODUCTION

This section describes the purpose of this noise impact analysis, project location, proposed development, and study area. Figure 1 shows the project location map and Figure 2 illustrates the project site plan.

PURPOSE AND OBJECTIVES

The purpose of this report is to provide an assessment of the noise impacts resulting from development of the 655 Highland Springs Office-Commercial project and to identify mitigation measures that may be necessary to reduce those impacts. The noise issues related to the proposed land use and development have been evaluated in light of applicable federal, state and local policies, including those of the City of Beaumont.

Although this is a technical report, effort has been made to write the report clearly and concisely. A list of acronyms and glossary are provided in Appendix A and Appendix B of this report to assist the reader with technical terms related to noise analysis.

PROJECT LOCATION

The approximately 2.3-acre project site is located on the west side of Highland Springs Avenue between 8th Street and 6th Street, addressed at 655, 675 and 695 Highland Springs Avenue, in the City of Beaumont, California. A vicinity map showing the project location is provided on Figure 1.

PROJECT DESCRIPTION

The proposed project consists of developing the currently vacant portion of the site with an approximately 6,400 square foot office building and 2,480 square foot fast-food restaurant with drive through window, and an addition of approximately 429 square-feet to the existing car wash building, remodel of the car wash, removal of an existing perimeter wall, relocation of existing curb, relocation of an existing trash enclosure, and addition of a new driveway. No renovation of the existing auto service building is proposed. The proposed project is consistent with the existing zoning (Commercial General). The proposed project is anticipated to be constructed and fully operational by year 2022.

Figure 2 illustrates the project site plan.

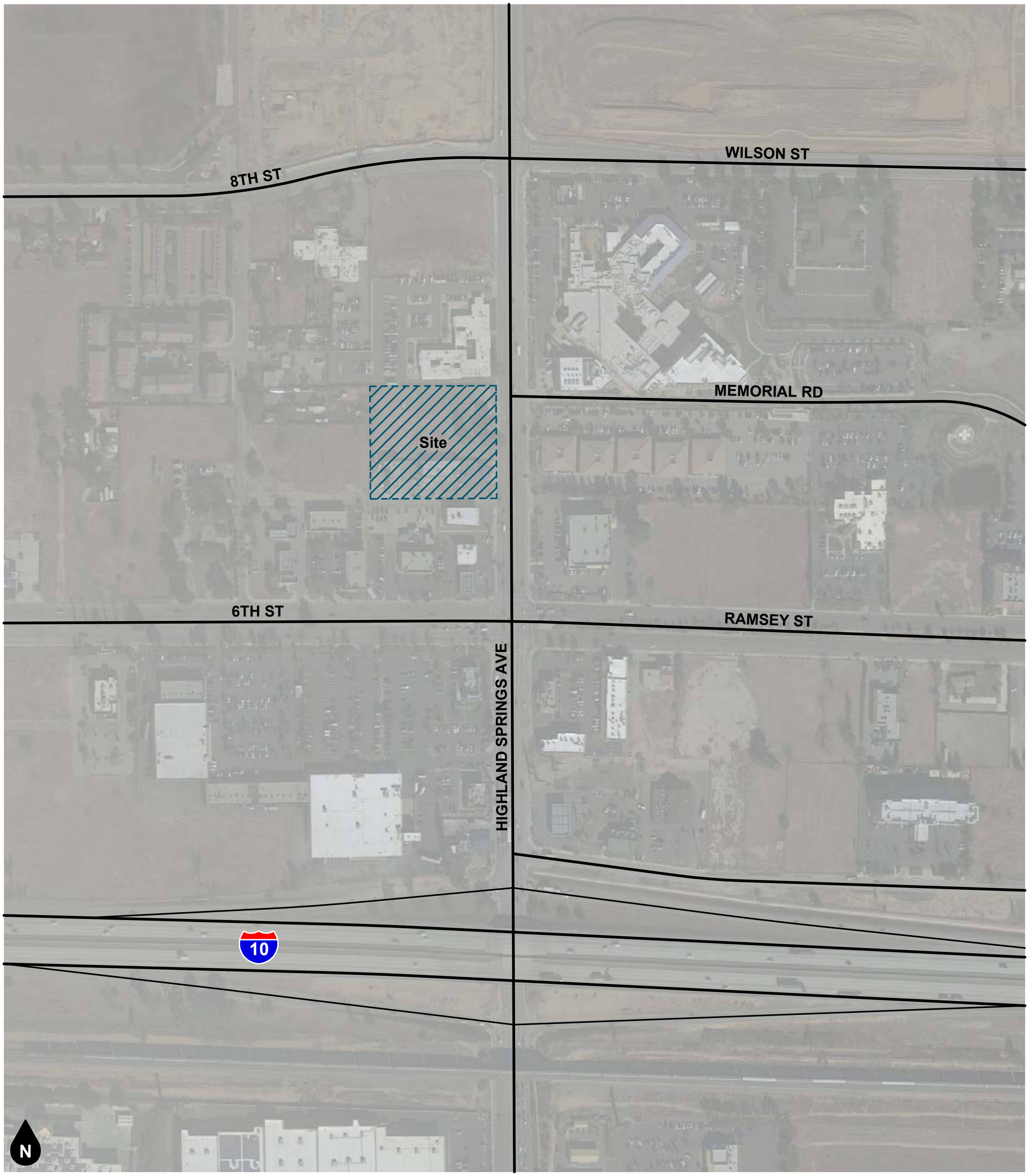


Figure 1
Project Location Map

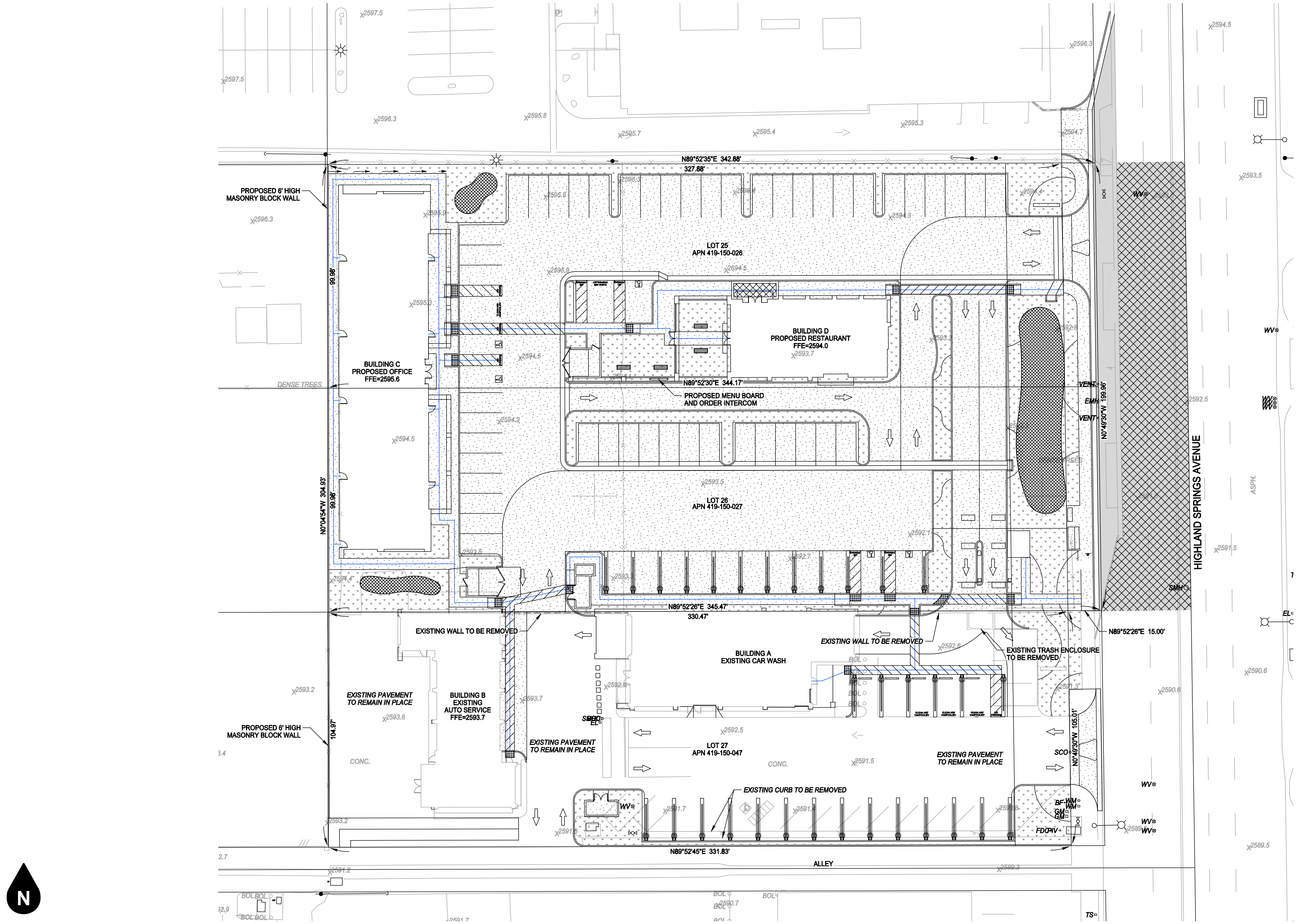


Figure 2
Site Plan

ganddini

655 Highland Springs Office-Commercial Project
Noise Impact Analysis
19300

2. NOISE AND VIBRATION FUNDAMENTALS

NOISE FUNDAMENTALS

Sound is a pressure wave created by a moving or vibrating source that travels through an elastic medium such as air. Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in extreme circumstances, hearing impairment.

Commonly used noise terms are presented in Appendix B. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the “A-weighted” noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dB(A) or dBA.

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiates uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease. Figure 3 shows the relationship of various noise levels to commonly experienced noise events.

Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, or the equivalent noise level for that period of time. For example, $L_{eq(3)}$ would represent a 3-hour average. When no period is specified, a one-hour average is assumed.

Noise standards for land use compatibility are stated in terms of the Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (DNL). CNEL is a 24-hour weighted average measure of community noise. CNEL is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours. DNL is a very similar 24-hour average measure that weights only the nighttime hours.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by the California Department of Transportation’s Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013).

VIBRATION FUNDAMENTALS

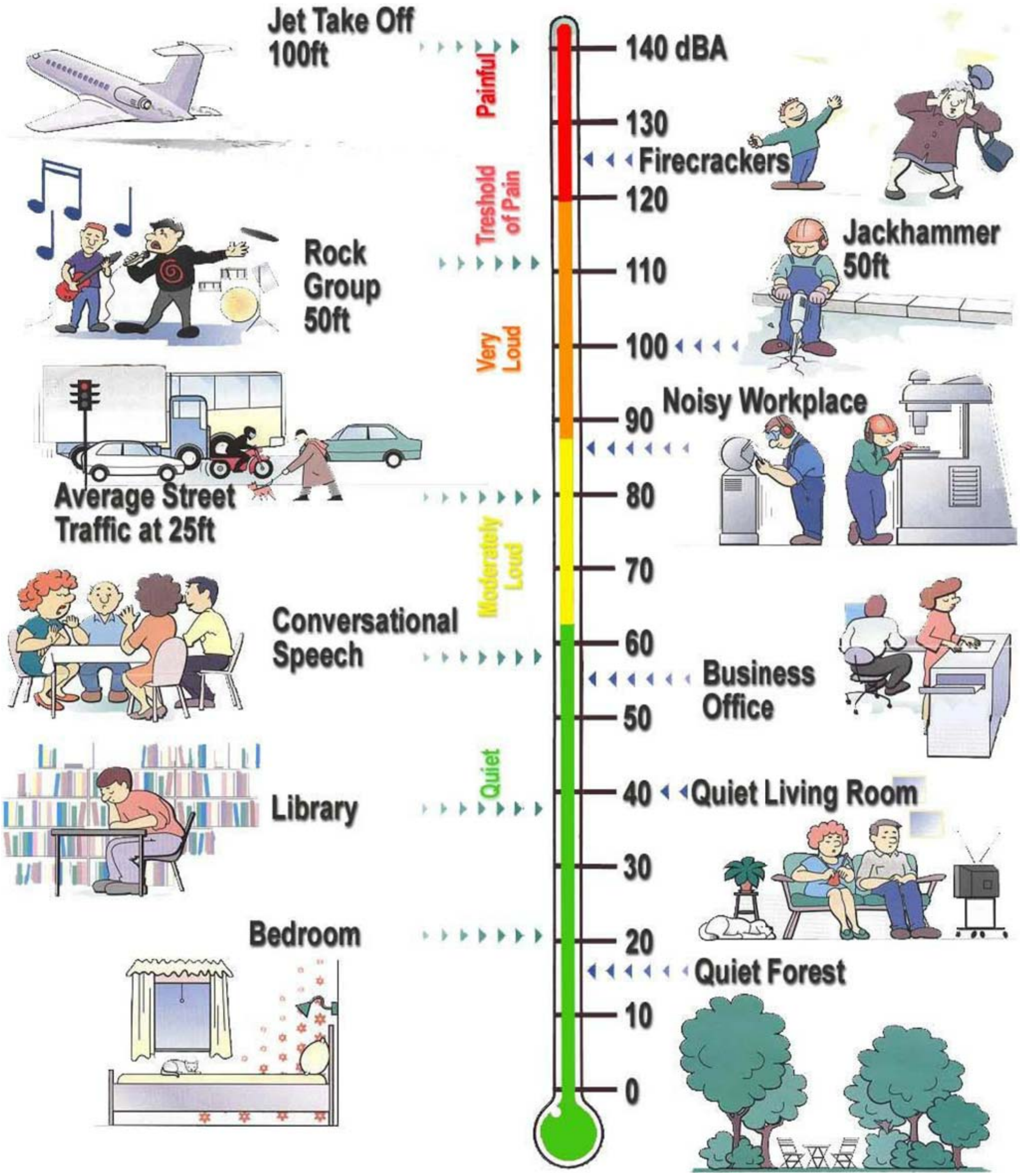
The way in which vibration is transmitted through the earth is called propagation. Propagation of earthborn vibrations is complicated and difficult to predict because of the endless variations in the soil through which waves travel. There are three main types of vibration propagation: surface, compression and shear waves. Surface waves, or Raleigh waves, travel along the ground’s surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water.

Compression waves, or P-waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a “push-pull” fashion). P-waves are analogous to airborne sound waves. Shear waves, or S-waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or “side-to-side and perpendicular to the direction of propagation”.

As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

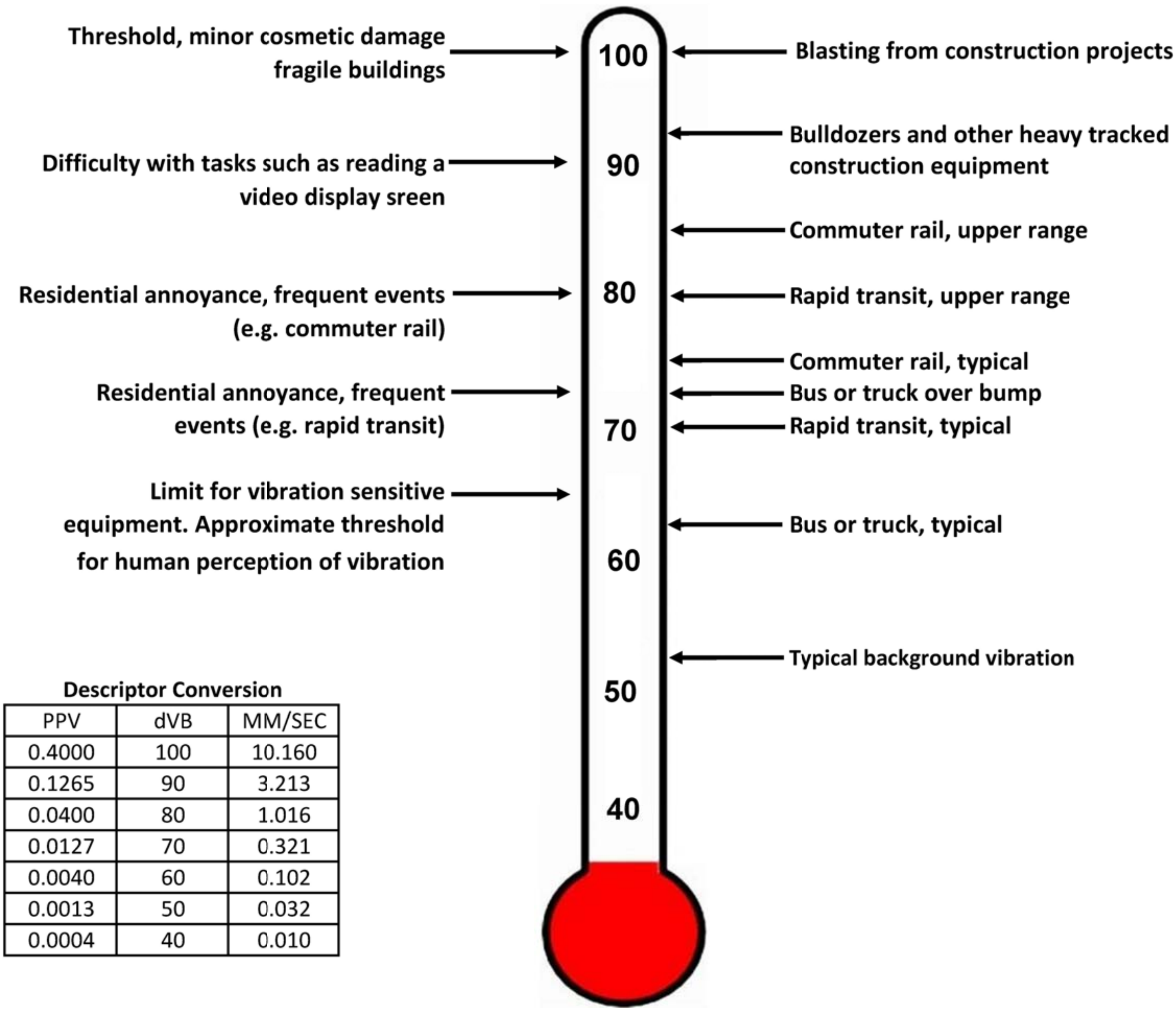
Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal in inches per second. The RMS of a signal is the average of the squared amplitude of the signal in vibration decibels (VdB), ref one micro-inch per second. The Federal Railroad Administration uses the abbreviation “VdB” for vibration decibels to reduce the potential for confusion with sound decibel.

PPV is appropriate for evaluating the potential of building damage and VdB is commonly used to evaluate human response. Decibel notation acts to compress the range of numbers required in measuring vibration. Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the average vibration and the maximum vibration level observed during a single vibration measurement interval. Figure 4 illustrates common vibration sources and the human and structural responses to ground-borne vibration. As shown in the figure, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. Vibration tolerance limits for sensitive instruments such as magnetic resonance imaging (MRI) or electron microscopes could be much lower than the human vibration perception threshold.



Source: Bruel & Kjaer 2001

Figure 3
Weighted Sound Levels and Human Response



Descriptor Conversion

PPV	dVB	MM/SEC
0.4000	100	10.160
0.1265	90	3.213
0.0400	80	1.016
0.0127	70	0.321
0.0040	60	0.102
0.0013	50	0.032
0.0004	40	0.010

Source: FRA, 2012. Federal Railroad Administration High-Speed Ground Transportation Noise and Vibration Impact Assessment. Office of Railroad Policy Development, Washington, D.C. DOT/FRA/ORD-12/15. September.

Figure 4
Typical Levels of Groundborne Vibration

3. EXISTING NOISE ENVIRONMENT

EXISTING LAND USES AND SENSITIVE RECEPTORS

The project site is bordered by commercial uses (medical offices) to the north, Highland Springs Avenue to the east, commercial uses to the south, and residential uses and vacant land to the west.

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, single and multiple-family residential, including transient lodging, motels and hotel uses make up the majority of these areas.

Sensitive land uses that may be affected by project noise include: the existing single-family detached residential dwelling unit property lines located adjacent to the west (associated dwelling units are located approximately 245 feet from the western property line), the hospital use property line located approximately 90 feet to the northeast (across Highland Springs Avenue), and the nursing home property line located approximately 100 feet to the northwest of the project site. Multi-family residential use property lines are also located approximately 380 feet to the west.

AMBIENT NOISE MEASUREMENTS

An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels. In order to document existing ambient noise levels in the project area and provide reference noise levels for the existing car wash, five (5) 15-minute daytime noise measurements were taken between 1:27 PM and 4:02 PM on October 19, 2020 and two (2) 15-minute daytime noise measurements were taken between 12:32 PM and 1:10 PM on December 10, 2020. In addition, one (1) long-term 24-hour noise measurement was also taken from October 19, 2020 to October 20, 2020. Field worksheets and noise measurement output data are included in Appendix C.

As shown on Figure 5, the noise measurements were taken near the multi-family and single-family residential uses to the west of the project site (along Allegheny Street) (STNM1), near the eastern property line of the single-family residential dwelling units located adjacent to the west of the project site (STNM2), near the commercial medical office uses located adjacent to the north of the project site (STNM3), near the hospital and commercial medical office buildings located to the northeast and east of the project site (across Highland Springs Avenue) (STNM4), near the commercial uses to the south of the project site (STNM5), at the existing car wash tunnel entrance (STNM6), at the existing car wash tunnel exit (STNM7), and near the center of the project site (LTNM1).

Table 1 provides a summary of the short-term ambient noise data. Table 2 provides hourly interval ambient noise data from the long-term noise measurement. As shown in Table 1, short-term ambient noise levels were measured between 52.4 and 69.1 dBA L_{eq}, while reference car wash noise levels ranged from 72.2 dBA L_{eq} at approximately 24 feet from the car wash tunnel entrance to 73.3 dBA L_{eq} at approximately 21 feet from the car wash tunnel exit. Long-term hourly noise measurement ambient noise levels ranged from 51.6 to 60.7 dBA L_{eq}. The dominant noise sources were from vehicles traveling along Highland Springs Avenue, Allegheny Street, the Interstate 10 Freeway, and other surrounding roadways and car wash noise.

Table 1
Short-Term Noise Measurement Summary (dBA)

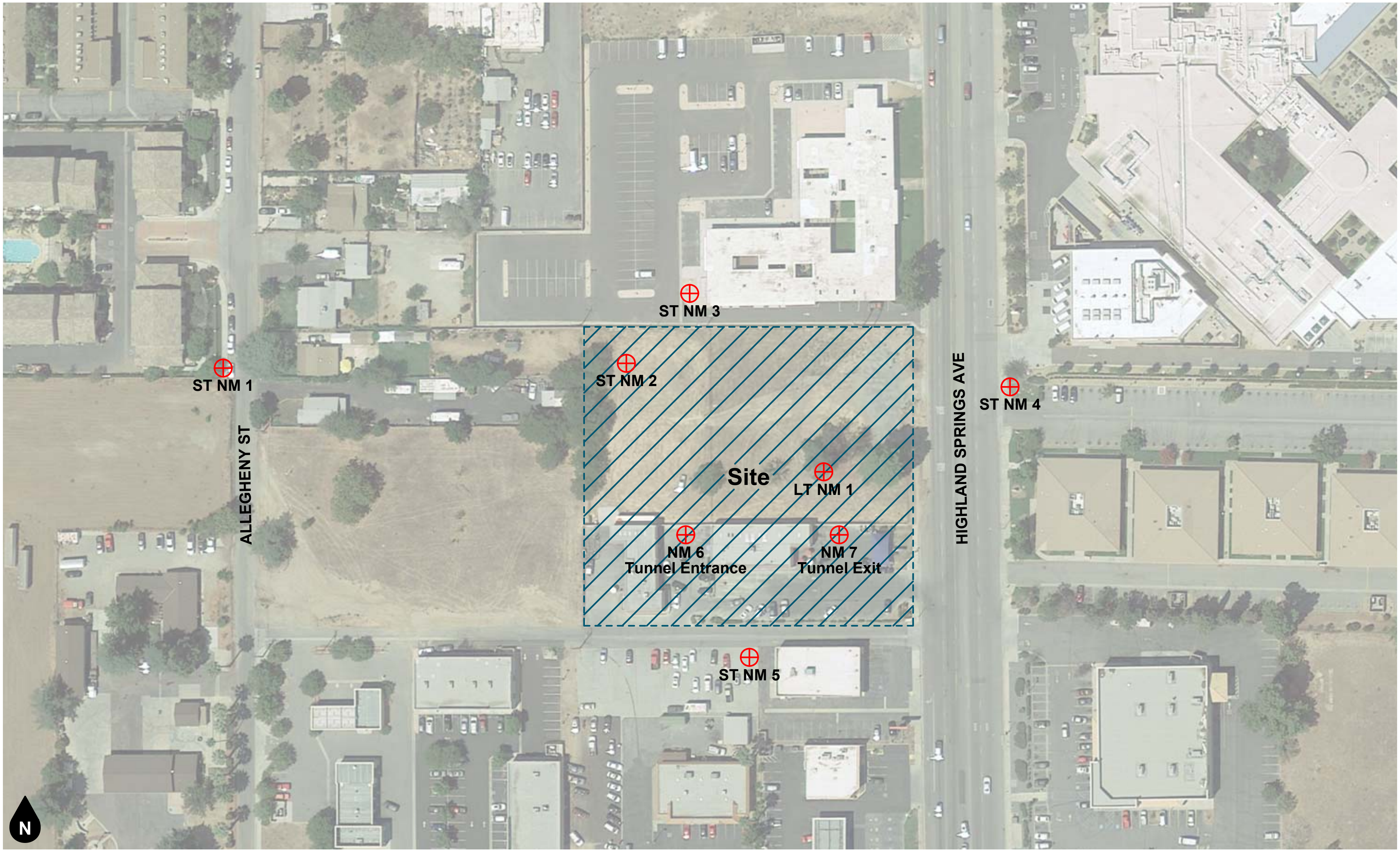
Daytime Measurements[1,2]								
Site Location	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
Ambient Noise Measurements								
STNM1	1:27 PM	53.6	68.4	47.3	59.5	56.2	53.5	52.1
STNM2	2:14 PM	52.4	63.7	48.9	55.0	53.9	53.1	52.3
STNM3	2:43 PM	55.1	72.3	51.2	59.3	57.4	55.2	54.2
STNM4	3:17 PM	69.1	78.7	51.9	75.6	73.8	70.4	66.5
STNM5	3:47 PM	59.6	71.7	56.3	63.7	60.8	59.6	58.9
Car Wash Tunnel Reference Noise Measurements								
STNM6	12:32 PM	72.2	77.1	62.5	76.1	75.6	73.6	71.6
STNM7	12:55 PM	73.3	83.1	63.2	80.3	79.5	68.6	65.7

Notes:
(1) See Figure 5 for noise measurement locations. Each noise measurement was performed over a 15-minute duration.
(2) Noise measurements STNM1 - STNM5 performed on October 19, 2020 and STNM6 - STNM7 performed on December 10, 2020.

Table 2
Long-Term Noise Measurement Summary (dBA)

24-Hour Ambient Noise[1,2]								
Hourly Measurements	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
Overall Summary	6:00 PM	56.8	88.0	42.1	62.3	59.6	56.9	54.3
1	6:00 PM	58.8	70.2	50.4	63.9	62.1	59.9	57.6
2	7:00 PM	60.7	83.1	49.1	63.8	60.6	58.4	55.8
3	8:00 PM	58.1	84.3	47.8	62.2	59.7	57.2	54.8
4	9:00 PM	56.0	79.1	46.4	61.2	58.7	56.1	53.2
5	10:00 PM	53.7	67.4	45.4	60.0	57.5	54.4	51.6
6	11:00 PM	53.6	68.3	45.4	59.5	57.1	54.1	51.7
7	12:00 AM	53.4	73.0	46.0	58.5	56.2	53.9	52.1
8	1:00 AM	52.2	70.5	42.1	57.1	54.9	52.9	51.2
9	2:00 AM	51.6	62.0	42.6	57.7	54.9	52.0	50.3
10	3:00 AM	54.3	77.2	46.1	59.2	56.2	53.4	51.7
11	4:00 AM	53.9	68.7	46.5	59.7	57.2	54.2	52.4
12	5:00 AM	55.6	67.6	48.8	60.9	59.0	56.5	54.0
13	6:00 AM	57.6	76.1	50.0	62.9	60.7	58.3	56.0
14	7:00 AM	60.2	81.9	52.5	65.3	62.4	60.2	58.4
15	8:00 AM	58.1	73.6	47.1	64.7	61.2	58.7	56.6
16	9:00 AM	56.4	69.7	45.4	63.1	59.7	57.1	54.8
17	10:00 AM	57.5	80.3	44.5	63.5	59.7	57.0	55.0
18	11:00 AM	56.3	69.0	45.5	62.2	59.5	57.0	55.1
19	12:00 PM	55.9	68.2	44.2	60.7	58.7	56.8	55.2
20	1:00 PM	55.3	69.7	44.6	60.4	58.1	56.2	54.5
21	2:00 PM	56.1	69.1	47.3	61.4	58.8	57.0	55.2
22	3:00 PM	56.3	68.7	46.7	61.0	59.0	57.1	55.6
23	4:00 PM	57.8	79.5	47.5	62.7	59.4	57.5	55.5
24	5:00 PM	59.3	88.0	46.9	62.2	59.1	57.1	55.1

Notes:
(1) See Figure 5 for noise measurement locations. Noise measurement was performed over a 24-hour duration.
(2) Noise measurement performed from October 19, 2020 to October 20, 2020.



Legend
NM 1 Noise Measurement Location
ST NM Short-Term Noise Measurement
LT NM Long-Term Noise Measurement

Figure 5
Noise Measurement Location Map

4. REGULATORY SETTING

FEDERAL REGULATION

Federal Noise Control Act of 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the Ldn should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In addition, the Levels of Environmental Noise identified five (5) dBA as an "adequate margin of safety" for a noise level increase relative to a baseline noise exposure level of 55 dBA Ldn (i.e., there would not be a noticeable increase in adverse community reaction with an increase of five dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, State, and local government agencies.

STATE REGULATIONS

State of California General Plan Guidelines 2017

Though not adopted by law, the State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., Ldn or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate any special acoustical treatment or noise mitigation. The "conditionally acceptable" or "normally unacceptable" ranges include conditions calling for detailed acoustical study prior to the construction or operation of the proposed project. The City of Beaumont has adopted their own version of the State Land Use Compatibility Guidelines (see Table 3).

California Environmental Quality Act

The California Environmental Quality Act Guidelines (Appendix G) establishes thresholds for noise impact analysis. This noise study includes analysis of noise and vibration impacts necessary to assess the project in light of the following Appendix G Checklist Thresholds.

Would the project result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Substantial increases in ambient noise levels are usually associated with project construction noise (temporary) and project operational noise (permanent).

Project Construction Noise: Construction noise sources are regulated within the City of Beaumont under Section 9.02.110(F) of the City's Municipal Code which prohibits construction activities within one-quarter mile of an occupied residence or residences other than between the hours of 6:00 AM and 6:00 PM during the months of June through September and between the hours of 7:00 AM and 6:00 PM during the months of October through May. Furthermore, Section 9.02.110(F) prohibits sound levels at any time to exceed fifty-five dB(A) for intervals of more than fifteen minutes per hour as measured in the interior of the nearest occupied residence or school. The interior noise level is the difference between the projected exterior noise level at the structure's facade and the noise reduction provided by the structure itself. Typical buildings generally provide a conservative 20 dBA noise level reduction with "windows closed". The projected interior noise level can be estimated by subtracting the building shell design from the predicted exterior noise level. A "windows closed" condition requires mechanical fresh air ventilation (e.g. air conditioning) be provided in habitable dwelling units.

Therefore, project construction noise would be significant if it occurs outside of the hours of 6:00 AM and 6:00 PM during the months of June through September or the hours of 7:00 AM and 6:00 PM during the months of October through May; or if it results in an exterior noise level at an occupied residence or school that exceeds 75 dBA for any 15-minute period.

Project Operational Noise (permanent): The proposed project has the potential to generate on-site and off-site noise. For on-site generated noise, the City of Beaumont Municipal Code Section 9.02.050 identifies noise levels of up to 55 dBA L_{eq} as the daytime base ambient noise level (BANL) (7:00 AM to 10:00 PM) and 45 dBA L_{eq} as the nighttime BANL (10:00 PM to 7:00 AM) for residential land uses. In addition, Section 9.02.090 identifies the maximum noise levels for non-residential land uses as up to 70 dBA L_{eq} daytime and 50 dBA L_{eq} nighttime. Furthermore, per Section 9.02.080 of the City's Municipal Code, residential interior noise levels are not to exceed 45 dBA between the hours of 7:00 AM and 10:00 PM or 35 dBA between the hours of 10:00 PM and 7:00 AM.

For off-site project generated noise, increases in ambient noise along affected roadways due to project generated vehicle traffic is considered substantial if they result in an increase of at least 5 dBA CNEL and: (1) the existing noise levels already exceed the applicable land use compatibility standard for the affected sensitive receptors set forth in the Safety Element of the City's General Plan; or (2) the project increases noise levels by at least 5 dBA CNEL and raises the ambient noise level from below the applicable standard to above the applicable standard.

b) Generate excessive groundborne vibration or groundborne noise levels?

As shown in Table 4, the threshold at which there is a risk to "architectural" damage to historic and some older buildings is a peak particle velocity (PPV) of 0.25, at older residential structures a PPV of 0.3, and at new residential structures and modern commercial/industrial buildings a PPV of 0.5. Table 5 shows that a PPV of 0.4 is the threshold at which groundborne vibration becomes severe in regards to annoyance. Therefore, impacts would be significant if construction activities result in groundborne vibration of 0.3 PPV or higher at residential structures and/or a PPV of 0.5 or higher at commercial structures.

California Department of Transportation (Caltrans)

The California Department of Transportation has published one of the seminal works for the analysis of ground-borne noise and vibration relating to transportation- and construction-induced vibrations and although the project is not subject to these regulations, it serves as useful tools to evaluate vibration impacts. These guidelines recommend that a standard of 0.3 inches per second (in/sec) PPV not be exceeded for the protection of older residential homes (California Department of Transportation, 2020).

LOCAL REGULATIONS

City of Beaumont General Plan

Table 3 shows the City's noise level standards related to land use compatibility. According to this matrix, noise levels of up to 65 dBA CNEL are considered the maximum desirable noise level for commercial land uses, while exterior noise levels of up 75 dBA CNEL are considered to be the maximum acceptable. These standards apply to the proposed project itself.

The City of Beaumont General Plan also includes the following goals and policies in regards to noise which apply to the proposed project.

Goal 10.1 A City where noise exposure is minimized for those living and working in the community.

Policies

10.1.1 Protect public health and welfare by eliminating existing noise problems and by preventing significant degradation of the future acoustic environment.

10.1.2 Adopt, maintain, and enforce planning guidelines that establish the acceptable noise standards identified in Section 9.02.050 and 9.02.070 of the City's Municipal Code.

10.1.3 Protect noise-sensitive uses, such as residences, schools, health care facilities, hotels, libraries, parks and places of worship, from excessive noise levels through land use adjacency, building design, and noise ordinance enforcement.

10.1.4 Incorporate noise considerations into land use planning decisions. Require the inclusion of noise mitigation measures, as may be necessary to meet standards, in the design of new development projects in the City.

10.1.5 Require projects involving new development or modifications to existing development to implement measures, where necessary, to reduce noise levels to at least the normally compatible range. Design measures should focus on architectural features and building design and construction, rather than site design features, such as excessive setbacks, berms, and sound walls, to maintain compatibility with adjacent and surrounding uses.

10.1.6 Encourage reduction of stationary noise impacts from commercial and industrial land uses, activities, events, and businesses on noise-sensitive land uses.

10.1.7 Limit delivery or service hours for stores and businesses with loading areas, docks, or trash bins that front, side, border, or gain access on driveways next to residential and other noise sensitive areas, such as residences, schools, hospitals, religious meeting spaces, and recreation areas.

10.1.8 Promote the effective enforcement of Federal, State, and City noise standards by all appropriate City departments.

Goal 10.2 A City with minimal mobile source-generated noise levels.

City of Beaumont Municipal Code

Chapter 9.02 of the City's Municipal Code establishes base ambient noise levels and establishes maximum noise level limits for stationary noise sources.

Section 9.02.050 Base Ambient Noise Level.

All ambient noise measurements shall commence at the base ambient noise levels in decibels within the respective times and zones as presented in the table below. Per the Code, ambient noise levels have been adjusted to show the most-quiet measured ambient noise level. The most-quiet measured noise ambient noise level was used to simplify the analysis and to be conservative.

Decibels	Time Period	Zone Use
45 dB(A)	10:00 PM - 7:00 AM	Residential
55 dB(A)	7:00 AM - 10:00 PM	Residential
50 dB(A)	10:00 PM - 7:00 AM	Industrial and Commercial
75 dB(A)	7:00 AM - 10:00 PM	Industrial and Commercial

Section 9.02.070 Maximum Residential Noise Levels.

Intermittent or occasional noise such as those associated with stationary noise sources is not of sufficient volume to exceed community noise standards that are based on a time-averaged scale such as the CNEL scale. To account for intermittent noise, another method to characterize noise is the percent noise level (L% or Ln). The percent noise level is the level exceeded X% of the time during the measurement period. Section 9.02.070 has established the following noise sources for intermittent or occasional noise that is usually associated with stationary noise sources. Noise levels shall not exceed the criteria shown in the table below for the duration periods specified:

Maximum Residential Noise Levels	
Noise Level Exceeded	Maximum Duration Period
5 dB(A) above BANL[1]	15 minutes in any hour
10 dB(A) above BANL	5 minutes in any hour
15 dB(A) above BANL	1 minute in any hour
20 dB(A) above BANL	Not permitted

[1] Base Ambient Noise Level

Section 9.02.080 Maximum Interior Noise Levels.

A. No person shall operate or cause to be operated, any source of sound which causes the noise level, when measured inside another dwelling unit, school or hospital, to exceed:

City of Beaumont Maximum Interior Noise Levels		
Decibels	Time Period	Land Use
35 dB(A)	10:00 PM - 7:00 AM	Residential
45 dB(A)	7:00 AM - 10:00 PM	Residential
45 dB(A)	7:00 AM - 10:00 PM (while school is in session)	School
45 dB(A)	Anytime	Hospital

B. No person shall operate or cause to be operated, any source of sound which causes the noise level, when measured inside another dwelling unit, school or hospital, to exceed:

City of Beaumont Maximum Interior Noise Levels	
Noise Level Exceeded	Maximum Duration Period
5 dB(A) above interior BANL	5 minutes in any hour
10 dB(A) above interior BANL	1 minutes in any hour
Over 10 dB(A) above interior BANL	Not permitted

C. If the measured interior noise level exceeds the permissible within the first two noise limit categories in this section, the allowable noise exposure standard shall be increased in five-decibel increments in each category as appropriate to reflect the interior ambient noise level. In the event the interior ambient noise level exceeds the third noise limit category, the maximum allowable interior noise level under said category shall be increased to reflect the maximum interior ambient noise level.

Section 9.02.090 Maximum Non-residential Noise Levels.

Any provision contained herein to the contrary notwithstanding, no exterior noise level shall exceed the base ambient noise levels (BANL) for nonresidential land uses set forth in any development agreement applicable to such development or as otherwise specifically set forth in any development standard which is by its terms enforceable by the City against the noise maker.

Section 9.02.110 Special Provisions.

F. Construction, landscape, maintenance or repair.

1. It shall be unlawful for any person to engage in or permit the generation of noise related to landscape maintenance, construction including erection, excavation, demolition, at the property line of the nearest adjacent occupied property, as to be in excess of the sound levels permitted under this Chapter, at other times than between the hours of 7:00 AM and 6:00 PM. The person engaged in such activity is hereby permitted to exceed sound levels otherwise set forth in this Chapter for the duration of the activity during the above described hours for purposes of construction. However, nothing contained herein shall permit any person to cause sound levels to at any time exceed fifty-five dB(A) for intervals of more than fifteen minutes per hour as measured in the interior of the nearest occupied residence or school.
2. Whenever a construction site is within one-quarter mile of an occupied residence or residences, no construction activities shall be undertaken between the hours of 6:00 PM and 6:00 AM during the months of June through September and between the hours of 6:00 PM and 7:00 AM during the months of October through May. Exceptions to these standards shall be allowed only within the written consent of the building official.
3. Construction related noise as defined in subsection F (1 and 2) above may take place outside the time period set forth therein and above the relative sound levels in case of urgent necessity in the interest of the public health and safety, and then only with the prior permission of the building inspector. Such permit may be granted for a period not to exceed three days or until the emergency ends, whichever is less. The permit may be renewed for periods of three days while the emergency continues.
4. Unless exempted in this Chapter, if the building official should determine that the public health and safety will not be impaired by the construction related noise, the building inspector may issue a permit for construction within the hours of 6:00 PM and 7:00 AM, upon application being made at the time the permit for the work is awarded or during the progress of the work. The building official may place such conditions on the issuance of the permit that are appropriate to maintain the public health and safety, as determined by the building official.

G. **Machinery, equipment, fans, and air conditioning.** It shall be unlawful for any person to operate, cause to operate or permit the operation of any machinery, equipment, device, pump, fan, compressor, air conditioning apparatus or similar mechanical device, including but not limited to the use of any steam shovel, pneumatic hammer, derrick, steam or electric hoist, blower or power fan, or any internal combustion engine, the operation of which causes noise due to the explosion of operating gases or fluids, or other appliance, in any manner so as to create any noise which would cause the noise level at the property line of the property upon which the equipment or machinery is operated to exceed the base ambient noise level by five dB(A).

Table 3
Noise and Land Use Compatibility Standards (Ambient Exterior Noise Exposure)

Land Use	Desirable Maximum (CNEL)	Maximum Acceptable (CNEL)
Single-Family Residential	55 dBA	65 dBA
Multiple-Family Residential	60 dBA	65 dBA
6th Street Corridor Overlay	65 dBA	70 dBA
6th Street Corridor Overlay	65 dBA	70 dBA
Public Facilities (Inc. Schools)	60 dBA	70 dBA
All Commercial & Mixed-Use	65 dBA	75 dBA
Industrial	70 dBA	75 dBA

Notes:
Source: City of Beaumont General Plan Safety Element, March 2007.

Table 4
Guideline Vibration Damage Potential Threshold Criteria

Structure Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, anceint monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes:

Source: California Department of Transportation. Transportation and Construction Vibration Guidance Manual, Chapter 7 Table 19, April 2020.

(1) Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 5
Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Notes:

(1) Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: California Department of Transportation. Transportation and Construction Vibration Guidance Manual, Chapter 7 Table 20, April 2020.

5. ANALYTICAL METHODOLOGY AND MODEL PARAMETERS

This section discusses the analysis methodologies used to assess noise impacts.

CONSTRUCTION NOISE MODELING

Construction noise associated with the proposed project was calculated at the sensitive receptor locations, utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Distances to receptors were based on the acoustical center of the project site. The equipment used to calculate the construction noise levels for each phase were based on the assumptions provided in the CalEEMod modeling in the Air Quality and Greenhouse Gas Analysis prepared for the proposed project (Lilburn, 2020). For construction noise purposes, the distance measured from the project site to sensitive receptors was assumed to be the acoustical center of the project site to the building façade of the dwelling unit associated with residential properties. Construction noise worksheets are provided in Appendix D.

FEDERAL HIGHWAY ADMINISTRATION (FHWA) TRAFFIC NOISE PREDICTION MODEL

Existing and Existing Plus project traffic noise levels were modeled for roadways affected by project generated traffic utilizing the FHWA Traffic Noise Prediction Model FHWA-RD-77-108 in order to quantify the proposed project's contribution to increases in ambient noise levels.

The FHWA Traffic Noise Prediction Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the REMEL to account for: total average daily traffic volumes, roadway classification, width, speed and truck mix, roadway grade and site conditions (hard or soft ground surface). Surfaces adjacent to all modeled roadways were assumed to have a "hard site" to predict worst-case, conservative noise levels. A hard site, such as pavement, is highly reflective and does not attenuate noise as quickly as grass or other soft sites. Possible reductions in noise levels due to intervening topography and buildings were not accounted for in this analysis.

Existing and Existing Plus Project vehicle mix were obtained from the project's traffic study (Ganddini Group 2021). Existing Plus Project vehicle mixes were calculated by adding the proposed project trips to existing conditions. FHWA spreadsheets are included in Appendix E.

6. IMPACT ANALYSIS

This impact discussion analyzes the potential for noise and/or groundborne vibration impacts to cause the exposure of a person to, or generation of, noise levels in excess of established City of Beaumont standards related to: construction, operation, and transportation noise related impacts to, or from, the proposed project.

IMPACTS RELATED TO CONSTRUCTION NOISE

The existing residential uses located to the west, the hospital use to the northeast, and the nursing home use to the northwest of the project site may be affected by short-term noise impacts associated with construction noise. Construction noise will vary depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work.

The construction phases for the proposed project are anticipated to include site preparation, grading, building construction, paving and architectural coating. A summary of noise level data for a variety of construction equipment compiled by the U.S. Department of Transportation is presented in Table 6. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings.

Construction noise associated with the proposed project was calculated utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Distances to receptors were based on the acoustical center of the proposed construction activity. Construction noise levels were calculated for each phase. Anticipated noise levels during each construction phase are presented in Table 7. Worksheets for each phase are included as Appendix D.

A comparison of existing noise levels and existing plus project construction noise levels are presented in Table 7. STNM1 was chosen to represent noise levels at the dwelling units of the multi-family residential uses to the west, STNM2 was chosen to represent noise levels at the dwelling units of the single-family residential uses to the west, STNM3 was chosen to represent noise levels at the closest commercial building façade to the north and the building façade of the nursing home to the northwest, STNM4 was chosen to represent noise levels at the closest commercial building façade to the east and the building façade of the hospital to the northeast, and STNM5 was chosen to represent noise levels at the closest commercial building façade to the south the project site.

Modeled unmitigated construction noise levels reached 66.8 dBA L_{eq} at the building façade of the nursing home to the northwest, 69.5 dBA L_{eq} at the building façade of the hospital use to the northeast, 68 dBA L_{eq} at the nearest single-family residential dwelling unit to the west, and up to 65.5 dBA L_{eq} at the nearest multi-family residential dwelling unit to the west of the project site.

As discussed earlier, construction noise sources are regulated within Section 9.02.110(F) of the City of Beaumont Municipal Code which prohibits construction activities within one-quarter mile of an occupied residence or residences other than between the hours of 6:00 AM and 6:00 PM during the months of June through September and between the hours of 7:00 AM and 6:00 PM during the months of October through May. Furthermore, Section 9.02.110(F) prohibits sound levels at any time to exceed fifty-five dB(A) for intervals of more than fifteen minutes per hour as measured in the interior of the nearest occupied residence or school. The interior noise level is the difference between the projected exterior noise level at the structure's facade and the noise reduction provided by the structure itself. Typical buildings generally provide a conservative 20 dBA noise level reduction with "windows closed." A "windows closed" condition requires mechanical fresh air ventilation (e.g. air conditioning) be provided in habitable dwelling units. The projected interior noise level can be estimated by subtracting the building shell design from the predicted exterior noise level.

Therefore, project construction noise would be significant if it occurs outside of the hours of 6:00 AM and 6:00 PM during the months of June through September or the hours of 7:00 AM and 6:00 PM during the months of October through May; or if it results in an exterior noise level at an occupied residence or school that exceeds 75 dBA for any 15-minute period.

Project construction would not be anticipated to exceed the exterior construction noise threshold of 75 dBA at residential or school uses. Furthermore, the project would be required to comply with the hours of construction specified in the City's Code.

Impacts related to construction noise will be further minimized with adherence to the above Municipal Ordinances and implementation of the recommended reduction measures presented in Section 7 of this report.

NOISE IMPACTS TO OFF-SITE RECEPTORS DUE TO PROJECT GENERATED TRIPS

During operation, the proposed project is expected to generate approximately 1,140 average daily trips with 58 trips during the AM peak-hour and 47 trips during the PM peak-hour. A worst-case project generated traffic noise level was modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108. Traffic noise levels were calculated at the right of way from the centerline of the analyzed roadway. The modeling is theoretical and does not take into account any existing barriers, structures, and/or topographical features that may further reduce noise levels. Therefore, the levels are shown for comparative purposes only to show the difference in with and without project conditions. Roadway input parameters including average daily traffic volumes (ADTs), speeds, and vehicle distribution data is shown in Table 8. The potential off-site noise impacts caused by an increase of traffic from operation of the proposed project on the nearby roadways were calculated for the following scenarios:

Existing Year (without Project): This scenario refers to existing year traffic noise conditions and is demonstrated in Table 8.

Existing Year (With Project): This scenario refers to existing year plus project traffic noise conditions and is demonstrated in Table 8.

As shown in Table 9, modeled Existing traffic noise levels range between 68.4-76.2 dBA CNEL at the right-of-way of each modeled roadway segment; and the modeled Existing Plus Project traffic noise levels range between 68.7-76.2 dBA CNEL at the right-of-way of each modeled roadway segment.

As stated previously, for purposes of this project, increases in ambient noise along affected roadways due to project generated vehicle traffic is considered substantial if they result in an increase of at least 5 dBA CNEL <u>and</u>: (1) the existing noise levels already exceed the applicable land use compatibility standard for the affected sensitive receptors set forth in the Safety Element of the City's General Plan; or (2) the project increases noise levels by at least 5 dBA CNEL and raises the ambient noise level from below the applicable standard to above the applicable standard.

All modeled roadway segments are anticipated to change the noise a nominal amount (between approximately 0.02 to 0.33 dBA CNEL). Therefore, a change in noise level would not be audible and would be considered less than significant. No mitigation is required.

NOISE IMPACTS TO OFF-SITE RECEPTORS DUE TO ON-SITE OPERATIONAL NOISE

As discussed previously, the nearest sensitive receptors to the project site are the existing single-family detached residential property line located adjacent to the west of the project site, the hospital property line located approximately 90 feet northeast of the project site, and the nursing home property line located approximately 100 feet northwest of the project site. In addition, multi-family residential property lines are located approximately 380 feet to the west of the project site.

The proposed project would generate onsite noise from stationary sources such as rooftop mechanical equipment, parking lot areas, drive-through (including speaker and queuing lane), car wash vacuum equipment, and the car wash tunnel. The auto repair use is existing and no changes are being made to this use as part of the project; therefore, it has not been included in this analysis. See Figure 6 for sensitive receptor and operational noise source locations.

Parking Lot Areas

Sources of noise from parking lot areas are primarily from engine and tire noise, slamming of doors, and pedestrians. Instantaneous maximum sound levels generated by a car door slamming, engine starting up and car passbys may be an annoyance to adjacent noise-sensitive receptors. A noise reference level of approximately 60 dBA L_{eq} (1-hour) at a distance of 50 feet is typically associated with parking lots.[1] Therefore, for the purpose of this analysis, parking lot noise levels were calculated utilizing the reference level of 60 dBA L_{eq} at 50 feet and the distance to the receptor was based on the approximate activity center of the parking lot.

The project includes the construction of a six foot high block wall along the entire length of the western property boundary and the proposed office building will be constructed in between the proposed parking lot and the adjacent residential receptors to the west. The proposed block wall and office building would break the line of sight between the parking lot and the residential uses to the west, reducing noise levels. Per the use of a barrier attenuation equation derived from the FTA[2], it would be anticipated that the proposed building and block wall would reduce parking lot noise levels at the property line of the single-family residential and multi-family residential uses by at least 5 dB. As shown in Table 10, with incorporation of attenuation due to the proposed office building and block wall, noise levels generated by the proposed parking lot would reach up to approximately 44.1 dBA L_{eq} at the property line of the single-family residential use to the west and 34.1 dBA L_{eq} at the property line of the multi-family residential uses to the west. Furthermore, parking lot noise levels would reach up to 45.7 dBA L_{eq} at the property line of the nursing home use to the northwest and 45.5 dBA L_{eq} at the property line of the hospital use to the northeast.

As shown in Table 1, existing ambient noise levels were measured at 52.4 dBA L_{eq} and 63.7 dBA L_{max} (STNM2) in the vicinity of the single-family residential use to the west, 53.6 dBA L_{eq} and 68.4 dBA L_{max} (STNM1) in the vicinity of the multi-family residential uses to the west, 55.1 dBA L_{eq} and 72.3 dBA L_{max} (STNM3) in the vicinity of the nursing home to the northwest, and 69.1 dBA L_{eq} and 78.7 dBA L_{max} (STNM4) in the vicinity of the multi-family residential uses to the west. Project generated parking lot noise would not result in substantially greater noise levels than currently exist in the project vicinity.

Furthermore, per the City of Beaumont Municipal Code Section 9.02.050, the exterior residential noise level thresholds are 55 dBA L_{eq} during the daytime and 45 dBA L_{eq} during the nighttime and, per Section 9.02.090, the maximum non-residential thresholds are 75 dBA L_{eq} during the daytime and 50 dBA L_{eq} during the nighttime. Therefore, as shown in Table 10, intermittent noise generated from the parking lot could exceed nighttime standards by approximately 0.7 dBA L_{eq} at the nursing home property line to the northwest; however, the southern portion of this property is occupied by a parking lot. The parking lot is not a sensitive

[1] PCR Services Corporation, The Grand Avenue Project Draft Environmental Impact Report, June 2006.

[2] Federal Transit Administration. Transit Noise and Vibration Impact Assessment Manual Table 4-28 and 4-29 Attenuation Due to Buildings, September 2018.

nighttime use and the nursing home building is located further away, at approximately 433 feet from the activity center of the parking lot, and would have a noise level of approximately 41.3 dBA L_{eq}. Therefore, the noise level at the nursing home would not exceed the City's nighttime residential standard of 45 dBA L_{eq}. Noise levels would not be anticipated to exceed ambient noise levels nor the City of Beaumont noise standards and impacts would be less than significant.

Drive-Through

The project would construct a fast-food drive-thru restaurant that would generate noise from idling passenger vehicles, engine ignition, microphones, and conversation. In order to determine the noise generated by a fast-food drive-through a noise reference level of approximately 51.5 dBA L_{eq} at 50 feet from the speakerphone was utilized.[3] The noise measurement associated with this reference level included voices over the speakerphone, customers' voices ordering food, car engines idling, car radios playing music, and cars queuing in the drive-through lane. For purposes of this analysis, the distances to each sensitive receptor was based on the approximate location of the speakerphone to the property line of the nearest receptor.

The closest sensitive receptor to the drive-through speakerphone is the residential use located on the eastern side of Allegheny Street, whose property line is located approximately 143 feet to the west of the drive-through speakerphone, with the building façade located approximately 382 feet to the west of the drive-through speakerphone. As previously discussed, the project includes the construction of a six foot high block wall along the entire length of the western property boundary and the proposed office building will be constructed in between the nearest drive-through and the adjacent residential receptor to the west. The proposed building and block wall would reduce drive-through noise levels at the property line of the single-family and multi-family residential uses to the west by at least 5 dB.

As shown in Table 11, with incorporation of attenuation due to the proposed office building and block wall, noise levels from the drive-through are as follows: at the single-family residential property line to the west would be approximately 37.4 dBA L_{eq} and 26 dBA L_{eq} at the property line of the multi-family residential uses to the west. The hospital to the northeast is located approximately 277 feet from the drive-through speakerphone, resulting in a noise level of approximately 36.6 dBA L_{eq} at the hospital property line. Furthermore, at the property line of the nursing home to the northwest noise levels would reach 37.7 dBA L_{eq}.

Per the City of Beaumont Municipal Code Section 9.02.050, the exterior residential noise level thresholds are 55 dBA L_{eq} during the daytime and 45 dBA L_{eq} during the nighttime and, per Section 9.02.090, the maximum non-residential thresholds are 75 dBA L_{eq} during the daytime and 50 dBA L_{eq} during the nighttime. Therefore, as noise levels would not exceed 38 dBA at the most impacted receptor (the nursing home located northwest of the site) noise associated with the drive-through would not exceed City of Beaumont noise standards.

Car Wash

Car wash noise sources include the proposed vacuums and the existing car wash tunnel. The noise levels at the nearest sensitive receptors generated by each of the proposed car wash noise sources have been calculated and are provided in Table 12. Manufacturer data utilized in the calculations is provided in Appendix F. The existing car wash hours are from 7:00 AM to 9:00 PM during the summer and 8:00 AM to 5:00 PM during the winter, these hours are to remain.

Vacuums

[3] Urban Crossroads, Highland Springs and 8th Retail Noise Impact Analysis, May 4, 2020.

Producers

Producers are the loudest elements of a vacuum system. Manufacturer data for a Vacutech 50 HP T4 Turbine Vacuum Producer with Exhaust silencer show that noise levels can be expected to reach 61 dBA in a closed door condition at a distance of 10 feet. The project includes two vacuum producer enclosures, specific locations of the producer enclosures are identified on Figure 6. With attenuation from proposed buildings and proposed and existing block walls, as applicable, noise levels associated with the vacuum producers would be anticipated to reach up to 29.9 dBA L_{eq} at the single-family residential property line to the west, 30.4 dBA L_{eq} at the hospital property line to the northeast, 23.1 dBA L_{eq} at the nursing home property line to the northwest, and approximately 21.9 dBA L_{eq} at the multi-family residential property line to the west of the nearest enclosure. Therefore, noise associated with the vacuum producers would not exceed City daytime or nighttime exterior standards.

Hose Systems

A hose system will extend from the housed producer system and hose ends will be available within the vacuum area. A reference noise level of 76.8 dB at three feet was utilized for the vacuum stations to represent noise associated with general vacuuming activities. This noise level was collected at a Fast Five Car Wash in the City of Murrieta, California on November 7th, 2017. The measured 76.8 dB at 3 feet noise level is an average of three (3) five-minute noise measurements taken while cleaning the front seat area of a car[4]. As shown in Table 12, incorporating the attenuation from proposed buildings and existing and proposed block walls, the vacuum hose system would generate noise levels of approximately 34.1 dBA L_{eq} at the property line of the single-family residential dwelling unit to the west and 27 dBA L_{eq} at the property line of the multi-family residential use to the west. Furthermore, the vacuum hose system would generate noise levels of approximately 40 dBA L_{eq} at the property line of the hospital use to the northeast and with incorporation of attenuation due to existing walls, 28 dBA L_{eq} at the property line of the nursing home use to the northwest. Therefore, noise associated with the vacuum hose systems would not exceed City daytime or nighttime standards.

<u>Tunnel</u>

The car wash tunnel is an existing use on the project site; however, the proposed project is to include the addition of approximately 429 square feet to the car wash building as well as new dryer system equipment. The new square footage is to allow for additional drip space (this allows the car to lose more water after washing before entering the drying portion of the tunnel) and the new dryer equipment will be spread out toward the end of the car wash tunnel. The drying system is typically the loudest and most dominant noise source associated with a car wash operation and is located at the tunnel exit.

Tunnel Exit

Per ambient noise measurements, the existing car wash tunnel exit has a noise level of approximately 73.3 dBA L_{eq} at approximately 21 feet from the tunnel exit (STNM7, see Table 1), which would propagate to approximately 72.5 dBA L_{eq} at approximately 23 feet from the tunnel exit. Per manufacturer data, when the drying system is set back approximately 17 feet in the tunnel, an air one profiler dryer with all three profiler producers on has a noise level of 88 dB at 8 feet from the tunnel exit.[5] Therefore, the proposed new dryer equipment would result in a potential noise level increase at nearby receptors and has been analyzed below.

The existing car wash tunnel exit is located on the eastern side of the car wash building, facing Highland Springs Avenue, whereas the proposed car wash tunnel exit is located on the western side of the car wash building facing the existing auto repair shop. Therefore, the nearest sensitive receptors that could be affected

[4] 2017 Noise Measurements, Fast Five Car Wash. City of Murrieta, November 7. Kunzman Associates.

[5] Manufacturer data provided in Appendix F.

by noise from the new dryer equipment are the single-family and multi-family residential uses located to the west and the nursing home use located to the northwest of the project site.

The property line of the single-family residential use to the west is located approximately 157 feet and the dwelling unit is located approximately 371 feet to the northwest of the car wash tunnel exit. As shown in Table 12, with incorporation of attenuation due to buildings and block walls, noise levels from the car wash tunnel exit would be anticipated to reach up to approximately 53.6 dBA L_{eq} at the single-family residential property line. In addition, with incorporation of attenuation due to buildings and proposed and existing block walls, noise levels from the car wash tunnel exit will reach up to 47.5 dBA L_{eq} at the nursing home property line, located approximately 324 feet northwest of the tunnel exit, and up to 46.7 dBA L_{eq} at the multi-family residential property line to the west, approximately 525 feet northwest of the tunnel exit.

As stated above, the City of Beaumont Municipal Code Section 9.02.050 exterior residential noise level thresholds are 55 dBA L_{eq} during the daytime and 45 dBA L_{eq} during the nighttime and, per Section 9.02.090, the maximum non-residential thresholds are 75 dBA L_{eq} during the daytime and 50 dBA L_{eq} during the nighttime. Therefore, as the car wash will not be operational during the nighttime hours, the proposed car wash dryer equipment at the tunnel exit would not exceed the City's daytime or nighttime standards.

Tunnel Entrance

The existing car wash tunnel entrance is located on the western side of the car wash building facing the existing auto repair shop; however, the proposed car wash tunnel entrance will be located on the eastern side of the car wash tunnel facing Highland Springs Avenue. As shown in Table 1, STNM6, the existing car wash entrance has a measured noise level of 72.2 dBA L_{eq} at a distance of approximately 24 feet.

Based on noise propagation from the car wash tunnel entrance, the greatest noise level impact from the tunnel entrance would be located at the commercial medical office use to the east of the tunnel (across Highland Springs Avenue). At the property line of this commercial use, approximately 190 feet from the car wash tunnel entrance, noise from the car wash entrance would generate noise levels of approximately 54.2 dBA L_{eq}, which would not exceed the City's non-residential threshold of 75 dBA.

As shown by the results in Table 12, utilizing the existing noise measurement, the proposed car wash tunnel entrance will result in noise levels of approximately 51.9 dBA L_{eq} at the property line of the hospital use, located approximately 250 feet to the northeast of the proposed car wash tunnel entrance.

Section 9.02.090 of the City of Beaumont Municipal Code states that the maximum non-residential thresholds are 75 dBA L_{eq} during the daytime and 50 dBA L_{eq} during the nighttime. As shown in Table 1, STNM4, the measured ambient noise level at the hospital and commercial uses to the northeast and east, respectively, is 69.1 dBA L_{eq}. The car wash will not be operational during the nighttime hours. Therefore, the proposed car wash tunnel entrance would not be anticipated to exceed ambient noise levels nor the City's daytime or nighttime non-residential BANL standard at the nearest commercial uses to the east or hospital uses to the northeast of the project site.

Combined Car Wash Noise Levels

As shown in Table 12, when the noise sources from the car wash are combined and with incorporation of attenuation due to proposed buildings and walls, the loudest car wash noise levels at nearby residential uses is approximately 53.7 dBA $L_{eq,}$ at the single-family residential use property line and 46.7 dBA L_{eq} at the multi-family residential uses located to the west of the project site. The noise level at the property line nearest to the nursing home is approximately 47.5 dBA L_{eq}, with incorporation of attenuation due to an existing block wall, and at the property line nearest to the hospital is approximately 52.2 dBA L_{eq}.

As stated previously, the City of Beaumont Municipal Code, the exterior residential noise level thresholds are 55 dBA L_{eq} during the daytime and 45 dBA L_{eq} during the nighttime and for nonresidential uses 75 dBA L_{eq}

during the daytime and 50 dBA L_{eq} during the nighttime. The car wash hours are from 7:00 AM to 9:00 PM during the summer and 8:00 AM to 5:00 PM during the winter. Therefore, as no nighttime (10:00 PM or later) operation would occur, the noise associated with operation of the car wash would not exceed either the City's daytime or nighttime standards at the nearest sensitive receptors.

Rooftop Mechanical Equipment

Proposed HVAC equipment would occur on the project site at the office building and the fast-food restaurant. This equipment typically has noise shielding cabinets, is placed on the roof or within mechanical equipment rooms and is not usually a significant source of noise. According to the site plan, the proposed office building is to include a parapet that would block the line of site of the HVAC unit from the nearby receptors. In order to determine the noise created by a rooftop heating, ventilation, and air conditioning (HVAC) unit, a reference noise measurement of 59.5 dBA L_{eq} at 10 feet was utilized. [6] The reference noise measurement was taken while an HVAC unit was operational on the rooftop of an existing commercial building. As is shown in Table 13, with incorporation of the reduction due to the proposed parapet on the office building, noise levels associated with the proposed HVAC units would be: 40.5 dBA l_{eq} at the single-family residential property line to the west, 32.5 dBA l_{eq} at the hospital property line to the northeast, 31.3 dBA L_{eq} at the nursing home property line to the northwest, and 24.7 dBA L_{eq} at the multi-family residential property line to the west. The HVAC units associated with the proposed office and fast-food restaurant buildings would not exceed the City of Beaumont's exterior residential BANL daytime noise standard of 55 dBA L_{eq} or non-residential daytime standard of 75 dBA L_{eq}. In addition, the City's nighttime noise standards of 45 dBA L_{eq} for residential uses and 50 dBA L_{eq} for non-residential uses would also not be exceeded at the nearest receptor property lines.

Furthermore, Section 9.02.110(G) of the City's Municipal Code states that it is unlawful for any person to operate air conditioning units which would cause the noise level at the property line of the property upon which the equipment or machinery is operated to exceed the BANL by five dB(A). Based on the project site plans, the proposed HVAC units associated with the proposed office building would be located as close as approximately 25 feet from the nearest property line and the HVAC units associated with the proposed fast-food restaurant would be located as close as approximately 78 feet from the closest project property line. Therefore, with incorporation of the reduction due to the proposed parapet on the office building, the highest noise levels at the property line of the proposed project from the HVAC equipment would be approximately 40.5 dBA L_{eq} from the office building and approximately 41.7 dBA L_{eq} from the fast-food restaurant. These noise levels would not exceed the City's exterior non-residential BANL daytime standard of 75 dBA L_{eq} or nighttime standard of 55 dBA L_{eq}.

Combined Project Operational Noise Levels

Drive-through, car wash and HVAC noise are continuous sources of on-site operational noise that would occur simultaneously. Therefore, drive-through, car wash and HVAC noise were added together and compared to City standards as a conservative estimate of operational noise. Sources of instantaneous on-site operational noise, such as parking lot noise, would be intermittent and were therefore not included in the combined operational analysis.

As shown in Table 14, with incorporation of attenuation due to proposed buildings and proposed and existing walls, when combined operational noise levels generated by the drive-through, car wash and HVAC equipment would reach up to 54 dBA L_{eq} during the daytime and 42.2 dBA L_{eq} during the nighttime at the property line of the single-family residential use to the west; 52.3 dBA L_{eq} during the daytime and 38.0 dBA L_{eq} during the nighttime at the hospital property line to the northeast; 48 dBA L_{eq} during the daytime and 38.6 dBA L_{eq} during the nighttime at the nursing home property line to the northwest; and 46.8 dBA L_{eq} during the daytime and 28.4 dBA L_{eq} during the nighttime at the multi-family residential property line to the west.

[6] Michael Brandman Associates, Noise Impact Analysis Majestic Chino Gateway Project, January 23, 2013.

The City's exterior residential noise level thresholds are 55 dBA L_{eq} during the daytime and 45 dBA L_{eq} during the nighttime and for nonresidential uses 75 dBA L_{eq} during the daytime and 50 dBA L_{eq} during the nighttime. Operational noise levels would not exceed the City's daytime or nighttime exterior standards.

Typical buildings generally provide a conservative 20 dBA noise level reduction with "windows closed". Per Section 9.02.080 of the City's Municipal Code, maximum residential interior noise level standards are 45 dBA L_{eq} during the daytime and 35 dBA L_{eq} during the nighttime and the maximum interior noise level standards for hospitals is 45 dBA L_{eq}. Therefore, as operational noise levels generated by the project reached up to approximately 54 dBA L_{eq} during the daytime and 42.2 dBA L_{eq} during the nighttime at residential property lines and up to approximately 52.3 dBA L_{eq} at hospital property lines, with incorporation of an approximate 20 dBA noise level reduction with "windows closed," interior noise levels would not exceed City interior noise standards.

Furthermore, as shown in Table 1, Short-Term Noise Measurement Summary, the existing ambient noise levels within the project vicinity range between 63.7 dBA L_{max} to 78.7 dBA L_{max} and 52.4 dBA L_{eq} to 69.1 dBA L_{eq}. Project operational noise would also not result in substantially greater noise levels than currently exist in the project vicinity. Therefore, no significant onsite noise impacts from the on-going operations of the proposed project would occur at the closest sensitive receptors. Impacts are less than significant.

GROUNDBORNE VIBRATION IMPACTS

Construction Vibration

There are several types of construction equipment that can cause vibration levels high enough to annoy persons in the vicinity and/or result in architectural or structural damage to nearby structures and improvements. For example, as shown in Table 15, a vibratory roller could generate up to 0.21 PPV at a distance of 25 feet; and operation of a large bulldozer (0.089 PPV) at a distance of 25 feet (two of the most vibratory pieces of construction equipment). Groundborne vibration at sensitive receptors associated with this equipment would drop off as the equipment moves away. For example, as the vibratory roller moves further than 100 feet from the sensitive receptors, the vibration associated with it would drop below 0.0026 PPV. It should be noted that these vibration levels are reference levels and may vary slightly depending upon soil type and specific usage of each piece of equipment.

Annoyance to Persons

The primary effect of perceptible vibration is often a concern. However, secondary effects, such as the rattling of a china cabinet, can also occur, even when vibration levels are well below perception. Any effect (primary perceptible vibration, secondary effects, or a combination of the two) can lead to annoyance. The degree to which a person is annoyed depends on the activity in which they are participating at the time of the disturbance. For example, someone sleeping or reading will be more sensitive than someone who is running on a treadmill. Reoccurring primary and secondary vibration effects often lead people to believe that the vibration is damaging their home, although vibration levels are well below minimum thresholds for damage potential. (California Department of Transportation, 2020)

As shown in Table 5, vibration becomes severe in regards to annoyance to people in buildings at a PPV of 0.4.

At a distance of 10 feet, which is the distance to the closest off-site building, a shed/garage associated with the residential uses to the west, use of a vibratory roller would be expected to generate a PPV of 0.83 and a bulldozer would be expected to generate a PPV of 0.352. Therefore, use of a vibratory roller could be considered severely annoying to the receptors to the west.

At 20 feet, which is the distance to the next closest off-site building, the commercial use to the north, use of a vibratory roller would be expected to generate a PPV of 0.293 and a bulldozer would be expected to generate a PPV of 0.124. Therefore, use of a vibratory roller or bulldozer would be perceptible to receptors to the north, but would not be considered severe in regards to annoyance.

At 25 feet, which is the distance to the next closest off-site building, the commercial use to the south, use of a vibratory roller would be expected to generate a PPV of 0.21 and a bulldozer would be expected to generate a PPV of 0.089. Therefore, use of a vibratory roller or bulldozer would be perceptible to receptors to the south, but would not be considered severe in regards to annoyance.

At 68 feet, which is the distance to the next closest off-site building, the commercial use to the southwest, use of a vibratory roller would be expected to generate a PPV of 0.047 and a bulldozer would be expected to generate a PPV of 0.02. Therefore, use of a vibratory roller or bulldozer would be perceptible to receptors to the southwest, but would not be considered severe in regards to annoyance.

Annoyance is expected to be short-term, occurring only during site grading and preparation. Mitigation measures to reduce potential impacts related to annoyance from vibration are presented in Section 7 of this report.

Architectural Damage

Vibration generated by construction activity generally has the potential to damage structures. This damage could be structural damage, such as cracking of floor slabs, foundations, columns, beams, or wells, or cosmetic architectural damage, such as cracked plaster, stucco, or tile. (California Department of Transportation, 2020)

Table 4 identifies a PPV level of 0.3 as the threshold at which there is a risk to "architectural" damage to older residential structures and a PPV of 0.5 for modern industrial/commercial buildings. Therefore, use of a vibratory roller within 10 feet or a large bulldozer within two feet of the portion of the western property line that lies adjacent to the existing residential structure could result in architectural damage. A mitigation measure restricting the use of vibratory rollers within 10 feet and large bulldozers within two feet of the western property line that lies adjacent to existing residential structures would reduce temporary vibration levels associated to less than significant. Vibration worksheets are provided in Appendix G.

Operational Vibration

As the proposed project consists of an approximately 6,400 square foot office building and 2,480 square foot fast-food restaurant with drive through window as well as renovations to an existing car wash use, the project does not include any sources of operational vibration; no impacts are anticipated.

IMPACTS TO PROJECT FROM AIRPORTS

The closest airport to the project site is the Banning Municipal Airport, which is located approximately 5.06 miles to the southeast of the project site. Per the City of Beaumont General Plan (August 2020), noise levels in the City associated with the Banning Municipal Airport are outside of all identified airport noise contours (55 dBA, 60 dBA, and 65 dBA). Therefore, as the project is not within two miles of a public airport or in the vicinity of a private airstrip, the project would not expose people residing or working in the project area to excessive noise levels associated with airports.

Table 6 (1 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	-N/A-	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-N/A-	0
Blasting	Yes	-N/A-	94	-N/A-	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-N/A-	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Forklift[2,3]	No	50	n/a	61	n/a
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-N/A-	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-N/A-	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	50	85	77	9
Paving Equipment	No	50	85	77	9
Pneumatic Tools	No	50	85	85	90

Table 6 (2 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-N/A-	0
Tractor	No	40	84	-N/A-	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Notes:

(1) Source: FHWA Roadway Construction Noise Model User's Guide January 2006.

(2) Warehouse & Forklift Noise Exposure - NoiseTesting.info Carl Stautins, November 4, 2014 http://www.noisetesting.info/blog/carl-strautins/page-3/

(3) Data provided Leq as measured at the operator. Sound Level at 50 feet is calculated using Inverse Square Law.

Table 7
Construction Noise Levels (dBA L_{eq})

Phase	Receptor Location	Existing Ambient Noise Levels (dBA Leq)[1]	Construction Noise Levels (dBA Leq)[2]
Site Preparation	Northwest (Nursing Home) (STNM3)	55.1	65.7
	Northeast (Hospital) (STNM4)	69.1	68.5
	West (Single-Family Residential) (STNM2)	52.4	66.9
	West (Multi-Family Residential) (STNM1)	53.6	64.4
Grading	Northwest (Nursing Home) (STNM3)	55.1	66.8
	Northeast (Hospital) (STNM4)	69.1	69.5
	West (Single-Family Residential) (STNM2)	52.4	68.0
	West (Multi-Family Residential) (STNM1)	53.6	65.5
Building Construction	Northwest (Nursing Home) (STNM3)	55.1	63.8
	Northeast (Hospital) (STNM4)	69.1	66.5
	West (Single-Family Residential) (STNM2)	52.4	64.9
	West (Multi-Family Residential) (STNM1)	53.6	62.4
Paving	Northwest (Nursing Home) (STNM3)	55.1	63.2
	Northeast (Hospital) (STNM4)	69.1	65.9
	West (Single-Family Residential) (STNM2)	52.4	64.4
	West (Multi-Family Residential) (STNM1)	53.6	61.8
Architectural Coating	Northwest (Nursing Home) (STNM3)	55.1	56.2
	Northeast (Hospital) (STNM4)	69.1	59.0
	West (Single-Family Residential) (STNM2)	52.4	57.4
	West (Multi-Family Residential) (STNM1)	53.6	54.9

Notes:

(1) Per measured existing ambient noise levels. STNM1 was used for multi-family residential receptors to the west, STNM2 for single-family residential receptors to the west, STNM3 for nursing home receptors to the northwest and commercial receptors to the north, STNM4 for hospital receptors to the northeast and commercial receptors to the east, and STNM5 for commercial receptors to the south.

(2) Construction noise worksheets are provided in Appendix D.

Table 8
Project Average Daily Traffic Volumes and Roadway Parameters

Roadway	Segment	Average Daily Traffic Volume[1]		Posted Travel Speeds (MPH)	Site Conditions
		Existing	Existing Plus Project		
8th Street	West of Highland Springs Avenue	5,000	400	35	Hard
Wilson Street	East of Highland Springs Avenue	12,800	100	45	Hard
6th Street	West of Highland Springs Avenue	17,800	500	35	Hard
Ramsey Street	East of Highland Springs Avenue	16,400	100	45	Hard
Highland Springs Avenue	North of 8th Street/Wilson Street	19,600	100	35	Hard
	8th Street/Wilson Street to Memorial Road	21,300	600	35	Hard
	Memorial Road to 6th Street/Ramsey Street	21,700	600	30	Hard
	6th Street/Ramsey Street to Interstate 10 Freeway	31,700	700	35	Hard
	South of Interstate 10 Freeway	40,300	200	35	Hard

Vehicle Distribution (Light Mix)[2]			
Motor-Vehicle Type	Daytime % (7 AM-7 PM)	Evening % (7 PM-10 PM)	Night % (10 PM-7 AM)
Automobiles	75.56	13.96	10.49
Medium Trucks	48.91	2.17	48.91
Heavy Trucks	47.30	5.41	47.30

Vehicle Distribution (Heavy Mix)[2]			
Motor-Vehicle Type	Daytime % (7 AM-7 PM)	Evening % (7 PM-10 PM)	Night % (10 PM-7 AM)
Automobiles	75.54	14.02	10.43
Medium Trucks	48.00	2.00	50.00
Heavy Trucks	48.00	2.00	50.00

Notes:

(1) Existing and project average daily traffic volumes obtained from the 655 Highland Springs Office-Commercial Project Traffic Impact Analysis (Ganddini Group, Inc., March 12, 2020).

(2) Existing vehicle percentages are based on the Riverside County Industrial Hygiene Letter for Traffic Noise.

Table 9
Change in Existing Noise Levels Along Roadways as a Result of Project (dBA CNEL)

Roadway	Segment	Distance from roadway centerline to right-of-way (feet)[2]	Modeled Noise Levels (dBA CNEL)[1]				
			Existing Without Project at right-of-way	Existing Plus Project at right-of-way	Change in Noise Level	Exceeds 65 dBA Standards[3]	Increase of 5 dB or More?
8th Street	West of Highland Springs Avenue	50	68.37	68.70	0.33	Yes	No
Wilson Street	East of Highland Springs Avenue	50	73.98	74.01	0.03	Yes	No
6th Street	West of Highland Springs Avenue	55	73.47	73.59	0.12	Yes	No
Ramsey Street	East of Highland Springs Avenue	55	74.64	74.67	0.03	Yes	No
Highland Springs Avenue	North of 8th Street/Wilson Street	55	73.88	73.91	0.03	Yes	No
	8th Street/Wilson Street to Memorial Road	55	74.25	74.37	0.12	Yes	No
	Memorial Road to 6th Street/Ramsey Street	55	73.46	73.58	0.12	Yes	No
	6th Street/Ramsey Street to Interstate 10 Freeway	67	75.11	75.21	0.10	Yes	No
	South of Interstate 10 Freeway	67	76.16	76.18	0.02	Yes	No

Notes:

(1) Exterior noise levels calculated 5 feet above pad elevation, perpendicular to subject roadway.

(2) Right of way per the City of Beaumont General Plan Circulation Element.

(3) Per the City of Beaumont desired maximum standard for single-family detached residential dwelling units (see Table 3).

Table 10
Parking Lot Noise Levels

Receptor	Distance (feet)[1]	Noise Level (dBA Leq)	Reduction due to Building Attenuation (dB)[2]	Noise Level with Reduction (dBA Leq)	Exceedance of Standards[3]	
					City Thresholds (day/night)	Exceeds Thresholds (day/night)?
Single-Family Residential to West	176	49.1	5	44.1	55/45	No/No
Hospital Property Line to Northeast	266	45.5	-	-	75/50	No/No
Nursing Home to Northwest	260	45.7	-	-	55/45	No/Yes
Multi-Family Residential Property Line to West	554	39.1	5	34.1	55/45	No/No

Notes:

(1) Distance from the acoustical activity center of the proposed parking lot to the property line of the receptor.

(2) Calculated reduction due to proposed office building and proposed six foot high block wall being located between the affected receptor and the parking lot. Per FTA Transit Noise and Vibration Impact Assessment Manual Tables 4-28 and 4-29 (September 2018), the reduction is the maximum reduction from either the wall or building. Building attenuation per FTA Tables 4-28 and 4-29 is approximately 5 dB. See calculations in Appendix F.

(3) Per the City of Beaumont Municipal Code Section 9.02.050 the exterior residential noise level thresholds are 55 dBA Leq during the daytime and 45 dBA Leq during the nighttime and per Section 9.02.090 the maximum nonresidential thresholds are 75 dBA Leq during the daytime and 50 dBA Leq during the nighttime.

Table 11
Drive-Through Noise Levels

Receptor	Distance (feet)[1]	Noise Level (dBA Leq)	Reduction due to Building Attenuation (dB)[2]	Noise Level with Reduction (dBA Leq)	Exceedance of Standards[3]	
					City Thresholds (day/night)	Exceeds Thresholds (day/night)?
Single-Family Residential Property Line to West	143	42.4	5	37.4	55/45	No/No
Hospital Property Line to Northeast	277	36.6	-	-	75/50	No/No
Nursing Home to Northwest	246	37.7	-	-	55/45	No/No
Multi-Family Residential Property Line to West	530	31.0	5	26.0	55/45	No/No

Notes:

(1) Distance from the drive-through speakerphone to the property line of the receptor (unless specified otherwise).

(2) Calculated reduction due to proposed office building and proposed six foot high block wall being located between affected receptor and the drive-through. Per FTA Transit Noise and Vibration Impact Assessment Manual Tables 4-28 and 4-29 (September 2018), the reduction is the maximum reduction from either the wall or building. Building attenuation per FTA Tables 4-28 and 4-29 is approximately 5 dB for residential uses to west. See Appendix F for calculations.

(3) Per the City of Beaumont Municipal Code Section 9.02.050 the exterior residential noise level thresholds are 55 dBA Leq during the daytime and 45 dBA Leq during the nighttime and per Section 9.02.090 the maximum nonresidential thresholds are 75 dBA Leq during the daytime and 50 dBA Leq during the nighttime.

Table 12
Car Wash Equipment Noise Levels

Land Use	Distance to Nearest Sensitive Receptor (feet)[1]	Noise Level (dBA Leq)	Reduction due to Building Attenuation (dB)[2]	Noise Level with Reduction (dBA Leq)	Exceedance of Standards?[3]	
					City Threshold?	Exceeds Threshold?
Single-Family Residential Property Line to West						
Vacuum Producer 1	138	38.2	8.3	29.9	55	No
Vacuum Producer 2	215	34.4	8.3	26.1	55	No
Vacuum Hose System	141	43.4	9.3	34.1	55	No
Tunnel - Exit	157	62.1	8.5	53.6	55	No
	Summed dBA Leq	62.2	-	53.7	55	No
Hospital Property Line to Northeast						
Vacuum Producer 1	339	30.4	-	-	75	No
Vacuum Producer 2	381	29.4	-	-	75	No
Vacuum Hose System	207	40.0	-	-	75	No
Tunnel - Entrance	250	51.9	-	-	75	No
	Summed dBA Leq	52.2	-	-	75	No
Nursing Home to Northwest						
Vacuum Producer 1	302	31.4	8.3	23.1	55	No
Vacuum Producer 2	398	29	8.2	20.8	55	No
Vacuum Hose System	301	36.8	8.8	28	55	No
Tunnel - Exit	324	55.9	8.4	47.5	55	No
	Summed dBA Leq	55.9	-	47.5	55	No
Multi-Family Residential Property Line to West						
Vacuum Producer 1	509	26.9	5	21.9	55	No
Vacuum Producer 2	547	26.2	5	21.2	55	No
Vacuum Hose System	520	32	5	27	55	No
Tunnel - Exit	525	51.7	5	46.7	55	No
	Summed dBA Leq	51.7	-	46.7	55	No

Notes:

(1) Distance from the closest portion of the proposed noise source to the property line of the nearest receptor.

(2) Calculated reduction due to the proposed office building, existing auto repair building, and proposed six foot block wall being located between the affected residential receptors and the car wash and an existing six foot block wall (at southern property boundary of nursing home use) and proposed/existing commercial buildings being located between the nursing home use and the car wash. Per FTA Transit Noise and Vibration Impact Assessment Manual Tables 4-28 and 4-29 (September 2018), the reduction is the maximum reduction from either the wall or building. Building attenuation per FTA Table 4-29 is approximately ~5 dB at multi-family residential property line and single-family dwelling unit, while barrier attenuation is ~8.3-8.5 dB at single-family residential property line and ~8.2-8.8 dB at nursing home property line. See Appendix F for calculations.

(3) Per the City of Beaumont Municipal Code Section 9.02.050 the exterior residential noise level threshold is 55 dBA Leq during the daytime and, per Section 9.02.090, the maximum non-residential threshold is 75 dBA Leq during the daytime. The car wash will not be operational during the noise-sensitive nighttime hours.

Table 13
HVAC Equipment Noise Levels

Land Use	Distance to Nearest Sensitive Receptor (feet)[1]	Noise Level (dBA Leq)	Reduction due Parapet (dB)[2]	Nighttime Noise Level (dBA Leq)[2]	Exceedance of Standards[3]	
					City Thresholds (day/night)	Exceeds Thresholds (day/night)?
Single-Family Residential Property Line to West						
Office Building	25	51.5	12	39.5	55/45	No/No
Fast-Food Restaurant	206	33.2	-	33.2	55/45	No/No
Summed dBA Leq		51.6		40.5	55/45	No/No
Hospital Property Line to Northeast						
Office Building	408	27.3	12	15.3	75/50	No/No
Fast-Food Restaurant	227	32.4	-	32.4	75/50	No/No
Summed dBA Leq		33.6		32.5	75/50	No/No
Nursing Home Property Line to Northwest						
Office Building	194	33.7	12	21.7	55/45	No/No
Fast-Food Restaurant	273	30.8	-	30.8	55/45	No/No
Summed dBA Leq		35.5		31.3	55/45	No/No
Multi-Family Residential Property Line to West						
Office Building	406	27.3	12	15.3	55/45	No/No
Fast-Food Restaurant	585	24.2	-	24.2	55/45	No/No
Summed dBA Leq		29.0		24.7	55/45	No/No

Notes:

(1) Distance from the HVAC being located at the approximate center of the proposed building to the property line of the nearest receptor.

(2) The proposed office building is to have a parapet that blocks the line of site of the associated HVAC units. Calculated reduction per FTA Transit Noise and Vibration Impact Assessment Manual Tables 4-28 (September 2018). Please see calculation provided in Appendix F.

(3) Per the City of Beaumont Municipal Code Section 9.02.050 the exterior residential noise level thresholds are 55 dBA Leq during the daytime and 45 dBA Leq during the nighttime and per Section 9.02.090 the maximum non-residential thresholds are 75 dBA Leq during the daytime and 50 dBA Leq during the nighttime.

Table 14
Combined Operational Noise Levels at Nearest Sensitive Receptors

Land Use	Daytime Noise Level (dBA Leq)[1]	Nighttime Noise Level (dBA Leq)[1,2]	Exceedance of Standards[3]	
			City Thresholds (day/night)	Exceeds Thresholds (day/night)?
Single-Family Residential Property Line to West				
Drive-Through	37.4	37.4	55/45	No/No
HVAC Equipment	40.5	40.5	55/45	No/No
Car Wash	53.7	-	55/45	No/No
Summed dBA Leq	54.0	42.2	55/45	No/No
Hospital Property Line to Northeast				
Drive-Through	36.6	36.6	75/50	No/No
HVAC Equipment	32.5	32.5	75/50	No/No
Car Wash	52.2	-	75/50	No/No
Summed dBA Leq	52.3	38.0	75/50	No/No
Nursing Home Property Line to Northwest				
Drive-Through	37.7	37.7	55/45	No/No
HVAC Equipment	31.3	31.3	55/45	No/No
Car Wash	47.5	-	55/45	No/No
Summed dBA Leq	48.0	38.6	55/45	No/No
Multi-Family Residential Property Line to West				
Drive-Through	26.0	26.0	55/45	No/No
HVAC Equipment	24.7	24.7	55/45	No/No
Car Wash	46.7	-	55/45	No/No
Summed dBA Leq	46.8	28.4	55/45	No/No

Notes:

(1) Noise levels are with incorporation of noise barrier and building attenuation. Per the City's Municipal Code, daytime is 7:00 AM to 10:00 PM and nighttime is 10:00 PM to 7:00 AM.

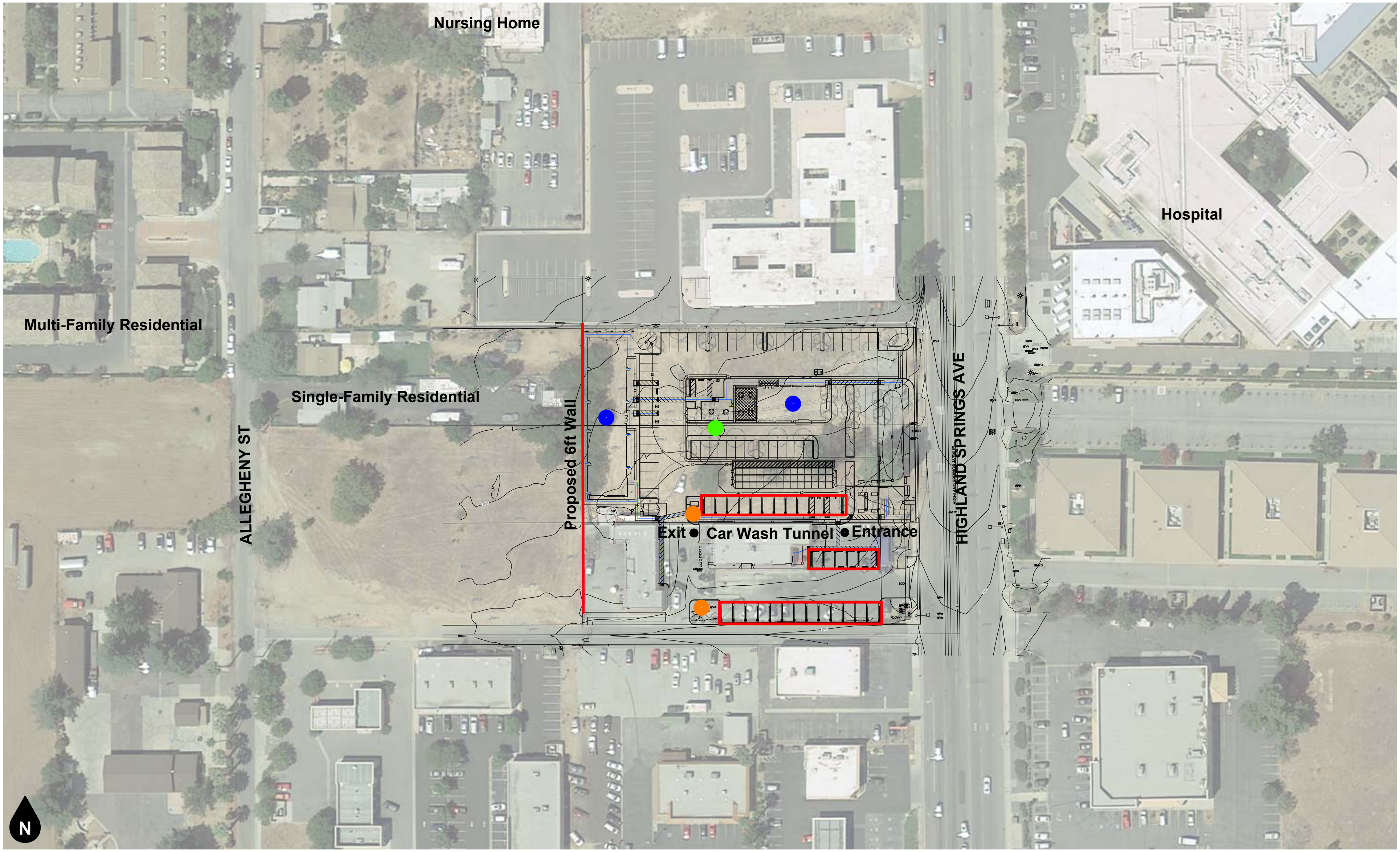
(2) The car wash hours of operation are 7:00 AM to 9:00 PM during the summer and 8:00 AM to 5:00 PM during the winter. Therefore, the car wash is not operational during the noise sensitive nighttime hours.

(3) Per the City of Beaumont Municipal Code Section 9.02.050 the exterior residential noise level thresholds are 55 dBA Leq during the daytime and 45 dBA Leq during the nighttime and for commercial uses 75 dBA Leq during the daytime and 50 dBA Leq during the nighttime.

Table 15
Construction Equipment Vibration Source Levels

Equipment		PPV at 25 ft, in/sec	Approximate Lv* at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment Manual, 2018.
*RMS velocity in decibels, VdB re 1 micro-in/sec



Legend

- Drive-Through Speakerphone
- Roof-Top Air Conditioning Units
- Vacuum Enclosure
- Vacuums

Figure 6
Operational Noise Source and Sensitive Receptor Locations

7. MEASURES TO REDUCE IMPACTS

Construction Noise Reduction Measures

In addition to adherence to the City of Beaumont Municipal Code which limits the construction hours of operation, the following measures are recommended to reduce construction noise and vibrations, emanating from the proposed project:

1. During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards.

2. The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

3. As applicable, all equipment shall be shut off and not left to idle when not in use.

4. The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

5. Jackhammers, pneumatic equipment and all other portable stationary noise sources shall be shielded and noise shall be directed away from sensitive receptors.

6. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

7. The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment.

9. Vibratory rollers, or any other equivalent vibratory equipment, shall not be utilized within 10 feet and large bulldozers within two feet of the portion of the western property line that lies adjacent to existing residential structures.

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APPENDICES

Appendix A List of Acronyms
Appendix B Glossary
Appendix C Noise Measurement Field Worksheet
Appendix D Construction Noise Modeling
Appendix E Project Generated Trips FHWA Worksheets
Appendix F Operational Noise Sources Manufacturer Data
Appendix G Vibration Worksheets

Appendix A

List of Acronyms

Term	Definition
ADT	Average Daily Traffic
ANSI	American National Standard Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
D/E/N	Day / Evening / Night
dB	Decibel
dBA or dB(A)	Decibel "A-Weighted"
dBA/DD	Decibel per Double Distance
dBA L_{eq}	Average Noise Level over a Period of Time
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
L_{02},L_{08},L_{50},L_{90}	A-weighted Noise Levels at 2 percent, 8 percent, 50 percent, and 90 percent, respectively, of the time period
DNL	Day-Night Average Noise Level
$L_{eq(x)}$	Equivalent Noise Level for '"x" period of time
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Level of Noise (measured using a sound level meter)
L_{min}	Minimum Level of Noise (measured using a sound level meter)
LOS C	Level of Service C
OPR	California Governor's Office of Planning and Research
PPV	Peak Particle Velocities
RCNM	Road Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root Mean Square

Appendix B

Glossary

Term	Definition
Ambient Noise Level	The all-encompassing noise environment associated with a given environment, at a specified time, usually a composite of sound from many sources, at many directions, near and far, in which usually no particular sound is dominant.
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear.
CNEL	Community Noise Equivalent Level. CNEL is a weighted 24-hour noise level that is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours.
Decibel, dB	A logarithmic unit of noise level measurement that relates the energy of a noise source to that of a constant reference level; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
DNL, Ldn	Day Night Level. The DNL, or Ldn is a weighted 24-hour noise level that is obtained by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the nighttime hours.
Equivalent Continuous Noise Level, L_{eq}	A level of steady state sound that in a stated time period, and a stated location, has the same A-weighted sound energy as the time-varying sound.
Fast/Slow Meter Response	The fast and slow meter responses are different settings on a sound level meter. The fast response setting takes a measurement every 100 milliseconds, while a slow setting takes one every second.
Frequency, Hertz	In a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., the number of cycles per second).
L_{02}, L_{08}, L_{50}, L_{90}	The A-weighted noise levels that are equaled or exceeded by a fluctuating sound level, 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively.
L_{max}, L_{min}	L_{max} is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval, using fast meter response. L_{min} is the minimum level.
Offensive/ Offending/ Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal information content as well as the prevailing ambient noise level.

Term	Definition
Root Mean Square (RMS)	A measure of the magnitude of a varying noise source quantity. The name derives from the calculation of the square root of the mean of the squares of the values. It can be calculated from either a series of lone values or a continuous varying function.

APPENDIX C

NOISE MEASUREMENT FIELD WORKSHEET

Noise Measurement
Field Data

Project Name: 655 Highland Springs Commercial Office Project, City of Beaumont. **Date:** October 19, 2020

Project #: JN 19300

Noise Measurement #: STNM1 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 690 Allegheny Street, Beaumont, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Multi-family residential to north & west, vacant land SW, Allegheny St to east w/ single-family residential further east.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 81 deg F **Wind:** 10-15mph **Humidity:** 25% **Terrain:** Flat

Start Time: 1:27 PM **End Time:** 1:42 PM **Run Time:**

Leq: 53.6 dB **Primary Noise Source:** Traffic noise from 14 vehicles traveling along Allegheny Street.

Lmax 68.4 dB Traffic Ambiance from the 10 Freeway & other surrounding roads.

L2 59.5 dB **Secondary Noise Sources:** Residential ambiance, fire station with intercom, gentle breeze

L8 56.2 dB rustling leaves and vegetation. Distant overhead helicopter doing circles.

L25 53.5 dB

L50 52.1 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	10/19/2020		

Noise Measurement
Field Data

PHOTOS:

STNM1 looking SE across Allegheny Street towards residence 680 Allegheny Street, City of Beaumont.

STNM1 looking N up Allegheny Street heading towards E 8th Street intersection.

Summary		
File Name on Meter	LxT_Data.001	
File Name on PC	SLM_0003099_LxT_Data_001.01.ldbin	
Serial Number	0003099	
Model	SoundTrack LxT®	
Firmware Version	2.402	
User	Ian Edward Gallagher	
Location	STNM1 JN 19300 33°55'51.78"N 116°56'57.90"W	
Job Description	15 minute noise measurement (1 x 15 minutes)	
Measurement		
Start	2020-10-19 13:27:37	
Stop	2020-10-19 13:42:37	
Duration	00:15:00.0	
Run Time	00:15:00.0	
Pause	00:00:00.0	
Pre Calibration	2020-10-19 13:26:42	
Post Calibration	None	
Overall Settings		
RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Overload	122.5 dB	
Results		
LAeq	53.6	
LAE	83.2	
EA	22.981 µPa²h	
EA8	735.384 µPa²h	
EA40	3.677 mPa²h	
LZpeak (max)	2020-10-19 13:28:35	97.6 dB
LASmax	2020-10-19 13:37:42	68.4 dB
LASmin	2020-10-19 13:41:30	47.3 dB
SEA	-99.9 dB	

		Statistics	
LCeq	68.5 dB	**LAI2.00**	59.5 dB
LAeq	53.6 dB	**LAI8.00**	56.2 dB
LCeq - LAeq	14.9 dB	**LAI25.00**	53.5 dB
LAIeq	55.1 dB	**LAI50.00**	52.1 dB
LAeq	53.6 dB	**LAI66.60**	51.4 dB
LAIeq - LAeq	1.5 dB	**LAI90.00**	50.3 dB
# Overloads	0		

Noise Measurement
Field Data

Project Name: 655 Highland Springs Commercial Office Project, City of Beaumont. **Date:** October 19, 2020

Project #: JN 19300

Noise Measurement #: STNM2 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: Backend of property 684 Allegheny Street, Beaumont, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Commercial medical office w/ parking lot to north, single-family residential to west, vacant project site to west & south with car wash & auto repair

Weather: Sunny, clear blue skies. **Settings:** $\boxed{\text{SLOW}}$ FAST

Temperature: 81 deg F **Wind:** 10-15mph **Humidity:** 25% **Terrain:** Flat

Start Time: 2:14 PM **End Time:** 2:29 PM **Run Time:**

Leq: 52.4 dB **Primary Noise Source:** Traffic Ambiance from Highland Springs Ave, the 10 Freeway & other surrounding roads.

Lmax 63.7 dB

L2 55.0 dB **Secondary Noise Sources:** Car wash station ambiance, bird song.

L8 53.9 dB

L25 53.1 dB

L50 52.3 dB

NOISE METER: SoundTrack LXT Class 1 **CALIBRATOR:** Larson Davis CAL250

MAKE: Larson Davis **MAKE:** Larson Davis

MODEL: LXT1 **MODEL:** Cal 250

SERIAL NUMBER: 3099 **SERIAL NUMBER:** 2733

FACTORY CALIBRATION DATE: 4/9/2020 **FACTORY CALIBRATION DATE:** 4/2/2020

FIELD CALIBRATION DATE: 10/19/2020

Noise Measurement
Field Data

PHOTOS:

STNM2 looking NW into backyard of residence, 684 Allegheny Street (behind trees).

STNM2 looking NE towards commercial building, 701 Highland Springs Avenue, City of Beaumont (behind chain-link fence).

Summary		
File Name on Meter	LxT_Data.002	
File Name on PC	SLM_0003099_LxT_Data_002.01.ldbin	
Serial Number	0003099	
Model	SoundTrack LxT®	
Firmware Version	2.402	
User	Ian Edward Gallagher	
Location	STNM2 JN 19300 33°55'51.71"N 116°56'53.03"W	
Job Description	15 minute noise measurement (1 x 15 minutes)	
Measurement		
Start	2020-10-19 14:14:25	
Stop	2020-10-19 14:29:25	
Duration	00:15:00.0	
Run Time	00:15:00.0	
Pause	00:00:00.0	
Pre Calibration	2020-10-19 14:14:14	
Post Calibration	None	
Overall Settings		
RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Overload	122.6 dB	
Results		
LAeq	52.4	
LAE	82.0	
EA	17.425 µPa²h	
EA8	557.586 µPa²h	
EA40	2.788 mPa²h	
LZpeak (max)	2020-10-19 14:21:51	90.6 dB
LASmax	2020-10-19 14:14:25	63.7 dB
LASmin	2020-10-19 14:20:43	48.9 dB
SEA	-99.9 dB	

		Statistics	
LCeq	67.2 dB	**LAI2.00**	55.0 dB
LAeq	52.4 dB	**LAI8.00**	53.9 dB
LCeq - LAeq	14.8 dB	**LAI25.00**	53.1 dB
LAIeq	54.4 dB	**LAI50.00**	52.3 dB
LAeq	52.4 dB	**LAI66.60**	51.7 dB
LAIeq - LAeq	2.0 dB	**LAI90.00**	50.5 dB
# Overloads	0		

Noise Measurement
Field Data

Project Name: 655 Highland Springs Commercial Office Project, City of Beaumont. **Date:** October 19, 2020

Project #: JN 19300

Noise Measurement #: STNM3 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 701 Highland Springs Avenue, Beaumont, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Commercial medical office w/ parking lot to north & project site to south.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 81 deg F **Wind:** 10-15mph **Humidity:** 25% **Terrain:** Flat

Start Time: 2:43 PM **End Time:** 2:58 PM **Run Time:**

Leq: 55.1 dB

Lmax 72.3 dB

L2 59.3 dB

L8 57.4 dB

L25 55.2 dB

L50 54.2 dB

Primary Noise Source: Traffic Ambiance from Highland Springs Ave, the 10 Freeway & other surrounding roads.

Secondary Noise Sources: Car wash station ambiance, bird song. Four vehicles passing microphone leaving parking lot to building 701 Highland Springs Avenue.

NOISE METER: SoundTrack LXT Class 1
MAKE: Larson Davis
MODEL: LXT1
SERIAL NUMBER: 3099
FACTORY CALIBRATION DATE: 4/9/2020
FIELD CALIBRATION DATE: 10/19/2020

CALIBRATOR: Larson Davis CAL250
MAKE: Larson Davis
MODEL: Cal 250
SERIAL NUMBER: 2733
FACTORY CALIBRATION DATE: 4/2/2020

Noise Measurement
Field Data

PHOTOS:

STNM3 looking NE towards back of building 701 Highland Springs Avenue, City of Beaumont.

STNM3 looking SE towards exit to parking lot of building 701 Highland Springs Avenue.

Summary			
File Name on Meter	LxT_Data.003		
File Name on PC	SLM_0003099_LxT_Data_003.01.ldbin		
Serial Number	0003099		
Model	SoundTrack LxT®		
Firmware Version	2.402		
User	Ian Edward Gallagher		
Location	STNM3 JN 19300 33°55'52.34"N 116°56'52.16"W		
Job Description	15 minute noise measurement (1 x 15 minutes)		
Measurement			
Start	2020-10-19 14:43:32		
Stop	2020-10-19 14:58:32		
Duration	00:15:00.0		
Run Time	00:15:00.0		
Pause	00:00:00.0		
Pre Calibration	2020-10-19 14:43:21		
Post Calibration	None		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Low		
OBA Bandwidth	1/1 and 1/3		
OBA Freq. Weighting	Z Weighting		
OBA Max Spectrum	Bin Max		
Overload	122.7 dB		
Results			
LAeq	55.1		
LAE	84.7		
EA	32.596 µPa²h		
EA8	1.043 mPa²h		
EA40	5.215 mPa²h		
LZpeak (max)	2020-10-19 14:43:40	99.1 dB	
LASmax	2020-10-19 14:56:09	72.3 dB	
LASmin	2020-10-19 14:58:02	51.2 dB	
SEA	-99.9 dB		

		Statistics	
LCeq	67.5 dB	**LAI2.00**	59.3 dB
LAeq	55.1 dB	**LAI8.00**	57.4 dB
LCeq - LAeq	12.4 dB	**LAI25.00**	55.2 dB
LAIeq	58.6 dB	**LAI50.00**	54.2 dB
LAeq	55.1 dB	**LAI66.60**	53.6 dB
LAIeq - LAeq	3.5 dB	**LAI90.00**	52.6 dB
# Overloads	0		

Noise Measurement
Field Data

Project Name: 655 Highland Springs Commercial Office Project, City of Beaumont. **Date:** October 19, 2020

Project #: JN 19300

Noise Measurement #: STNM4 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: Highland Springs Avenue & Memorial Drive.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Highland Springs Ave to west, commercial medical offices w/ parking lot to southeast, & hospital w/ parking lot area to northeast.

Weather: Sunny, clear blue skies. **Settings:** $\boxed{\text{SLOW}}$ FAST

Temperature: 81 deg F **Wind:** 10-15mph **Humidity:** 25% **Terrain:** Flat

Start Time: 3:17 PM **End Time:** 3:32 PM **Run Time:**

Leq: 69.1 dB

Lmax 78.7 dB

L2 75.6 dB

L8 73.8 dB

L25 70.4 dB

L50 66.5 dB

Primary Noise Source: Traffic noise from 324 vehicles passing microphone traveling along Highland Springs Avenue. Traffic ambiance from 10 Freeway & other roads.

Secondary Noise Sources: Car wash station ambiance, bird song. Pedestrians.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	10/19/2020		

Noise Measurement
Field Data

PHOTOS:

STNM4 looking N up Highland Springs Avenue past Memorial Drive intersection.

STNM4 looking W across Highland Springs Avenue towards site area.

Summary			
File Name on Meter	LxT_Data.004		
File Name on PC	SLM_0003099_LxT_Data_004.01.ldbin		
Serial Number	0003099		
Model	SoundTrack LxT®		
Firmware Version	2.402		
User	Ian Edward gallagher		
Location	STNM4 JN 19300 33°55'51.54"N 116°56'48.32"W		
Job Description	15 minute noise measurement (1 x 15 minutes)		
Measurement			
Start	2020-10-19 15:17:41		
Stop	2020-10-19 15:32:41		
Duration	00:15:00.0		
Run Time	00:15:00.0		
Pause	00:00:00.0		
Pre Calibration	2020-10-19 15:13:53		
Post Calibration	None		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Low		
OBA Bandwidth	1/1 and 1/3		
OBA Freq. Weighting	Z Weighting		
OBA Max Spectrum	Bin Max		
Overload	122.7 dB		
Results			
LAeq	69.1		
LAE	98.7		
EA	815.784 µPa²h		
EA8	26.105 mPa²h		
EA40	130.526 mPa²h		
LZpeak (max)	2020-10-19 15:26:53	103.0 dB	
LASmax	2020-10-19 15:18:30	78.7 dB	
LASmin	2020-10-19 15:32:02	51.9 dB	
SEA	-99.9 dB		

		Statistics	
LCeq	75.4 dB	**LAI2.00**	75.6 dB
LAeq	69.1 dB	**LAI8.00**	73.8 dB
LCeq - LAeq	6.2 dB	**LAI25.00**	70.4 dB
LAIeq	70.7 dB	**LAI50.00**	66.5 dB
LAeq	69.1 dB	**LAI66.60**	63.4 dB
LAIeq - LAeq	1.6 dB	**LAI90.00**	56.8 dB
# Overloads	0		

Noise Measurement
Field Data

Project Name: 655 Highland Springs Commercial Office Project, City of Beaumont. **Date:** October 19, 2020

Project #: JN 19300

Noise Measurement #: STNM5 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 655 Highland Springs Avenue, Beaumont, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Commercial uses & parking lot to south, access road to north with car wash & associated parking further north.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 82 deg F **Wind:** 10-15mph **Humidity:** 25% **Terrain:** Flat

Start Time: 3:47 PM **End Time:** 4:02 PM **Run Time:**

Leq: 59.6 dB **Primary Noise Source:** Traffic noise from vehicles traveling along Highland Springs Avenue.

Lmax 71.7 dB Traffic ambiance from 10 Freeway & other roads.

L2 63.7 dB **Secondary Noise Sources:** Car wash station ambiance, bird song.

L8 60.8 dB

L25 59.6 dB

L50 58.9 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	10/19/2020		

Noise Measurement
Field Data

PHOTOS:

STNM5 looking N across access road towards car wash tunnel, building 655 Highland Springs Ave.

STNM5 looking E down access road towards Highland Springs Avenue intersection.

Summary			
File Name on Meter	LxT_Data.005		
File Name on PC	SLM_0003099_LxT_Data_005.01.ldbin		
Serial Number	0003099		
Model	SoundTrack LxT®		
Firmware Version	2.402		
User	Ian Edward Gallagher		
Location	STNM5 JN 19300 33°55'48.80"N 116°56'51.40"W		
Job Description	15 minute noise measurement (1 x 15 minutes)		
Measurement			
Start	2020-10-19 15:47:37		
Stop	2020-10-19 16:02:37		
Duration	00:15:00.0		
Run Time	00:15:00.0		
Pause	00:00:00.0		
Pre Calibration	2020-10-19 15:47:15		
Post Calibration	None		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Low		
OBA Bandwidth	1/1 and 1/3		
OBA Freq. Weighting	Z Weighting		
OBA Max Spectrum	Bin Max		
Overload	122.5 dB		
Results			
LAeq	59.6		
LAE	89.1		
EA	90.958 µPa²h		
EA8	2.911 mPa²h		
EA40	14.553 mPa²h		
LZpeak (max)	2020-10-19 15:55:42	95.9 dB	
LASmax	2020-10-19 15:53:44	71.7 dB	
LASmin	2020-10-19 15:58:50	56.3 dB	
SEA	-99.9 dB		

		Statistics	
LCeq	71.0 dB	**LAI2.00**	63.7 dB
LAeq	59.6 dB	**LAI8.00**	60.8 dB
LCeq - LAeq	11.4 dB	**LAI25.00**	59.6 dB
LAIeq	60.6 dB	**LAI50.00**	58.9 dB
LAeq	59.6 dB	**LAI66.60**	58.6 dB
LAIeq - LAeq	1.0 dB	**LAI90.00**	57.9 dB
# Overloads	0		

Noise Measurement
Field Data

Project Name: 655 Highland Springs Commercial Office Project, City of Beaumont. **Date:** October 19-20, 2020

Project #: JN 19300

Noise Measurement #: LTNM1 Run Time: 24 hours (24 x 1 hours) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 655 Highland Springs Avenue, Beaumont, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Vacant project site to north, car wash & auto repair to south, Highland Springs Ave to east, & potential homeless activity nearby on-site.

Weather: Clear skies. sunny by day **Settings:** $\boxed{\text{SLOW}}$ FAST

Temperature: 53-83 deg F **Wind:** 0-15mph **Humidity:** 25-50% **Terrain:** Flat

Start Time: 6:00 PM **End Time:** 6:00 PM **Run Time:**

Leq: 56.8 dB **Primary Noise Source:** Traffic noise from Highland Springs Ave, 10 Freeway ambiance & other surrounding roads.

Lmax 88 dB

L2 62.3 dB **Secondary Noise Sources:** Car wash station ambiance, bird song, possible homeless activity (sleeping area). Air traffic, helicopters.

L8 59.6 dB

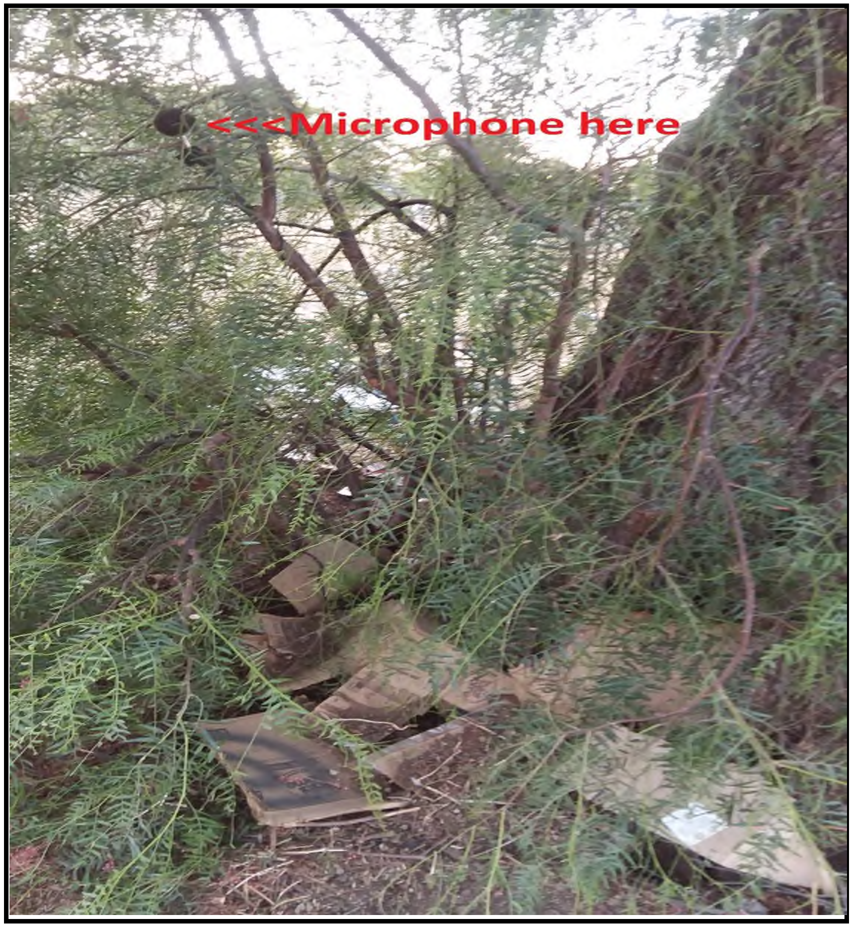
L25 56.9 dB

L50 54.3 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	10/19/2020		

Noise Measurement
Field Data

PHOTOS:



LTNM1 looking W towards microphone located in tree approximately 5 feet above ground, electronic equipment disguised at base of tree.

LTNM1 looking down, actual location relative to surrounding structures & other features.

Summary		
File Name on Meter	LxT_Data.006	
File Name on PC	SLM_0003099_LxT_Data_006.01.ldbin	
Serial Number	0003099	
Model	SoundTrack LxT®	
Firmware Version	2.402	
User	Ian Edward Gallagher	
Location	LTNM1 JN 19300 33°55'50.71"N 116°56'50.34"W	
Job Description	24 hour noise measurement (24 x 1 hours)	
Measurement		
Start	2020-10-19 18:00:00	
Stop	2020-10-20 18:00:00	
Duration	24:00:00.0	
Run Time	24:00:00.0	
Pause	00:00:00.0	
Pre Calibration	2020-10-19 17:03:55	
Post Calibration	None	
Overall Settings		
RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	A Weighting	
OBA Max Spectrum	Bin Max	
Overload	122.5 dB	
Results		
LAeq	56.8	
LAE	106.2	
EA	4.624 mPa²h	
EA8	1.541 mPa²h	
EA40	7.707 mPa²h	
LApeak (max)	2020-10-20 17:13:04	98.6 dB
LASmax	2020-10-20 17:13:04	88.0 dB
LASmin	2020-10-20 01:44:42	42.1 dB
SEA	-99.9 dB	

		Statistics	
LCeq	65.4 dB	**LAI2.00**	62.3 dB
LAeq	56.8 dB	**LAI8.00**	59.6 dB
LCeq - LAeq	8.5 dB	**LAI25.00**	56.9 dB
LAIeq	58.5 dB	**LAI50.00**	54.3 dB
LAeq	56.8 dB	**LAI90.00**	49.5 dB
LAIeq - LAeq	1.7 dB	**LAI99.00**	46.8 dB
# Overloads	0		

Record #	Date	Time	Run Duration	Run Time	Pause	LAeq	LASmin	LASmin Time	LASmax	LASmax Time	LAS2.00	LAS8.00	LAS25.00	LAS50.00	LAS90.00	LAS99.00
1	2020-10-19	18:00:00	01:00:00.0	01:00:00.0	00:00:00.0	58.8	50.4	18:55:14	70.2	18:16:27	63.9	62.1	59.9	57.6	53.5	51.5
2	2020-10-19	19:00:00	01:00:00.0	01:00:00.0	00:00:00.0	60.7	49.1	19:16:19	83.1	19:45:55	63.8	60.6	58.4	55.8	52.1	50.4
3	2020-10-19	20:00:00	01:00:00.0	01:00:00.0	00:00:00.0	58.1	47.8	20:41:22	84.3	20:24:15	62.2	59.7	57.2	54.8	51.1	49.1
4	2020-10-19	21:00:00	01:00:00.0	01:00:00.0	00:00:00.0	56.0	46.4	21:18:43	79.1	21:22:01	61.2	58.7	56.1	53.2	49.1	47.7
5	2020-10-19	22:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.7	45.4	22:44:10	67.4	22:42:16	60.0	57.5	54.4	51.6	48.6	47.0
6	2020-10-19	23:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.6	45.4	23:29:00	68.3	23:31:50	59.5	57.1	54.1	51.7	48.8	46.8
7	2020-10-20	00:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.4	46.0	00:33:41	73.0	00:59:10	58.5	56.2	53.9	52.1	49.1	47.1
8	2020-10-20	01:00:00	01:00:00.0	01:00:00.0	00:00:00.0	52.2	42.1	01:44:42	70.5	01:17:46	57.1	54.9	52.9	51.2	47.7	44.7
9	2020-10-20	02:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.6	42.6	02:43:44	62.0	02:56:35	57.7	54.9	52.0	50.3	47.6	45.0
10	2020-10-20	03:00:00	01:00:00.0	01:00:00.0	00:00:00.0	54.3	46.1	03:03:54	77.2	03:10:01	59.2	56.2	53.4	51.7	49.0	47.0
11	2020-10-20	04:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.9	46.5	04:04:05	68.7	04:07:58	59.7	57.2	54.2	52.4	49.7	47.6
12	2020-10-20	05:00:00	01:00:00.0	01:00:00.0	00:00:00.0	55.6	48.8	05:40:43	67.6	05:58:10	60.9	59.0	56.5	54.0	51.9	50.3
13	2020-10-20	06:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.6	50.0	06:32:03	76.1	06:54:46	62.9	60.7	58.3	56.0	53.2	51.6
14	2020-10-20	07:00:00	01:00:00.0	01:00:00.0	00:00:00.0	60.2	52.5	07:01:17	81.9	07:20:08	65.3	62.4	60.2	58.4	55.2	53.4
15	2020-10-20	08:00:00	01:00:00.0	01:00:00.0	00:00:00.0	58.1	47.1	08:56:43	73.6	08:24:37	64.7	61.2	58.7	56.6	51.6	48.7
16	2020-10-20	09:00:00	01:00:00.0	01:00:00.0	00:00:00.0	56.4	45.4	09:31:54	69.7	09:35:20	63.1	59.7	57.1	54.8	48.4	46.4
17	2020-10-20	10:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.5	44.5	10:56:15	80.3	10:57:42	63.5	59.7	57.0	55.0	49.3	46.2
18	2020-10-20	11:00:00	01:00:00.0	01:00:00.0	00:00:00.0	56.3	45.5	11:53:26	69.0	11:12:14	62.2	59.5	57.0	55.1	48.8	46.4
19	2020-10-20	12:00:00	01:00:00.0	01:00:00.0	00:00:00.0	55.9	44.2	12:16:55	68.2	12:12:03	60.7	58.7	56.8	55.2	49.2	45.8
20	2020-10-20	13:00:00	01:00:00.0	01:00:00.0	00:00:00.0	55.3	44.6	13:07:39	69.7	13:35:44	60.4	58.1	56.2	54.5	49.2	46.7
21	2020-10-20	14:00:00	01:00:00.0	01:00:00.0	00:00:00.0	56.1	47.3	14:09:58	69.1	14:15:39	61.4	58.8	57.0	55.2	50.6	48.2
22	2020-10-20	15:00:00	01:00:00.0	01:00:00.0	00:00:00.0	56.3	46.7	15:35:26	68.7	15:18:59	61.0	59.0	57.1	55.6	51.1	48.3
23	2020-10-20	16:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.8	47.5	16:22:09	79.5	16:57:38	62.7	59.4	57.5	55.5	50.2	48.3
24	2020-10-20	17:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.3	46.9	17:20:51	88.0	17:13:04	62.2	59.1	57.1	55.1	50.6	48.3

Noise Measurement
Field Data

Project Name: Splash @ Highland Springs Car Wash, City of Beaumont. **Date:** December 10, 2020

Project #: JN 19300

Noise Measurement #: STNM6 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 6555 Highland Springs Avenue, Beaumont, California. Tunnel Entrance.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Car wash tunnel entrance ~8 yds east & auto repair shop to southwest.

Weather: Sunny, <5% white cloud. **Settings:** SLOW FAST

Temperature: 56 deg F **Wind:** 5-10mph **Humidity:** 30% **Terrain:** Flat

Start Time: 12:32 PM **End Time:** 12:47 PM **Run Time:**

Leq:	72.2	dB
Lmax	77.1	dB
L2	76.1	dB
L8	75.6	dB
L25	73.6	dB
L50	71.6	dB

Primary Noise Source: Noise from electrical room located just south of car wash entrance. Noise from car wash entrance (~8 yds E) including water spray nozzles & rotating brushes in tunnel.

Secondary Noise Sources: Traffic noise from Highland Springs Ave (immediately E), 8th St , 6th St & 10 Freeway. Car mechanic shop ~11 yards SW of microphone.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	12/10/2020		

Noise Measurement
Field Data

PHOTOS:

NM6 looking E towards entrance of car wash tunnel (~8 yards or ~24 ft), 6' high cinder block wall located ~8' W of microphone.

NM6 looking SW towards car mehanic shop.

Summary		
File Name on Meter	LxT_Data.032	
File Name on PC	SLM_0003099_LxT_Data_032.01.ldbin	
Serial Number	0003099	
Model	SoundTrack LxT®	
Firmware Version	2.402	
User	Ian Edward Gallagher	
Location	NM6 JN 19300 Car Wash Entrance 33°55'49.99"N 116°56'52.02"W	
Job Description	15 minute noise measurement (1 x 15 minutes)	
Measurement		
Start	2020-12-10 12:32:26	
Stop	2020-12-10 12:47:26	
Duration	00:15:00.0	
Run Time	00:15:00.0	
Pause	00:00:00.0	
Pre Calibration	2020-12-10 12:32:10	
Post Calibration	None	
Overall Settings		
RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Overload	122.8 dB	
Results		
LAeq	72.2	
LAE	101.8	
EA	1.667 mPa²h	
EA8	53.341 mPa²h	
EA40	266.707 mPa²h	
LZpeak (max)	2020-12-10 12:41:25	102.8 dB
LASmax	2020-12-10 12:36:57	77.1 dB
LASmin	2020-12-10 12:34:14	62.5 dB
SEA	-99.9 dB	

		Statistics	
LCeq	77.3 dB	**LAI2.00**	76.1 dB
LAeq	72.2 dB	**LAI8.00**	75.6 dB
LCeq - LAeq	5.1 dB	**LAI25.00**	73.6 dB
LAIeq	73.1 dB	**LAI50.00**	71.6 dB
LAeq	72.2 dB	**LAI66.60**	70.9 dB
LAIeq - LAeq	0.9 dB	**LAI90.00**	64.6 dB
# Overloads	0		

Noise Measurement
Field Data

Project Name: Splash @ Highland Springs Car Wash, City of Beaumont **Date:** December 10, 2020

Project #: JN 19300

Noise Measurement #: STNM7 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 6555 Highland Springs Avenue, Beaumont, California. Tunnel Exit.

Site Description (Type of Existing Land Use and any other notable features): Project site: Commercial medical offices to north, Highand Springs Ave east w/ hospital further east, southern end of site commercial w/car wash and auto repair & other commercial uses to south, & residential & vacant land to west. Noise Measurement Site: Car wash tunnel ~7 yds west, detail parking area to southeast, & Highland Spring Ave to east.

Weather: Sunny, <5% white cloud. **Settings:** SLOW (boxed) FAST

Temperature: 56 deg F **Wind:** 5-10mph **Humidity:** 30% **Terrain:** Flat

Start Time: 12:55 PM **End Time:** 1:10 PM **Run Time:**

Leq:	73.3	dB
Lmax	83..1	dB
L2	80.3	dB
L8	79.5	dB
L25	68.6	dB
L50	65.7	dB

Primary Noise Source: Noise from car wash exit (7yds W) including rotating brushes, water spray nozzles and blowers.

Secondary Noise Sources: Traffic noise from Highland Springs Ave (immediately east), 8th St, 6th St &10 Freeway. Car detailing area immediately SE of microphone.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	12/10/2020		

Noise Measurement
Field Data

PHOTOS:

NM7 looking W towards tunnel exit (~7 yards or ~21 feet). 6' high cinder block wall ~6' N of microphone.

NM7 looking SE acoss detailing parking lot area towards Highland Springs Ave intersecting with E 6th Street.

Summary			
File Name on Meter	LxT_Data.033		
File Name on PC	SLM_0003099_LxT_Data_033.01.ldbin		
Serial Number	0003099		
Model	SoundTrack LxT®		
Firmware Version	2.402		
User	Ian Edward Gallagher		
Location	NM7 JN 19300 Car Wash Exit 33°55'49.99"N 116°56'50.25"W		
Job Description	15 minute noise measurement (1 x 15 minutes)		
Measurement			
Start	2020-12-10 12:55:35		
Stop	2020-12-10 13:10:35		
Duration	00:15:00.0		
Run Time	00:15:00.0		
Pause	00:00:00.0		
Pre Calibration	2020-12-10 12:55:19		
Post Calibration	None		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Low		
OBA Bandwidth	1/1 and 1/3		
OBA Freq. Weighting	Z Weighting		
OBA Max Spectrum	Bin Max		
Overload	123.1 dB		
Results			
LAeq	73.3		
LAE	102.9		
EA	2.153 mPa²h		
EA8	68.902 mPa²h		
EA40	344.508 mPa²h		
LZpeak (max)	2020-12-10 13:00:34	107.2 dB	
LASmax	2020-12-10 13:00:34	83.1 dB	
LASmin	2020-12-10 13:02:31	63.2 dB	
SEA	-99.9 dB		

		Statistics	
LCeq	79.9 dB	**LAI2.00**	80.3 dB
LAeq	73.3 dB	**LAI8.00**	79.5 dB
LCeq - LAeq	6.6 dB	**LAI25.00**	68.6 dB
LAIeq	74.5 dB	**LAI50.00**	65.7 dB
LAeq	73.3 dB	**LAI66.60**	64.9 dB
LAIeq - LAeq	1.2 dB	**LAI90.00**	64.2 dB
# Overloads	0		

APPENDIX D

CONSTRUCTION NOISE MODELING

Receptor - Nursing Home to Northwest

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Site Preparation										
Tractors/Loaders/Backhoes	1	84	487	40	0.40	64.2	60.2	Muffler (10 dB Reduction)	50.2	
Grader	1	85	487	40	0.40	65.2	61.2	Muffler (10 dB Reduction)	51.2	10.0
Scraper	1	85	487	40	0.40	65.2	61.2	Muffler (10 dB Reduction)	51.2	
						Log Sum	65.7		55.7	
Grading										
Grader	1	85	487	40	0.40	65.2	61.2	Muffler (10 dB Reduction)	51.2	
Rubber Tired Dozers	1	85	487	40	0.40	65.2	61.2	Muffler (10 dB Reduction)	51.2	10.0
Tractors/Loaders/Backhoes	2	84	487	40	0.80	64.2	63.3	Muffler (10 dB Reduction)	53.3	
						Log Sum	66.8		56.8	
Building Construction										
Cranes	1	83	487	16	0.16	63.2	55.3	Muffler (10 dB Reduction)	45.3	
Forklifts [2]	2	48	487	40	0.80	28.2	27.3	n/a	27.3	
Generator Set	1	81	487	50	0.50	61.2	58.2	Enclosure or Acoustic Tent (10 dB Reduction)	48.2	6.6
Welders	3	74	487	40	1.20	54.2	55.0	n/a	55.0	
Tractors/Loaders/Backhoes	1	84	487	40	0.40	64.2	60.2	Muffler (10 dB Reduction)	50.2	
						Log Sum	63.8		57.2	
Paving										
Cement and Mortar Mixers	1	79	487	40	0.40	59.2	55.2	Muffler (10 dB Reduction)	45.2	
Pavers	1	77	487	50	0.50	57.2	54.2	Muffler (10 dB Reduction)	44.2	
Paving Equipment	1	85	487	20	0.20	65.2	58.2	Muffler (10 dB Reduction)	48.2	10.0
Rollers	2	80	487	20	0.40	60.2	56.2	Muffler (10 dB Reduction)	46.2	
Tractors/Loaders/Backhoes	1	84	487	40	0.40	64.2	60.2	Muffler (10 dB Reduction)	50.2	
						Log Sum	63.2		53.2	
Architectural Coating										
Air Compressors	1	80	487	40	0.40	60.2	56.2	Enclosure or Acoustic Tent (10 dB Reduction)	46.2	10.0
						Log Sum	56.2		46.2	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Hospital to Northeast

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Site Preparation										
Tractors/Loaders/Backhoes	1	84	355	40	0.40	67.0	63.0	Muffler (10 dB Reduction)	53.0	10.0
Grader	1	85	355	40	0.40	68.0	64.0	Muffler (10 dB Reduction)	54.0	
Scraper	1	85	355	40	0.40	68.0	64.0	Muffler (10 dB Reduction)	54.0	
						Log Sum	68.5		58.5	
Grading										
Grader	1	85	355	40	0.40	68.0	64.0	Muffler (10 dB Reduction)	54.0	10.0
Rubber Tired Dozers	1	85	355	40	0.40	68.0	64.0	Muffler (10 dB Reduction)	54.0	
Tractors/Loaders/Backhoes	2	84	355	40	0.80	67.0	66.0	Muffler (10 dB Reduction)	56.0	
						Log Sum	69.5		59.5	
Building Construction										
Cranes	1	83	355	16	0.16	66.0	58.0	Muffler (10 dB Reduction)	48.0	6.6
Forklifts [2]	2	48	355	40	0.80	31.0	30.0	n/a	30.0	
Generator Set	1	81	355	50	0.50	64.0	61.0	Enclosure or Acoustic Tent (10 dB Reduction)	51.0	
Welders	3	74	355	40	1.20	57.0	57.8	n/a	57.8	
Tractors/Loaders/Backhoes	1	84	355	40	0.40	67.0	63.0	Muffler (10 dB Reduction)	53.0	
						Log Sum	66.5		59.9	
Paving										
Cement and Mortar Mixers	1	79	355	40	0.40	62.0	58.0	Muffler (10 dB Reduction)	48.0	10.0
Pavers	1	77	355	50	0.50	60.0	57.0	Muffler (10 dB Reduction)	47.0	
Paving Equipment	1	85	355	20	0.20	68.0	61.0	Muffler (10 dB Reduction)	51.0	
Rollers	2	80	355	20	0.40	63.0	59.0	Muffler (10 dB Reduction)	49.0	
Tractors/Loaders/Backhoes	1	84	355	40	0.40	67.0	63.0	Muffler (10 dB Reduction)	53.0	
						Log Sum	65.9		55.9	
Architectural Coating										
Air Compressors	1	80	355	40	0.40	63.0	59.0	Enclosure or Acoustic Tent (10 dB Reduction)	49.0	10.0
						Log Sum	59.0		49.0	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Single-Family Residential to West at Dwelling Unit

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Site Preparation										
Tractors/Loaders/Backhoes	1	84	425	40	0.40	65.4	61.4	Muffler (10 dB Reduction)	51.4	10.0
Grader	1	85	425	40	0.40	66.4	62.4	Muffler (10 dB Reduction)	52.4	
Scraper	1	85	425	40	0.40	66.4	62.4	Muffler (10 dB Reduction)	52.4	
						Log Sum	66.9		56.9	
Grading										
Grader	1	85	425	40	0.40	66.4	62.4	Muffler (10 dB Reduction)	52.4	10.0
Rubber Tired Dozers	1	85	425	40	0.40	66.4	62.4	Muffler (10 dB Reduction)	52.4	
Tractors/Loaders/Backhoes	2	84	425	40	0.80	65.4	64.4	Muffler (10 dB Reduction)	54.4	
						Log Sum	68.0		58.0	
Building Construction										
Cranes	1	83	425	16	0.16	64.4	56.5	Muffler (10 dB Reduction)	46.5	6.6
Forklifts [2]	2	48	425	40	0.80	29.4	28.4	n/a	28.4	
Generator Set	1	81	425	50	0.50	62.4	59.4	Enclosure or Acoustic Tent (10 dB Reduction)	49.4	
Welders	3	74	425	40	1.20	55.4	56.2	n/a	56.2	
Tractors/Loaders/Backhoes	1	84	425	40	0.40	65.4	61.4	Muffler (10 dB Reduction)	51.4	
						Log Sum	64.9		58.4	
Paving										
Cement and Mortar Mixers	1	79	425	40	0.40	60.4	56.4	Muffler (10 dB Reduction)	46.4	10.0
Pavers	1	77	425	50	0.50	58.4	55.4	Muffler (10 dB Reduction)	45.4	
Paving Equipment	1	85	425	20	0.20	66.4	59.4	Muffler (10 dB Reduction)	49.4	
Rollers	2	80	425	20	0.40	61.4	57.4	Muffler (10 dB Reduction)	47.4	
Tractors/Loaders/Backhoes	1	84	425	40	0.40	65.4	61.4	Muffler (10 dB Reduction)	51.4	
						Log Sum	64.4		54.4	
Architectural Coating										
Air Compressors	1	80	425	40	0.40	61.4	57.4	Enclosure or Acoustic Tent (10 dB Reduction)	47.4	10.0
						Log Sum	57.4		47.4	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Multi-Family Residential to West

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Site Preparation										
Tractors/Loaders/Backhoes	1	84	568	40	0.40	62.9	58.9	Muffler (10 dB Reduction)	48.9	10.0
Grader	1	85	568	40	0.40	63.9	59.9	Muffler (10 dB Reduction)	49.9	
Scraper	1	85	568	40	0.40	63.9	59.9	Muffler (10 dB Reduction)	49.9	
						Log Sum	64.4		54.4	
Grading										
Grader	1	85	568	40	0.40	63.9	59.9	Muffler (10 dB Reduction)	49.9	10.0
Rubber Tired Dozers	1	85	568	40	0.40	63.9	59.9	Muffler (10 dB Reduction)	49.9	
Tractors/Loaders/Backhoes	2	84	568	40	0.80	62.9	61.9	Muffler (10 dB Reduction)	51.9	
						Log Sum	65.5		55.5	
Building Construction										
Cranes	1	83	568	16	0.16	61.9	53.9	Muffler (10 dB Reduction)	43.9	6.6
Forklifts [2]	2	48	568	40	0.80	26.9	25.9	n/a	25.9	
Generator Set	1	81	568	50	0.50	59.9	56.9	Enclosure or Acoustic Tent (10 dB Reduction)	46.9	
Welders	3	74	568	40	1.20	52.9	53.7	n/a	53.7	
Tractors/Loaders/Backhoes	1	84	568	40	0.40	62.9	58.9	Muffler (10 dB Reduction)	48.9	
						Log Sum	62.4		55.9	
Paving										
Cement and Mortar Mixers	1	79	568	40	0.40	57.9	53.9	Muffler (10 dB Reduction)	43.9	10.0
Pavers	1	77	568	50	0.50	55.9	52.9	Muffler (10 dB Reduction)	42.9	
Paving Equipment	1	85	568	20	0.20	63.9	56.9	Muffler (10 dB Reduction)	46.9	
Rollers	2	80	568	20	0.40	58.9	54.9	Muffler (10 dB Reduction)	44.9	
Tractors/Loaders/Backhoes	1	84	568	40	0.40	62.9	58.9	Muffler (10 dB Reduction)	48.9	
						Log Sum	61.8		51.8	
Architectural Coating										
Air Compressors	1	80	568	40	0.40	58.9	54.9	Enclosure or Acoustic Tent (10 dB Reduction)	44.9	10.0
						Log Sum	54.9		44.9	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

APPENDIX E

PROJECT GENERATED TRIPS FHWA WORKSHEETS

Existing Traffic Noise

1	:Id	
8th Street	:Road	
West of Highland Springs Avenue	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	5000
Speed	35
Distance	50
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime			Evening			Night		
	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	289.57	6.00	10.00	214.97	1.00	1.67	53.31	8.33	13.89
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	18.87	2.03	4.25	17.58	-5.75	-3.53	11.52	3.46	5.68
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	58.91	51.79	59.23	57.62	44.01	51.45	51.56	53.22	60.66
	DAY LEQ	62.47		EVENING LEQ	58.71		NIGHT LEQ	61.81	

F	CNEL	68.37	Day hour	89.00
	DAY LEQ	62.47	Absorptive?	no
			Use hour?	no
			GRADE dB	0.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

1	:Id
8th Street	:Road
West of Highland Springs Avenue	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	5400
Speed	35
Distance	50
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	312.74	6.48	10.80	232.17	1.08	1.80	57.57	9.00	15.00
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	19.21	2.37	4.59	17.91	-5.41	-3.19	11.86	3.80	6.01
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	59.25	52.13	59.56	57.95	44.35	51.78	51.90	53.55	60.99
	DAY LEQ	62.81		EVENING LEQ	59.04		NIGHT LEQ	62.14	

CNEL	68.70
DAY LEQ	62.81

Day hour	89.00
Absorptive?	no
Use hour?	no
GRADE dB	0.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

2	:Id	
Wilson Street	:Road	
East of Highland Springs Avenue	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	12800
Speed	45
Distance	50
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime			Evening			Night		
	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	741.30	15.36	25.60	550.33	2.56	4.27	136.47	21.33	35.56
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	21.86	5.03	7.24	20.57	-2.76	-0.54	14.51	6.45	8.67
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	66.14	57.58	64.32	64.84	49.80	56.53	58.79	59.00	65.74
	DAY LEQ	68.68		EVENING LEQ	65.56		NIGHT LEQ	67.25	

CNEL	73.98
DAY LEQ	68.68

Day hour	90.00
Absorptive?	no
Use hour?	no
GRADE dB	1.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

2	:Id	
Wilson Street	:Road	
East of Highland Springs Avenue	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	12900
Speed	45
Distance	50
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	747.09	15.48	25.80	554.63	2.58	4.30	137.54	21.50	35.83
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	21.90	5.06	7.28	20.60	-2.72	-0.50	14.55	6.49	8.70
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	66.17	57.61	64.35	64.88	49.83	56.57	58.82	59.04	65.78
	DAY LEQ	68.72		EVENING LEQ	65.59		NIGHT LEQ	67.28	

CNEL	74.01
DAY LEQ	68.72

Day hour	90.00
Absorptive?	no
Use hour?	no
GRADE dB	1.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

3	:Id	
6th Street	:Road	
West of Highland Springs Avenue	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	17800
Speed	35
Distance	55
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime Autos	Daytime Medium Trucks	Daytime Heavy Trucks	Evening Autos	Evening Medium Trucks	Evening Heavy Trucks	Night Autos	Night Medium Trucks	Night Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1030.87	21.36	35.60	765.31	3.56	5.93	189.78	29.67	49.44
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	24.39	7.55	9.77	23.09	-0.23	1.99	17.04	8.98	11.19
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	64.01	56.89	64.33	62.72	49.11	56.55	56.66	58.32	65.76
	DAY LEQ	67.57		EVENING LEQ	63.81		NIGHT LEQ	66.91	

CNEL	73.47
DAY LEQ	67.57

Day hour	91.00
Absorptive?	no
Use hour?	no
GRADE dB	2.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light heavy mix.

Existing Plus Project Traffic Noise

3	:Id
6th Street	:Road
West of Highland Springs Avenue	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	18300
Speed	35
Distance	55
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime			Evening			Night		
	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1059.83	21.96	36.60	786.80	3.66	6.10	195.11	30.50	50.83
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	24.51	7.67	9.89	23.21	-0.11	2.11	17.16	9.10	11.31
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	64.13	57.01	64.45	62.84	49.23	56.67	56.78	58.44	65.88
	DAY LEQ	67.69		EVENING LEQ	63.93		NIGHT LEQ	67.03	

CNEL	73.59
DAY LEQ	67.69

Day hour	91.00
Absorptive?	no
Use hour?	no
GRADE dB	2.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light heavy mix.

Existing Traffic Noise

4	:Id		ADT	16400
Ramsey Street	:Road		Speed	45
East of Highland Springs Avenue	:Segment		Distance	55
			Left Angle	-90
			Right Angle	90

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	949.79	19.68	32.80	705.11	3.28	5.47	174.85	27.33	45.56
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	22.94	6.10	8.32	21.64	-1.68	0.54	15.59	7.53	9.75
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	66.80	58.24	64.98	65.51	50.46	57.20	59.45	59.67	66.41
	DAY LEQ	69.34		EVENING LEQ	66.22		NIGHT LEQ	67.91	

CNEL	74.64	Day hour	92.00
DAY LEQ	69.34	Absorptive?	no
		Use hour?	no
		GRADE dB	3.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

4	:Id
Ramsey Street	:Road
East of Highland Springs Avenue	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	16500
Speed	45
Distance	55
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	955.58	19.80	33.00	709.41	3.30	5.50	175.92	27.50	45.83
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14
ADJUSTMENTS									
Flow	22.96	6.13	8.35	21.67	-1.65	0.57	15.62	7.56	9.77
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	66.83	58.27	65.00	65.53	50.49	57.22	59.48	59.69	66.43
	DAY LEQ	69.37		EVENING LEQ	66.25		NIGHT LEQ	67.93	

CNEL	74.67
DAY LEQ	69.37

Day hour	92.00
Absorptive?	no
Use hour?	no
GRADE dB	3.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

5	:Id
Highland Springs Avenue	:Road
North of 8th Street/Wilson Street	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	19600
Speed	35
Distance	55
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime			Evening			Night		
	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1135.11	23.52	39.20	842.70	3.92	6.53	208.97	32.67	54.44
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	24.80	7.97	10.19	23.51	0.19	2.40	17.45	9.39	11.61
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	64.43	57.31	64.75	63.14	49.53	56.97	57.08	58.74	66.18
	DAY LEQ	67.99		EVENING LEQ	64.23		NIGHT LEQ	67.33	

CNEL	73.88
DAY LEQ	67.99

Day hour	93.00
Absorptive?	no
Use hour?	no
GRADE dB	4.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

5	:Id
Highland Springs Avenue	:Road
North of 8th Street/Wilson Street	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	19700
Speed	35
Distance	55
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime			Evening			Night		
	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1140.91	23.64	39.40	846.99	3.94	6.57	210.04	32.83	54.72
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	24.83	7.99	10.21	23.53	0.21	2.43	17.48	9.42	11.64
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	64.45	57.33	64.77	63.16	49.55	56.99	57.10	58.76	66.20
	DAY LEQ	68.01		EVENING LEQ	64.25		NIGHT LEQ	67.35	

CNEL	73.91
DAY LEQ	68.01

Day hour	93.00
Absorptive?	no
Use hour?	no
GRADE dB	4.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

6	:Id	
Highland Springs Avenue	:Road	
8th Street/Wilson Street to Memorial Road	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	21300
Speed	35
Distance	55
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime			Evening			Night		
	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1233.57	25.56	42.60	915.79	4.26	7.10	227.10	35.50	59.17
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	25.17	8.33	10.55	23.87	0.55	2.77	17.82	9.76	11.97
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	64.79	57.67	65.11	63.50	49.89	57.33	57.44	59.10	66.54
	DAY LEQ	68.35		EVENING LEQ	64.59		NIGHT LEQ	67.69	

CNEL	74.25
DAY LEQ	68.35

Day hour	94.00
Absorptive?	no
Use hour?	no
GRADE dB	5.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

6	:Id
Highland Springs Avenue	:Road
8th Street/Wilson Street to Memorial Road	:Segment

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	21900
Speed	35
Distance	55
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1268.32	26.28	43.80	941.58	4.38	7.30	233.49	36.50	60.83
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	25.29	8.45	10.67	23.99	0.67	2.89	17.94	9.88	12.09
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	64.91	57.79	65.23	63.62	50.01	57.45	57.56	59.22	66.66
	DAY LEQ	68.47		EVENING LEQ	64.71		NIGHT LEQ	67.81	

CNEL	74.37
DAY LEQ	68.47

Day hour	94.00
Absorptive?	no
Use hour?	no
GRADE dB	5.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

7	:Id	
Highland Springs Avenue	:Road	
Memorial Road to 6th Street/Ramsey Street	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	21700
Speed	30
Distance	55
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime			Evening			Night		
	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1256.73	26.04	43.40	932.98	4.34	7.23	231.36	36.17	60.28
Speed in MPH	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	62.51	73.11	78.76	62.51	73.11	78.76	62.51	73.11	78.76
ADJUSTMENTS									
Flow	25.92	9.08	11.30	24.62	1.30	3.52	18.57	10.51	12.72
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	62.94	56.71	64.57	61.65	48.93	56.79	55.59	58.14	66.00
	DAY LEQ	67.25		EVENING LEQ	63.05		NIGHT LEQ	66.99	

CNEL	73.46
DAY LEQ	67.25

Day hour	95.00
Absorptive?	no
Use hour?	no
GRADE dB	6.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

7	:Id	
Highland Springs Avenue	:Road	
Memorial Road to 6th Street/Ramsey Street	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	22300
Speed	30
Distance	55
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1291.48	26.76	44.60	958.78	4.46	7.43	237.76	37.17	61.94
Speed in MPH	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	62.51	73.11	78.76	62.51	73.11	78.76	62.51	73.11	78.76
ADJUSTMENTS									
Flow	26.03	9.20	11.42	24.74	1.42	3.63	18.68	10.62	12.84
Distance	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48	-0.48
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	63.06	56.83	64.69	61.77	49.05	56.91	55.71	58.25	66.12
	DAY LEQ	67.37		EVENING LEQ	63.17		NIGHT LEQ	67.10	

CNEL	73.58
DAY LEQ	67.37

Day hour	95.00
Absorptive?	no
Use hour?	no
GRADE dB	6.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

8	:Id	
Highland Springs Avenue	:Road	
6th Street/Ramsey Street to Interstate 10 Freeway	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	31700
Speed	35
Distance	67
Left Angle	-90
Right Angle	90

Noise Parameters	Daytime Autos	Daytime Medium Trucks	Daytime Heavy Trucks	Evening Autos	Evening Medium Trucks	Evening Heavy Trucks	Night Autos	Night Medium Trucks	Night Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1835.87	38.04	63.40	1362.93	6.34	10.57	337.98	52.83	88.06
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	26.89	10.06	12.27	25.60	2.27	4.49	19.54	11.48	13.70
Distance	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	65.66	58.54	65.98	64.37	50.76	58.20	58.31	59.97	67.41
	DAY LEQ	69.22		EVENING LEQ	65.46		NIGHT LEQ	68.56	

CNEL	75.11
DAY LEQ	69.22

Day hour	96.00
Absorptive?	no
Use hour?	no
GRADE dB	7.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

8	:Id	
Highland Springs Avenue	:Road	
6th Street/Ramsey Street to Interstate 10 Freeway	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	32400
Speed	35
Distance	67
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1876.41	38.88	64.80	1393.03	6.48	10.80	345.44	54.00	90.00
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	26.99	10.15	12.37	25.69	2.37	4.59	19.64	11.58	13.80
Distance	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	65.76	58.64	66.07	64.46	50.86	58.29	58.41	60.06	67.50
	DAY LEQ	69.32		EVENING LEQ	65.55		NIGHT LEQ	68.65	

CNEL	75.21
DAY LEQ	69.32

Day hour	96.00
Absorptive?	no
Use hour?	no
GRADE dB	7.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Traffic Noise

9	:Id	
Highland Springs Avenue	:Road	
South of Interstate 10 Freeway	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	40300
Speed	35
Distance	67
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	2333.93	48.36	80.60	1732.69	8.06	13.43	429.67	67.17	111.94
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	27.93	11.10	13.32	26.64	3.32	5.54	20.58	12.53	14.74
Distance	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	66.70	59.59	67.02	65.41	51.80	59.24	59.35	61.01	68.45
	DAY LEQ	70.26		EVENING LEQ	66.50		NIGHT LEQ	69.60	

CNEL	**76.16**
DAY LEQ	70.26

Day hour	97.00
Absorptive?	no
Use hour?	no
GRADE dB	8.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside heavy truck mix.

Existing Plus Project Traffic Noise

9	:Id	
Highland Springs Avenue	:Road	
South of Interstate 10 Freeway	:Segment	

Vehicle Distribution (Heavy Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.54	14.02	10.43	92.00
Medium Trucks	48.00	2.00	50.00	3.00
Heavy Trucks	48.00	2.00	50.00	5.00

ADT	40500
Speed	35
Distance	67
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	2345.52	48.60	81.00	1741.28	8.10	13.50	431.80	67.50	112.50
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	27.96	11.12	13.34	26.66	3.34	5.56	20.61	12.55	14.77
Distance	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34	-1.34
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	66.72	59.61	67.04	65.43	51.83	59.26	59.38	61.03	68.47
	DAY LEQ	70.29		EVENING LEQ	66.52		NIGHT LEQ	69.62	

F	CNEL	76.18	Day hour	97.00
	DAY LEQ	70.29	Absorptive?	no
			Use hour?	no
			GRADE dB	8.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

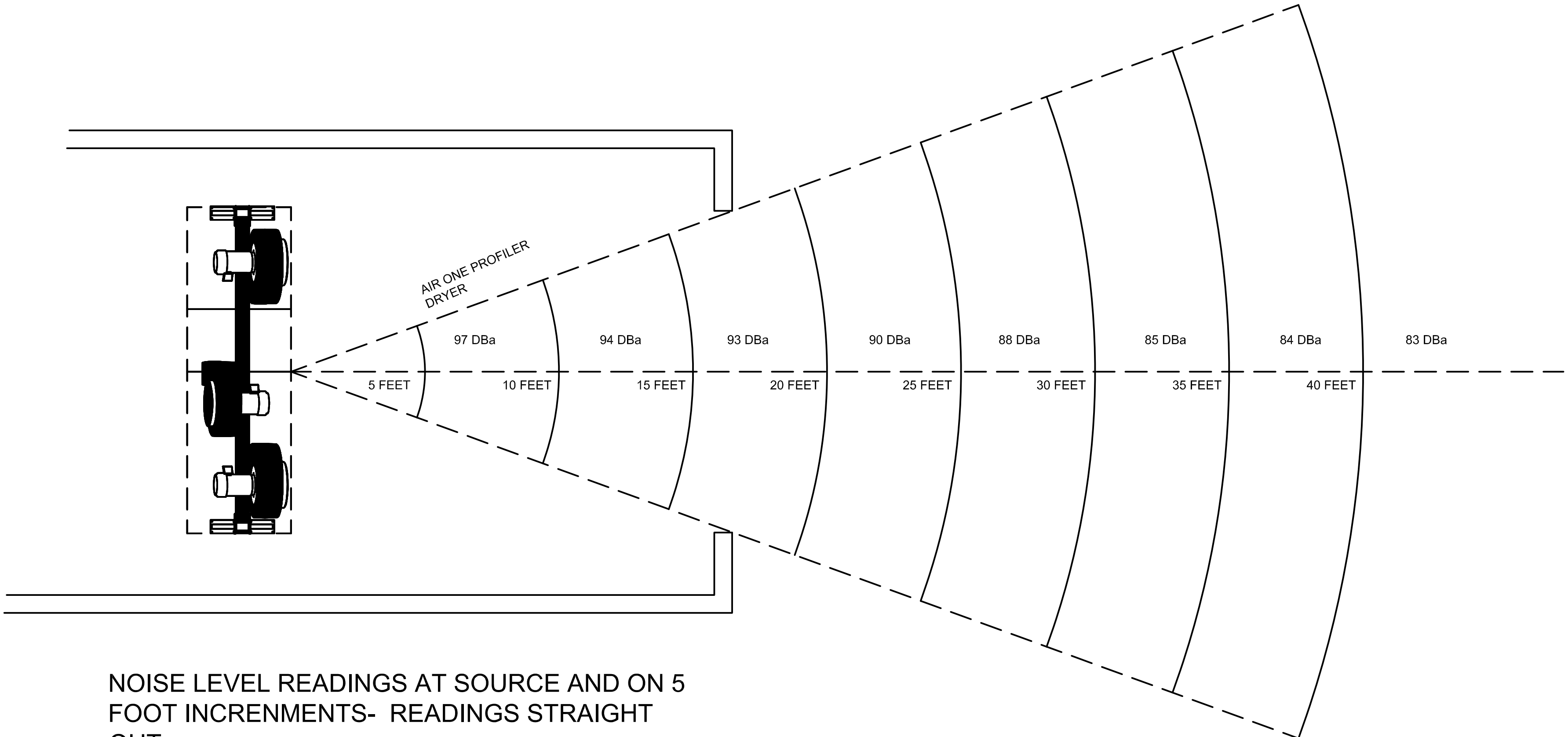
(2) Vehicle percentages based on County of Riverside heavy truck mix.

APPENDIX F

OPERATIONAL NOISE SOURCES MANUFACTURER DATA

www.motorcitywashworks.com

Rev 1– Date: XX/XX/XXXX



NOISE LEVEL READINGS AT SOURCE AND ON 5 FOOT INCRENMENTS- READINGS STRAIGHT OUT -

READINGS ARE WITH ALL 3 PROFILER PRODUCERS "ON".

MATERIAL USED: MATERIAL # XXXXX : XXXXX

NOTES:
XXXXX

TOOL LIST
1– XXXXX
2–
3–
4–
5–
6–
7–
8–
9–

.XX ± .010
.XXX ± .005
.XXXX ± .001
Fract. ± 1/32"
Unless otherwise specified

Scale: 1:X in

MICHIGAN
MOTOR WASH WORKS CITY

Part Number: XXXX

Description: NOISE LEVEL READINGS

MasterCAM # XXX (Date) 08/01/2011

A

Drawn By: RJW Jay Thomas Lanigan Date: 10/22/2011

Modified By: Date:

MECHANICAL TEMPLATE

MOTOR CITY WASH WORKS

SOUND LEVEL METER READINGS

MODEL: FT-DD-T450HP3 (50HP T4 TURBINE VACUUM PRODUCER with EXHAUST SILENCER)

READING A: 68 dB(A), 3 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING B: 61 dB(A), 10 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING C: 53 dB(A), 20 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

NOTE: THESE READINGS WERE TAKEN OUTSIDE OF 8'x10'x8' CINDER BLOCK ENCLOSURE WITH CONCRETE SLAB AND WOOD JOIST ROOF.

SOUND LEVEL METER USED:

SIMPSON MODEL #40003 – MSHA APPROVED.
MEETS OSHA & WALSH-HEALY REQUIREMENTS FOR NOISE CONTROL.
CONFORMS TO ANSI S1.4-1983, IEC 651 SPECS FOR METER TYPE.

Vacutech
1350 Hi-Tech Drive, Sheridan WY, 82801
PHONE: (800) 917-9444 FAX: (303) 675-1988
EMAIL: info@vacutechllc
WEB SITE: vacutechllc.com

Barrier Attenuation Calculation - HVAC Parapet

2019 California Building Code Title 24 (Chaper 7 Section 705.11.1), minimum height of a parapet is 30 inches or ~2.5 feet. This height has been utilized in these calculations.

Typcial Commercial Rooftop HVAC units were estimated to be ~3 feet tall.

at Single-Family Residential:

Notes: Building is 23 ft high, HVAC assumed to be ~3 ft, parapet assumed to be ~2.5 ft, buildng is ~5 ft from residential property line, and HVAC is assumed to be at center of building (~20 feet from parapet).

P=A+B-C
P=20+21-29
P=12

Abarrier = min(12 or [5.3log(P) + 6.7])
Abarrier = min (12 or [5.3log(12)+6.7])
A barrier = min (12 or 12.5)
A barrier = 12

IL barrier = max {0 or (A barrier - 10 (GNB - GB)log (D/50))} hard ground G=0
IL barrier = max {0 or 12-0}
IL barrier = 12

at Multi-Family Residential:

Notes: Building is 23 ft high, HVAC assumed to be ~3 ft, parapet assumed to be ~2.5 ft, building is ~386 ft from residential property line, and HVAC is assumed to be at center of building (~20 feet from parapet).

P=A+B-C
P=20+386.5-387
P=19.5

Abarrier = min(12 or [5.3log(P) + 6.7])
Abarrier = min (12 or [5.3log(19.5)+6.7])
A barrier = min (12 or 13.5)
A barrier = 12

IL barrier = max {0 or (A barrier - 10 (GNB - GB)log (D/50))} hard ground G=0
IL barrier = max {0 or 12-0}
IL barrier = 12

at Nursing Home:

Notes: Building is 23 ft high, HVAC assumed to be ~3 ft, parapet assumed to be ~2.5 ft, buildng is ~114 ft from nursing home property line, and HVAC is assumed to be at center of building (~80 feet from parapet).

P=A+B-C
P=80+115.5-140.5
P=55

Abarrier = min(12 or [5.3log(P) + 6.7])
Abarrier = min (12 or [5.3log(55)+6.7])
A barrier = min (12 or 15.9)
A barrier = 12

IL barrier = max {0 or (A barrier - 10 (GNB - GB)log (D/50))} hard ground G=0
IL barrier = max {0 or 12-0}
IL barrier = 12

at Hospital:

Notes: Building is 23 ft high, HVAC assumed to be ~3 ft, parapet assumed to be ~2.5 ft, buildng is ~388 ft from hospital poperty line, and HVAC is assumed to be at center of building (~20 feet from parapet).

P=A+B-C
P=20+388-388.4
P=19.6

Abarrier = min(12 or [5.3log(P) + 6.7])
Abarrier = min (12 or [5.3log(19.6)+6.7])
A barrier = min (12 or 13.5)
A barrier = 12

IL barrier = max {0 or (A barrier - 10 (GNB - GB)log (D/50))} hard ground G=0
IL barrier = max {0 or 12-0}
IL barrier = 12

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Vacuum Enclosure 1 C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111
Distance Receiver to Barrier (ft) (B)	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	111.018017	111.004504	111.000000	111.004504	111.018017	111.040533	111.072049	111.112556	111.162044	111.220502	111.287915	111.364267	111.449540	111.543713	111.646764	111.758669
B	249.018072	249.032126	249.050196	249.072279	249.098374	249.128481	249.162598	249.200722	249.242853	249.288989	249.339126	249.393264	249.451398	249.513527	249.579647	249.649755
C	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721	360.034721
P (=A + B - C)	0.0013676	0.0019103	0.0154752	0.0420625	0.0816701	0.1342935	0.1999257	0.2785573	0.3701768	0.4747701	0.5923208	0.7228104	0.8662177	1.0225195	1.1916905	1.3737027
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B	0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$	0.085046378	0.115830626	0.839075248	2.045046113	3.47444351	4.935355795	6.3240829	7.599390777	8.75392855	9.79551152	10.7371743	11.59255532	12.37405376	13.0922923	13.7561345	14.3729024
$IL_{barrier}$	0.0	0.0	0.0	0.7	1.9	3.3	4.5	5.6	6.6	7.5	8.3	9.0	9.6	10.2	10.7	11.2

Barrier Height (ft)	IL (dBA)
6	0
7	0
8	0
9	1
10	2
11	3
12	4
13	6
14	7
15	7
16	8
17	9
18	10
19	10
20	11
21	11

Reciever height and distance from source to barrier estimated per use of page 64 of
[Appendix I-1_120815.pdf (rctlma.org)]

gandini

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Vacuum Enclosure 2 C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)		131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131
Distance Receiver to Barrier (ft) (B)		274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274
Soft Ground = 1; Hard Ground = 0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																	
A		131.015266	131.003817	131.000000	131.003817	131.015266	131.034347	131.061054	131.095385	131.137333	131.186890	131.244047	131.308796	131.381125	131.461021	131.548470	131.643458
B		274.016423	274.029196	274.045617	274.065686	274.089401	274.116763	274.147770	274.182421	274.220714	274.262648	274.308221	274.357431	274.410277	274.466756	274.526866	274.590604
C		405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863	405.030863
P (=A + B - C)		0.0008261	0.0021492	0.0147536	0.0386393	0.0738047	0.1202471	0.1779618	0.2469431	0.3271836	0.4186744	0.5214053	0.6353644	0.7605387	0.8969135	1.0444728	1.2031992
Ground type H_{eff} (with barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)		11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B		0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$		0.054174203	0.129336448	0.802690441	1.902932156	3.21800657	4.582717922	5.90010454	7.125881929	8.24706565	9.26634292	10.1929336	11.03789279	11.81195643	12.5247045	13.1843547	13.79782824
	$IL_{barrier}$	0.0	0.0	0.0	0.4	1.6	2.8	4.0	5.0	6.0	6.8	7.6	8.3	8.9	9.4	9.9	10.4

Barrier Height (ft)	IL (dBA)
6	0
7	0
8	0
9	0
10	2
11	3
12	4
13	5
14	6
15	7
16	8
17	8
18	9
19	9
20	10
21	10

Reciever height and distance from source to barrier estimated per use of page 64 of

Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Hose Sytem   C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121
Distance Receiver to Barrier (ft) (B)	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	121.037184	121.066098	121.103262	121.148669	121.202310	121.264174	121.334249	121.412520	121.498971	121.593585	121.696343	121.807225	121.926207	122.053267	122.188379	122.331517
B	244.018442	244.032785	244.051224	244.073759	244.100389	244.131112	244.165927	244.204832	244.247825	244.294904	244.346066	244.401309	244.460631	244.524027	244.591496	244.663034
C	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000	365.000000
P (=A + B - C)	0.0556263	0.0988823	0.1544859	0.2224283	0.3026994	0.3952867	0.5001763	0.6173520	0.7467962	0.8884891	1.0424095	1.2085341	1.3868380	1.5772945	1.7798753	1.9945504
H_{eff} no barrier	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
G_B	0.59	0.57	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32
G_{NB}	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
$A_{barrier}$	2.576096211	3.997116272	5.403973893	6.724109078	7.93197112	9.026313157	10.016335	10.91450842	11.7332955	12.4838709	13.1757839	13.81702089	14.41420784	14.9728393	15	15
$IL_{barrier}$	1.7	2.9	4.2	5.3	6.4	7.3	8.2	8.9	9.6	10.2	10.7	11.2	11.6	12.0	11.9	11.8

Barrier Height (ft)	IL (dBA)
6	2
7	3
8	4
9	5
10	6
11	7
12	8
13	9
14	10
15	10
16	11
17	11
18	12
19	12
20	12
21	12

Reciever height and distance from source to barrier estimated per use of page 64 of
Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground																	
Receiver - SFD West P/L - Tunnel Exit (6 ft wall)	C = sqrt(A^2 + B^2)																
Enter Variables here:																	
Source Height H_S(ft)		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Receiver Height H_R(ft)		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)		121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121
Distance Receiver to Barrier (ft) (B)		250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Soft Ground = 1; Hard Ground = 0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																	
A		121.004132	121.000000	121.004132	121.016528	121.037184	121.066098	121.103262	121.148669	121.202310	121.264174	121.334249	121.412520	121.498971	121.593585	121.696343	121.807225
B		250.017999	250.031998	250.049995	250.071990	250.097981	250.127967	250.161948	250.199920	250.241883	250.287834	250.337772	250.391693	250.449596	250.511477	250.577333	250.647162
C		371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563	371.021563
P (=A + B - C)		0.0005688	0.0104352	0.0325644	0.0669547	0.1136025	0.1725022	0.2436466	0.3270263	0.4226305	0.5304460	0.6504582	0.7826504	0.9270042	1.0834994	1.2521141	1.4328244
Ground type H_{eff} (with barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
H_{eff} no barrier		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G_B		0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
G_{NB}		0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
$A_{barrier}$		0.039449262	0.580253527	1.641898704	2.984632095	4.40735468	5.788951227	7.0737361	8.245107517	9.30573488	10.266093	11.138715	11.93564919	12.66752743	13.3433736	13.970717	14.55580473
	$IL_{barrier}$	0.0	0.0	0.4	1.6	2.9	4.1	5.2	6.2	7.1	7.9	8.7	9.3	9.9	10.4	10.9	11.3

Barrier Height (ft)	IL (dBA)
6	0
7	0
8	0
9	2
10	3
11	4
12	5
13	6
14	7
15	8
16	9
17	9
18	10
19	10
20	11
21	11

Reciever height and distance from source to barrier estimated per use of page 64 of
[Appendix I-1_120815.pdf (rctlma.org)]

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Vacuum Enclosure 1 C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	138.014492	138.003623	138.000000	138.003623	138.014492	138.032605	138.057959	138.090550	138.130373	138.177422	138.231690	138.293167	138.361844	138.437712	138.520757	138.610966
B	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435	148.084435
P (=A + B - C)	0.3703631	0.6895174	1.0959045	1.5810916	2.1366122	2.7544179	3.4271475	4.1482503	4.9120066	5.7134862	6.5484737	7.4133820	8.3051655	9.2212385	10.1594041	11.1177913
[redacted]																
H_{eff} (with barrier)	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B	0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$	8.756009886	11.38947197	13.39273066	14.98327837	15	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	8.3	10.8	12.7	14.2	14.2	14.1	14.0	13.9	13.8	13.7	13.7	13.6	13.5	13.4	13.3	13.2

Barrier Height (ft)	IL (dBA)
6	8
7	11
8	13
9	14
10	14
11	14
12	14
13	14
14	14
15	14
16	14
17	14
18	13
19	13
20	13
21	13

Reciever height and distance from source to barrier estimated per use of page 64 of
Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Vacuum Enclosure 2	C = sqrt(A^2 + B^2)																
Enter Variables here:																	
Source Height H_S(ft)		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)		215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
Distance Receiver to Barrier (ft) (B)		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																	
A		215.009302	215.002326	215.000000	215.002326	215.009302	215.020929	215.037206	215.058132	215.083705	215.113923	215.148786	215.188290	215.232433	215.281211	215.334623	215.392665
B		10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C		225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549	225.055549
P (=A + B - C)		0.3940599	0.7171065	1.1247912	1.6086807	2.1603090	2.7716290	3.4352814	4.1447186	4.8942247	5.6788740	6.4944565	7.3373915	8.2046402	9.0936250	10.0021575	10.9283763
Ground type H_{eff} (with barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)		11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B		0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$		9.01337083	11.55841713	13.50554658	15	15	15	15	15	15	15	15	15	15	15	15	15
	$IL_{barrier}$	8.3	10.7	12.6	14.0	13.8	13.7	13.6	13.5	13.4	13.3	13.1	13.0	12.9	12.8	12.7	12.6

Barrier Height (ft)	IL (dBA)
6	8
7	11
8	13
9	14
10	14
11	14
12	14
13	13
14	13
15	13
16	13
17	13
18	13
19	13
20	13
21	13

Reciever height and distance from source to barrier estimated per use of page 64 of

Appendix I-1_120815.pdf (rctlma.org)

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Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Hose Sytem C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	141.031911	141.056726	141.088625	141.127602	141.173652	141.226768	141.286942	141.354165	141.428427	141.509717	141.598023	141.693331	141.795628	141.904898	142.021125	142.144293
B	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000	151.000000
P (=A + B - C)	0.4722178	0.8270558	1.2689645	1.7895056	2.3802075	3.0330165	3.7405661	4.4963008	5.2944959	6.1302163	6.9992421	7.8979814	8.8233840	9.7728600	10.7442081	11.7355532
H_{eff} no barrier	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
G_B	0.59	0.57	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32
G_{NB}	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
$A_{barrier}$	9.772722079	12.1740322	14.02872076	15	15	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	9.3	11.6	13.3	14.2	14.1	14.1	14.0	13.9	13.8	13.7	13.6	13.5	13.5	13.4	13.3	13.2

Barrier Height (ft)	IL (dBA)
6	9
7	12
8	13
9	14
10	14
11	14
12	14
13	14
14	14
15	14
16	14
17	14
18	13
19	13
20	13
21	13

Reciever height and distance from source to barrier estimated per use of page 64 of
Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Tunnel Exit (6 ft wall) C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157	157
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	157.003185	157.000000	157.003185	157.012738	157.028660	157.050947	157.079598	157.114608	157.155973	157.203690	157.257750	157.318149	157.384879	157.457931	157.537297	157.622968
B	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897	167.047897
P (=A + B - C)	0.3955939	0.7224323	1.1356272	1.6267448	2.1873181	2.8092983	3.4853244	4.2088462	4.9741449	5.7762916	6.6110724	7.4749022	8.3647376	9.2779958	10.2124828	11.1663308
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
H_{eff} no barrier	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G_B	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
G_{NB}	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
$A_{barrier}$	9.029547515	11.59030071	13.54712542	15	15	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	8.5	10.9	12.8	14.2	14.1	14.0	13.9	13.8	13.7	13.6	13.5	13.4	13.3	13.2	13.1	13.0

Barrier Height (ft)	IL (dBA)
6	8
7	11
8	13
9	14
10	14
11	14
12	14
13	14
14	14
15	14
16	14
17	13
18	13
19	13
20	13
21	13

Reciever height and distance from source to barrier estimated per use of page 64 of

Appendix I-1_120815.pdf (rctlma.org)

Building Attenuation - Car Wash, Parking Lot, & Drive-Through

FTA Transit & Vibration Impact Assessment Manual, Table 4-29 (September 2018)

Attenuation due to Buildings: Abldg = min (10 or [1.5(R-1)+5])
where R= number of rows of building between reciever and source

at Single-Family Residential:

Car Wash Tunnel Exit/Vauum Producers 1 & 2/Vacuum Hose System/Drive-Through Speakerphone/Parking Lot
Abldg = min (10 or {1.5(1-1)+5})
Abldg = 5

at Multi-Family Residential:

Car Wash Tunnel Exit/Vauum Producers 1 & 2/Vacuum Hose System/Drive-Through Speakerphone
Abldg = min (10 or {1.5(1-1)+5})
Abldg = 5

at Nursing Home:

Car Wash Tunnel Exit/Vauum Producers 1 & 2/Vacuum Hose System/Drive-Through Speakerphone
Abldg = min (10 or {1.5(1-1)+5})
Abldg = 5

Barrier insertion loss For Flat Ground																	
Receiver - SFD West P/L - Drive through	C = sqrt(A^2 + B^2)																
Enter Variables here:																	
Source Height H_S(ft)		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Receiver Height H_R(ft)		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Barrier Height H_B(ft)		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)		143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
Distance Receiver to Barrier (ft) (B)		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																	
A		143.031465	143.055933	143.087386	143.125819	143.171226	143.223601	143.282937	143.349224	143.422453	143.502613	143.589693	143.683680	143.784561	143.892321	144.006944	144.128415
B		10.049876	10.198039	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962
C		153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071	153.013071
P (=A + B - C)		0.0682694	0.2409008	0.5146211	0.8830771	1.3384947	1.8724339	2.4764212	3.1424011	3.8630056	4.6316775	5.4426906	6.2911084	7.1727092	8.0839000	9.0216293	9.9833059
Ground type H_{eff} (with barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
H_{eff} no barrier		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
G_B		0.57	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30
G_{NB}		0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
$A_{barrier}$		3.030181412	7.029873728	10.13724456	12.45743645	14.2602138	15	15	15	15	15	15	15	15	15	15	15
	$IL_{barrier}$	2.5	6.4	9.4	11.7	13.4	14.0	14.0	13.9	13.8	13.7	13.6	13.5	13.4	13.4	13.3	13.2

Barrier Height (ft)	IL (dBA)
6	3
7	6
8	9
9	12
10	13
11	14
12	14
13	14
14	14
15	14
16	14
17	14
18	13
19	13
20	13
21	13

Reciever height and distance receiver to barrier estimated per use of page 64 of Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - MFD West P/L - Drive through   C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Receiver Height H_R(ft)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
Distance Receiver to Barrier (ft) (B)	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	143.031465	143.055933	143.087386	143.125819	143.171226	143.223601	143.282937	143.349224	143.422453	143.502613	143.589693	143.683680	143.784561	143.892321	144.006944	144.128415
B	387.001292	387.005168	387.011628	387.020671	387.032298	387.046509	387.063302	387.082679	387.104637	387.129177	387.156299	387.186002	387.218285	387.253147	387.290589	387.330608
C	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774	530.003774
P (=A + B - C)	0.0289835	0.0573275	0.0952400	0.1427165	0.1997510	0.2663367	0.3424656	0.4281289	0.5233164	0.6280171	0.7422188	0.8659086	0.9990722	1.1416945	1.2937593	1.4552495
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
H_{eff} no barrier	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
G_B	0.57	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30
G_{NB}	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
$A_{barrier}$	1.48241309	2.639356525	3.890609886	5.13599058	6.32084848	7.421812471	8.43357688	9.359928829	10.2084978	10.9879754	11.7067813	12.37251024	12.99177514	13.5702339	14.1126908	14.62321775
$IL_{barrier}$	0.4	1.4	2.4	3.5	4.5	5.4	6.2	7.0	7.6	8.2	8.8	9.3	9.7	10.1	10.5	10.8

Barrier Height (ft)	IL (dBA)
6	0
7	1
8	2
9	3
10	4
11	5
12	6
13	7
14	8
15	8
16	9
17	9
18	10
19	10
20	10
21	11

Reciever height and distance receiver to barrier estimated per use of page 64 of

Reciever height estimated per use of page 64 of

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Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Vacuum Enclosure 1   C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113
Distance Receiver to Barrier (ft) (B)	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	113.017698	113.004425	113.000000	113.004425	113.017698	113.039816	113.070774	113.110565	113.159180	113.216607	113.282832	113.357840	113.441615	113.534136	113.635382	113.745330
B	396.011363	396.020202	396.031564	396.045452	396.061864	396.080800	396.102260	396.126243	396.152748	396.181776	396.213326	396.247397	396.283989	396.323101	396.364731	396.408880
C	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557	509.024557
P (=A + B - C)	0.0045038	0.0000688	0.0070070	0.0253193	0.0550042	0.0960585	0.1484765	0.2122505	0.2873709	0.3738257	0.4716009	0.5806806	0.7010467	0.8326790	0.9755555	1.1296520
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B	0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$	0.260873406	0.010740207	0.397695871	1.314643123	2.552786979	3.914724379	5.268874823	6.547161731	7.723504756	8.794517086	9.767196667	10.652249	11.46085832	12.20331869	12.88858579	13.52424704
$IL_{barrier}$	0.0	0.0	0.0	0.0	0.8	1.9	3.1	4.2	5.2	6.1	6.9	7.6	8.2	8.8	9.3	9.7

Barrier Height (ft)	IL (dBA)
6	0
7	0
8	0
9	0
10	1
11	2
12	3
13	4
14	5
15	6
16	7
17	8
18	8
19	9
20	9
21	10

Reciever height caclculated per page 64 of

[Appendix I-1_120815.pdf (rctlma.org)]

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Vacuum Enclosure 2 C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13
Distance Source to barrier (ft) (A)	126	126	126	126	126	126	126	126
Distance Receiver to Barrier (ft) (B)	421	421	421	421	421	421	421	421
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0
Calculations								
A	126.015872	126.003968	126.000000	126.003968	126.015872	126.035709	126.063476	126.099167
B	421.010689	421.019002	421.029690	421.042753	421.058191	421.076003	421.096189	421.118748
C	547.022851	547.022851	547.022851	547.022851	547.022851	547.022851	547.022851	547.022851
P (=A + B - C)	0.0037093	0.0001187	0.0068387	0.0238699	0.0512113	0.0888604	0.1368132	0.1950640
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5
H_{eff} no barrier	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B	0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42
G_{NB}	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$	0.216798903	0.013609425	0.388591117	1.24695381	2.408570905	3.698887345	4.996185615	6.233269293
$IL_{barrier}$	0.0	0.0	0.0	0.0	0.6	1.7	2.8	3.8

Source Height H_S(ft)	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	126	126	126	126	126	126	126	126
Distance Receiver to Barrier (ft) (B)	421	421	421	421	421	421	421	421
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0
Calculations								
A	126.142776	126.194295	126.253713	126.321020	126.396202	126.479247	126.570139	126.668860
B	421.143681	421.170987	421.200665	421.232715	421.267136	421.303928	421.343091	421.384622
C	547.022851	547.022851	547.022851	547.022851	547.022851	547.022851	547.022851	547.022851
P (=A + B - C)	0.2636058	0.3424299	0.4315261	0.5308830	0.6404872	0.7603242	0.8903778	1.0306306
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$	7.381218866	8.433148882	9.393096361	10.26959897	11.07236808	11.81073901	12.49305865	13.12653267
$IL_{barrier}$	4.8	5.7	6.4	7.1	7.7	8.3	8.8	9.2

Barrier Height (ft)	IL (dBA)
6	0
7	0
8	0
9	0
10	1
11	2
12	3
13	4
14	5
15	6
16	6
17	7
18	8
19	8
20	9
21	9

Reciever height caclculated per page 64 of
Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Hose Sytem C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
Distance Receiver to Barrier (ft) (B)	393	393	393	393	393	393	393	393	393	393	393	393	393	393	393	393
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	127.035428	127.062977	127.098387	127.141653	127.192767	127.251719	127.318498	127.393092	127.475488	127.565669	127.663621	127.769323	127.882759	128.003906	128.132744	128.269248
B	393.011450	393.020356	393.031805	393.045799	393.062336	393.081417	393.103040	393.127206	393.153914	393.183163	393.214954	393.249285	393.286155	393.325565	393.367513	393.411998
C	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000	520.000000
P (=A + B - C)	0.0468783	0.0833322	0.1301924	0.1874521	0.2551031	0.3331355	0.4215382	0.5202983	0.6294017	0.7488328	0.8785744	1.0186082	1.1689142	1.3294711	1.5002563	1.6812459
[redacted]																
H_{eff} (with barrier)	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
H_{eff} no barrier	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
G_B	0.59	0.57	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32
G_{NB}	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
$A_{barrier}$	2.239253871	3.52714421	4.83481343	6.087696939	7.25260472	8.320588984	9.29489231	10.18389379	10.9974256	11.7450418	12.4353221	13.07568436	13.67242661	14.2308565	14.7554416	15
$IL_{barrier}$	1.1	2.3	3.4	4.5	5.4	6.3	7.1	7.8	8.5	9.0	9.5	10.0	10.4	10.8	11.1	11.2

Barrier Height (ft)	IL (dBA)
6	1
7	2
8	3
9	4
10	5
11	6
12	7
13	8
14	8
15	9
16	10
17	10
18	10
19	11
20	11
21	11

Reciever height caclculated per page 64 of
Appendix I-1_120815.pdf (rctlma.org)

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Barrier insertion loss For Flat Ground

Receiver - MF West P/L - Tunnel Exit (6-ft wall along properyt line)   C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
Distance Receiver to Barrier (ft) (B)	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	125.004000	125.000000	125.004000	125.015999	125.035995	125.063984	125.099960	125.143917	125.195847	125.255738	125.323581	125.399362	125.483067	125.574679	125.674182	125.781557
B	400.011250	400.020000	400.031249	400.044997	400.061245	400.079992	400.101237	400.124980	400.151221	400.179960	400.211194	400.244925	400.281151	400.319872	400.361087	400.404795
C	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238	525.015238
P (=A + B - C)	0.0000119	0.0047616	0.0200108	0.0457586	0.0820023	0.1287378	0.1859593	0.2536598	0.3318301	0.4204600	0.5195376	0.6290492	0.7489799	0.8793132	1.0200311	1.1711140
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
H_{eff} no barrier	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G_B	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
G_{NB}	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
$A_{barrier}$	0.007462776	0.275105393	1.062886802	2.194675303	3.485014184	4.798683761	6.05864723	7.230428907	8.30456126	9.284164871	10.17767066	10.99502146	11.74588912	12.43895815	13.08173326	13.68058186
$IL_{barrier}$	0.0	0.0	0.0	0.6	1.7	2.8	3.9	4.9	5.8	6.5	7.3	7.9	8.5	9.0	9.4	9.9

Barrier Height (ft)	IL (dBA)
6	0
7	0
8	0
9	1
10	2
11	3
12	4
13	5
14	6
15	7
16	7
17	8
18	8
19	9
20	9
21	10

Reciever height caclculated per page 64 of
Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - MF West P/L - Tunnel Exit (8-ft vacuum enclosure at exit) C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Distance Receiver to Barrier (ft) (B)	495	495	495	495	495	495	495	495	495	495	495	495	495	495	495	495
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	5.099020	5.000000	5.099020	5.385165	5.830952	6.403124	7.071068	7.810250	8.602325	9.433981	10.295630	11.180340	12.083046	13.000000	13.928388	14.866069
B	495.009091	495.016161	495.025252	495.036362	495.049492	495.064642	495.081811	495.101000	495.122207	495.145433	495.170678	495.197940	495.227221	495.258518	495.291833	495.327165
C	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000	500.016000
P (=A + B - C)	0.0921106	0.0001616	0.1082717	0.4055274	0.8644446	1.4517667	2.1368795	2.8952497	3.7085327	4.5634146	5.4503080	6.3622804	7.2942668	8.2425186	9.2042217	10.1772336
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
H_{eff} no barrier	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G_B	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
G_{NB}	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
$A_{barrier}$	3.797403736	0.01607764	4.262378725	9.132955262	12.36519192	14.61281627	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	2.7	0.0	2.8	7.5	10.6	12.6	12.9	12.7	12.5	12.3	12.1	12.0	11.8	11.6	11.4	11.3

Barrier Height (ft)	IL (dBA)
6	3
7	0
8	3
9	8
10	11
11	13
12	13
13	13
14	13
15	12
16	12
17	12
18	12
19	12
20	11
21	11

Reciever height caclculated per page 64 of

Appendix I-1_120815.pdf (rctlma.org)

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Barrier insertion loss For Flat Ground

Receiver - Nursing Home Northwest P/L - Vacuum Enclos C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	302	302	302	302	302	302	302	302	302	302	302	302	302	302	302	302
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	302.006622	302.001656	302.000000	302.001656	302.006622	302.014900	302.026489	302.041388	302.059597	302.081115	302.105942	302.134076	302.165518	302.200265	302.238317	302.279672
B	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062	312.040062
P (=A + B - C)	0.4068674	0.7319237	1.1402784	1.6234979	2.1731165	2.7810872	3.4400514	4.1434620	4.8856040	5.6615528	6.4670996	7.2986652	8.1532124	9.0281655	9.9213380	10.8308706
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B	0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$	9.14672949	11.64655853	13.5648513	15	15	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	8.3	10.7	12.4	13.7	13.6	13.4	13.3	13.2	13.0	12.9	12.7	12.6	12.4	12.3	12.2	12.0

Barrier Height (ft)	IL (dBA)
6	8
7	11
8	12
9	14
10	14
11	13
12	13
13	13
14	13
15	13
16	13
17	13
18	12
19	12
20	12
21	12

Reciever height and distance receiver to barrier estimated per use of page 64 of Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - Nursing Home Northwest P/L - Vacuum Enc C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	398.005025	398.001256	398.000000	398.001256	398.005025	398.011306	398.020100	398.031406	398.045224	398.061553	398.080394	398.101746	398.125608	398.151981	398.180863	398.212255
B	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636	408.030636
P (=A + B - C)	0.4146955	0.7409498	1.1497038	1.6325240	2.1809446	2.7869187	3.4430879	4.1429053	4.8806562	5.6514163	6.4509773	7.2757602	8.1227286	8.9893072	9.8733102	10.7728791
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
H_{eff} no barrier	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
G_B	0.54	0.53	0.51	0.49	0.47	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.29	0.28
G_{NB}	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
$A_{barrier}$	9.226380038	11.69940203	13.60055324	15	15	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	8.2	10.6	12.3	13.5	13.4	13.2	13.0	12.9	12.7	12.6	12.4	12.2	12.1	11.9	11.7	11.6

Barrier Height (ft)	IL (dBA)
6	8
7	11
8	12
9	14
10	13
11	13
12	13
13	13
14	13
15	13
16	12
17	12
18	12
19	12
20	12
21	12

Reciever height and distance from receiver to barrier estimated per use of page 64 of Appendix I-1_120815.pdf (rctlma.org)

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Barrier insertion loss For Flat Ground

Receiver - Nursing Home Northwest P/L - Vacuum Enc C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301	301
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	301.014950	301.026577	301.041525	301.059795	301.081384	301.106294	301.134521	301.166067	301.200930	301.239108	301.280600	301.325406	301.373522	301.424949	301.479684	301.537726
B	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000	311.000000
P (=A + B - C)	0.4552563	0.7969065	1.2218653	1.7216985	2.2879400	2.9125420	3.5881455	4.3082028	5.0669984	5.8596070	6.6818196	7.5300560	8.4012788	9.2929115	10.2027671	11.1289859
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
H_{eff} no barrier	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
G_B	0.59	0.57	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32
G_{NB}	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
$A_{barrier}$	9.618302557	12.01359635	13.86461481	15	15	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	8.8	11.0	12.7	13.7	13.6	13.4	13.3	13.2	13.0	12.9	12.7	12.6	12.4	12.3	12.2	12.0

Barrier Height (ft)	IL (dBA)
6	9
7	11
8	13
9	14
10	14
11	13
12	13
13	13
14	13
15	13
16	13
17	13
18	12
19	12
20	12
21	12

Reciever height and distance receiver to barrier estimated per use of page 64 of Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - Nursing Home Northwest P/L - Vacuum Enclosure 1 (6-ft wall) C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Receiver Height H_R(ft)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	324.001543	324.000000	324.001543	324.006173	324.013889	324.024690	324.038578	324.055551	324.075608	324.098750	324.124976	324.154284	324.186675	324.222146	324.260698	324.302328
B	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962	19.723083	20.591260
C	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951	334.023951
P (=A + B - C)	0.4178985	0.7463784	1.1579319	1.6441253	2.1964930	2.8069877	3.4682508	4.1737352	4.9177260	5.6952985	6.5022441	7.3349836	8.1904798	9.0661571	9.9598293	10.8696371
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
H_{eff} no barrier	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G_B	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
G_{NB}	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
$A_{barrier}$	9.258576959	11.73088215	13.63148271	15	15	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	8.4	10.7	12.5	13.7	13.5	13.4	13.2	13.1	12.9	12.8	12.6	12.5	12.3	12.2	12.1	11.9

Barrier Height (ft)	IL (dBA)
6	8
7	11
8	12
9	14
10	14
11	13
12	13
13	13
14	13
15	13
16	13
17	12
18	12
19	12
20	12
21	12

Reciever height and distance reciever to barrier estimated per use of page 64 of Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - SFD West P/L - Parkng Lot

C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Receiver Height H_R(ft)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
Distance Receiver to Barrier (ft) (B)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calculations

A	176.002841	176.011363	176.025566	176.045449	176.071008	176.102243	176.139150	176.181724	176.229963	176.283862	176.343415	176.408617	176.479461	176.555940	176.638048	176.725776
B	10.049876	10.198039	10.440307	10.770330	11.180340	11.661904	12.206556	12.806248	13.453624	14.142136	14.866069	15.620499	16.401219	17.204651	18.027756	18.867962
C	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000	186.000000
P (=A + B - C)	0.0527165	0.2094023	0.4658728	0.8157783	1.2513483	1.7641468	2.3457052	2.9879728	3.6835874	4.4259976	5.2094837	6.0291159	6.8806800	7.7605907	8.6658044	9.5937385
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
H_{eff} no barrier	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G_B	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
G_{NB}	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
$A_{barrier}$	2.466237984	6.496490611	9.71556812	12.11470286	13.9680625	15	15	15	15	15	15	15	15	15	15	15
$IL_{barrier}$	1.9	5.8	8.9	11.2	12.9	13.9	13.8	13.7	13.6	13.5	13.4	13.3	13.2	13.1	13.0	12.9

Barrier Height (ft)	IL (dBA)
6	2
7	6
8	9
9	11
10	13
11	14
12	14
13	14
14	14
15	13
16	13
17	13
18	13
19	13
20	13
21	13

Distance source to barrier estimated per using page 64 of

Appendix I-1_120815.pdf (rctlma.org)

Barrier insertion loss For Flat Ground

Receiver - MFD West P/L - Parking Lot — C = sqrt(A^2 + B^2)

Enter Variables here:

Source Height H_S(ft)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Receiver Height H_R(ft)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Barrier Height H_B(ft)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Distance Source to barrier (ft) (A)	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
Distance Receiver to Barrier (ft) (B)	385	385	385	385	385	385	385	385	385	385	385	385	385	385	385	385
Soft Ground = 1; Hard Ground = 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calculations																
A	169.002959	169.011834	169.026625	169.047331	169.073948	169.106475	169.144908	169.189243	169.239475	169.295599	169.357610	169.425500	169.499263	169.578890	169.664375	169.755707
B	385.001299	385.005195	385.011688	385.020779	385.032466	385.046750	385.063631	385.083108	385.105180	385.129848	385.157111	385.186968	385.219418	385.254461	385.292097	385.332324
C	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000	554.000000
P (=A + B - C)	0.0042573	0.0170287	0.0383133	0.0681093	0.1064145	0.1532257	0.2085394	0.2723511	0.3446557	0.4254477	0.5147206	0.6124674	0.7186805	0.8333516	0.9564716	1.0880309
Ground type H_{eff} (with barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Ground type H_{eff} (no barrier)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
H_{eff} (with barrier)	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
H_{eff} no barrier	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
G_B	0.55	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
G_{NB}	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
$A_{barrier}$	0.247229042	0.916671858	1.889215125	3.024655981	4.21093654	5.375936171	6.4810366	7.51002667	8.45970977	9.33358236	10.1380667	10.88045229	11.56786428	12.2068085	12.8030212	13.36146817
$IL_{barrier}$	0.0	0.0	0.4	1.3	2.3	3.3	4.2	5.1	5.8	6.5	7.2	7.7	8.2	8.7	9.1	9.4

Barrier Height (ft)	IL (dBA)
6	0
7	0
8	0
9	1
10	2
11	3
12	4
13	5
14	6
15	7
16	7
17	8
18	8
19	9
20	9
21	9

Appendix G

Vibration Worksheets

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial		Date: 10/16/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to West (Shed)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	10.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.352	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial		Date: 10/16/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to West (Shed)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	10.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.830	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial		Date: 10/16/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Commercial to North		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	20.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.124	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial		Date: 10/16/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Commercial to North		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	20.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.293	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial	Date:	10/16/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Commercial to South		
Address:			
PPV = PPVref(25/D)^n (in/sec)			

INPUT			
Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	25.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

RESULTS			
PPV =	0.089	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19300 655 Highland Springs Office/Commercial	Date:	10/16/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Commercial to South		
Address:			

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	25.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

RESULTS

PPV =	0.210	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial		Date: 10/16/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Commercial to Southwest		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	68.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.020	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial	Date:	10/16/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Commercial to Southwest		
Address:			
PPV = PPVref(25/D)^n (in/sec)			

INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	68.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

RESULTS			
PPV =	0.047	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial	Date:	10/16/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to West (Shed)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	12.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.268	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19300 655 Highland Springs Office/Commercial		Date: 10/16/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to West (Shed)		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	20.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.293	IN/SEC	OUTPUT IN BLUE

GANDDINI GROUP, INC.
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APPENDIX I
TRAFFIC IMPACT ANALYSIS
MARCH 12, 2020

655 HIGHLAND SPRINGS OFFICE-COMMERCIAL PROJECT TRAFFIC IMPACT ANALYSIS

City of Beaumont

March 12, 2020

ganddini

Traffic Engineering • Transportation Planning • Parking • Noise & Vibration
Air Quality • Global Climate Change • Health Risk Assessment

655 HIGHLAND SPRINGS OFFICE-COMMERCIAL PROJECT TRAFFIC IMPACT ANALYSIS

City of Beaumont

March 12, 2021

prepared by

Perrie Ilercil, PE (AZ)
Giancarlo Ganddini, PE, PTP

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Project No. 19300

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EXECUTIVE SUMMARY

Project Description

The approximately 2.3-acre project site is located on the west side of Highland Springs Avenue between 8th Street and 6th Street, addressed at 655, 675 and 695 Highland Springs Avenue in the City of Beaumont. The proposed in-fill project consists of developing the currently vacant site with an approximately 6,400 square foot office building and 2,480 square foot fast-food restaurant with drive through window. The proposed project is consistent with the existing zoning (Commercial General). The proposed project is anticipated to be constructed and fully operational by year 2022.

The project proposes one restricted right turn in-out access driveway at Highland Springs Avenue and will share the existing access to Highland Springs Avenue currently being used by the carwash. The Project also proposes reciprocal access with the southerly adjacent property.

Existing Conditions

The study intersections currently operate within acceptable Levels of Service (D or better) during the peak hours for Existing conditions.

Project Trip Generation

The proposed project is forecast to generate a total of approximately 1,401 new daily trips, including 58 new trips during the AM peak hour and 47 new trips during the PM peak hour.

Forecast Levels of Service

The study intersections are forecast to operate within acceptable Levels of Service (D or better), during the peak hours for Existing Plus Project conditions; therefore, no improvements are required.

The study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours for Opening Year (2022) Without Project conditions, except for the following study intersections that are projected to operate at deficient Level of Service E/F without improvements:

- Highland Springs Avenue at Eight Street – #1 (PM peak hour LOS F)
- Highland Springs Avenue at Project South Driveway – #3 (PM peak hour LOS E)

The study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours for Opening Year (2022) With Project conditions, except for the study intersections as noted above for the Without Project condition.

The project impact at the study intersections is forecast to increase delay by less than 5.0 seconds; therefore, the project does <u>not</u> exceed the City-established operational threshold that would require improvements related to the project for Opening Year (2022) With Project conditions.

Operational Improvements

The following improvements are recommended for Opening Year (2022) Without Project conditions to maintain acceptable Levels of Service at the study intersections as specified by the City-established operating requirements for General Plan consistency:

- Highland Springs Avenue (NS) at Eighth Street (EW) – #1
  - Restripe northbound lanes to provide a second through lane. This improvement is as noted "By Others" because it is a requirement of another development as noted in the Highland Springs and 8th Retail Traffic Impact Analysis (Urban Crossroads, April 23, 2020).
- Highland Springs Avenue (NS) at Project South Driveway – #3
  - Install right-turn-only sign for the hours of 3:00 to 6:00 PM on the Walgreen's westbound-east leg driveway. This improvement is an optional interim measure, as the City planned Highland Springs Avenue median will provide future access restrictions for minor driveways.

The identified improvements under Opening Year (2022) Without Project conditions would also maintain acceptable Levels of Service at the study intersections for Opening Year (2022) With Project conditions. Since the improvements are required for the Without Project condition, the project impact is considered to be indirect/cumulative. Therefore, the project shall contribute its fair share of the cost to construct the necessary improvements through payment of applicable development impact fees.

Site Access Improvements

This analysis assumes the following improvements will be constructed by the project to provide project site access:

Highland Springs Avenue (NS) at Project North Driveway (EW) - #2
- Install eastbound stop control.
- Construct the eastbound approach to consist of one right turn only lane.

Highland Springs Avenue (NS) at Project South Driveway (EW) - #3
- Maintain existing eastbound stop control currently utilized by the auto related businesses south of the proposed site.
- Modify the eastbound approach to consist of one right turn only lane.

Construct two-way circulation driveways between the proposed site and the adjacent project to the south of the site. Improvements at the project driveways are project design features which shall be constructed by the project. Site-adjacent improvements shall be constructed in conjunction with the project.

Vehicle Miles Traveled (VMT) Analysis

The proposed project involves construction of a local-serving retail and office space below the project type screening square footage thresholds. Therefore, the project VMT impact may be presumed less than significant based on the WRCOG TIA Guidelines, as adopted by the City of Beaumont, and criteria for Categorical Exemption under CEQA.

1. INTRODUCTION

This section describes the purpose of this traffic impact analysis, project location, proposed development, and study area. Figure 1 and Figure 2 show the regional vicinity map and project location map, respectively. Figure 3 illustrates the project site plan.

PURPOSE AND OBJECTIVES

The purpose of this traffic impact analysis is to provide an assessment of traffic operations resulting from development of the proposed 655 Highland Springs Office-Commercial Project and to identify measures necessary to maintain roadway performance standards established by the City of Beaumont. This analysis also contains an assessment of the project vehicle miles traveled (VMT) impact in context of the California Environmental Quality Act (CEQA). Although this is a technical report, effort has been made to write the report clearly and concisely glossary is provided in Appendix A to assist the reader with technical terms related to transportation engineering.

PROJECT DESCRIPTION

The approximately 2.3-acre project site is located on the west side of Highland Springs Avenue between 8th Street and 6th Street, addressed at 655, 675 and 695 Highland Springs Avenue in the City of Beaumont. The proposed in-fill project consists of developing the currently vacant site with an approximately 6,400 square foot office building and 2,480 square foot fast-food restaurant with drive through window. The proposed project is consistent with the existing zoning (Commercial General). The proposed project is anticipated to be constructed and fully operational by year 2022.

The project proposes one restricted right turn in-out access driveway at Highland Springs Avenue and will share the existing access to Highland Springs Avenue currently being used by the carwash. The Project also proposed reciprocal access with the southerly adjacent property.

STUDY AREA

Based on the study intersections identified in the approved scoping agreement (Appendix B), the study area consists of the following study intersections within the Cities of Beaumont and Banning and California Department of Transportation (Caltrans) jurisdiction:

Study Intersections[1]	Jurisdiction
1. Highland Springs Avenue (NS) at Eighth Street (EW)	Beaumont/Banning
2. Highland Springs Avenue (NS) at Memorial Drive (EW)	Beaumont/Banning
3. Highland Springs Avenue (NS) at Project Driveway (EW)	Beaumont/Banning
4. Highland Springs Avenue (NS) at Sixth Street (EW)	Beaumont/Banning
5. Highland Springs Avenue (NS) at I-10 WB Off-Ramp (EW)	Beaumont/Banning/Caltrans
6. Highland Springs Avenue (NS) at I-10 EB On-Ramp (EW)	Beaumont/Banning/Caltrans

[1] (NS) = north-south roadway; (EW) = east-west roadway; WB = Westbound; EB = Eastbound

Analysis Scenarios

The following scenarios are analyzed during typical weekday AM and PM peak hour conditions:

- Existing Conditions
- Existing Plus Project Conditions
- Opening Year (2022) Without Project Conditions
- Opening Year (2022) With Project Conditions

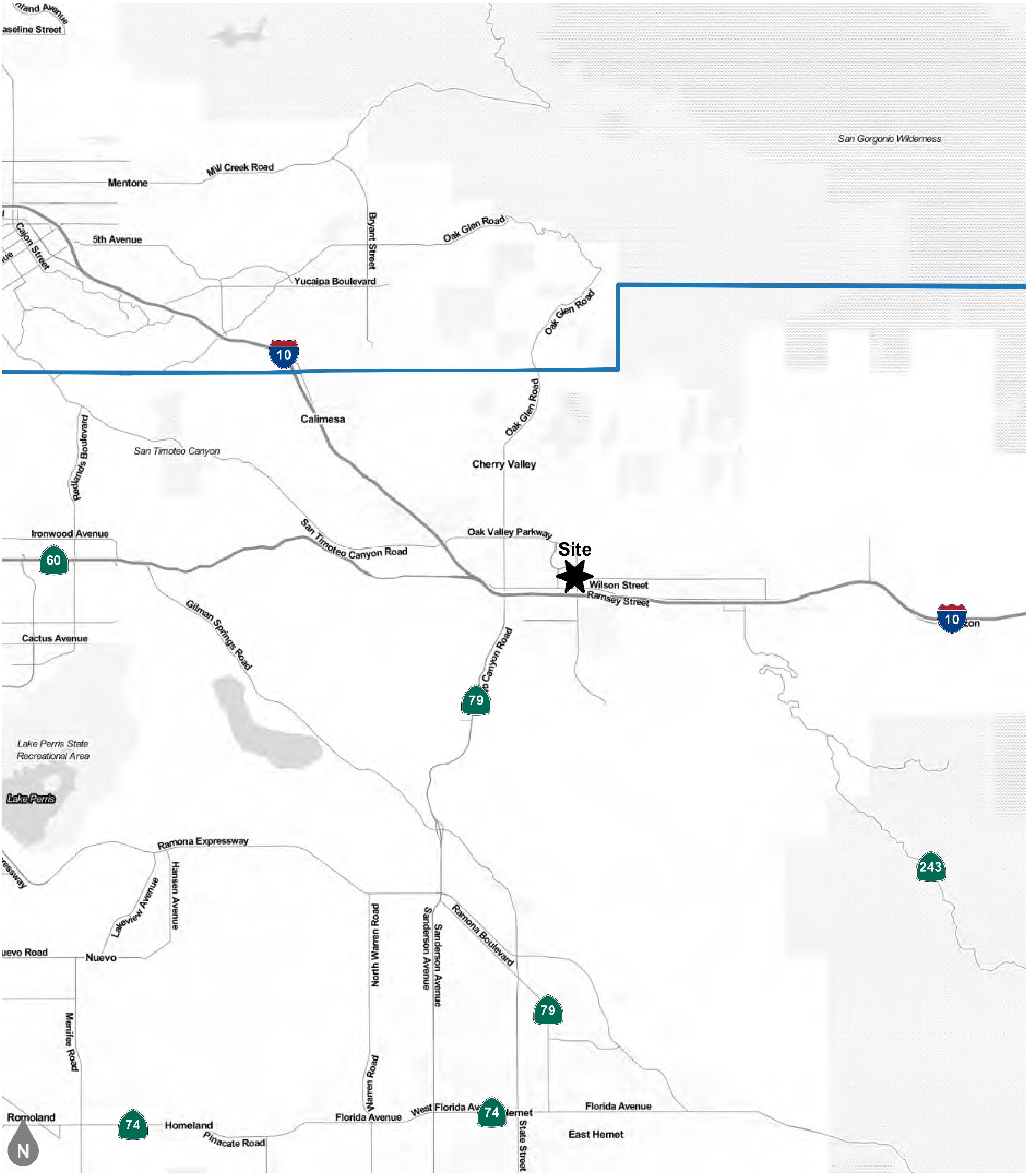


Figure 1
Regional Vicinity

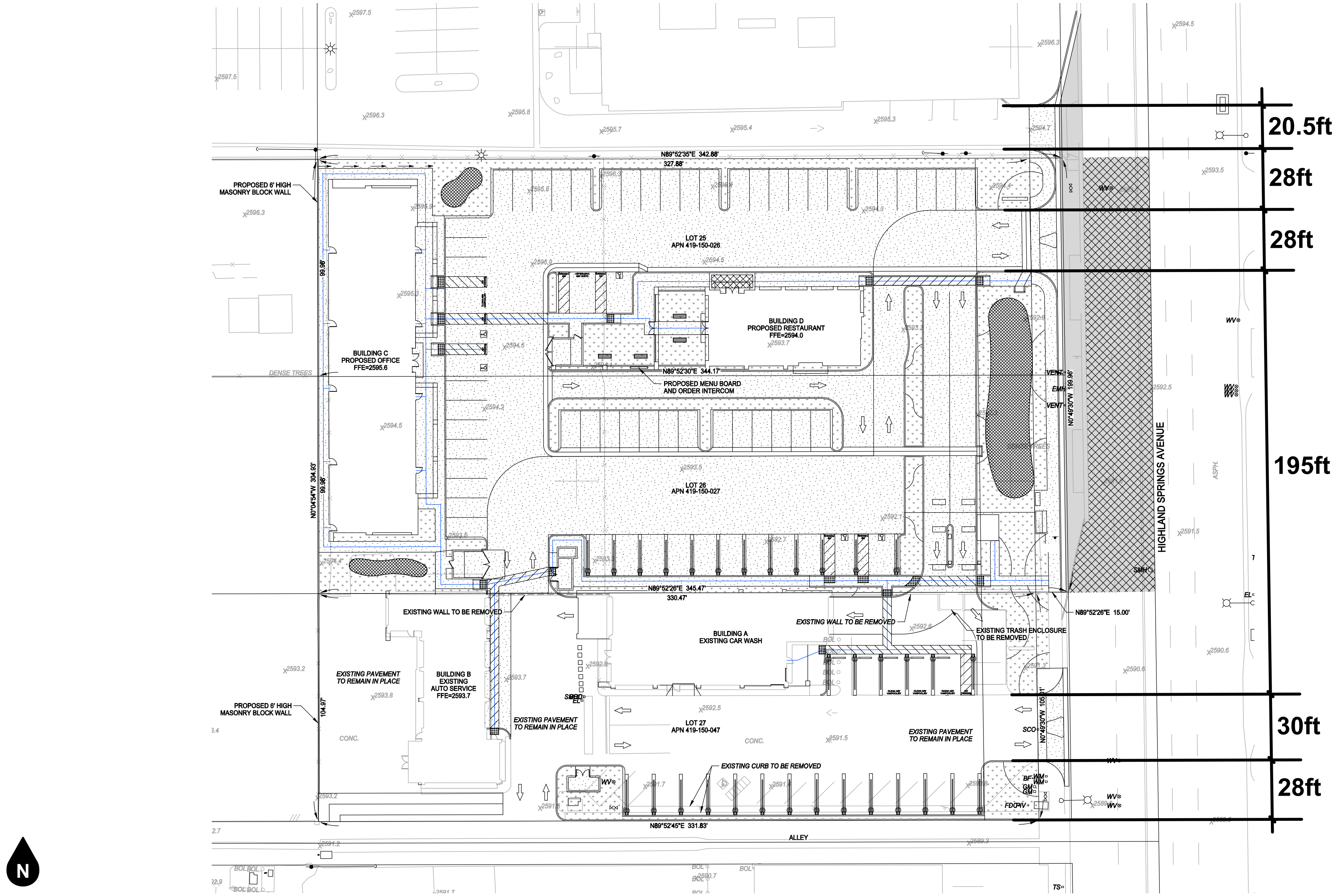
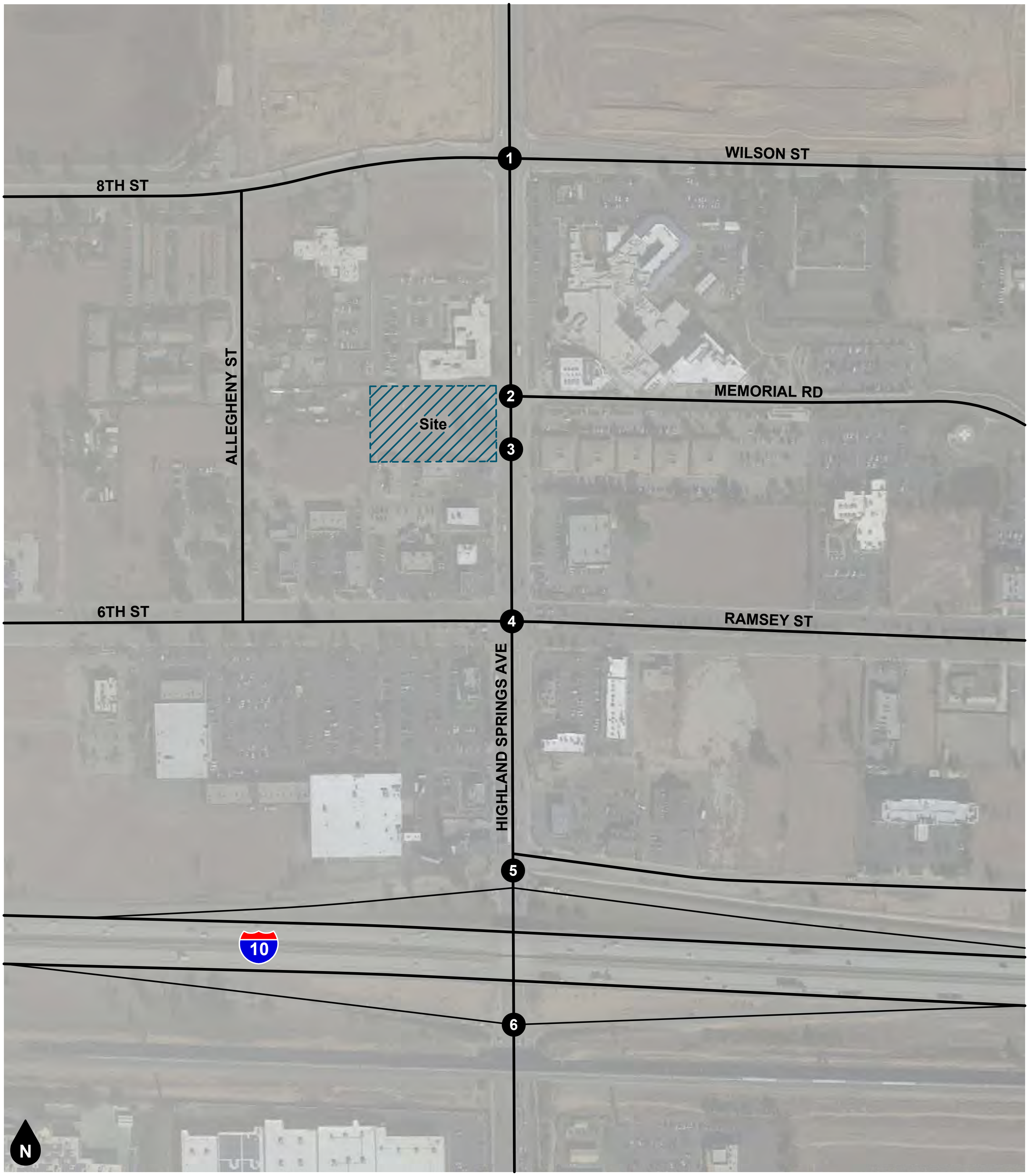


Figure 3
Site Plan



Legend
Study Intersection

Figure 2
Project Location Map

2. METHODOLOGY

This section discusses the analysis methodologies used to assess transportation facility performance as adopted by the respective jurisdictional agencies.

INTERSECTION DELAY METHODOLOGY

The methodology for Level of Service analysis is outlined in the Western Riverside Council of Governments (WRCOG) Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (March 2020) as adopted for use in the City of Beaumont by resolution of the City Council ["WRCOG TIA Guidelines"].

The technique used to assess the performance of intersections is known as the intersection delay methodology based on the procedures contained in the Highway Capacity Manual (Transportation Research Board, 6th Edition). The methodology considers the traffic volume and distribution of movements, traffic composition, geometric characteristics, and signalization details to calculate the average control delay per vehicle and corresponding Level of Service. Control delay is defined as the portion of delay attributed to the intersection traffic control (such as a traffic signal or stop sign) and includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay. The intersection control delay is then correlated to Level of Service based on the following thresholds:

Level of Service	Intersection Control Delay (Seconds / Vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10.0	≤ 10.0
B	> 10.0 to ≤ 20.0	> 10.0 to ≤ 15.0
C	> 20.0 to ≤ 35.0	> 15.0 to ≤ 25.0
D	> 35.0 to ≤ 55.0	> 25.0 to ≤ 35.0
E	> 55.0 to ≤ 80.0	> 35.0 to ≤ 50.0
F	> 80.0	> 50.0

Source: Transportation Research Board, Highway Capacity Manual (6th Edition).

Level of Service is used to qualitatively describe the performance of a roadway facility, ranging from Level of Service A (free-flow conditions) to Level of Service F (extreme congestion and system failure). At intersections with traffic signal or all way stop control, Level of Service is determined by the average control delay for the overall intersection. At intersections with cross street stop control (i.e., one- or two-way stop control), Level of Service is determined by the average control delay for the worst individual movement (or movements sharing a single lane). Intersection delay analysis was performed using the Vistro software.

Signalized intersection input parameters, such as saturation flow rates and default values for Highway Capacity Manual calculations, were used in accordance with the recommended values shown in the County of Riverside TA Preparation Guide.

PERFORMANCE STANDARDS

City of Beaumont. The City of Beaumont General Plan Policy 4.1.2, seeks to maintain the following target Levels of Service: Level of Service D along auto-priority streets within the City of Beaumont. Level of Service E is considered acceptable on non-auto-priority streets. As shown on the City of Beaumont General Plan Auto Priority Network Map (Figure 4.4), the City of Beaumont defines roadways by priority as:

- Auto-priority roadways, designed to move large volumes of traffic generally classified as Secondary Highway and higher, are major distribution arterials to provide regional mobility as well as connectivity to collector streets.

- Non-auto-priority roadways, designed to move smaller volumes of traffic at slower speeds generally classified as Collector and lower, are minor distribution streets, to provide intra-city mobility as well as connectivity to between neighborhoods and adjacent land uses.

City of Banning. Per Resolution 2013-34, The City of Banning General Plan Policy 4.C.6, seeks to maintain peak hour Level of Service D (or better) on roadways and intersections.

California Department of Transportation. As stated in the Guide for the Preparation of Traffic Impact Studies (State of California, 2002), "California Department of Transportation endeavors to maintain a target LOS [Level of Service] at the transition between LOS "C" and LOS "D" on State highway facilities". The California Department of Transportation acknowledges this may not always be feasible and recommends consultation with the California Department of Transportation to determine the appropriate target Level of Service. For consistency with local requirements, this analysis defines Level of Service D as the minimum acceptable Level of Service for State Highway facilities.

GENERAL PLAN CONSISTENCY/OPERATING REQUIREMENTS

The WRCOG TIA Guidelines, as adopted by the City of Beaumont, establish the following operating requirements for General Plan consistency.

Signalized Intersections

- Any study intersection operating at an acceptable Level of Service (D or better) without project traffic in which the addition of project traffic causes the intersection to degrade to a Level of Service (E or F) shall identify improvements to improve operations to Level of Service (D or better).

- Any signalized study intersection that is operating at unacceptable Level of Service (E or F) without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.

Unsignalized Intersections

An operational improvement would be required if the study determines that either section (a) or both sections (b and c) occur:

a) The addition of project related traffic causes the intersection to degrade from an acceptable Level of Service D or better to Level of Service E or F.
OR
b) The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at a Level of Service E or F.
AND
c) The intersection meets the peak hour traffic signal warrant after the addition of project traffic.

If the conditions above are satisfied, improvements should be identified that achieve the following:

- Level of Service D or better for case a) above or to pre-project Level of Service and delay for case b) above.

California Department of Transportation. Based on the established performance standards for County of Riverside, a potentially operational transportation impact is defined to occur if:

- The addition of project-generated trips is forecast to cause the performance of a study intersection to deteriorate from acceptable Level of Service (D or better) to unacceptable Level of Service (E or F).
  OR
- The addition of project generated trips is forecast to worsen the performance of a study intersection operating at unacceptable Level of Service (E or F) in the baseline condition.

3. EXISTING CONDITIONS

This section describes the existing roadway conditions prior to the proposed development, as well as providing agency existing and planned circulation elements. The existing volumes are illustrated on figures contained in this section.

EXISTING ROADWAY SYSTEM

Figure 4 identifies the lane geometry and intersection traffic controls for Existing conditions based on a field survey of the study area. Regional access to the project site is provided by the I-10 Freeway located approximately 1,400 feet south of the project site. Key roadways providing local circulation include Highland Springs Avenue, Eighth Street, Memorial Drive and Sixth Street.

Interstate 10 is an eight (8) lane divided highway generally trending in east-west direction in the project vicinity. Interstate 10 provides regional access through southern California. Highway access is provided at grade separated interchanges north and south of the elevated freeway. It currently carries approximately 135,000 to 140,000 vehicles per day in the project vicinity. Interstate 10 is an auto-priority roadway and designated truck route.

Highland Springs Avenue is a four (4) lane divided with two-way left turn (TWLT)[2] lane roadway trending in a north-south direction in the project vicinity. Highland Springs Avenue is classified as an Arterial Highway (4-lane divided) north of 6th Street and an Urban Arterial (6-lane divided) south of 6th Street in the City of Beaumont General Plan. Bicycle lanes are currently not provided, and on-street parking is prohibited in the project vicinity. Sidewalks are provided along the east side of Highland Springs Avenue and on the west side south of the project. The posted speed is 30 miles per hour. Highland Springs Avenue is an auto-priority roadway and designated truck route.

Eighth Street is a two (2) lane divided (TWLT) to four (4) lane divided (TWLT) roadway trending in an east-west direction in the project vicinity. Eighth Street is classified as a Major Highway (4-lane divided) in the City of Beaumont General Plan. Bicycle lanes are currently not provided, and on-street parking is permitted in the project vicinity. Sidewalks are provided along north side from Highland Springs Avenue to the west, and along the south side from Highland Springs Avenue to the east. The posted speed is 35 miles per hour. Eighth Street west of Highland Springs Avenue is a non-auto-priority roadway with proposed Class I Bicycle Route.

Sixth Street is a four (4) lane divided roadway trending in an east-west direction in the project vicinity. Sixth Street is classified as an Arterial Highway (4-lane divided) in the City of Beaumont General Plan. Bicycle lanes are currently provided west of Highland Springs Avenue, and on-street parking is permitted in the project vicinity. Sidewalks are provided along both sides of roadway. The posted speed is 35 miles per hour. Sixth Street west of Highland Springs Avenue is an auto-priority roadway and designated truck route.

Memorial Drive is a one (1) lane eastbound-only to two (2) lane undivided roadway trending in an easterly direction south of the Memorial Hospital to a north-south direction west of the hospital helicopter landing pad. Memorial Drive is an unclassified road in the City of Beaumont General Plan. Bicycle lanes are currently not provided, and on-street parking is prohibited. in the project vicinity. Sidewalks are provided along the north-east side of this roadway. The posted speed is 5 miles per hour. Memorial Drive is a non-auto-priority roadway.

[2] The City of Beaumont plans to construct a raised median on Highland Springs Avenue which will restriction left turn access to minor driveways. The proposed project does not include left-turn access from the existing TWLT lane.

PEDESTRIAN FACILITIES

Existing pedestrian facilities in the project vicinity are shown on Figure 5. As shown on Figure 5, sidewalks are currently provided along the project site frontage.

TRANSIT SERVICE

Figure 6 shows Existing public transit facilities and routes in the project vicinity. As shown on Figure 6, the study area is currently served by PassTransit bus service. Routes 3, 4, and 6 run along Highland Springs Avenue.

GENERAL PLAN CONTEXT

Figure 7 shows the City of Beaumont General Plan Circulation Element roadway classifications map. This figure shows the nature and extent of arterial and collector highways that are needed to adequately serve the ultimate development depicted by the Land Use Element of the General Plan. The City of Beaumont standard roadway cross-sections are illustrated on Figure 8.

BICYCLE FACILITIES AND PEDESTRIAN TRAILS

The City of Beaumont Bicycle and Pedestrian Trails Master Plan is illustrated on Figure 9. There are currently existing bicycle lanes along Sixth Street. Sidewalks are provided intermittently on the north and south sides of Highland Springs Avenue and are not provided adjacent to the site.

TRUCK ROUTES

The City of Beaumont designated truck route map is shown on Figure 10. Truck route roadways are auto-priority and designed to carry large volumes of traffic within and through the City.

EXISTING ROADWAY VOLUMES

Figure 11 shows the Existing average daily traffic volumes. The Existing average daily traffic volumes have been obtained from the 2018 Traffic Volumes on California State Highways by the California Department of Transportation (Caltrans), and factored from peak hour intersection turning movement volumes using the following formula for each intersection leg:

PM Peak Hour (Approach Volume + Exit Volume) x 13.56 = Leg Volume.

Existing peak hour traffic conditions are based upon AM peak period and PM peak period intersection turning movement counts obtained in December 2019 during typical weekday conditions. The weekday AM peak period was counted between 7:00 AM and 9:00 AM, and the weekday PM peak period was counted between 4:00 PM and 6:00 PM. The actual peak hour within the peak period is the four consecutive 15-minute periods with the highest total volume when all movements are added together. Thus, the weekday PM peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15-minute periods have the highest combined volume. Intersection turning movement count worksheets are provided in Appendix C.

The current COVID-19 pandemic and related stay-at-home orders imposed by State and local municipalities have generally resulted in a reduction of peak hour volumes compared to pre-pandemic conditions. In addition to the current public health restrictions, it is anticipated that the pandemic may have a lasting effect on travel behaviors, such as an increase telecommuting. To provide a conservative analysis, the existing volumes used in this analysis are based on counts from December 2019 obtained from the Highland Springs and 8th Retail Traffic Impact Analysis (Urban Crossroads, April 23, 2020). Since the December 2019 counts were collected within the past 12 months, no adjustment factors have been applied. Inbound and outbound AM and PM peak hour turning movement volumes for the existing auto facilities south of the project site were added to the Highland Springs Avenue at Project South Driveway based on counts at the existing driveway. This approach is likely to overestimate actual volumes since the long-term trend of work from home is expected to hold even as public health restrictions are eased.

Figure 12 and Figure 13 show the Existing AM peak hour and PM peak hour intersection turning movement volumes.

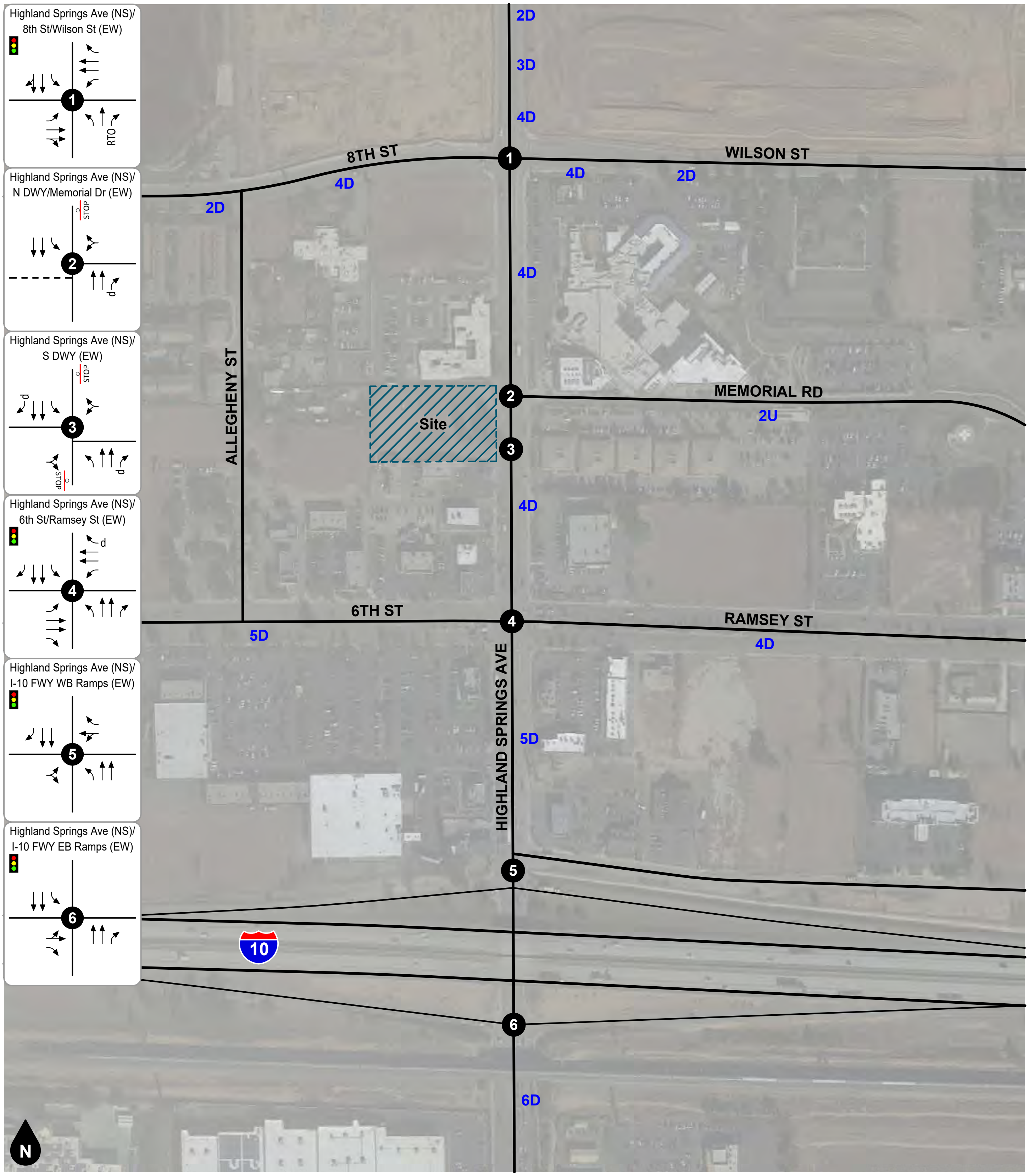
EXISTING LEVEL OF SERVICE

The intersection Levels of Service for Existing conditions have been calculated and are shown in Table 1. As shown in Table 1, the study intersections currently operate within acceptable Levels of Service (D or better) during the peak hours for Existing conditions. Existing intersection Level of Service worksheets are provided in Appendix D.

Table 1
Existing Intersection Levels of Service

ID / Study Intersection	Traffic Control[1]	AM Peak Hour		PM Peak Hour	
		Delay[2]	LOS[3]	Delay[2]	LOS[3]
1. Highland Springs Avenue at Eight Street	TS	23.6	C	23.2	C
2. Highland Springs Avenue at Memorial Drive / North Pro	CSS[4]	12.6	B	13.8	B
3. Highland Springs Avenue at South Project Driveway	CSS[4]	11.3	B	16.3	C
4. Highland Springs Avenue at Sixth Street	TS	20.2	C	24.5	C
5. Highland Springs Avenue at I-10 Westbound Ramps	TS	19.4	B	22.9	C
6. Highland Springs Avenue at I-10 Eastbound Ramps	TS	17.6	B	22.0	C

Notes:
(1) TS = Traffic Signal; CSS = Cross Street Stop.
(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).
(3) LOS = Level of Service
(4) Delay in seconds per vehicle for cross street stop control is shown for the average delay of the worst side street shared lane movement.

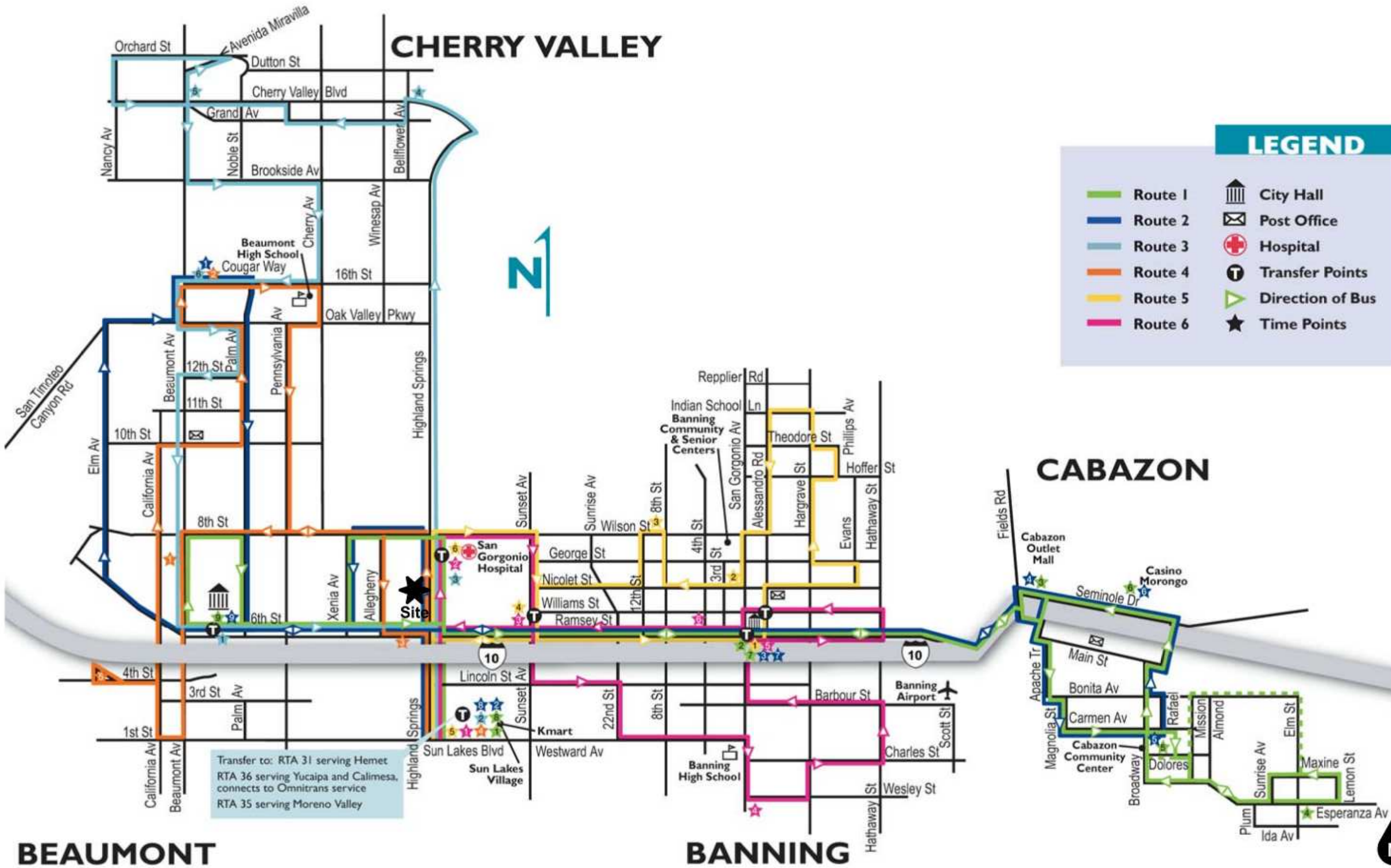


Legend

- Traffic Signal
- STOP Stop Sign
- #D #-Lane Divided Roadway
- #U #-Lane Undivided Roadway
- Existing Lane
- RTO Right Turn Overlap
- d De Facto Right Turn Lane
- --- Project Driveway

Figure 4
Existing Lane Geometry and Intersection Traffic Controls

Figure 5
Existing Pedestrian Facilities



Source: Pass Transit

Figure 6
Existing Transit Routes

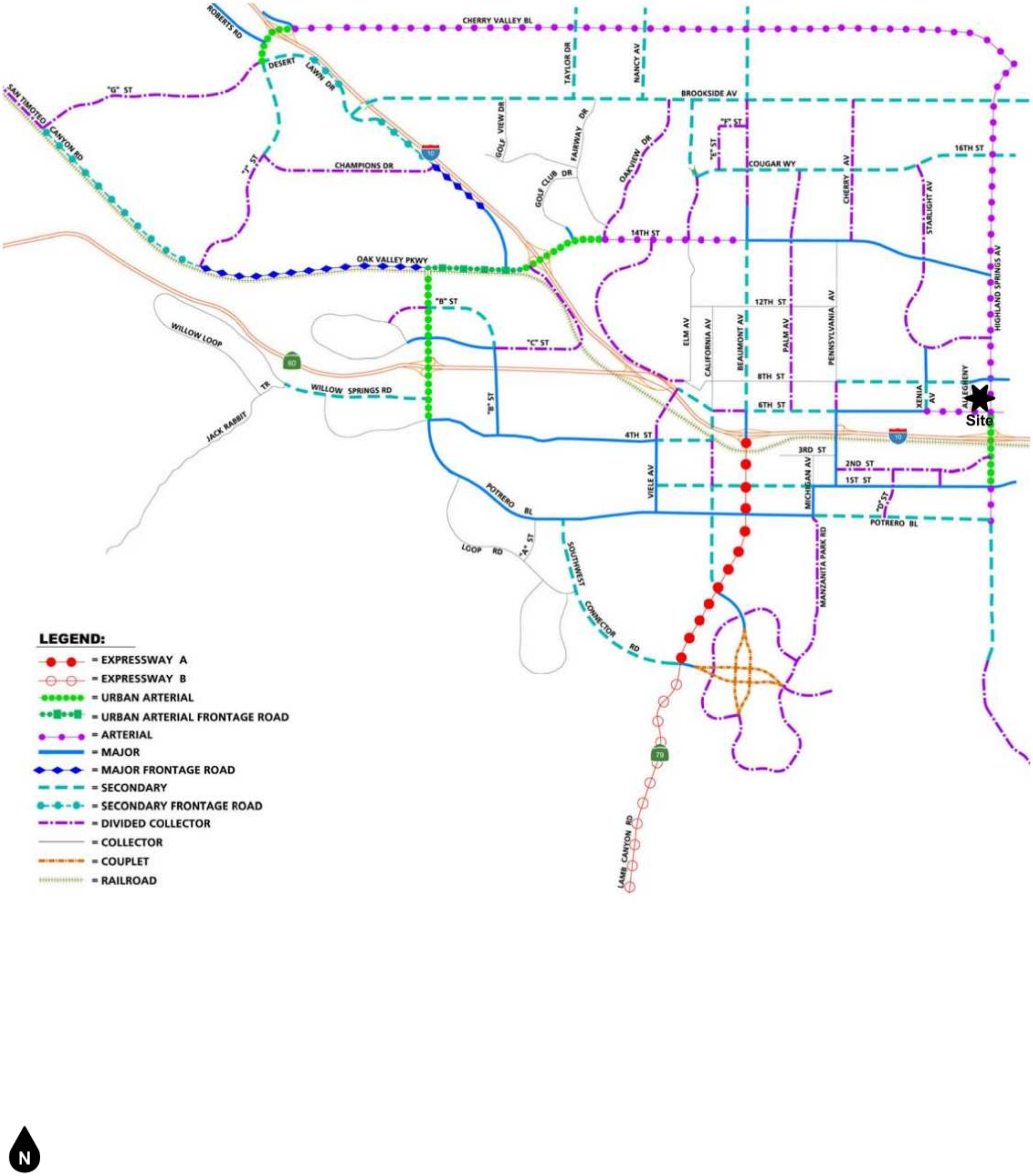
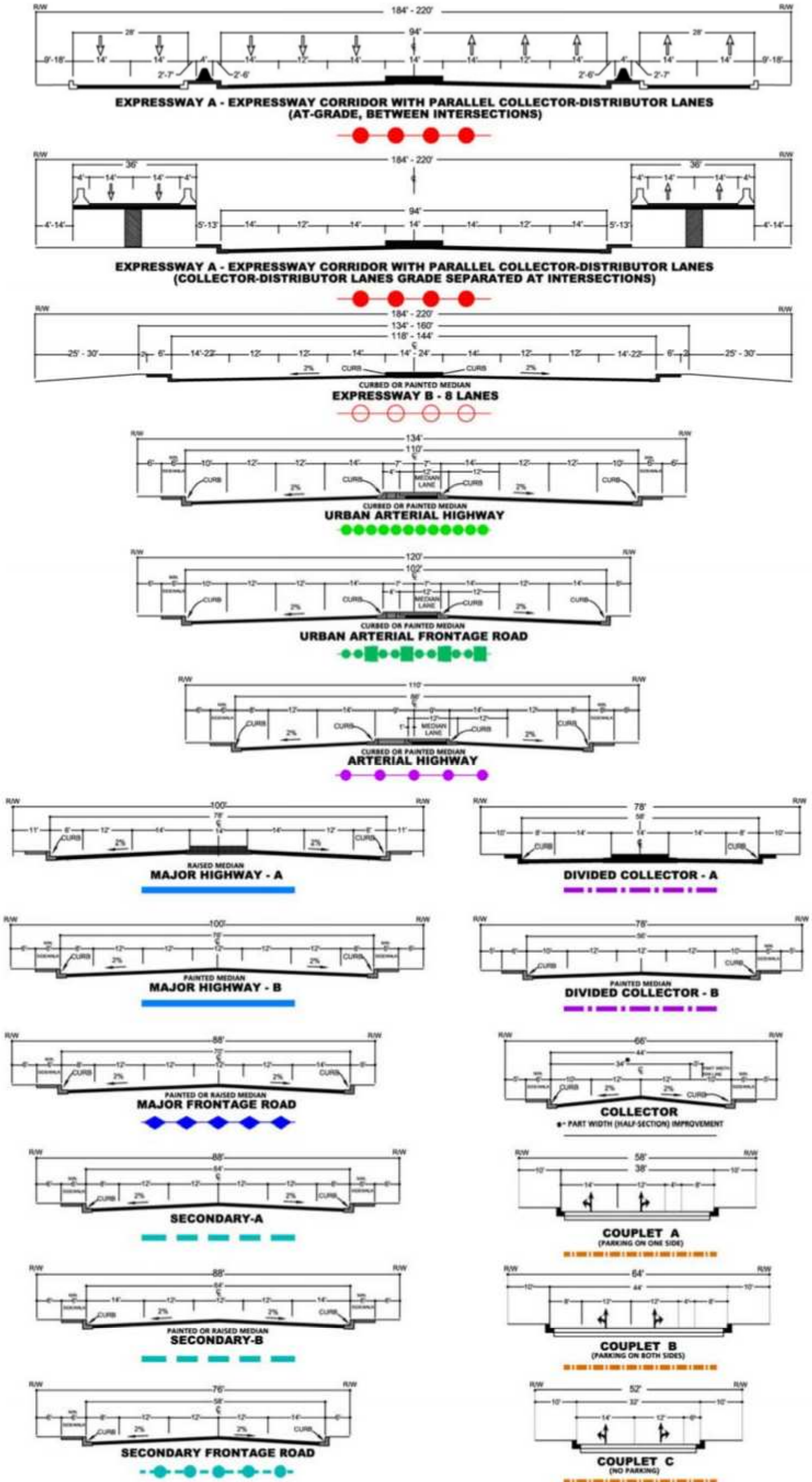


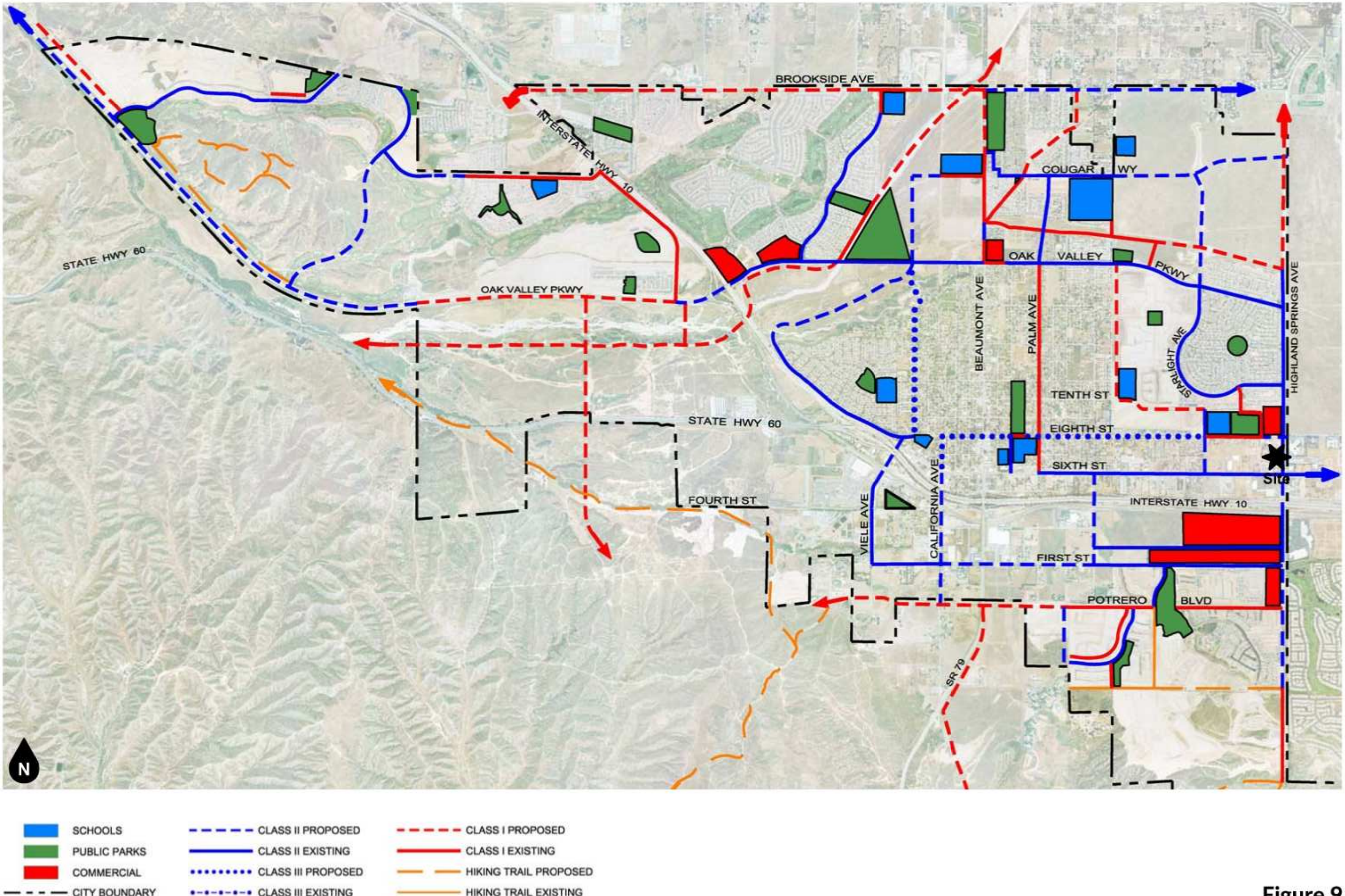
Figure 7
City of Beaumont General Plan Circulation Element

Source: City of Beaumont



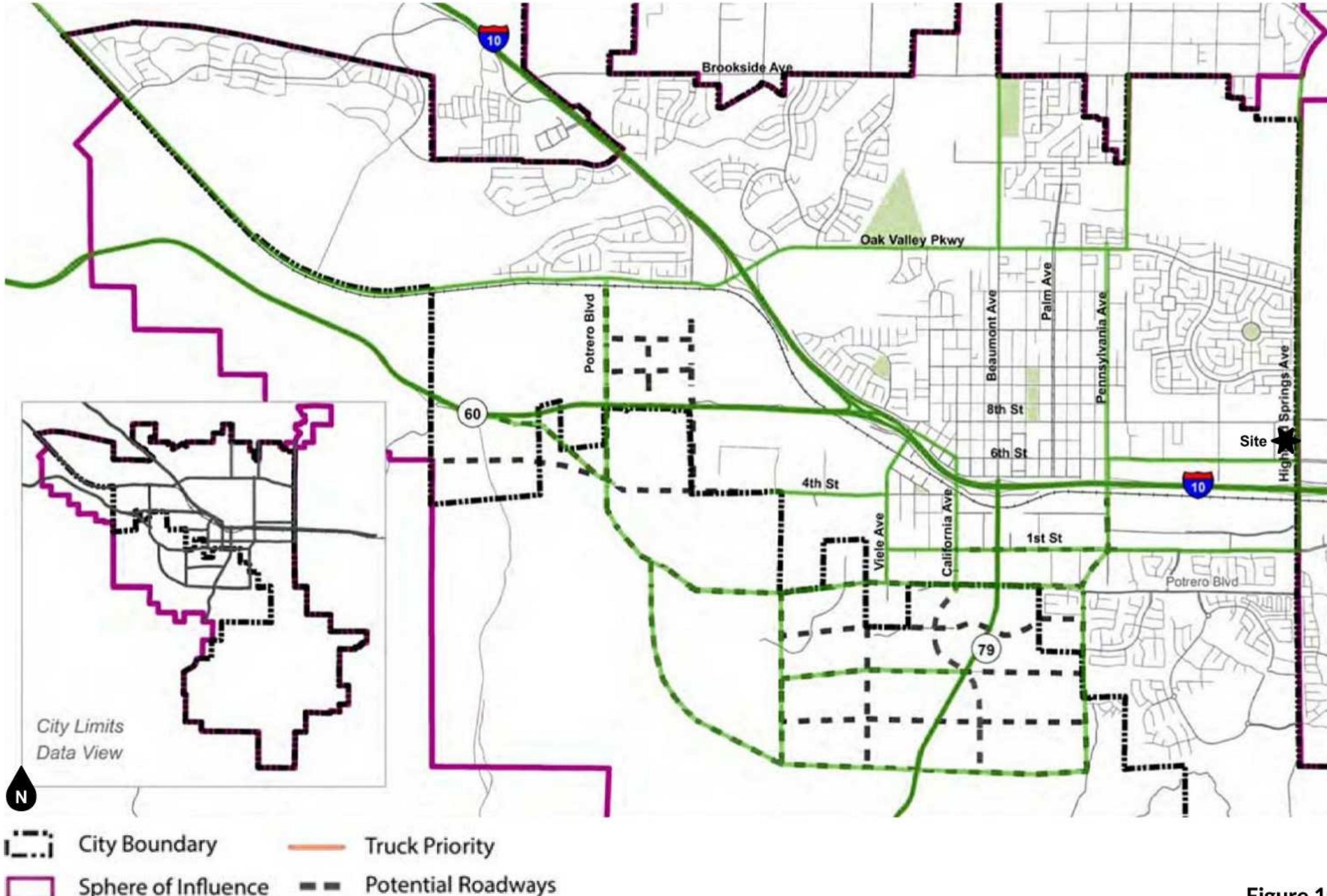
Source: City of Beaumont

Figure 8
City of Beaumont General Plan Roadway Cross-Sections



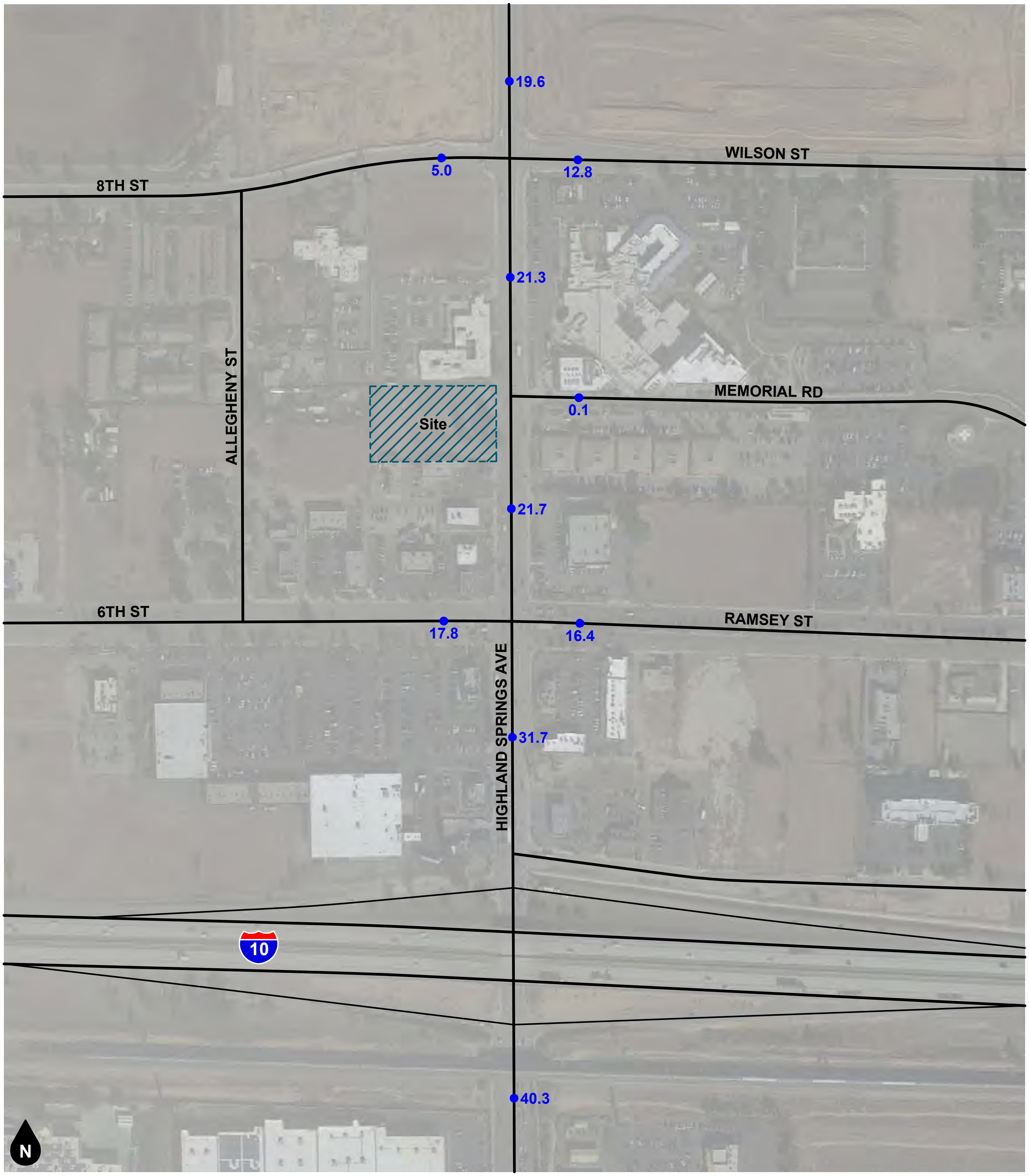
Source: City of Beaumont

Figure 9
City of Beaumont General Plan Bike and Pedestrian Facilities Master Plan



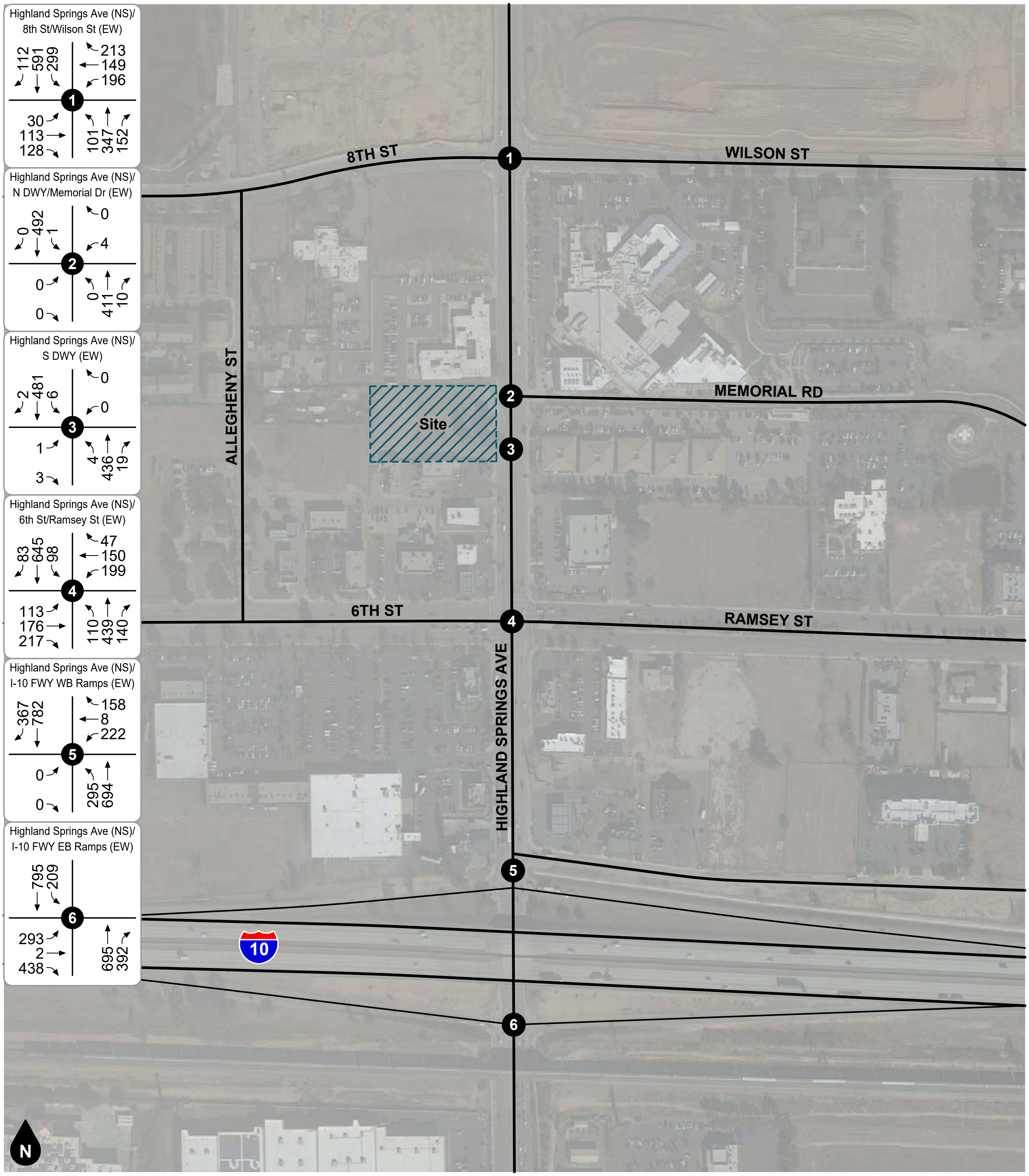
Source: City of Beaumont

Figure 10
City of Beaumont Designated Truck Routes



Legend
●## Vehicles Per Day (1,000's)

Figure 11
Existing Average Daily Traffic Volumes



Legend
Study Intersection

Figure 12
Existing AM Peak Hour Intersection Turning Movement Volumes

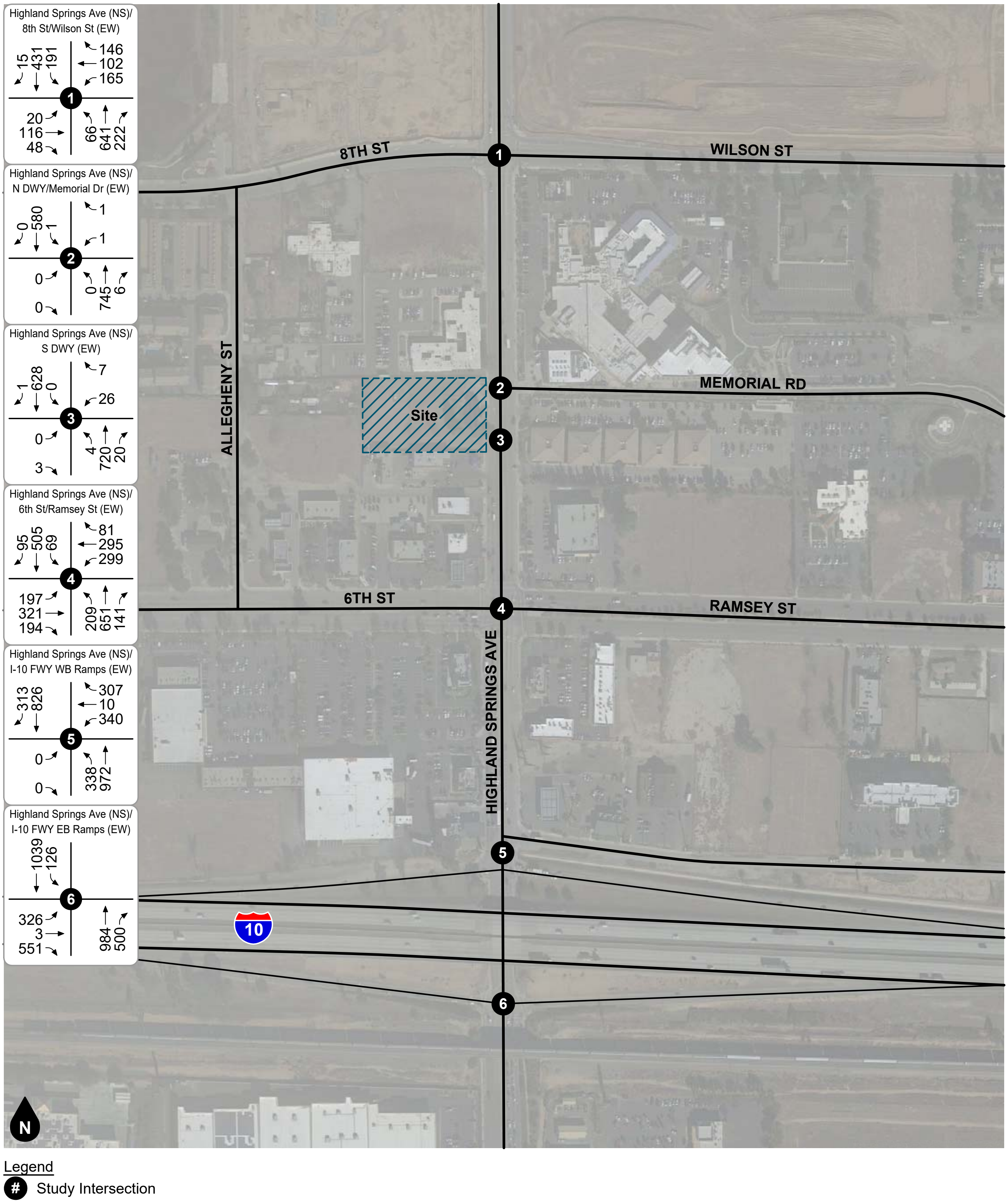


Figure 13
Existing PM Peak Hour Intersection Turning Movement Volumes

4. PROJECT TRIP FORECASTS

This section describes how project trip generation, trip distribution, and trip assignment forecasts were developed. The forecast project volumes are illustrated on figures contained in this section.

PROJECT TRIP GENERATION

Table 2 shows the proposed trip generation, pass-by trip adjustments and net new project site trip generation.

The proposed project trip generation is based upon trip generation rates obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017). Based on the ITE land use descriptions, trip generation rates for ITE Land Use Codes 710 – General Office, and 934 – Fast Food Restaurant with Drive-Through Window were determined to adequately describe the proposed project uses and were selected for this analysis. The number of trips forecast to be generated by the proposed project are determined by multiplying the trip generation rates and directional distribution by the land use quantities.

Pass-By Adjustment

The project trip generation shown in Table 2 includes applicable pass-by trip adjustments in accordance with procedures outlined in the ITE Trip Generation Handbook (3rd Edition, 2017). Land uses such as shopping centers, gasoline stations, and fast-food restaurants will often locate next to busy roadways to attract motorists already on the street. For example, if a customer visits the fast food restaurant on the way home from work, one pass-by trip occurs as the vehicle enters the project site driveway and one pass-by trip occurs as the vehicle exits the project site driveway. Since the vehicle is already using the street system to travel home from work, no new trips would be added to the street system as a result of the new fast food restaurant, except at the project site driveway(s). The pass-by trip reduction was not applied at the project site driveways between 8th Street and 6th Street.

As shown in Table 2, the proposed project is forecast to generate a total of approximately 1,140 daily vehicle trips, including 58 trips during the AM peak hour and 47 trips during the PM peak hour.

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Figure 14 and Figure 15 show the forecast directional outbound, inbound, and pass-by distribution patterns for the project generated trips. The project trip distribution patterns are based on review of existing volume data, surrounding land uses, designated truck routes, and the local and regional roadway facilities in the project vicinity.

Based on the identified project trip generation and distributions, project average daily traffic volumes have been calculated and shown on Figure 16. Project AM and PM peak hour intersection turning movement volumes expected from the project are depicted on Figure 17 and Figure 18, respectively.

Table 2
Project Trip Generation

Trip Generation Rates									
			AM Peak Hour			PM Peak Hour			
Land Use	Source[1]	Units[2]	% In	% Out	Rate	% In	% Out	Rate	Daily
General Office Building	ITE 710	TSF	86%	14%	1.16	16%	84%	1.15	9.74
Fast-Food Restaurant with Drive Thru Window	ITE 934	TSF	51%	49%	40.19	52%	48%	32.67	470.95

Trips Generated									
			AM Peak Hour			PM Peak Hour			
Land Use	Quantity[3]	Units[2]	In	Out	Total	In	Out	Total	Daily
General Office Building	6.400	TSF	6	1	7	1	6	7	62
Fast-Food Restaurant with Drive Thru Window	2.480	TSF	51	49	100	42	39	81	1,168
Pass-by: 49%/50%/AM+PM	*[a]*		-25	-24	-49	-21	-20	-41	-90
Subtoal Project Trips without Pass-by credit			57	50	107	43	45	88	1,230
Total Project Trips Generated			**32**	**26**	**58**	**22**	**25**	**47**	**1,140**

Notes:

(1) ITE = Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017; ### = Land Use Code(s).

[a] = ITE Trip Generation Handbook (3rd Edition, 2017). Pass-by peak hour values per handbook percentages. Daily pass-by value is the sum of the peak hour values when no daily rate is available.

(2) TSF = Thousand Square Feet

(3) Source: Preliminary Grading and Drainage Plan, dated May 11, 2020 and documentation from client October 2, 2020.

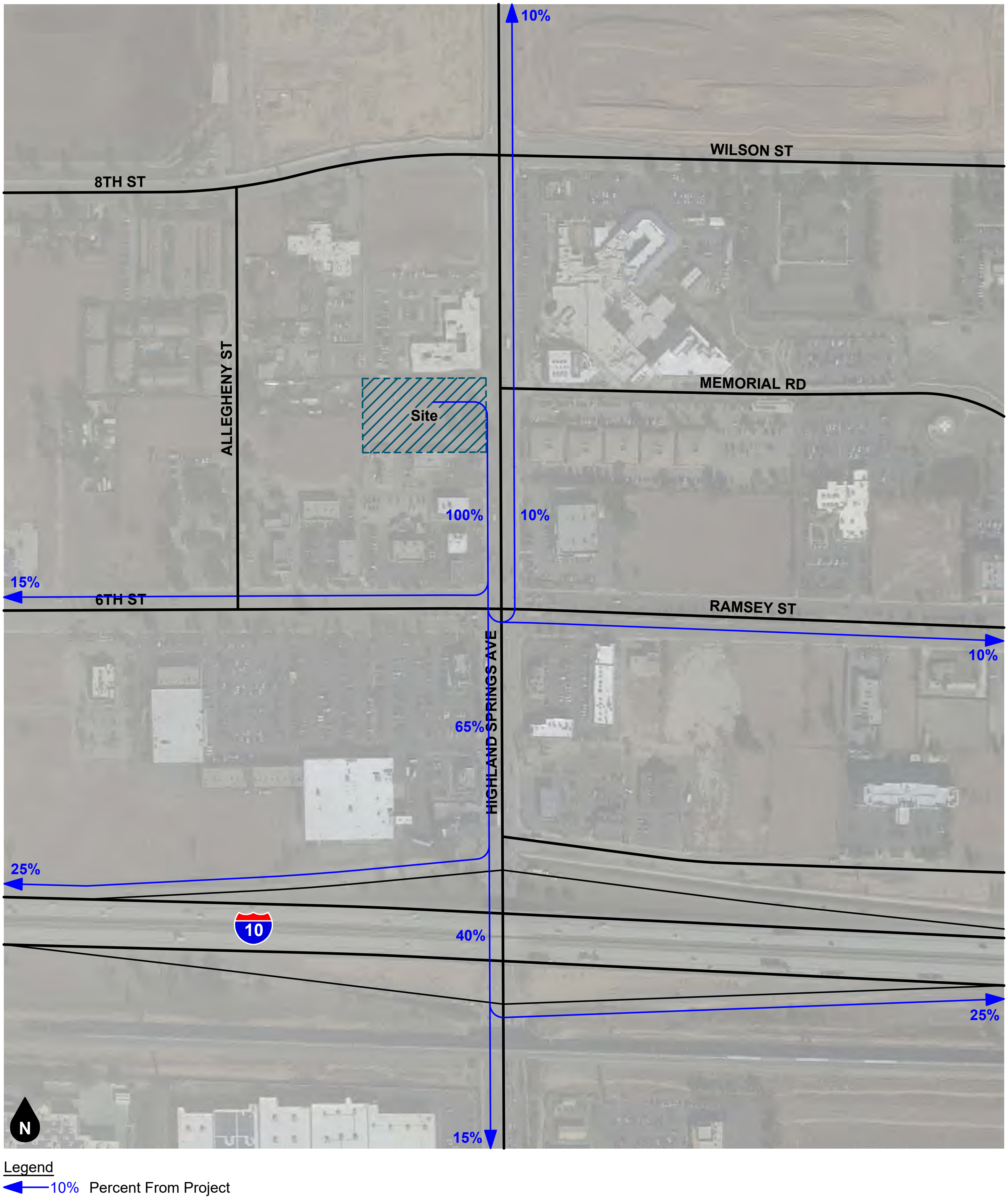


Figure 14
Project Outbound Trip Distribution

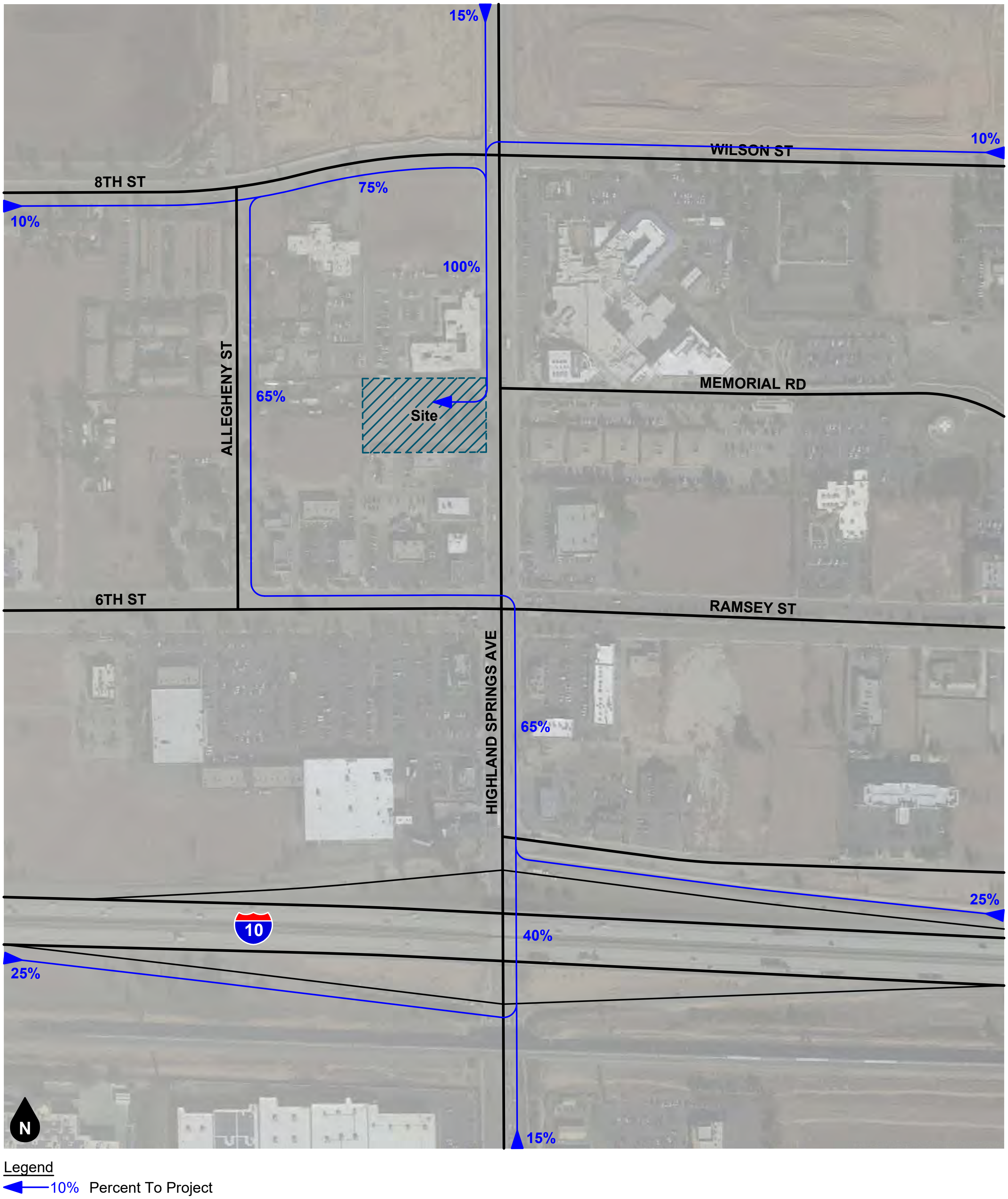
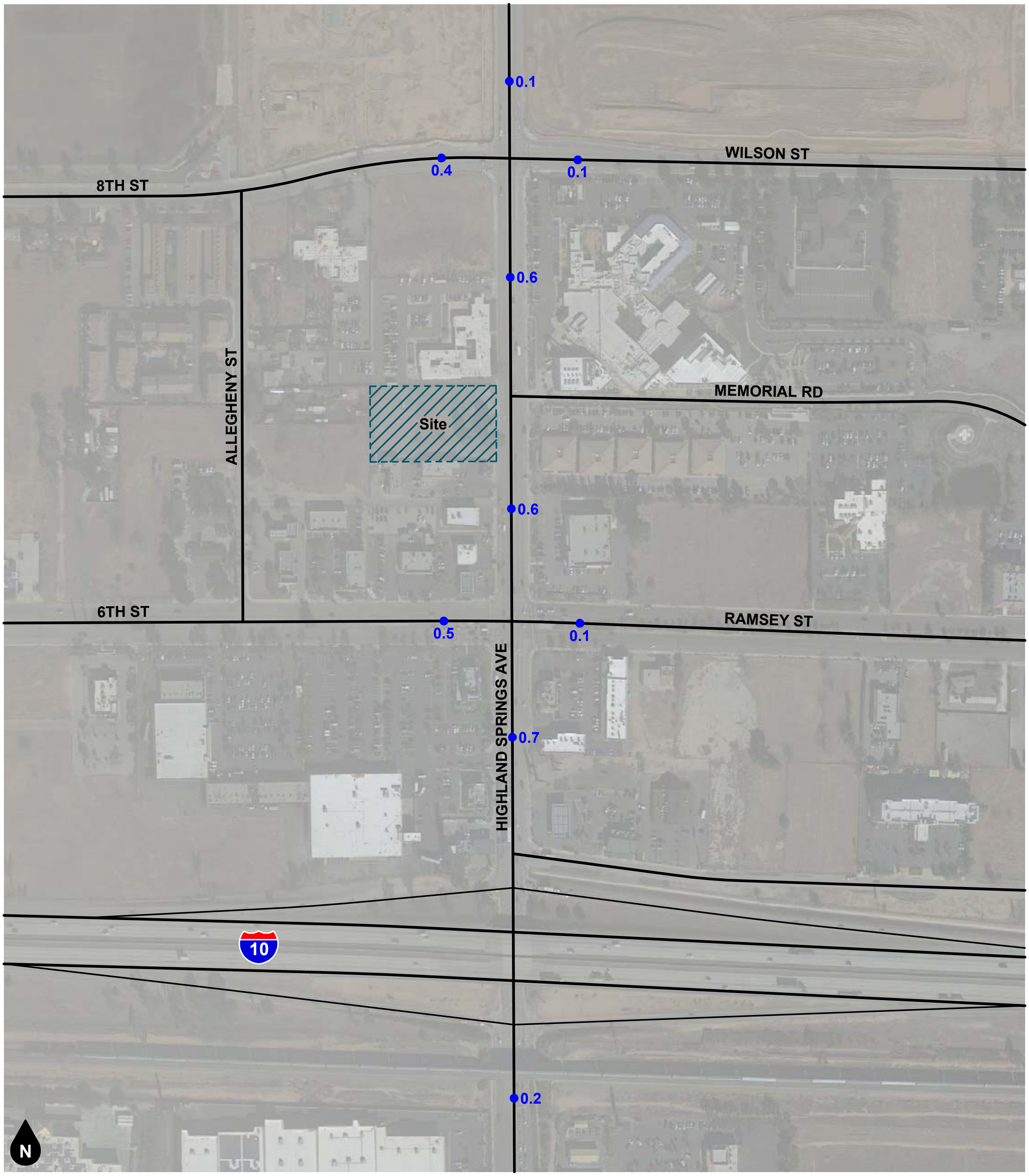
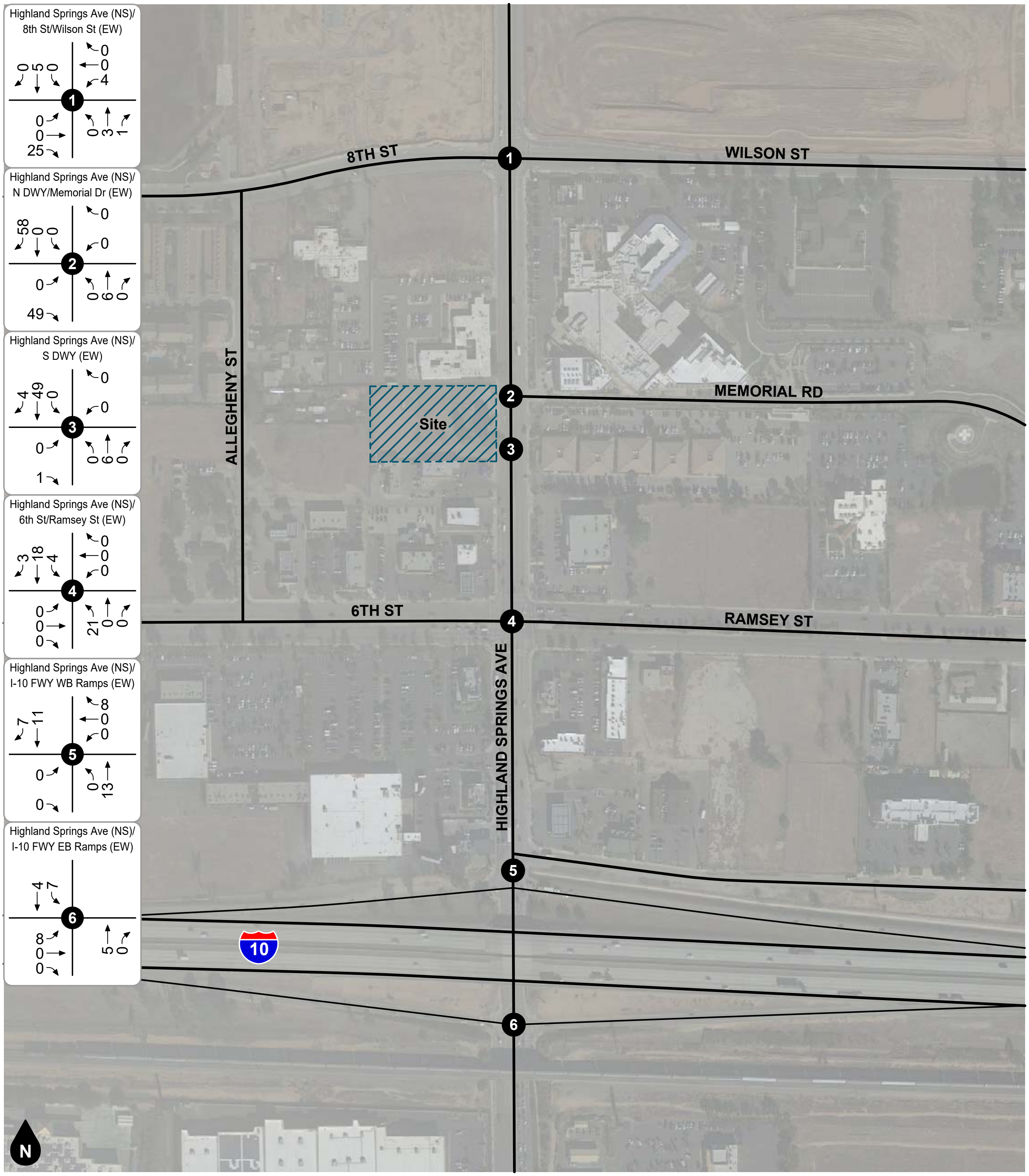


Figure 15
Project Inbound Trip Distribution



Legend
●## Vehicles Per Day (1,000's)

Figure 16
Project Average Daily Traffic Volumes



Legend
Study Intersection

Figure 17
Project AM Peak Hour Intersection Turning Movement Volumes

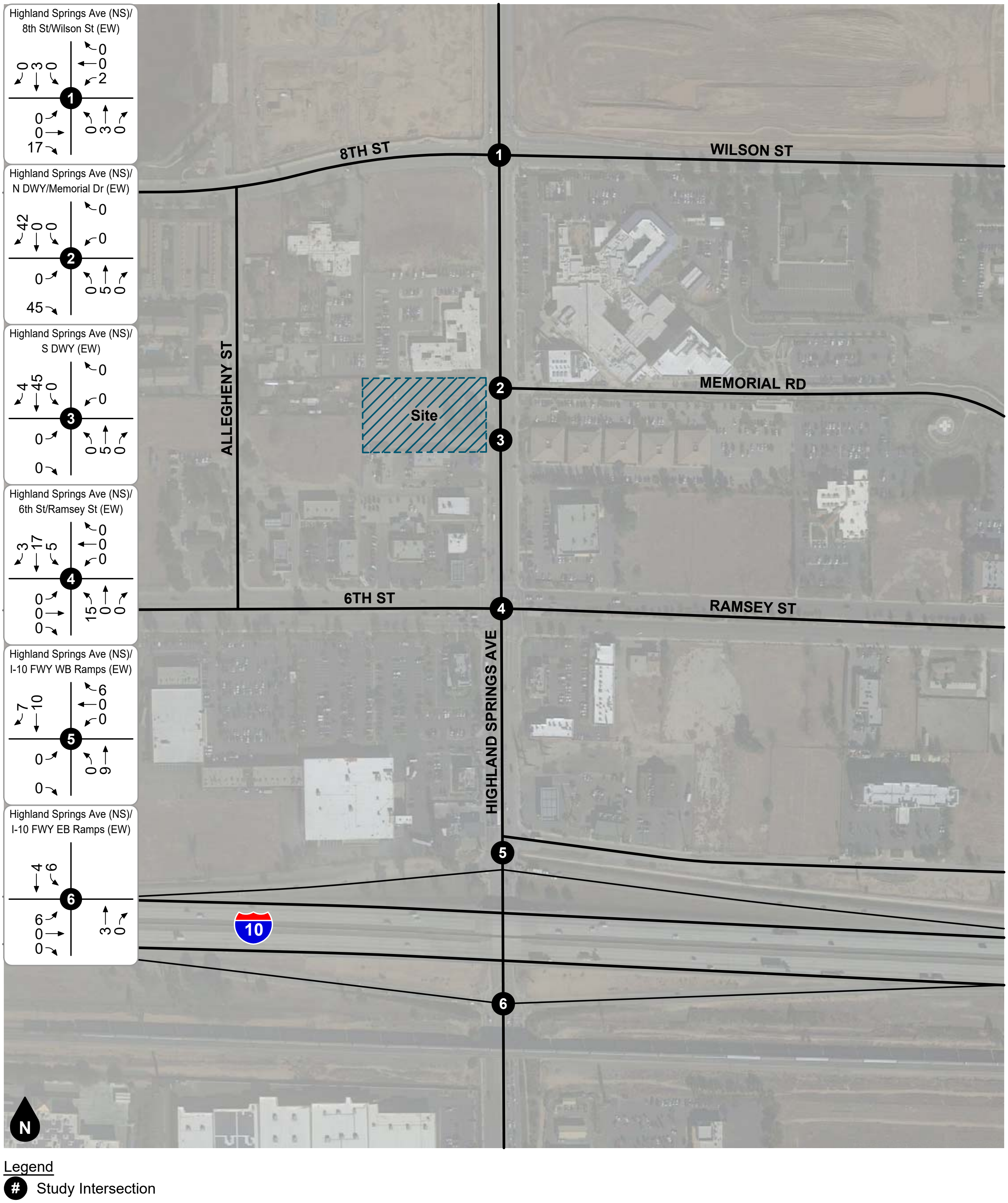


Figure 18
Project PM Peak Hour Intersection Turning Movement Volumes

5. FUTURE VOLUME FORECASTS

This section describes how future volume forecasts for each analysis scenario were developed. Forecast study area volumes are illustrated on figures contained in this section.

CUMULATIVE TRIPS

Ambient Growth Rate

To account for ambient growth on roadways, existing 2020 roadway volumes were increased by a growth rate of two percent (2%) per year over two years for Opening Year (2020) conditions. This equates to a total growth factor of approximately 1.04. The ambient growth rate was conservatively applied to all movements at the study intersections.

Other Development

To account for trips generated by future development, trips generated by pending or approved other development projects in the City of Beaumont and City of Banning were reviewed and added to the study area as appropriate. Table 3 shows the other development project list and regional ambient growth is assumed to account for any additional trips generated by other developments not specifically listed in Table 3. Figure 19 illustrates the other development location map.

Average daily traffic volumes generated by other developments are shown on Figure 20. Figure 21 and Figure 22 show the forecast AM peak hour, and PM peak hour intersection turning movement volumes for trips generated by other developments.

ANALYSIS SCENARIO VOLUME FORECASTS

Existing Plus Project

Existing Plus Project volume forecasts were derived by adding the project generated trips to Existing (year 2020) volumes. Existing Plus Project average daily traffic volumes are shown on Figure 23. Existing Plus Project AM and PM peak hour intersection turning movement volumes are shown on Figure 24 and Figure 25.

Opening Year (2022) Without Project

The Opening Year (2022) Without Project volume forecasts were developed by applying the ambient growth factor to existing (year 2020) volumes and adding trips generated by other developments. Opening Year (2022) Without Project average daily traffic volumes are shown on Figure 26. Opening Year (2022) Without Project AM and PM peak hour intersection turning movement volumes are shown Figure 27 and Figure 28.

Opening Year (2022) With Project

Opening Year (2022) With Project volume forecasts were developed by adding project generated trips to the Opening Year (2022) Without Project forecast. Opening Year (2022) With Project average daily traffic volumes are shown on Figure 29. Opening Year (2022) With Project AM and PM peak hour intersection turning movement volumes are shown on Figure 30 and Figure 31.

Table 3 (1 of 3)
Other Development Trip Generation

ID	Other Development Name/Address	Land Use	Quantity	Units[1]	Source[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
City of Beaumont[3]												
1	Sundance Specific Plan	Single-family Detached Housing	505	DU	ITE 210	93	281	374	315	185	500	4,767
2	Fairway Canyon SCPGA	Single-family Detached Housing	1750	DU	ITE 210	324	971	1,295	1,091	642	1,733	16,520
		Mixed Commercial Retail	707.410	TSF	ITE 820	412	253	665	1,294	1,401	2,695	26,705
		Pass-by: 0%/34%/AM+PM			*ITE Hbk*	0	0	0	-396	-352	-748	-748
		Internal Capture				-15	-12	-27	-418	-406	-824	-851
		Subtotal				721	1,212	1,933	1,571	1,285	2,856	41,626
3	Four Seasons Tract No. 32260 &96	Single-family Detached Housing	1890	DU	ITE 210	350	1,049	1,399	1,179	692	1,871	17,842
4	Heartland (Olivewood)	Single-family Detached Housing	981	DU	ITE 210	181	545	726	612	359	971	9,261
		Mixed Commercial Retail	942.200	TSF	ITE 820	549	337	886	1,723	1,867	3,590	35,568
		Pass-by: 0%/34%/AM+PM			*ITE Hbk*	0	0	0	-533	-540	-1,073	-1,073
		Internal Capture				-7	-9	-16	-342	-320	-662	-678
		Subtotal				730	882	1,612	1,802	1,686	3,488	43,756
5	Beaumont Point Specific Plan	Fulfillment Center Warehouse	4,500.00	TSF	ITE 155	1,832	823	2,655	1,911	4,254	6,165	36,810
	Jack Rabbit Trail to Potrero Blvd	General Light Industrial	500.000	TSF	ITE 110	308	42	350	41	274	315	2,480
	4th Street to SR-60	Hotel	125	RM	ITE 310	35	24	59	38	37	75	1,045
		Miniature Golf	36	HOLE	ITE 431	2	2	4	4	8	12	20
		Rock Climbing Gym	26.000	TSF	ITE 434	12	24	36	24	19	43	71
		Indoor Go-Kart Facility	77.000	TSF	ITE 435	55	37	92	152	124	276	460
		Trampoline Park	24.000	TSF	ITE 436	7	5	12	17	19	36	60
		Bowling Alley	40.000	TSF	ITE 437	31	1	32	30	16	46	77
		Quality Restaurant	15.000	TSF	ITE 931	6	5	11	78	39	117	1,258
		Sit Down Restaurant	15.000	TSF	ITE 932	82	67	149	91	56	147	1,683
		Pass-by: 0%/43%/AM+PM				0	0	0	-36	-20	-56	-56
		Internal Capture				-24	-10	-34	-447	-917	-1,364	-1,398
		Subtotal				2,346	1,020	3,366	1,903	3,909	5,812	42,510
6	Sundance Corporate Center	Office Park	130.000	TSF	ITE 750	167	20	187	10	129	139	1,439
7	Kirkwood Ranch	Single-family Detached Housing	403	DU	ITE 210	75	223	298	251	148	399	3,804
8	Potrero Creek Estates	Single-family Detached Housing	700	DU	ITE 210	130	388	518	437	256	693	6,608
9	Tract No. 32850	Single-family Detached Housing	95	DU	ITE 210	18	52	70	59	35	94	897
10	Noble Creek Vistas	Single-family Detached Housing	648	DU	ITE 210	120	360	480	404	238	642	6,117
11	Sunny-Cal Specific Plan	Single-family Detached Housing	571	DU	ITE 210	106	317	423	356	209	565	5,390
		Mixed Commercial Retail	153.680	TSF	ITE 820	90	54	144	281	305	586	5,801
		Pass-by: 0%/34%/AM+PM			*ITE Hbk*	0	0	0	-86	-77	-163	-163
		Internal Capture			*ITE Hbk*	-6	-4	-10	-94	-92	-186	-196
		Subtotal				190	367	557	457	345	802	10,832
12	Beaumont Shopping Center	Mixed Commercial Retail	46.100	TSF	ITE 820	27	16	43	84	92	176	1,740
	NW Highland Springs Ave/ 1st St	Pass-by: 0%/34%/AM+PM			*ITE Hbk*	0	0	0	-29	-31	-60	-60
		Subtotal				27	16	43	55	61	116	1,680
13	Tournament Hills 3, TM 36307	Single-family Detached Housing	279	DU	ITE 210	52	154	206	174	102	276	2,634
14	Rolling Hills Ranch Industrial Ph2	General Light Industrial	2,850.00	TSF	ITE 110	1,756	239	1,995	233	1,563	1,796	14,136

Table 3 (2 of 3)
Other Development Trip Generation

ID	Other Development Name/Address	Land Use	Quantity	Units[1]	Source[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
City of Beaumont[3]												
15	Beaumont Village	Mixed Commercial Retail	50.810	TSF	ITE 820	30	18	48	93	101	194	1,918
		Pass-by: 0%/34%/AM+PM			*ITE Hbk*	0	0	0	-32	-34	-66	-66
		Subtotal				30	18	48	61	67	128	1,852
16	Beaumont Gas Station	Service Station w/ Convenience	18	FP	ITE 945	114	110	224	128	124	252	3,696
	NWC Pennsylvania Ave / I-10	Sit Down Restaurant	1.570	TSF	ITE 932	9	7	16	10	5	15	176
		Automated Car Wash	3.000	TSF	ITE 948	9	10	19	21	22	43	426
		Pass-by: 35%/35%/35%			*[a]*	-46	-45	-91	-56	-53	-109	-1,504
		Subtotal				86	82	168	103	98	201	2,794
17	San Gorgonio Village	Movie Theater	975	TSF	ITE 444	29	30	59	48	40	88	1,716
	SEC 2nd St / Commercial Way	Mixed Commercial Retail	85.750	TSF	ITE 820	50	31	81	157	170	327	3,237
		Pass-by: 10%/34%/10%			*[b]*	-5	-3	-8	-53	-58	-111	-775
		Subtotal				74	58	132	152	152	304	4,178
18	Hidden Canyon Industrial	General Light Industrial	2,890.00	TSF	ITE 110	1,780	243	2,023	237	1,584	1,821	14,334
19	Potrero Logistic Center	High-Cube Warehouse	577.920	TSF	ITE 154	36	10	46	16	42	58	809
20	Beaumont Landing	Service Station w/ Convenience	18	FP	ITE 945	114	110	224	128	124	252	3,696
	SWC Oak Valley Pkwy / I-10	Fast Food w/ Drive-Thru	4.000	TSF	ITE 934	82	79	161	68	63	131	1,884
		Automated Car Wash	1.500	TSF	ITE 948	5	4	9	11	10	21	190
		Pass-by			*[c]*	-111	-107	-218	-106	-101	-207	-3,123
		Diverted Trips			*[c]*	-47	-45	-92	-56	-53	-109	-1,144
		Subtotal				43	41	84	45	43	88	1,503
21	8th St & Highland Springs Retail	Super Mart w/ Gas Pumps	12	FP	ITE 960	168	169	337	138	138	276	2,766
	SWC 8th/Highland Springs	Fast Food w/ Drive-Thru	3.500	TSF	ITE 934	72	69	141	59	55	114	1,648
		Internal Capture			*[d]*	-32	-32	-64	-40	-40	-80	-982
		Pass-by			*[d]*	-134	-134	-268	-105	-105	-210	-2,332
		Subtotal			*[d]*	74	71	145	52	48	100	1,100
City of Banning[4]												
BN1	Butterfield Specific Plan	Single-family Detached Housing	571	DU	ITE 210	106	317	423	356	209	565	5,390
	NEC 8th/Highland Springs	Mixed Commercial Retail	153.680	TSF	ITE 820	90	54	144	281	305	586	5,801
		Golf Course	253.9	AC	ITE 430	36	12	48	24	47	71	950
		School (23 Acre)	100.000	TSF	ITE 520	383	314	697	62	75	137	1,952
		Pass-by: 0%/34%/AM+PM			*ITE Hbk*	0	0	0	-19	-19	-38	-38
		Internal Capture			*ITE Hbk*	-18	-7	-25	-120	-130	-250	-275
		Subtotal				597	690	1,287	584	487	1,071	13,780
BN2	Sun Lakes North Specific Plan	Industrial Park	877.30	TSF	ITE 130	284	67	351	74	277	351	2,956
	I-10 to Sun Lakes Blvd	Medical Dental Office	52.065	TSF	ITE 720	113	32	145	50	130	180	1,812
	east of Highland Spring Avenue	Mixed Commercial Retail	37.189	TSF	ITE 820	22	13	35	68	74	142	1,404
		Internal Capture			*[e]*	-11	-11	-22	-6	-6	-12	-122
		Pass-by			*[e]*	0	0	0	-21	-21	-42	-458
		Subtotal		PCE	*[e]*	461	113	574	176	496	672	6,280

Table 3 (3 of 3)
Other Development Trip Generation

ID	Other Development Name/Address	Land Use	Quantity	Units[1]	Source[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
City of Banning[4]												
BN3	1.39 AC Redevelopment Project 300 S Highland Springs Ave	Mixed Commercial Retail	-87.600	TSF	ITE 820	-51	-31	-82	-160	-174	-334	-3,307
		Medical Dental Office	87.600	TSF	ITE 720	190	54	244	85	218	303	3,048
		Subtotal				139	23	162	-75	44	-31	-259
BN4	Redevelopment Project 4240 W Ramsey Street	Mixed Commercial Retail	-3.200	TSF	ITE 820	-2	-1	-3	-6	-6	-12	-121
		Medical Dental Office	5.100	TSF	ITE 720	11	3	14	5	13	18	177
		Subtotal				9	2	11	-1	7	6	56
BN5	7-11 Convenience Gas Station 3251 W Ramsey Street	Service Station w/ Convenience	10	FP	ITE 945	64	61	125	71	69	140	2,054
		Pass-by: 62%/56%/AM+PM			*ITE Hbk*	-40	-38	-78	-40	-38	-78	-156
		Subtotal				461	113	574	176	496	672	6,280
BN6	Redevelopment Project 2372 W Ramsey Street	Single-family Detached Housing	-2.0	DU	ITE 210	0	-1	-1	-1	-1	-2	-19
		Marijuana Dispensary	3.250	TSF	SPACK	36	19	55	87	91	178	1,307
		Subtotal				36	18	54	86	90	176	1,288
BN7	SEC 8th St / Lincoln St	Manufacturing	21.000	TSF	ITE 140	10	3	13	4	10	14	83
TOTAL OTHER DEVELOPMENT TRIPS						8,795	7,495	16,290	10,213	12,672	22,885	237,583

Notes:

(1) DU = Dwelling Units; TSF = Thousand Square Feet; RM = Hotel Rooms; HOLE = Golf Course or Mini-golf holes; FP = Fuel Positions at Gas Station; AC = Acres; PCE = Passenger Car Equivalents.

(2) Sources:

ITE = Institute of Transportation Engineers Trip Generation Manual (10th Edition, 2017); ### = Land Use Code.

Hbk = ITE Trip Generation Handbook (3rd Edition, 2017).
Pass-by peak hour values per handbook percentages. Daily pass-by value is the sum of the peak hour values when no daily rate is available.
Internal capture rates calculated in accordance with procedures in the handbook. The daily internal capture is equal to the sum of the peak hour

[a] = Traffic Impact Study for New Gas Station NWC of Pennsylvania Ave and I-10 WB Off Ramp (March 20, 2020), K2 Traffic Engineering, Inc.

[b] = Traffic Impact Analysis Report San Gorgonio Village (July 16, 2018), Linscott Law & Greenspan Engineers.

[c] = Traffic Impact Analysis Beaumont Landing (February, 2020), LSA Associates, Inc.

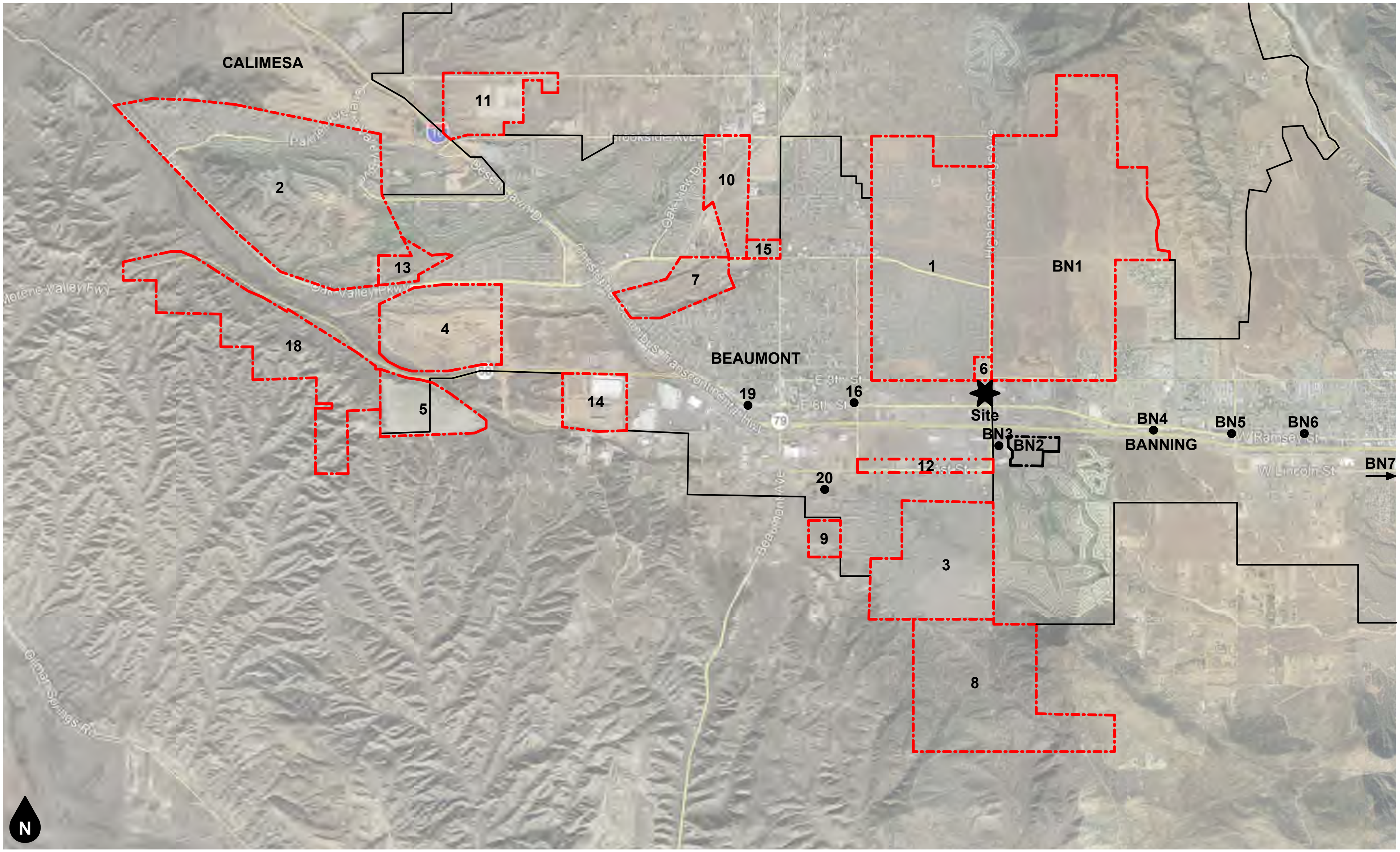
[d] = Highland Springs & 8th Retail Traffic Impact Analysis (April 23, 2020), Urban Crossroads.

[e] = Sun Lakes Village North Specific Plan Amendment No. 5 Traffic Impact Analysis (September 4, 2020), Urban Crossroads.

Spack= Spack Consulting trip generation information.

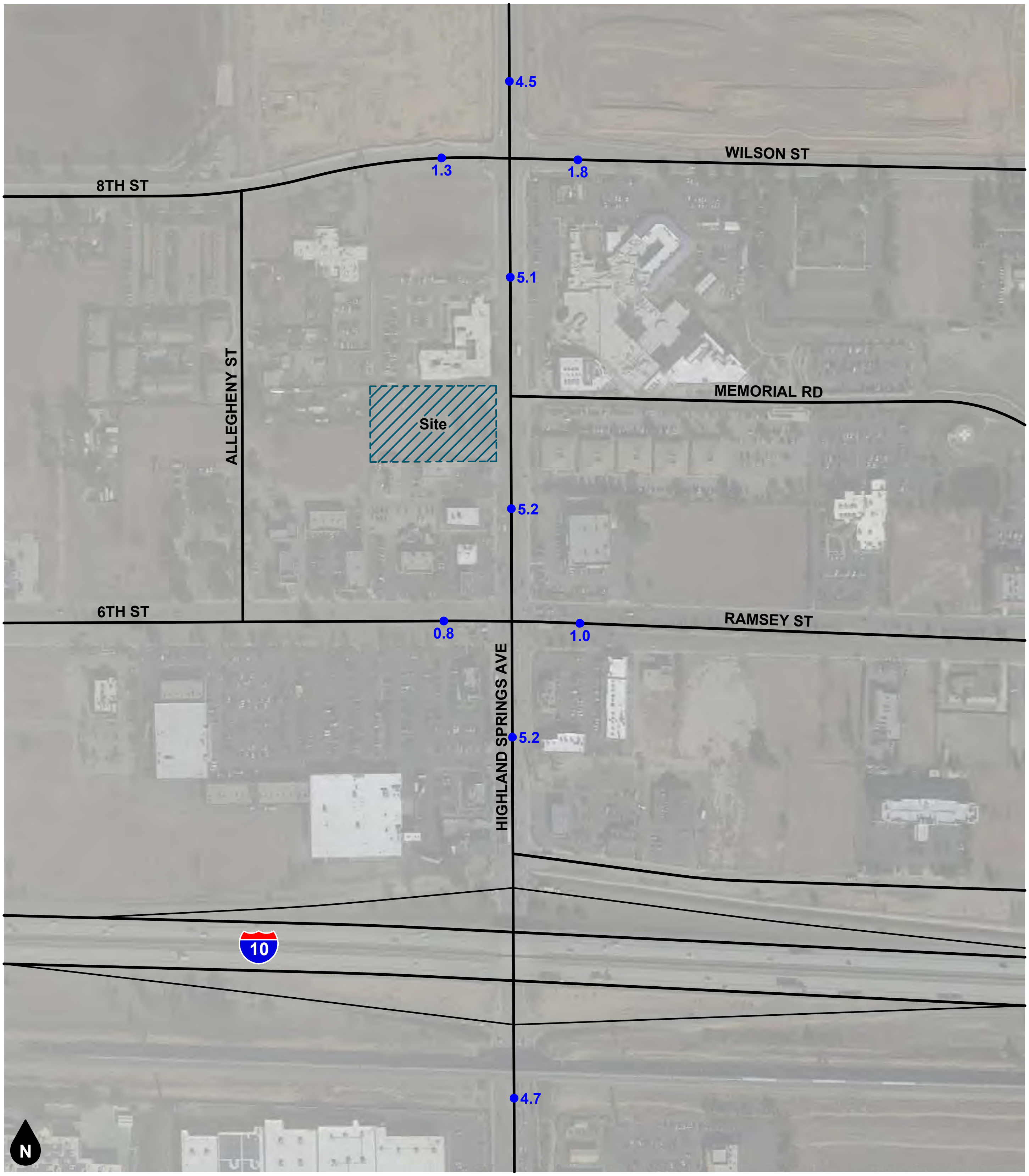
(3) Source: City of Beaumont Planning Documents October 2020.

(4) Source: City of Banning Planning Documents October 2020.



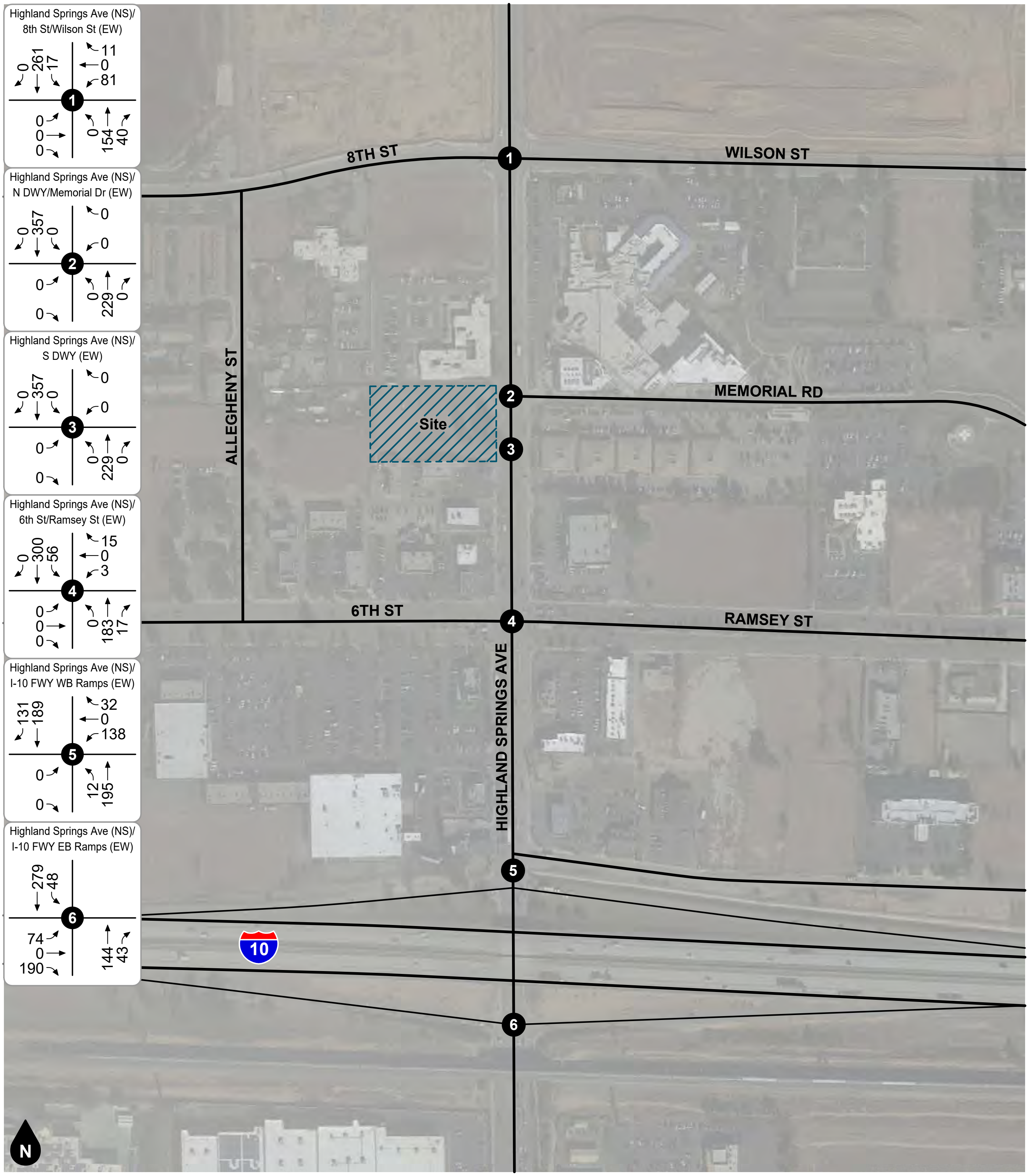
Legend
Project in Beaumont
BN# Project in Banning

Figure 19
Other Development Location Map



Legend
●## Vehicles Per Day (1,000's)

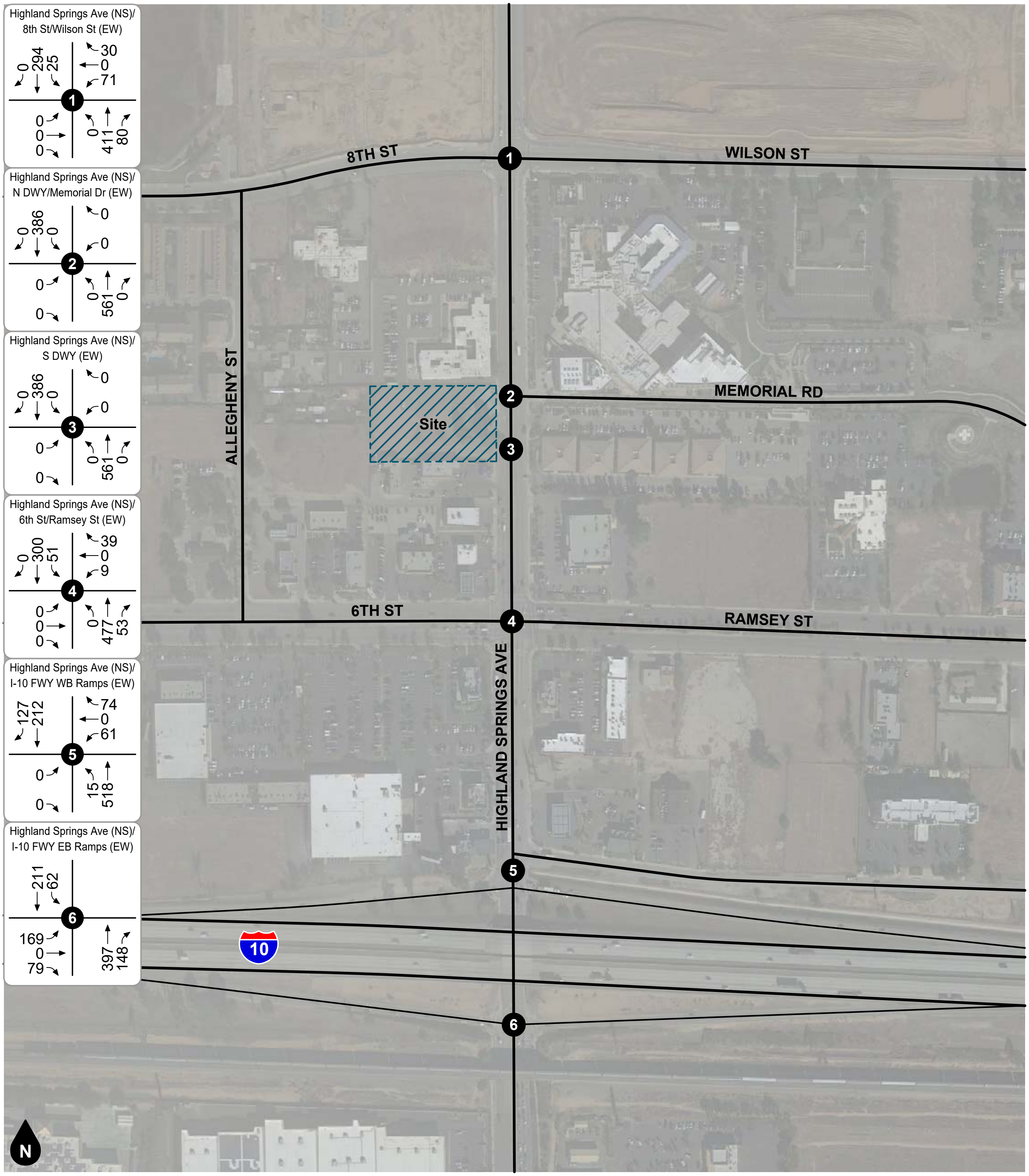
Figure 20
Other Development Average Daily Traffic Volumes



Legend

● # Study Intersection

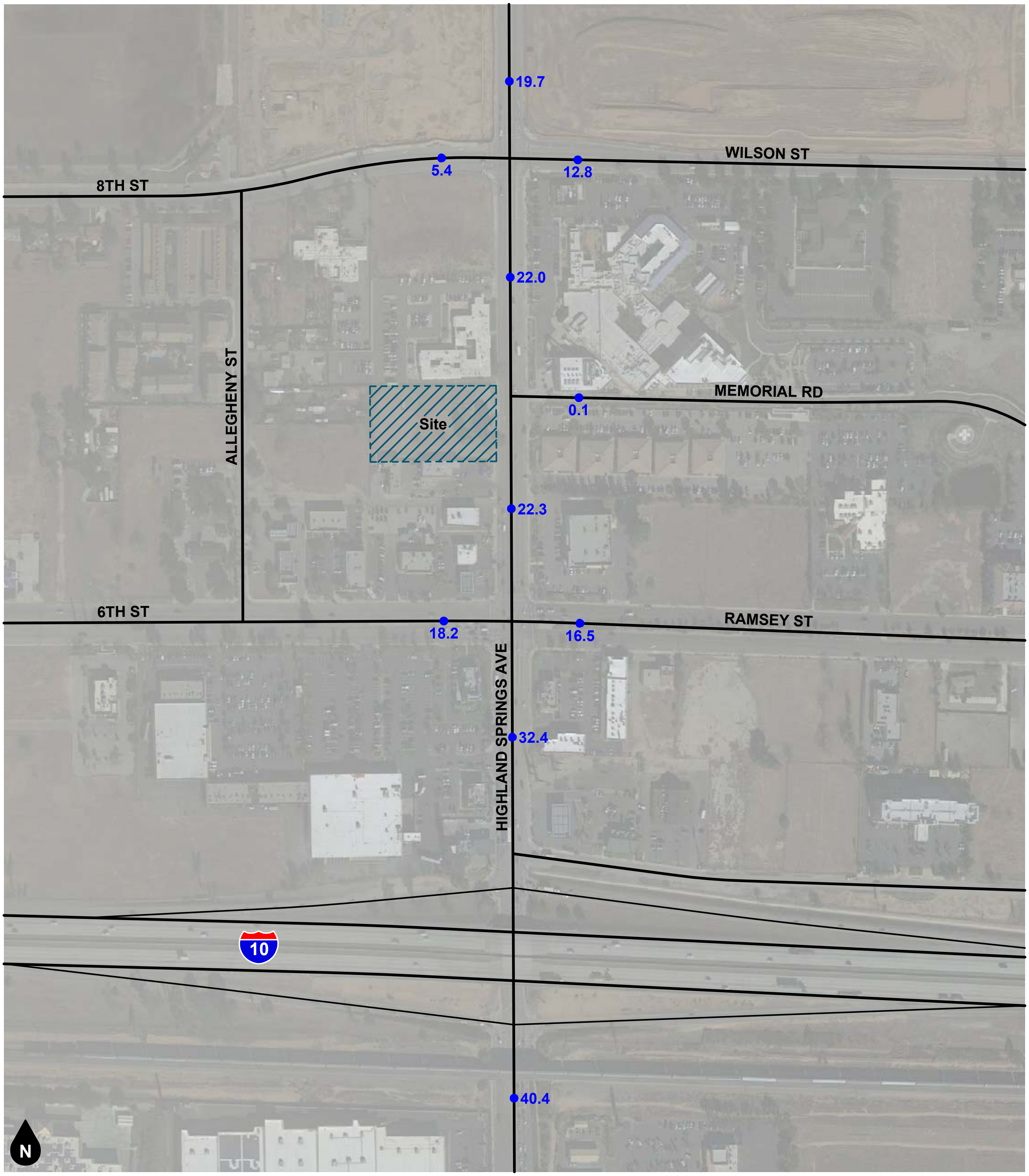
Figure 21
Other Development
AM Peak Hour Intersection Turning Movement Volumes



Legend

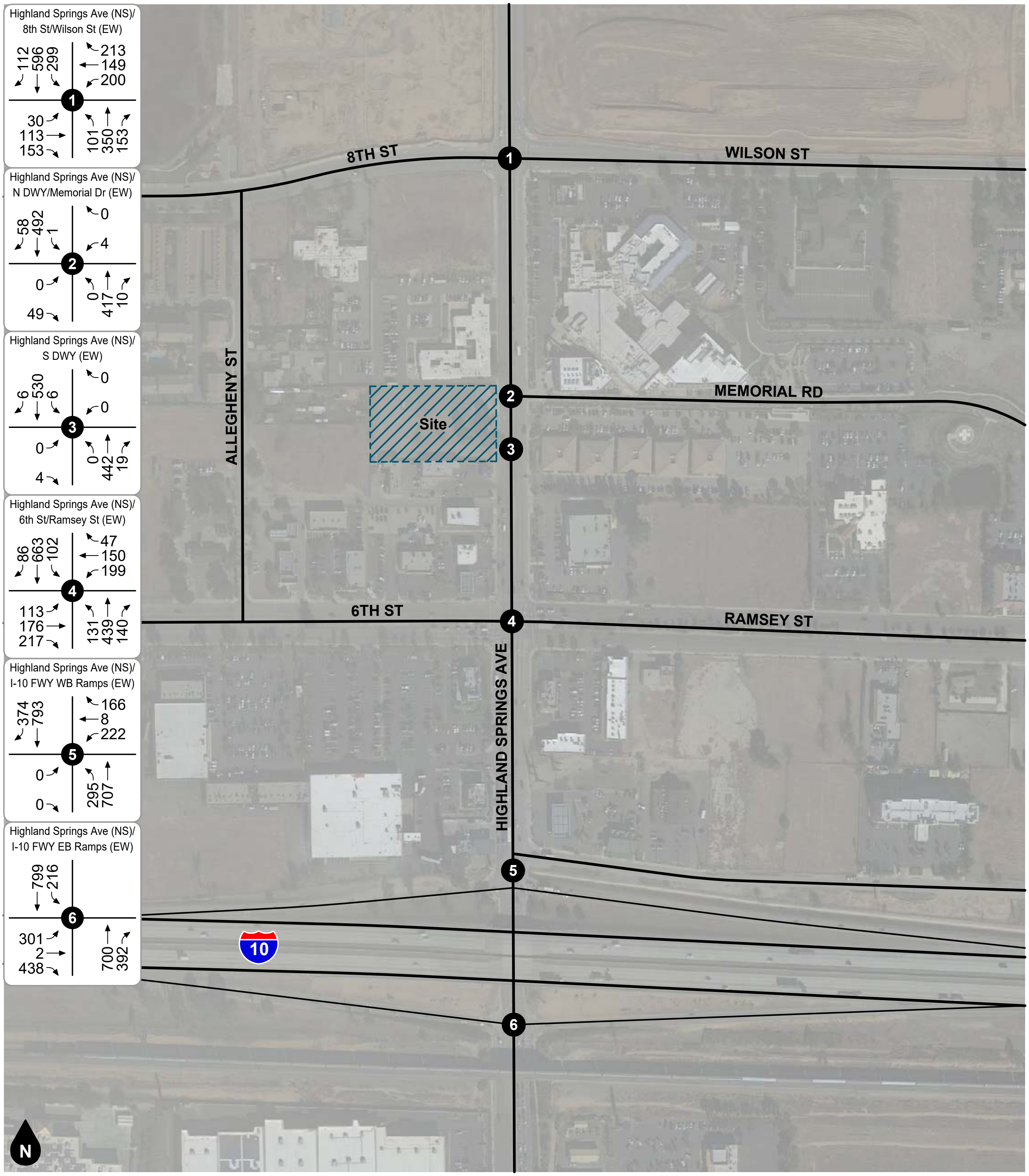
Study Intersection

Figure 22
Other Development
PM Peak Hour Intersection Turning Movement Volumes



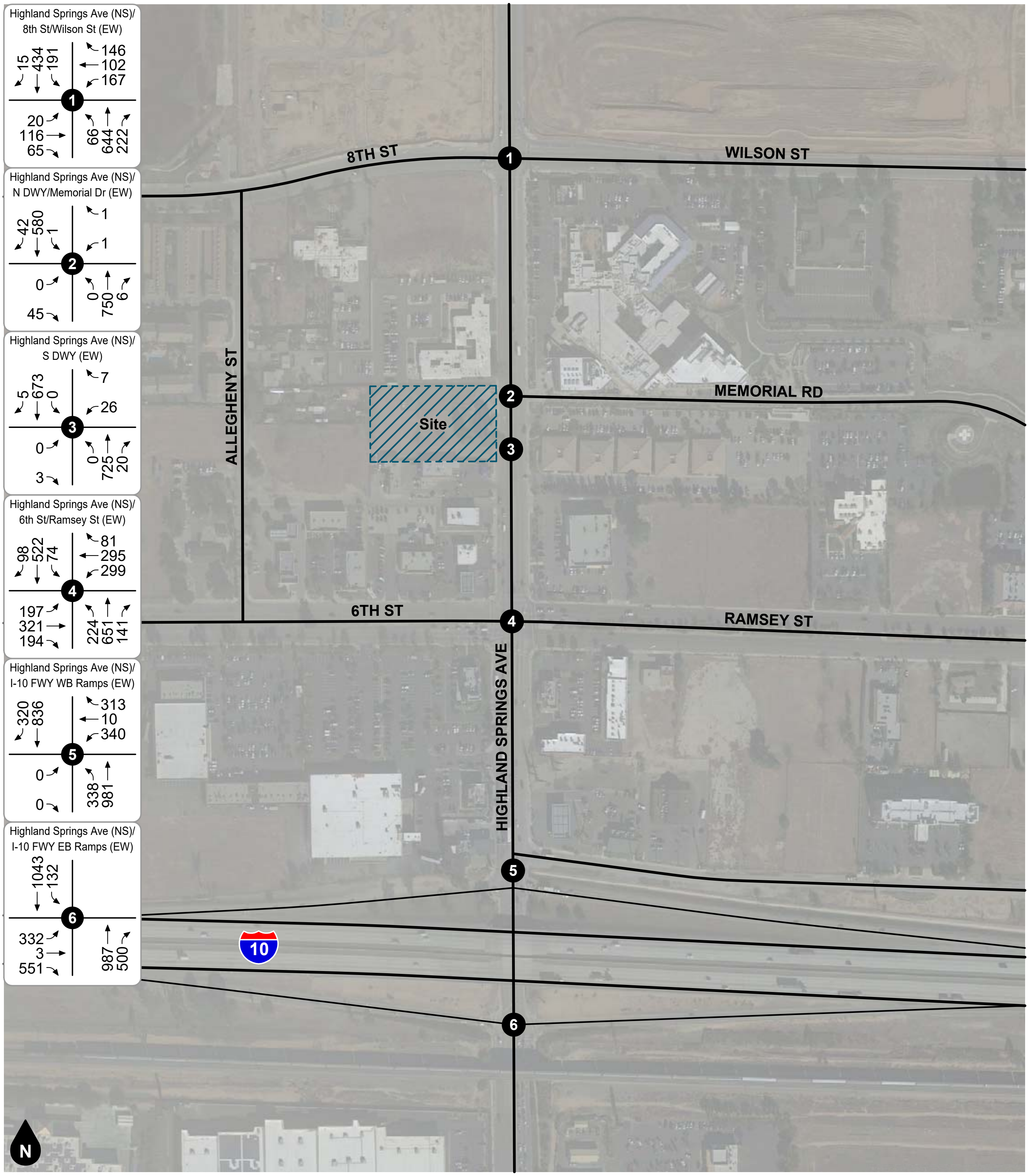
Legend
●## Vehicles Per Day (1,000's)

Figure 23
Existing Plus Project Average Daily Traffic Volumes



Legend
Study Intersection

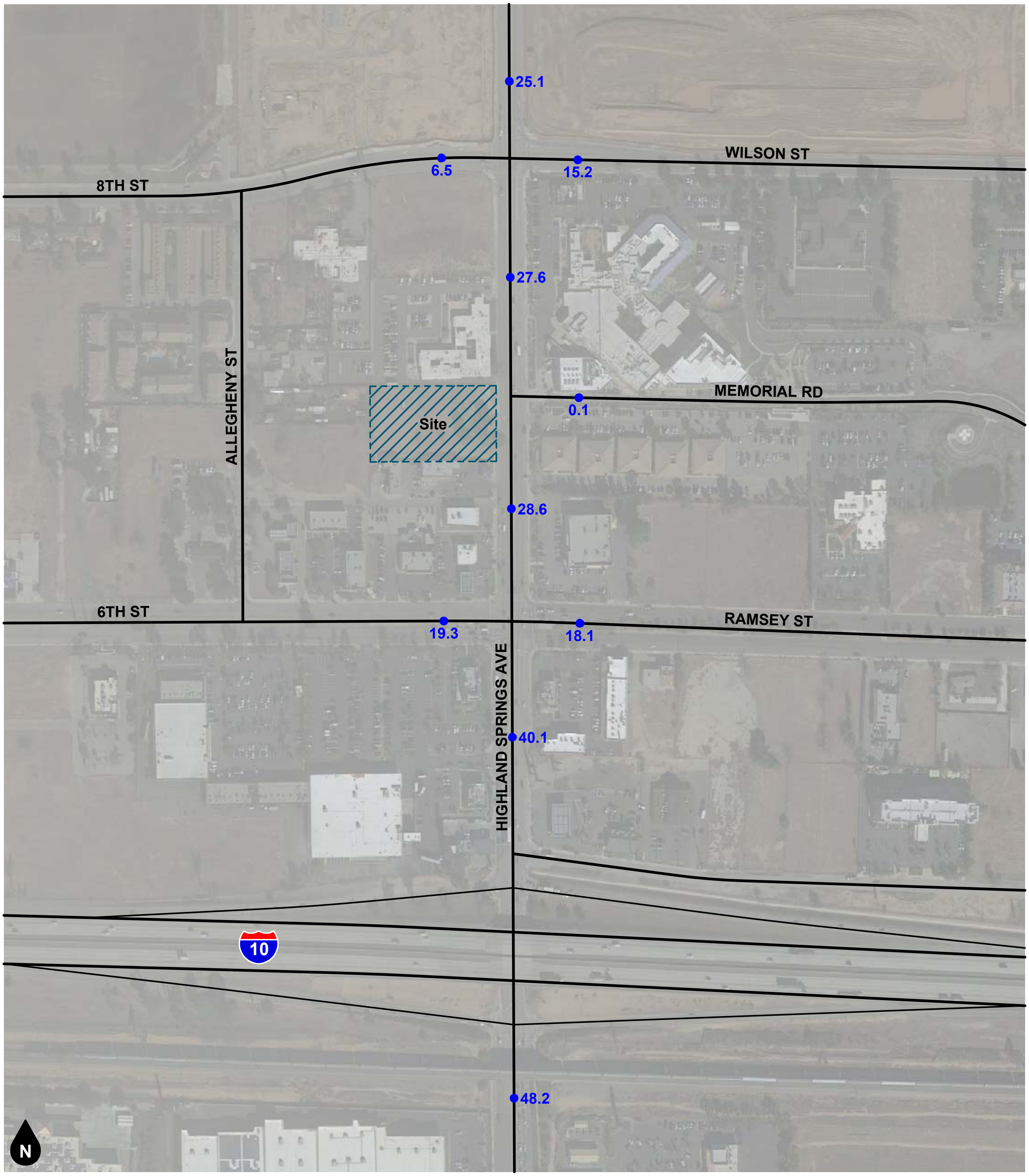
Figure 24
Existing Plus Project
AM Peak Hour Intersection Turning Movement Volumes



Legend

\# Study Intersection

Figure 25
Existing Plus Project
PM Peak Hour Intersection Turning Movement Volumes



Legend
●## Vehicles Per Day (1,000's)

Figure 26
Opening Year (2022) Without Project Average Daily Traffic Volumes

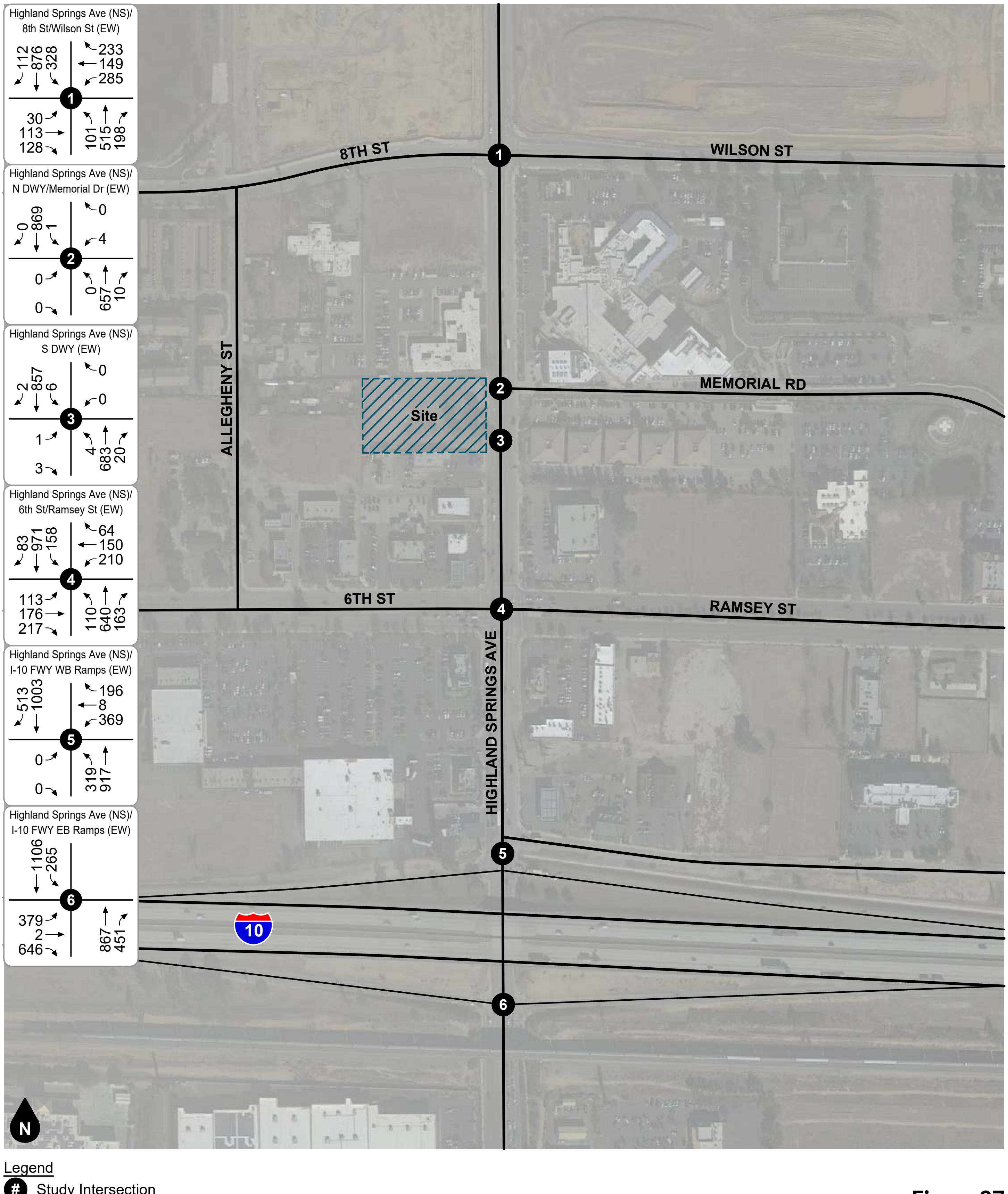


Figure 27
Opening Year (2022) Without Project
AM Peak Hour Intersection Turning Movement Volumes

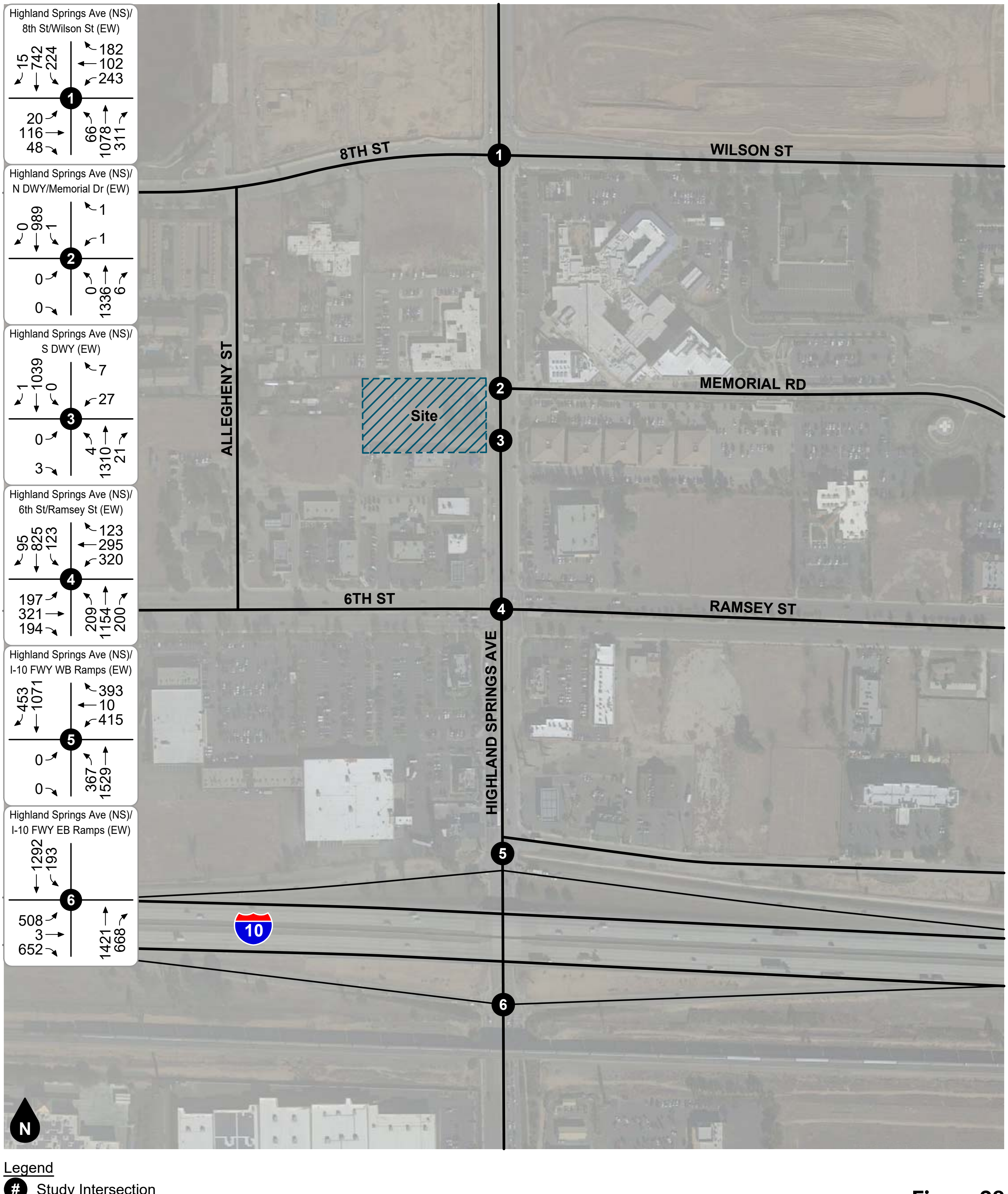
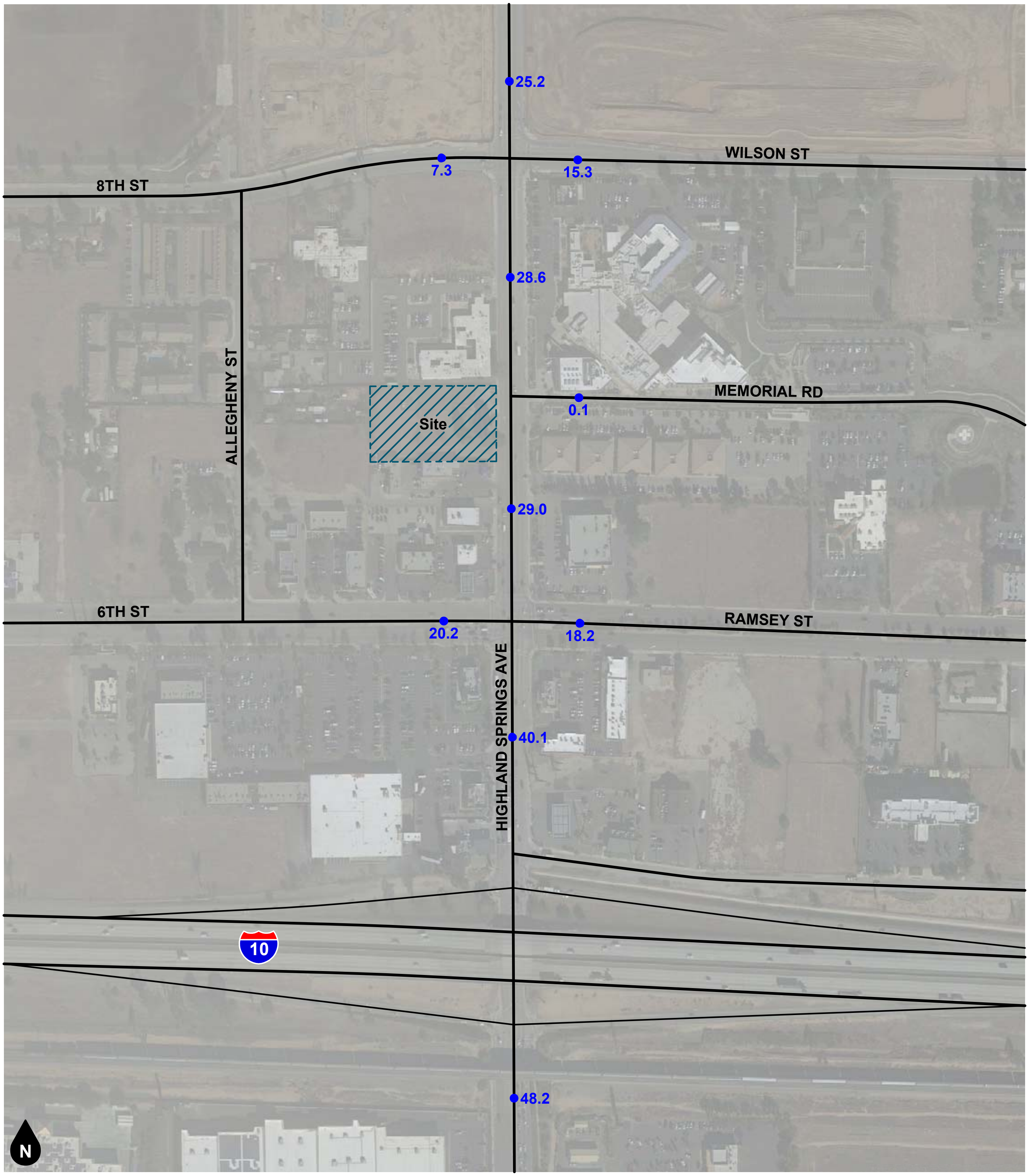
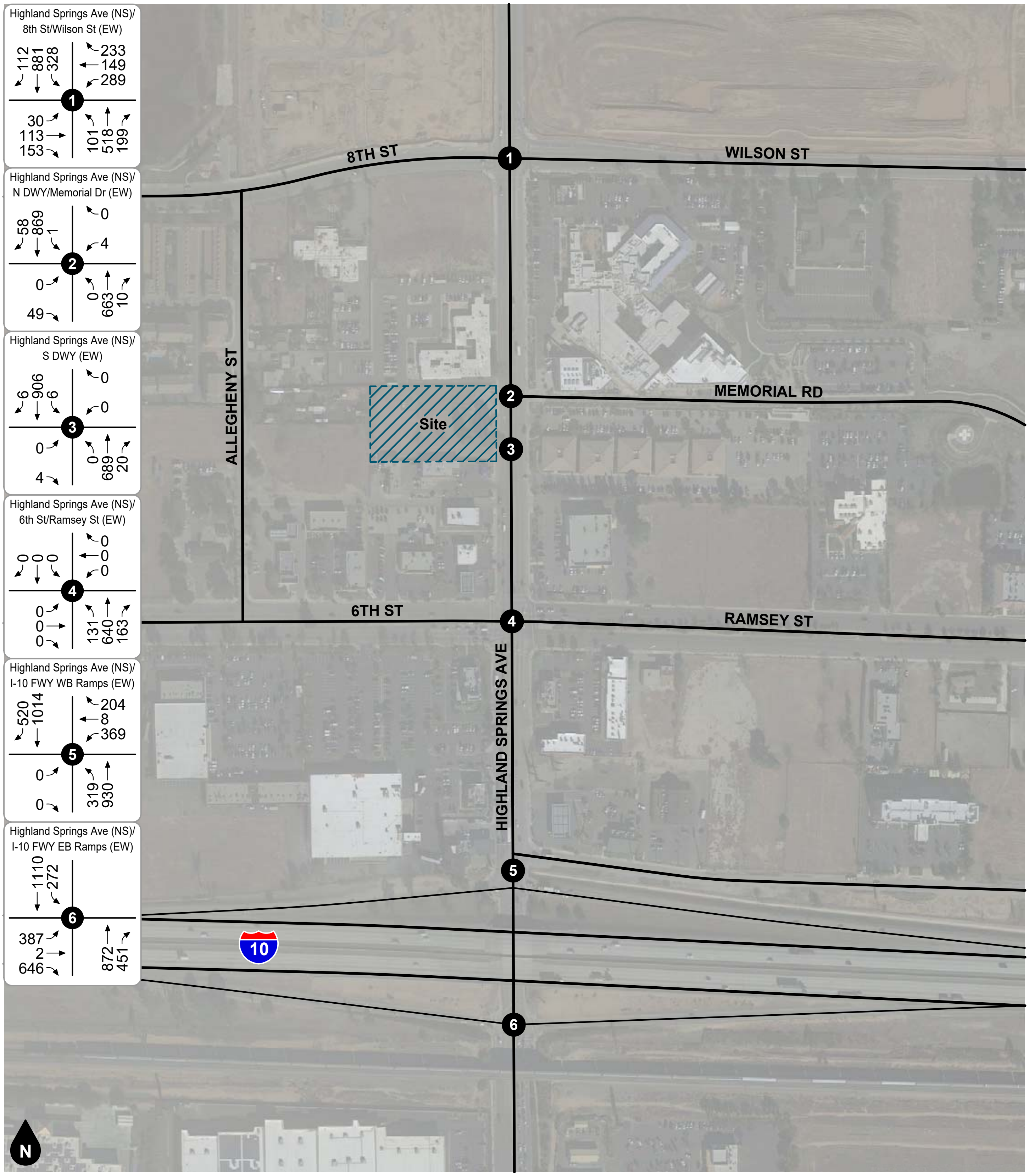


Figure 28
Opening Year (2022) Without Project
PM Peak Hour Intersection Turning Movement Volumes



Legend
●## Vehicles Per Day (1,000's)

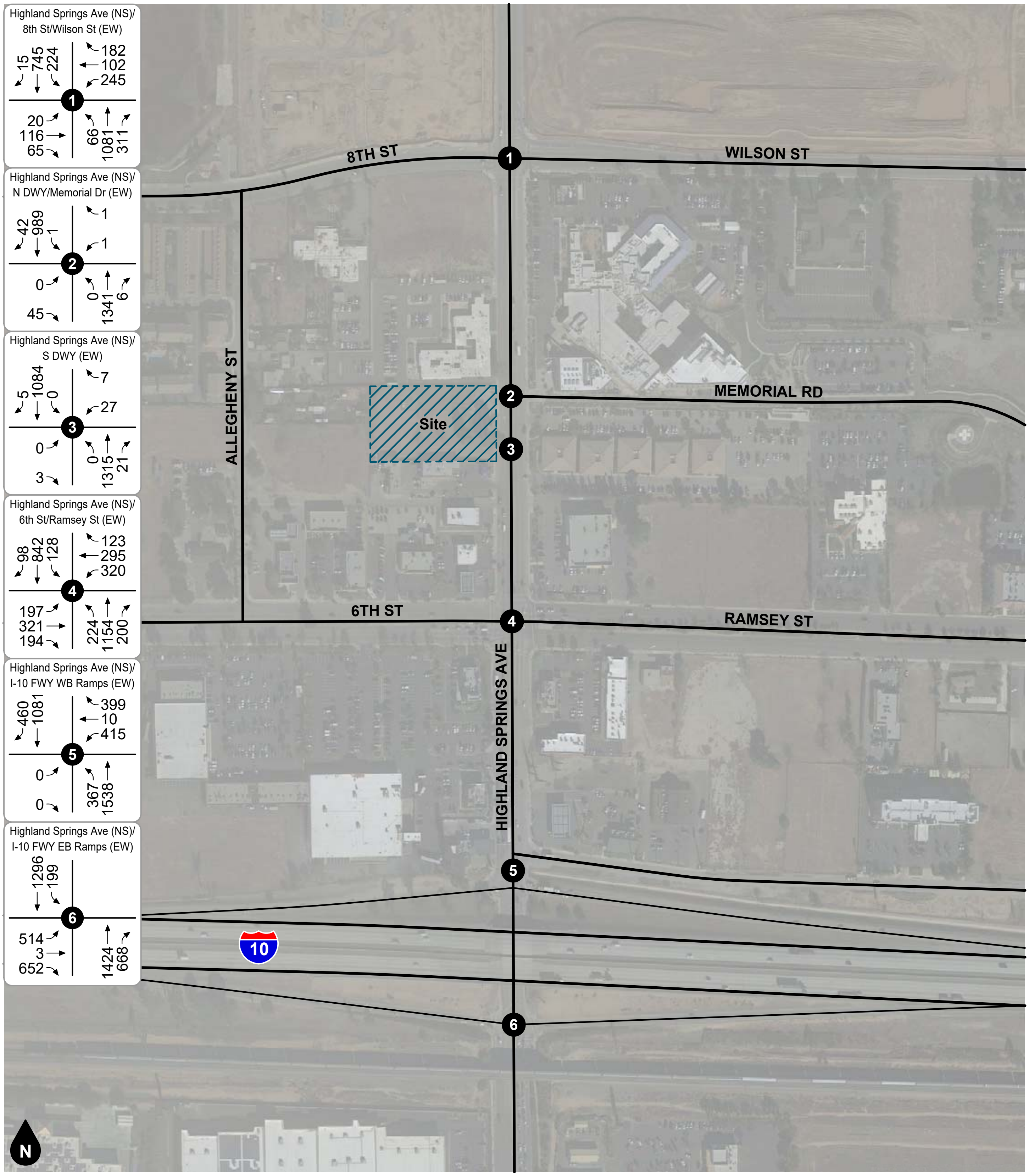
Figure 29
Opening Year (2022) With Project Average Daily Traffic Volumes



Legend

Study Intersection

Figure 30
Opening Year (2022) With Project
AM Peak Hour Intersection Turning Movement Volumes



Legend
Study Intersection

Figure 31
Opening Year (2022) With Project
PM Peak Hour Intersection Turning Movement Volumes

6. FUTURE OPERATIONAL ANALYSIS

Detailed intersection Level of Service calculation worksheets for each of the following analysis scenarios are provided in Appendix E. Project design features, such as improvements necessary to provide project site access to Highland Springs Avenue, are assumed to be constructed by the proposed project and are described in further detail in the Site Access & Circulation section later in this report.

EXISTING PLUS PROJECT

The intersection Levels of Service for Existing Plus Project conditions are shown in Table 4. As shown in Table 4, the study intersections are forecast to operate within acceptable Levels of Service (D or better), during the peak hours for Existing Plus Project conditions.

OPENING YEAR (2022) WITHOUT PROJECT

The intersection Levels of Service for Opening Year (2022) Without Project conditions are shown in Table 5. As shown in Table 5, the study intersections are forecast to operate within acceptable Levels of Service (D or better) during the peak hours for Opening Year (2022) Without Project conditions, except for the following study intersections that are projected to operate at deficient Level of Service E/F without improvements:

- Highland Springs Avenue at Eight Street – #1 (PM peak hour LOS F)
- Highland Springs Avenue at Project South Driveway – #3 (PM peak hour LOS E)

While the Project South Driveway provides connectivity to an auto-priority roadway (Highland Springs Avenue), the driveway itself is a private, non-auto-priority roadway. The northbound and southbound movements along Highland Springs Avenue are uncontrolled and would continue to operate at an acceptable Level of Service A. The eastbound approach at the project site driveway would continue to operate at an acceptable Level of Service B. However, the exiting stop-controlled westbound approach (slightly offset and opposite the site), is forecast to operate at Level of Service E without the project. The Level of Service E at the Project South Driveway relates only to commercial trips exiting the existing westbound driveway. The commercial driveway is not forecast to satisfy the California MUTCD peak hour volume traffic signal warrant; furthermore, the 95th-percentile queue length for the westbound driveway approach is not forecast to exceed two vehicle lengths, which can be stored on-site without negatively impacting on-site circulation. As an optional interim measure, installation of right-turn-only sign for the PM peak hour on the Walgreen's westbound-east leg driveway will provide acceptable Level of Service improvement to LOS C. The City planned Highland Springs Avenue median will provide access restrictions for minor driveways.

The following improvements are recommended for Opening Year (2022) Without Project conditions to maintain acceptable Levels of Service at the study intersections as specified by the City-established operating requirements for General Plan consistency:

- Highland Springs Avenue (NS) at Eighth Street (EW) – #1
  - Restripe northbound lanes to provide a second through lane. This improvement is noted as "By Others" because it is a requirement of another development as noted in the Highland Springs and 8th Retail Traffic Impact Analysis (Urban Crossroads, April 23, 2020).
- Highland Springs Avenue (NS) at Project South Driveway – #3
  - Install right-turn-only sign for the hours of 3:00 to 6:00 PM on the Walgreen's westbound-east leg driveway. This improvement is an optional interim measure, as the City planned Highland Springs Avenue median will provide future access restrictions for minor driveways.

As shown in Table 5, the study intersections are forecast to operate within acceptable Levels of Service (D or better) during the peak hours for Opening Year (2022) Without Project conditions, with improvements.

OPENING YEAR (2022) WITH PROJECT

The intersection Levels of Service for Opening Year (2022) With Project conditions are shown in Table 6. As shown in Table 6, the study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours for Opening Year (2022) With Project conditions, except for the following study intersections that are projected to operate at unacceptable Level of Service without improvements:

- Highland Springs Avenue at Eight Street – #1 (PM peak hour LOS F)
- Highland Springs Avenue at Project South Driveway – #3 (PM peak hour LOS E)

While the Project South Driveway provides connectivity to an auto-priority roadway (Highland Springs Avenue), the driveway itself is a private, non-auto-priority roadway. The northbound and southbound movements along Highland Springs Avenue are uncontrolled and would continue to operate at an acceptable Level of Service A. The eastbound approach at the project site driveway would continue to operate at an acceptable Level of Service C. However, the exiting stop-controlled westbound approach (slightly offset and opposite the site), is forecast to operate at Level of Service E without the project. The Level of Service E at the Project South Driveway relates only to commercial trips exiting the existing westbound driveway. The commercial driveway is not forecast to satisfy the California MUTCD peak hour volume traffic signal warrant; furthermore, the 95th-percentile queue length for the northbound driveway approach is not forecast to exceed two vehicle lengths, which can be stored on-site without negatively impacting on-site circulation. As an optional interim measure, installation of right-turn-only sign for the PM peak hour on the Walgreen's westbound-east leg driveway will provide acceptable Level of Service improvement to LOS C. The City planned Highland Springs Avenue median will provide access restrictions for minor driveways.

In addition, as shown in Table 6, the project impact at the study intersections is forecast to increase delay by less than 5.0 seconds; therefore, the project does not exceed the City-established operational threshold that would require improvements related to the project for Opening Year (2022) With Project conditions.

The identified improvements under Opening Year (2022) Without Project conditions would also maintain acceptable Levels of Service at the study intersections for Opening Year (2022) With Project conditions. Since the improvements are required for the Without Project condition, the project impact is considered to be indirect/cumulative. Therefore, the project shall contribute its fair share of the cost to construct the necessary improvements through payment of applicable development impact fees.

Table 4
Existing Plus Project Level of Service Operations Assessment

ID	Study Intersection	Existing				Existing Plus Project				AM Peak Hour		PM Peak Hour	
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour					
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Project Delay[3]	Exceed Operational Threshold[4]	Project Delay	Exceed Operational Threshold
1.	Highland Springs Avenue at Eight Street	23.6	C	23.2	C	24.9	C	23.6	C	+1.3	NO	+0.4	NO
2.	Highland Springs Avenue at Memorial Drive / North Project Driveway	12.6	B	13.8	B	12.9	B	13.9	B	+0.3	NO	+0.1	NO
3.	Highland Springs Avenue at South Project Driveway	11.3	B	16.3	C	11.3	B	16.3	C	+0.0	NO	+0.0	NO
4.	Highland Springs Avenue at Sixth Street	20.2	C	24.5	C	20.7	C	25.3	C	+0.5	NO	+0.8	NO
5.	Highland Springs Avenue at I-10 Westbound Ramps	19.4	B	22.9	C	19.5	B	23.1	C	+0.1	NO	+0.2	NO
6.	Highland Springs Avenue at I-10 Eastbound Ramps	17.6	B	22.0	C	17.9	B	22.4	C	+0.3	NO	+0.4	NO

Notes:

(1) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(2) LOS = Level of Service

(3) The change in delay in seconds related to the project.

(4) The operational threshold is exceeded when the project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at a Level of Service E or F.

Table 5
Opening Year (2022) Without Project Intersection Levels of Service

ID	Study Intersection	Traffic Control[1]	AM Peak Hour		PM Peak Hour	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]
1.	Highland Springs Avenue at Eight Street	TS	38.6	D	74.0	E
	With Improvements	TS	26.9	C	24.9	C
2.	Highland Springs Avenue at Memorial Drive / North Pro	CSS[4]	16.7	C	23.9	C
3.	Highland Springs Avenue at South Project Driveway	CSS[4]	13.9	B	35.3	E[5]
	With improvements[6]	CSS	11.9	B	15.6	C
4.	Highland Springs Avenue at Sixth Street	TS	24.4	C	37.7	D
5.	Highland Springs Avenue at I-10 Westbound Ramps	TS	42.1	D	37.3	D
6.	Highland Springs Avenue at I-10 Eastbound Ramps	TS	46.2	D	48.3	D

Notes:

(1) TS = Traffic Signal; CSS = Cross Street Stop.

(2) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(3) LOS = Level of Service

(4) Delay in seconds per vehicle for cross street stop control is shown for the average delay of the worst side street shared lane movement.

(5) The project driveway is not forecast to satisfy the Caltrans peak hour traffic signal warrant. The major roadway is uncontrolled and forecast to operate at LOS A. The project right-turn exit driveway is forecast to operate at Level of Service B. The Westbound driveway opposite the project site is forecast to exceed Level of Service D.

(6) Providing left turn restriction for the PM peak hours of 3:00 to 6:00 PM on the Westbound-East leg driveway improves LOS to within acceptable limits.

Table 6
Opening Year (2022) With Project Level of Service Operations Assessment

ID	Study Intersection	Opening Year (2022) Without Project				Opening Year (2022) With Project				AM Peak Hour		PM Peak Hour	
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour					
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Project Delay[3]	Exceed Operational Threshold[4]	Project Delay	Exceed Operational Threshold
1.	Highland Springs Avenue at Eight Street	38.6	D	74.0	E	42.8	D	77.0	E	+4.2	NO	+3.0	NO
	With Improvements	26.9	C	24.9	C	28.6	C	25.4	C	+1.7	NO	+0.5	NO
2.	Highland Springs Avenue at Memorial Drive / North Project Driveway	16.7	C	23.9	C	17.3	C	24.2	C	+0.6	NO	+0.3	NO
3.	Highland Springs Avenue at South Project Driveway	13.9	B	35.3	E	13.9	B	35.1	E	+0.0	NO	-0.2	NO[5]
	With improvements[6]	11.9	B	15.6	C	12.1	B	15.6	C	+0.2	NO	+0.0	NO
4.	Highland Springs Avenue at Sixth Street	24.4	C	37.7	D	25.3	C	38.4	D	+0.9	NO	+0.7	NO
5.	Highland Springs Avenue at I-10 Westbound Ramps	42.1	D	37.3	D	42.2	D	38.3	D	+0.1	NO	+1.0	NO
6.	Highland Springs Avenue at I-10 Eastbound Ramps	46.2	D	48.3	D	47.7	D	50.1	D	+1.5	NO	+1.8	NO

Notes:

(1) Delay is shown in seconds per vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(2) LOS = Level of Service

(3) The change in delay in seconds related to the project.

(4) The operational threshold is exceeded when the project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at a Level of Service E or F.

(5) The project driveway is not forecast to satisfy the Caltrans peak hour traffic signal warrant. The major roadway is uncontrolled and forecast to operate at LOS A. The project right-turn exit driveway is forecast to operate at Level of Service B. The Westbound driveway opposite the project site is forecast to exceed Level of Service D.

(6) Providing left turn restriction for the PM peak hours of 3:00 to 6:00 PM on the Westbound-East leg driveway improves LOS to within acceptable limits.

7. SITE ACCESS AND CIRCULATION

This section includes a description of project improvements necessary to provide site access and an evaluation of site access and circulation. The project proposes one restricted right turn in-out access driveway at Highland Springs Avenue and will share the existing access to Highland Springs Avenue currently being used by the carwash. The Project also proposed reciprocal access with the southerly adjacent property.

PROJECT IMPROVEMENTS & STANDARD CONDITIONS

This analysis assumes the following improvements will be constructed by the project to provide project site access:

Highland Springs Avenue at Project North Driveway - #2

- Install eastbound stop control.
- Construct the eastbound approach to consist of one right turn only lane.

Highland Springs Avenue (NS) at Project South Driveway (EW) - #3

- Maintain existing eastbound stop control currently utilized by the auto related businesses south of the proposed site.
- Modify the eastbound approach to consist of one right turn only lane.

Construct two-way circulation driveways between the proposed site and the adjacent project to the south of the site. Improvements at the project driveways are project design features which shall be constructed by the project. Site-adjacent improvements shall be constructed in conjunction with the project.

This analysis also assumes the project shall comply with the following conditions as part of the City of Beaumont standard development review process:

- A construction work site traffic control plan shall comply with State standards set forth in the California Manual of Uniform Traffic Control Devices and shall be submitted to the City of Beaumont for review and approval prior to the issuance of a grading permit or start of construction. The plan shall identify any roadway, sidewalk, bike route, or bus stop closures and detours as well as haul routes and hours of operation. All construction related trips shall be restricted to off-peak hours to the extent possible.

- All on-site and off-site roadway design, traffic signing and striping, and traffic control improvements relating to the proposed project shall be constructed in accordance with applicable State/Federal engineering standards and to the satisfaction of the City of Beaumont.

- Site-adjacent roadways shall be constructed or repaired at their ultimate half-section width, including landscaping and parkway improvements in conjunction with development, or as otherwise required by the City of Beaumont.

- Adequate off-street parking shall be provided to the satisfaction of City of Beaumont.

- Adequate emergency vehicle access shall be provided to the satisfaction of the Riverside County Fire Authority.

- The final grading, landscaping, and street improvement plans shall demonstrate that sight distance requirements are met in accordance with applicable City of Beaumont Department of Public Works sight distance standards.

SITE ACCESS QUEUEING

Table 7 summarizes the results of a queue analysis for left turn, right turn, or shared through/turn lanes at project driveways based on the forecast 95th-percentile queue lengths shown in the delay calculation worksheets (see Appendix E).

Based on the queuing analysis shown in Table 7, the proposed storage lengths for the project driveways are forecast to provide adequate queueing capacity with the addition of new project trips.

TRAFFIC SIGNAL WARRANT ANALYSIS

The potential need for installation of a traffic signal at the project driveways was evaluated based on the California Manual on Uniform Traffic Control Devices ("California MUTCD"), Section 4C.04, peak hour volume graphs (Warrant 3). The project driveways are not forecast to satisfy the California MUTCD peak hour volume warrant. Traffic signal warrant worksheets are provided in Appendix F.

Table 7
Queueing Analysis Summary

ID	Intersection	Approach	Lane	Storage Length (Feet)[1]	Peak Hour 95th-Percentile Queue Length (Feet)[2] Opening Year (2022) With Project AM	PM	Adequate Storage Provided 2022
2.	Highland Springs Avenue at Memorial Drive / North Project Driveway	Southbound	Thru-Right	24	<5	<5	YES
		Eastbound	Right	40	15	10	YES
3.	Highland Springs Avenue at South Project Driveway	Southbound	Thru-Right	195	<5	<5	YES
		Eastbound	Right	30	<5	<5	YES

Notes:

(1) Distance to the adjacent driveway (existing or proposed future development).

(2) For a more conservative analysis, the forecast 95th-percentile queue lengths shown in the delay calculation worksheets have been rounded up to nearest 5-foot increment.

8. VEHICLES MILES TRAVELED (VMT)

This section describes the project Vehicle Miles Traveled (VMT) impact for CEQA compliance. The VMT assessment has been prepared in accordance with methodology outlined in the WRCOG TIA Guidelines as adopted for use in the City of Beaumont by resolution of the City Council.

BACKGROUND

California Senate Bill 743 (SB 743) directs the State Office of Planning and Research (OPR) to amend the California Environmental Quality Act (CEQA) Guidelines for evaluating transportation impacts to provide alternatives to Level of Service that "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." In December 2018, the California Natural Resources Agency certified and adopted the updated CEQA Guidelines package. The amended CEQA Guidelines, specifically Section 15064.3, recommend the use of Vehicle Miles Traveled (VMT) as the primary metric for the evaluation of transportation impacts associated with land use and transportation projects. In general terms, VMT quantifies the amount and distance of automobile travel attributable to a project or region. All agencies and projects State-wide are required to utilize the updated CEQA guidelines recommending use of VMT for evaluating transportation impacts as of July 1, 2020.

The updated CEQA Guidelines allow for lead agency discretion in establishing methodologies and thresholds provided there is substantial evidence to demonstrate that the established procedures promote the intended goals of the legislation. Where quantitative models or methods are unavailable, Section 15064.3 allows agencies to assess VMT qualitatively using factors such as availability of transit and proximity to other destinations. The Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA (State of California, December 2018) ["OPR Technical Advisory"] provides technical considerations regarding methodologies and thresholds with a focus on office, residential, and retail developments as these projects tend to have the greatest influence on VMT.

SCREENING CRITERIA

The City of Beaumont adopted VMT guidelines on June 16, 2020 via the Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (March 2020) developed for Western Riverside Council of Governments (WRCOG) agencies ["WRCOG TIA Guidelines"]; therefore, the project-related VMT impact has been assessed based on guidance from this document.

The WRCOG TIA Guidelines, as adopted by the City of Beaumont, include guidance for certain types of projects/activities that generally will not require a VMT analysis. A presumption of less than significant VMT impact for the following activities is based on substantial evidence provided in the OPR Technical Advisory, or is related to projects that are local serving, thus reducing the number of trips/trip lengths and VMT:

- Projects located in a Transit Priority Areas (TPA)
- Projects located in a low-VMT generating area
- Local serving retail less than 50,000 square feet
- Local-serving K-12 schools
- Local parks
- Day care centers
- Local-serving gas stations
- Local-serving banks
- Local-serving hotels (e.g. non-destination hotels)
- Student housing projects

- Local serving community colleges that are consistent with the assumptions noted in the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)
- Projects generating less than 110 daily vehicle trips:
  - 11 single family housing units
  - 16 multi-family, condominiums, or townhouse housing units
  - 10,000 square feet of office
  - 15,000 square feet of light industrial
  - 63,000 square feet of warehousing
  - 79,000 square feet of high-cube transload and short-term storage warehouse

PROJECT TYPE SCREENING

The WRCOG TIA Guidelines include screening criteria for certain types of projects that are local serving in nature or generate a low number of vehicle trips and may be presumed to have a less than significant impact.

Among the project type screening land uses are local serving retail projects with less than 50,000 square feet. Local serving retail projects will generally redistribute shopping trips rather than creating new trips. By adding retail opportunities into the urban fabric and thereby improving proximity, local serving retail projects tend to shorten trips and reduce VMT. Similarly, the proposed restaurant would add dining opportunities into the community, thereby improving proximity and reducing VMT. Since the proposed project involves construction of 2,480 square foot local-serving restaurant, which is significantly less than the 50,000 square feet screening criteria, the retail component of project-related VMT impact is presumed to be less than significant.

Consistent with State guidance, the WRCOG TIA Guidelines include screening criteria for projects that generate less than 110 daily trips based on the Categorical Exemption under CEQA for additions to existing buildings of 10,000 square feet or less. The 110 daily trip threshold is generally derived from the number of trips generated by 10,000 square feet of office land uses. Since the proposed office component generates less than 110 daily trips, the office component of project-related VMT impact is presumed to be less than significant.

Combined, the proposed restaurant and office uses total 8,880 square feet, which also satisfies the Categorical Exemption for additions to buildings less than 10,000 square feet.

VMT FINDINGS

The proposed project involves construction of a local-serving retail and office space below the project type screening square footage thresholds. Therefore, the project VMT impact may be presumed less than significant based on the WRCOG TIA Guidelines, as adopted by the City of Beaumont, and criteria for Categorical Exemption under CEQA.

9. CONCLUSIONS

This section summarizes the findings, operational improvements (if any), and recommendations identified and described in previous sections of this study.

PROJECT TRIP GENERATION

The proposed project is forecast to generate a total of approximately 1,140 daily vehicle trips, including 58 trips during the AM peak hour and 47 trips during the PM peak hour.

LEVELS OF SERVICE ANALYSIS

The study intersections are forecast to operate within acceptable Levels of Service (D or better), during the peak hours for Existing Plus Project conditions; therefore, no improvements are required.

The study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours for Opening Year (2022) Without Project conditions, except for the following study intersections that are projected to operate at unacceptable Level of Service for without improvements:

- Highland Springs Avenue at Eight Street – #1 (PM peak hour LOS F)
- Highland Springs Avenue at Project South Driveway – #3 (PM peak hour LOS E)

The study intersections are projected to operate within acceptable Levels of Service (D or better) during the peak hours for Opening Year (2022) With Project conditions, except for the study intersections as noted above for the Without Project condition.

The project impact at the study intersections is forecast to increase delay by less than 5.0 seconds; therefore, the project does <u>not</u> exceed the City-established operational threshold that would require improvements related to the project for Opening Year (2022) With Project conditions.

OPERATIONAL IMPROVEMENTS

The following improvements are recommended for Opening Year (2022) Without Project conditions to maintain acceptable Levels of Service at the study intersections as specified by the City-established operating requirements for General Plan consistency:

- Highland Springs Avenue (NS) at Eighth Street (EW) – #1
  - Restripe northbound lanes to provide a second through lane. This improvement is noted as "By Others" because it is a requirement of another development as noted in the <u>Highland Springs and 8th Retail Traffic Impact Analysis</u> (Urban Crossroads, April 23, 2020).
- Highland Springs Avenue (NS) at Project South Driveway – #3
  - Install right-turn-only sign for the hours of 3:00 to 6:00 PM on the Walgreen's westbound-east leg driveway. This improvement is an optional interim measure, as the City planned Highland Springs Avenue median will provide future access restrictions for minor driveways.

The identified improvements under Opening Year (2022) Without Project conditions would also maintain acceptable Levels of Service at the study intersections for Opening Year (2022) With Project conditions. Since the improvements are required for the Without Project condition, the project impact is considered to be indirect/cumulative. Therefore, the project shall contribute its fair share of the cost to construct the necessary improvements through payment of applicable development impact fees.

SITE ACCESS IMPROVEMENTS

This analysis assumes the following improvements will be constructed by the project to provide project site access:

Highland Springs Avenue at Project North Driveway - #2

- Install eastbound stop control.
- Construct the eastbound approach to consist of one right turn only lane.

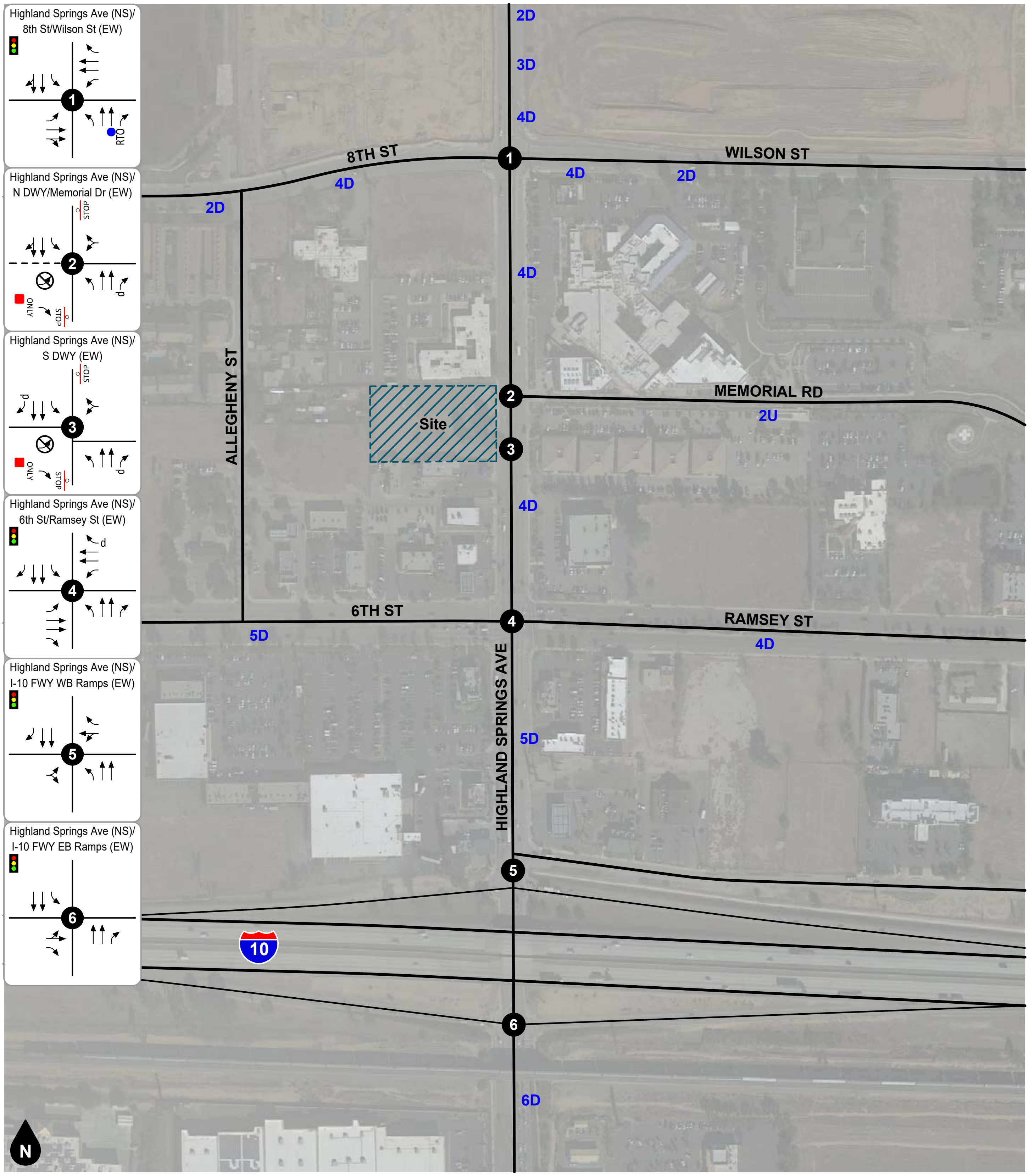
Highland Springs Avenue (NS) at Project South Driveway (EW) - #3

- Maintain existing eastbound stop control currently utilized by the auto related businesses south of the proposed site.
- Modify the eastbound approach to consist of one right turn only lane.

Construct two-way circulation driveways between the proposed site and the adjacent project to the south of the site. Improvements at the project driveways are project design features which shall be constructed by the project. Site-adjacent improvements shall be constructed in conjunction with the project. Figure 32 graphically illustrates the identified improvements.

VEHICLE MILES TRAVELED ANALYSIS

The proposed project involves construction of a local-serving retail and office space below the project type screening square footage thresholds. Therefore, the project VMT impact may be presumed less than significant based on the WRCOG TIA Guidelines, as adopted by the City of Beaumont, and criteria for Categorical Exemption under CEQA.



Legend

Traffic Signal	Project Improvement
STOP Stop Sign	By Others
#D #-Lane Divided Roadway	RTO Right Turn Overlap
#U #-Lane Undivided Roadway	d De Facto Right Turn Lane
Existing Lane	--- Project Driveway

Figure 32
Opening Year (2022)
Lane Geometrics and Intersection Traffic Controls

APPENDICES

APPENDIX A

GLOSSARY

GLOSSARY OF TERMS

ACRONYMS

AC	Acres
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
DU	Dwelling Unit
ICU	Intersection Capacity Utilization
LOS	Level of Service
TSF	Thousand Square Feet
V/C	Volume/Capacity
VMT	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The average 24-hour volume for a stated period divided by the number of days in that period. For example, Annual Average Daily Traffic is the total volume during a year divided by 365 days.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A point of constriction along a roadway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CONTROL DELAY: The component of delay, typically expressed in seconds per vehicle, resulting from the type of traffic control at an intersection. Control delay is measured by comparison with the uncontrolled condition; it includes delay incurred by slowing down, stopping/waiting, and speeding up.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CORNER SIGHT DISTANCE: The minimum sight distance required by the driver of a vehicle to cross or enter the lanes of the major roadway without requiring approaching traffic travelling at a given speed to radically alter their speed or trajectory. Corner sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 36 inches above the pavement in the center of the nearest approach lane.

CYCLE LENGTH: The time period in seconds required for a traffic signal to complete one full cycle of indications.

CUL-DE-SAC: A local street open at one end only and with special provisions for turning around.

DAILY CAPACITY: A theoretical value representing the daily traffic volume that will typically result in a peak hour volume equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

PASSENGER CAR EQUIVALENT (PCE): A metric used to assess the impact of larger vehicles, such as trucks, recreational vehicles, and buses, by converting the traffic volume of larger vehicles to an equivalent number of passenger cars.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

QUEUE: The number of vehicles waiting at a service area such as a traffic signal, stop sign, or access gate.

QUEUE LENGTH: The length of vehicle queue, typically expressed in feet, waiting at a service area such as a traffic signal, stop sign, or access gate.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SHARED/RECIPROCAL PARKING AGREEMENT: A written binding document executed between property owners to provide a designated number of off-street parking stalls within a designated area to be available for specified businesses or land uses.

SIGHT DISTANCE: The continuous length of roadway visible to a driver or roadway user.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STACKING DISTANCE: The length of area available behind a service area, such as a traffic signal or gate, for vehicle queueing to occur.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through an intersection.

STOPPING SIGHT DISTANCE: The minimum distance required by the driver of a vehicle on the major roadway travelling at a given speed to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 6 inches above the pavement.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination (i.e., each trip has two trip-ends). A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

TURNING RADIUS: The circular arc formed by the smallest turning path radius of the front outside tire of a vehicle, such as that performed by a U-turn maneuver. This is based on the length and width of the wheel base as well as the steering mechanism of the vehicle.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

SCOPING AGREEMENT

Oct. 27, 2020

Ms. Perrie Llercil, PE
Senior Engineer
Ganddini Group
550 Parkcenter Drive, Suite 202
Santa Ana, CA 92705

Subject: TO#59 – PW2020-0562 1st Review of TIA Scoping Agreement for 655 Highland Springs Avenue Office-Commercial Project, Beaumont, CA

Dear Ms. Llercil,

We have completed our 1st review of **TO#59 – PW2020-0562 1st Review of TIA Scoping Agreement for 655 Highland Springs Avenue Office-Commercial Project, Beaumont, CA dated October 5, 2020.**

With regard to the Scoping Agreement, we have the following comments:

1. The Beaumont City Council has ratified SB743 VMT Thresholds for CEQA Compliance Related to Transportation Analysis on June 16, 2020. The aforementioned document shall be used for the VMT analysis for this project.
2. For the next submittal and the TIA report, please replace the Site Plan, Figure 2 with a clear plan for access, roadway and parking with corresponding dimension and distances from the nearest driveways, intersections & etc.

Should you have any questions, I can be contacted conveniently via e-mail at minagarf@minagrinc.com.

Thank you.

Sincerely,

MINAGAR & ASSOCIATES, INC.
(A California Corporation)

Fred Minagar, MS, RCE, PE, FITE
President/Contract City Traffic Engineer

MEMORANDUM OF UNDERSTANDING

TO: Suzanne Foxworth | CITY OF BEAUMONT

FROM: Perrie Ilercil, Giancarlo Ganddini | GANDDINI GROUP, INC.

DATE: October 5, 2020

SUBJECT: 655 Highland Springs Avenue Office-Commercial Project Traffic Study Scope
Project No. 19300

INTRODUCTION

The purpose of this scoping document is to outline the proposed traffic analysis parameters and assumptions for review/concurrence by City of Beaumont staff.

PROJECT DESCRIPTION

Figure 1 shows the project location map. The approximately 2.3-acre project site is located on the west side of Highland Springs Avenue between 8th Street and 6th Street, addressed at 655 Highland Springs Avenue, in the City of Beaumont, California.

The site plan is illustrated on Figure 2. The currently vacant portion of the site is proposed to be developed with an approximately 2,480 square foot fast-food restaurant with drive through window and 6,400 square foot office building. The currently occupied portion of the site is proposed to be remodeled with an additional 429 square feet, removal of an existing perimeter wall, relocation of existing curb, relocation of an existing trash enclosure, and addition of a new driveway. No renovation of the existing auto service building is proposed.

Direct vehicular access is proposed via two full access driveways at Highland Springs Avenue.

PROJECT TRIP GENERATION & DISTRIBUTION

Table 1 shows the project trip generation based upon rates obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017) and pass-by rates from the ITE Trip Generation Handbook (3rd Edition, 2017). Based on review of the proposed Project land uses and ITE land use descriptions, trip generation rates for fast-food restaurant with drive through (ITE Land Use Code 934), and general office building (ITE Land Use Code 710), were selected for the analysis. Pass-by rates for fast-food restaurant with drive through were applied in accordance with the ITE Trip Generation Handbook.

As shown in Table 1, the proposed Project is forecast to generate approximately 1,140 daily trips, including 58 trips during the AM peak hour and 47 trips during the PM peak hour.

Figure 3 illustrates the forecast directional distribution patterns of project-generated trips.

STUDY AREA

Based on the Riverside County Transportation Department Traffic Impact Analysis Preparation Guide (2008) guidelines, intersections identified for analysis typically include signalized intersections at which a project is forecast to contribute 50 or more trips during the AM or PM peak hours. The study area is proposed to consist of the following five (5) study intersections, even if the project may not contribute 50 or more trips during either the AM or PM peak hours, but are the adjacent or primary intersections impacted by the proposed project. The intersections are also consistent with the Highland Springs and 8th Retail Traffic Impact Study, prepared by Urban Crossroads (April 23, 2020).

Study Intersections

1. Highland Springs Avenue (NS) at 8th Street/Wilson Street (EW)
2. Highland Springs Avenue (NS) at North Project Driveway/Memorial Drive (EW)
3. Highland Springs Avenue (NS) at South Project Driveway (EW)
4. Highland Springs Avenue (NS) at 6th Street/Ramsey Street (EW)
5. Highland Springs Avenue (NS) at I-10 Westbound Ramps (EW)
6. Highland Springs Avenue (NS) at I-10 Eastbound Ramps (EW)

TRAFFIC COUNTS

Intersection turning movement counts will be used at the study intersections during the AM peak period (7:00 AM – 9:00 AM) and PM peak period (4:00 PM – 6:00 PM) on a typical weekday (Tuesday, Wednesday, or Thursday). The Highland Springs and 8th Retail Traffic Impact Study, prepared by Urban Crossroads (April 23, 2020) provides traffic counts from December 2019 for four intersections.

Due to the effect of the COVID-19 pandemic on current traffic patterns, adjustment factors will be derived from the Caltrans Performance Measurement System (PeMS) database for I-10 mainline in the project vicinity by comparing peak hour freeway flows on the count date to January 2020 freeway flows. The calculated adjustment factors will be applied to the respective intersection counts to reflect typical pre-pandemic conditions for existing year 2020.

ANALYSIS SCENARIOS

The traffic study shall evaluate the following analysis scenarios for weekday AM and PM peak hour conditions:

- Existing
- Existing Plus Project
- Opening Year (2022[1]) Without Project
- Opening Year (2022) With Project

ANALYSIS METHODOLOGY

The study intersection Level of Service shall be calculated based on the intersection delay methodology in accordance with the Highway Capacity Manual (Transportation Research Board, 6th Edition), default saturation flow rates, and measured peak hour factors. Intersection Level of Service shall be calculated using the Vistro software.

[1] The proposed project has an estimated opening year of 2021; however, this report will use 2022 for analysis to incorporate a more conservative permitting and construction time frame.

PERFORMANCE STANDARDS

The City of Beaumont has established Level of Service D as the target Level of Service standard and Level of E as a threshold standard.

As stated in the Guide for the Preparation of Traffic Impact Studies (State of California, 2002), "California Department of Transportation endeavors to maintain a target LOS [Level of Service] at the transition between LOS "C" and LOS "D" on State highway facilities". The California Department of Transportation acknowledges this may not always be feasible and recommends consultation with the California Department of Transportation to determine the appropriate target Level of Service. For consistency with local requirements, this analysis defines Level of Service D as the minimum acceptable Level of Service for State Highway facilities.

Based on the established performance standards, the project shall provide or contribute to improvements if:

- The addition of project-generated trips is forecast to cause the performance of a study intersection to deteriorate from acceptable Level of Service (D or better) to unacceptable Level of Service (E or F); or,

- The addition of project generated trips is forecast to worsen the performance of a study intersection operating at unacceptable Level of Service (E or F) in the baseline condition.

FORECASTING METHODOLOGY

To account for ambient growth, existing roadway volumes shall be increased by a growth rate of 2 percent (2%) per year over a two-year period for Opening Year (2022) conditions.

In addition, a list of pending and approved other development projects shall be requested from the City of Beaumont. Trip forecasts for other development projects within the project study area shall be determined based on the Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition, 2017 and will be added to existing roadway volumes for the applicable analysis scenarios.

VEHICLES MILES TRAVELED (VMT) ANALYSIS

Since the City of Beaumont has not yet adopted VMT guidelines, the scope of work for the VMT analysis is based on the County of Riverside Draft Transportation Analysis Preparation Guide, August 2020 ["TA Preparation Guide"].

Based on preliminary review, the proposed project restaurant component satisfies the screening criteria for local-serving retail less than 50,000 square feet, the office component satisfies the map-based screening in a low VMT area for the office employment, and the remodel component of the project is less than the 10,000 square feet of expansion on an existing facility; therefore, a detailed VMT analysis is not anticipated to be required. The traffic study shall document VMT screening analysis in accordance with the County of Riverside TA Preparation Guide.

CONCLUSION

We appreciate the opportunity to provide this scoping document for your review. Should you have any questions or comments regarding the proposed scope, please contact Perrie Ilercil at (714) 795-3100 x 103.

Table 1
Project Trip Generation

Trip Generation Rates									
			AM Peak Hour			PM Peak Hour			Daily
Land Use	Source[1]	Units[2]	% In	% Out	Rate	% In	% Out	Rate	Rate
General Office Building	ITE 710	TSF	86%	14%	1.16	16%	84%	1.15	9.74
Fast-Food Restaurant with Drive Thru Window	ITE 934	TSF	51%	49%	40.19	52%	48%	32.67	470.95

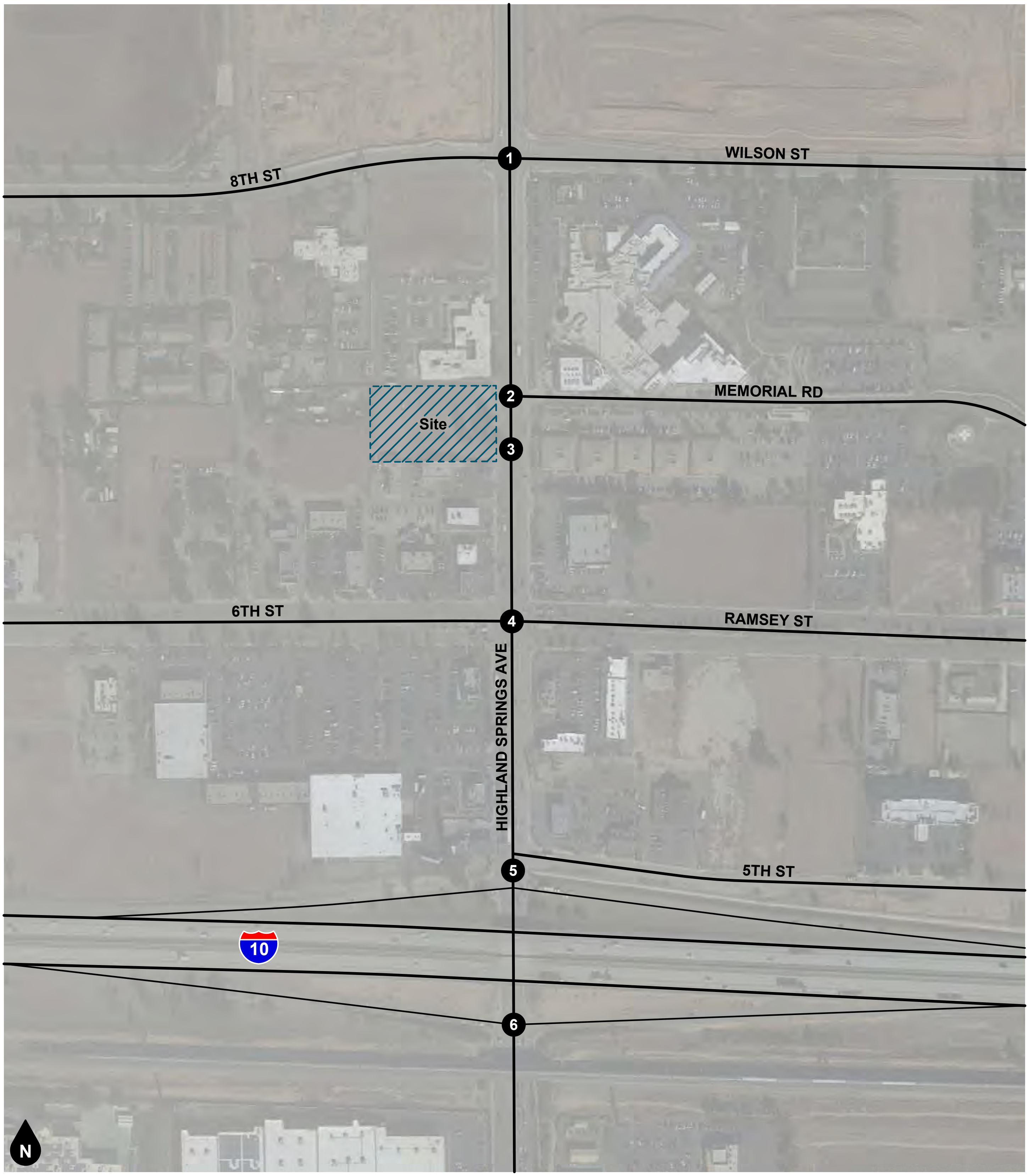
Trips Generated									
			AM Peak Hour			PM Peak Hour			
Land Use	Quantity	Units[2]	In	Out	Total	In	Out	Total	Daily
General Office Building	6.400	TSF	6	1	7	1	6	7	62
Fast-Food Restaurant with Drive Thru Window	2.480	TSF	51	49	100	42	39	81	1,168
Pass-by Trips (49% AM, 50% PM)	*[a]*		*-25*	*-24*	*-49*	*-21*	*-20*	*-41*	*-90*
NET PROJECT TRIPS GENERATED			32	26	58	22	25	47	1,140

Notes:

(1) Source: ITE = Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017; ### = Land Use Code(s).

[a] = ITE Trip Generation Handbook (3rd Edition, 2017).

(2) TSF = Thousand Square Feet



Legend
Study Intersection

Figure 1
Project Location Map

ganddini

655 Highland Springs Office/Commercial Project
Transportation Impact Analysis
19300

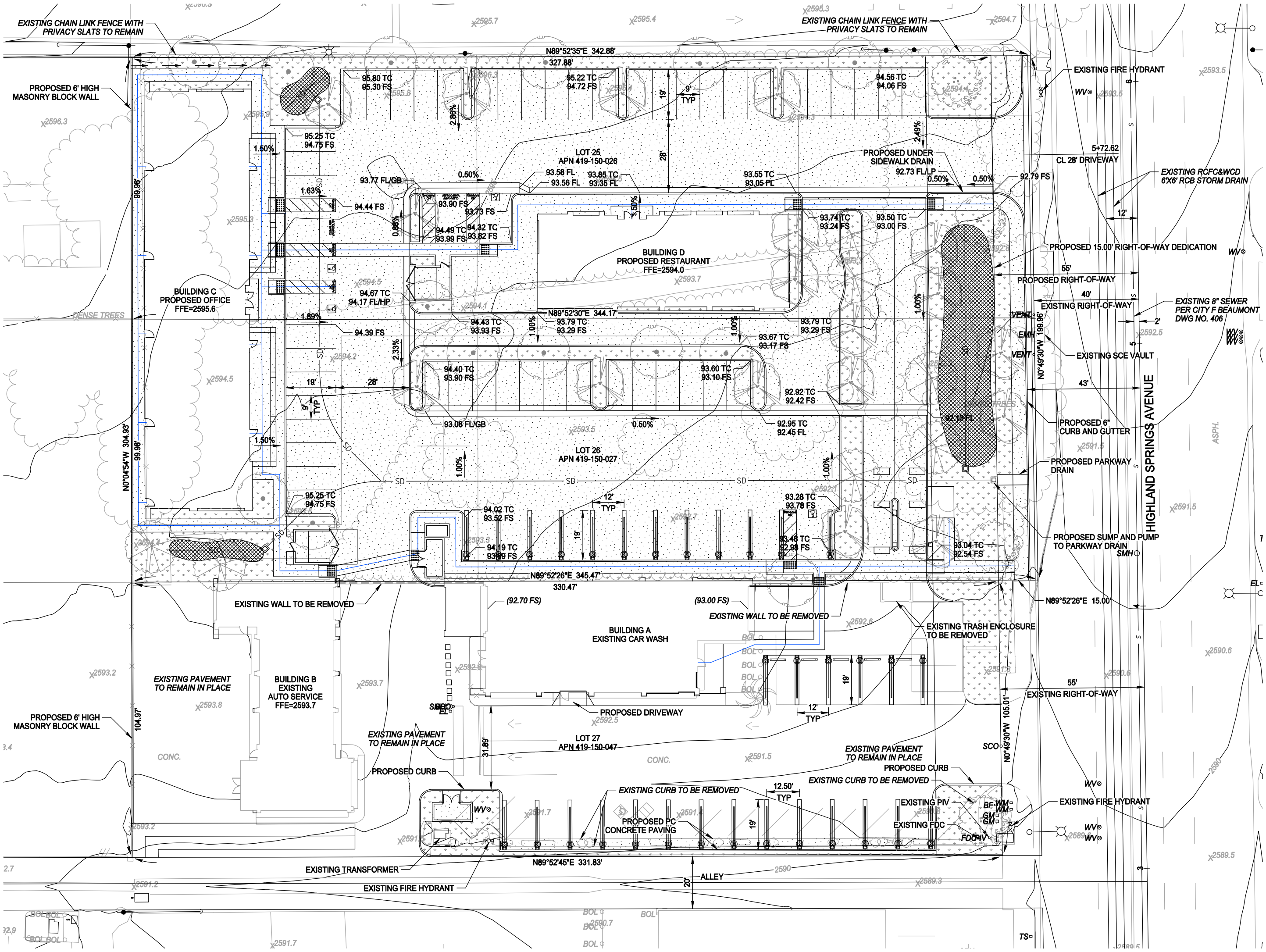


Figure 2
Site Plan

655 Highland Springs Office/Commercial Project
Transportation Impact Analysis
19300

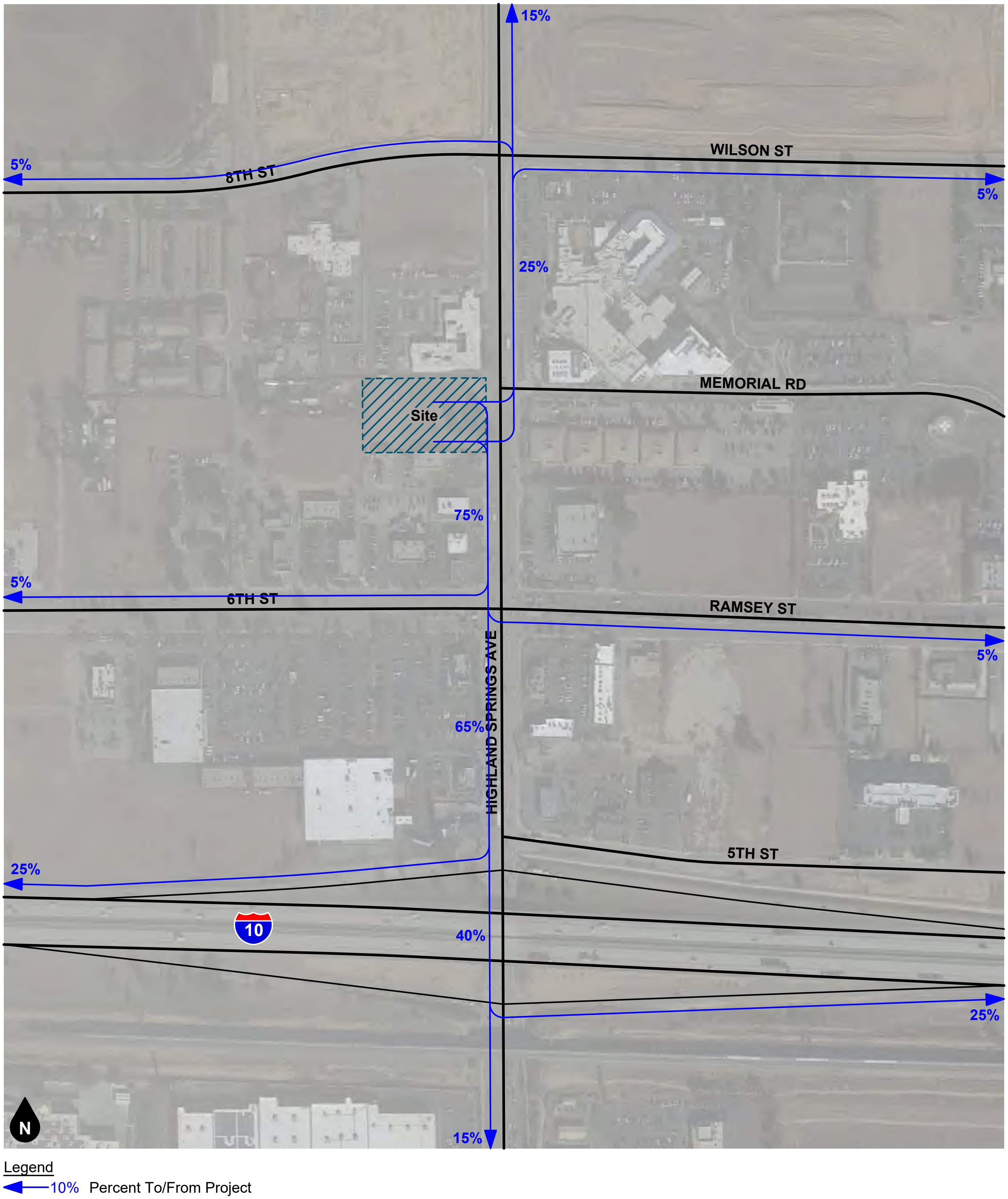


Figure 3
Project Trip Distribution

655 Highland Springs Office/Commercial Project
Transportation Impact Analysis
19300

APPENDIX C

VOLUME COUNT WORKSHEETS

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Beaumont	PROJECT #:	SC2704
10/21/20	NORTH & SOUTH:	Highland Springs	LOCATION #:	1
WEDNESDAY	EAST & WEST:	Driveway	CONTROL:	STOP E/W

PCE Adjusted	NOTES:								AM		N	
	Class	1	2	3	4	5	6		PM			
	Factor	1	1.5	2	3	2	2		MD	◄ W		E ►
									OTHER		S	
									OTHER			

		NORTHBOUND Highland Springs			SOUTHBOUND Highland Springs			EASTBOUND Driveway			WESTBOUND Driveway			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	2	0	0	2	0	0	1	0	0	1	0	
AM	7:00 AM	0	76	1	0	104	0	0	0	0	0	0	0	181
	7:15 AM	2	84	1	0	121	0	0	0	0	0	0	0	208
	7:30 AM	3	82	6	1	123	0	0	0	0	0	0	0	214
	7:45 AM	0	107	12	5	120	3	0	0	0	0	0	0	247
	8:00 AM	1	112	9	2	89	0	0	0	0	0	0	0	213
	8:15 AM	1	126	5	2	99	0	1	0	1	0	0	0	234
	8:30 AM	0	89	4	2	137	2	0	0	0	0	0	0	234
	8:45 AM	2	109	1	0	157	0	0	0	2	0	0	0	271
	VOLUMES	9	785	39	12	947	5	1	0	3	0	0	0	1,800
	APPROACH %	1%	94%	5%	1%	98%	1%	25%	0%	75%	0%	0%	0%	
	APP/DEPART	832	/	786	964	/	950	4	/	51	0	/	14	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	4	436	19	6	481	2	1	0	3	0	0	0	951
	APPROACH %	1%	95%	4%	1%	98%	0%	25%	0%	75%	0%	0%	0%	
	PEAK HR FACTOR		0.872			0.780			0.500			0.000		0.879
	APP/DEPART	459	/	437	489	/	484	4	/	25	0	/	6	0
PM	4:00 PM	0	158	1	0	163	0	1	0	2	3	0	1	328
	4:15 PM	1	171	0	1	123	2	0	0	4	1	0	1	303
	4:30 PM	3	173	2	1	153	3	1	0	4	0	0	2	340
	4:45 PM	1	195	0	0	147	0	0	0	3	8	0	2	356
	5:00 PM	2	156	18	0	153	0	0	0	0	9	0	1	338
	5:15 PM	1	164	1	0	157	1	0	0	0	6	0	3	333
	5:30 PM	0	206	1	0	171	0	0	0	0	3	0	1	382
	5:45 PM	0	184	1	1	128	0	1	0	1	3	0	3	321
	VOLUMES	8	1,404	23	3	1,193	6	3	0	14	33	0	14	2,700
	APPROACH %	1%	98%	2%	0%	99%	0%	18%	0%	82%	71%	0%	29%	
	APP/DEPART	1,435	/	1,421	1,202	/	1,240	17	/	26	47	/	14	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	4	720	20	0	628	1	0	0	3	26	0	7	1,408
	APPROACH %	1%	97%	3%	0%	100%	0%	0%	0%	100%	79%	0%	21%	
	PEAK HR FACTOR		0.900			0.919			0.250			0.825		0.923
	APP/DEPART	744	/	727	629	/	657	3	/	20	33	/	5	0

Highland Springs

NORTH SIDE

Driveway WEST SIDE

EAST SIDE **Driveway**

SOUTH SIDE

Highland Springs

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: 10/21/20 WEDNESDAY	LOCATION:	Beaumont	PROJECT #:	SC2704
	NORTH & SOUTH:	Highland Springs	LOCATION #:	2
	EAST & WEST:	Memorial	CONTROL:	STOP W

	NOTES:								AM
PCE Adjusted	Class	1	2	3	4	5	6		PM
	Factor	1	1.5	2	3	2	2		MD
									OTHER
									OTHER

▲ N — ◄ W — E ► — S ▼

		NORTHBOUND Highland Springs			SOUTHBOUND Highland Springs			EASTBOUND Memorial			WESTBOUND Memorial			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	X	2	0	0	2	X	X	X	X	0	X	0	
AM	7:00 AM	0	77	1	1	111	0	0	0	0	4	0	1	194
	7:15 AM	0	84	2	0	119	0	0	0	0	0	0	0	205
	7:30 AM	0	80	2	0	131	0	0	0	0	0	0	0	213
	7:45 AM	0	97	1	1	111	0	0	0	0	0	0	0	210
	8:00 AM	0	104	2	1	106	0	0	0	0	2	0	0	214
	8:15 AM	0	116	3	0	106	0	0	0	0	2	0	0	227
	8:30 AM	0	92	3	0	123	0	0	0	0	1	0	0	219
	8:45 AM	0	99	2	0	157	0	0	0	0	0	0	0	258
	VOLUMES	0	749	15	3	963	0	0	0	0	8	0	1	1,738
	APPROACH %	0%	98%	2%	0%	100%	0%	0%	0%	0%	88%	0%	12%	
	APP/DEPART	764	/	750	966	/	971	0	/	18	9	/	0	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	0	411	10	1	492	0	0	0	0	4	0	0	917
	APPROACH %	0%	98%	2%	0%	100%	0%	0%	0%	0%	100%	0%	0%	
	PEAK HR FACTOR		0.882			0.784			0.000			0.667		0.890
	APP/DEPART	420	/	411	493	/	496	0	/	11	4	/	0	0
PM	4:00 PM	0	169	1	0	156	0	0	0	0	0	0	0	326
	4:15 PM	0	168	1	0	130	0	0	0	0	1	0	0	300
	4:30 PM	0	191	2	1	155	0	0	0	0	2	0	0	350
	4:45 PM	0	167	1	0	130	0	0	0	0	0	0	0	297
	5:00 PM	0	198	0	0	143	0	0	0	0	1	0	1	343
	5:15 PM	0	156	0	0	160	0	0	0	0	0	0	0	316
	5:30 PM	0	195	1	0	162	0	0	0	0	0	0	0	357
	5:45 PM	0	197	5	1	116	0	0	0	0	0	0	0	319
	VOLUMES	0	1,439	11	2	1,150	0	0	0	0	4	0	1	2,606
	APPROACH %	0%	99%	1%	0%	100%	0%	0%	0%	0%	80%	0%	20%	
	APP/DEPART	1,449	/	1,440	1,152	/	1,154	0	/	13	5	/	0	0
	BEGIN PEAK HR		5:00 PM											
	VOLUMES	0	745	6	1	580	0	0	0	0	1	0	1	1,334
	APPROACH %	0%	99%	1%	0%	100%	0%	0%	0%	0%	50%	0%	50%	
	PEAK HR FACTOR		0.931			0.899			0.000			0.250		0.934
	APP/DEPART	751	/	746	581	/	581	0	/	7	2	/	0	0

Highland Springs

NORTH SIDE

Memorial WEST SIDE

EAST SIDE **Memorial**

SOUTH SIDE

Highland Springs

APPENDIX D

HIGHLAND SPRINGS AND 8^TH RETAIL TRAFFIC IMPACT ANALYSIS TRAFFIC VOLUMES

Highland Springs and 8th Retail

TRAFFIC IMPACT ANALYSIS

CITY OF BEAUMONT

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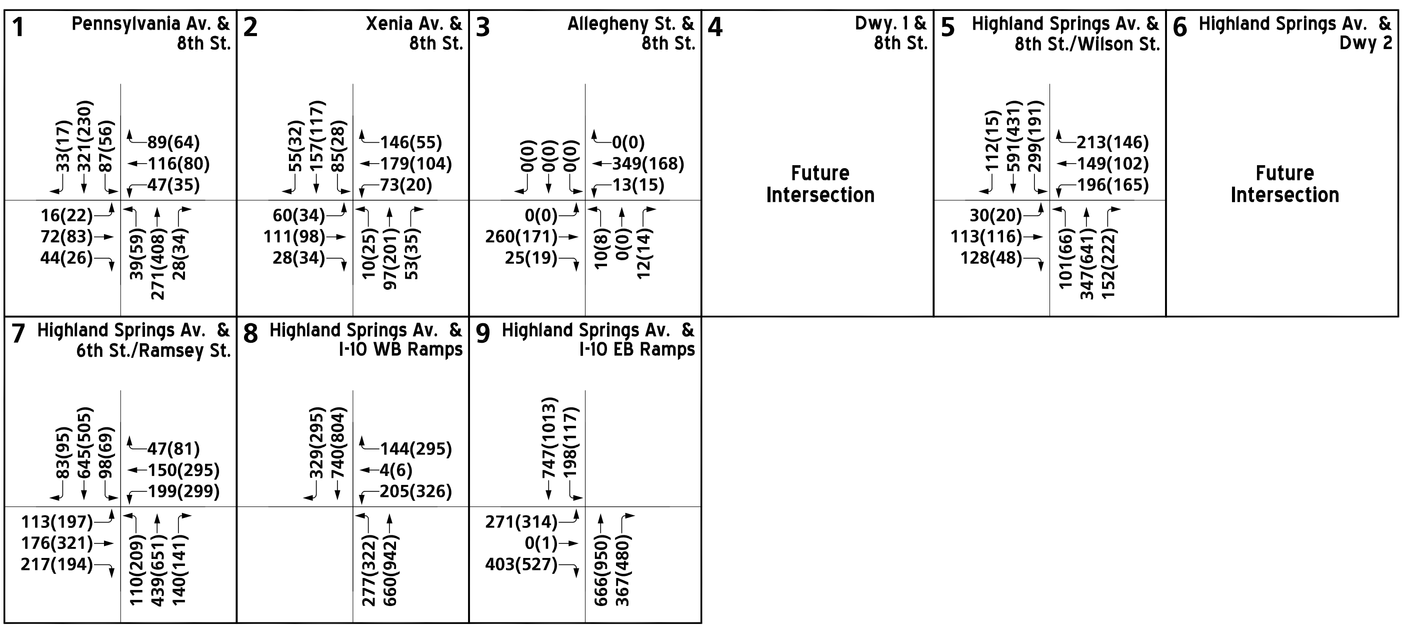
APRIL 23, 2020

13072-03 TIA Report

Exhibit 3-8: Existing (2020) Traffic Volumes

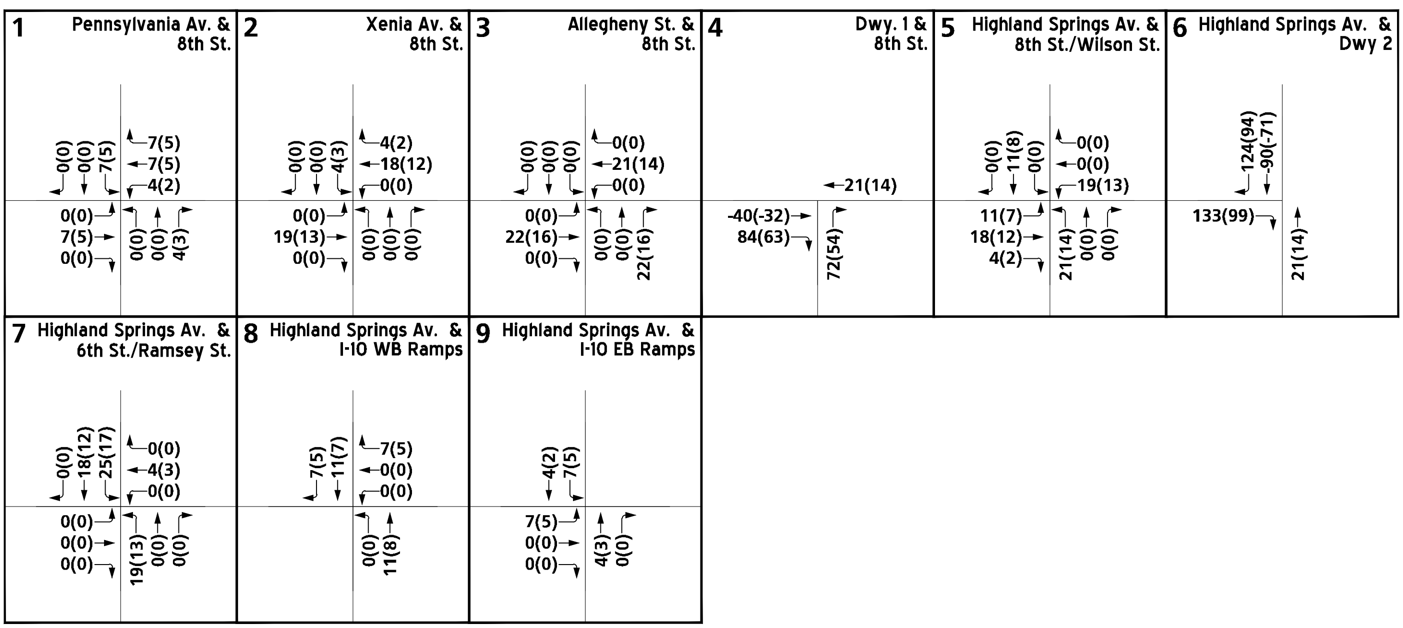


LEGEND:

- **10.0** = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)
- **10.0** = ESTIMATED VEHICLES PER DAY (1000'S)
- 10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

N

Exhibit 4-2: Project Only Traffic Volumes

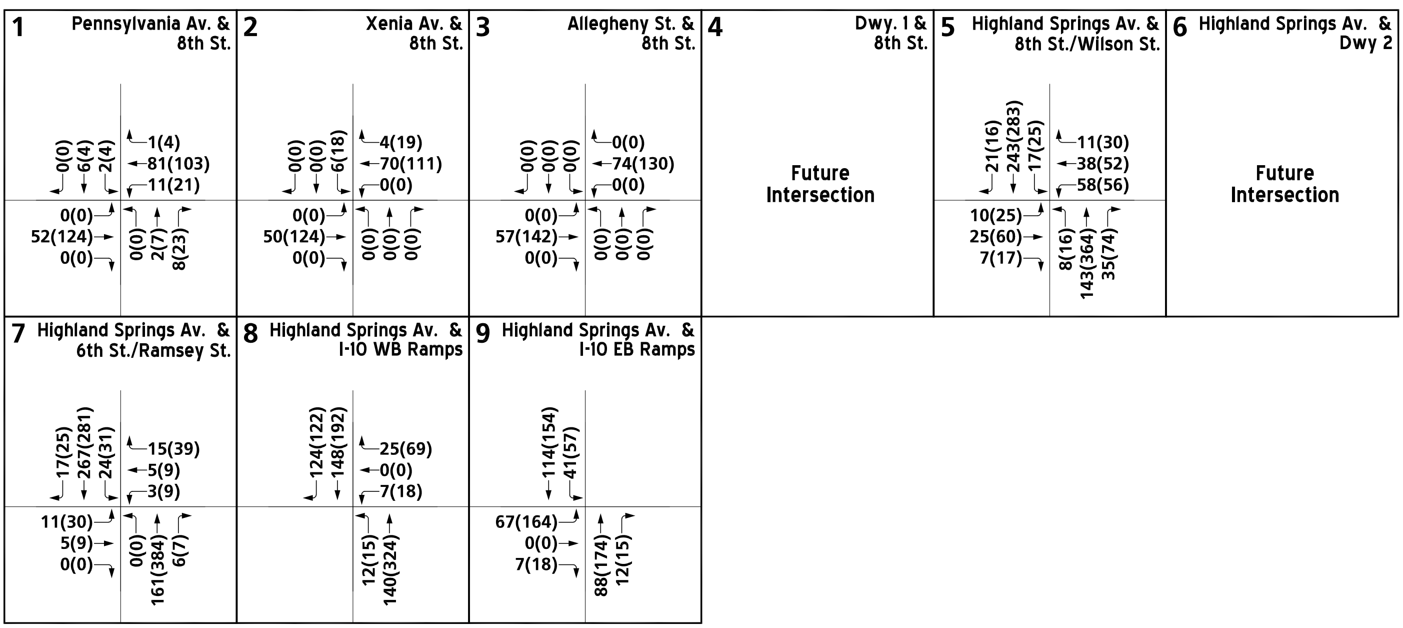


LEGEND:

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

N

EXHIBIT 4-4: CUMULATIVE ONLY TRAFFIC VOLUMES



LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

10.0 = VEHICLES PER DAY (1000'S)

N

APPENDIX E

INTERSECTION LEVEL OF SERVICE WORKSHEETS

EXISTING

Highland Springs Office-Commercial

Vistro File: G:\...\AME.vistro

Report File: G:\...\AME.pdf

Scenario 1 Existing

3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	0.800	23.6	C
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.010	12.6	B
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	EB Left	0.002	13.3	B
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	WB Left	0.726	20.2	C
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	NB Left	0.687	19.4	B
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	SB Left	0.816	17.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	23.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.800

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	101	347	152	299	591	112	30	113	128	196	149	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	101	347	152	299	591	112	30	113	128	196	149	213
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	96	42	83	164	31	8	31	36	54	41	59
Total Analysis Volume [veh/h]	112	386	169	332	657	124	33	126	142	218	166	237
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	25	25	18	32	0	11	28	0	14	31	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	66	66	66	66	66	66	66	66	66	66	66	66
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	16	31	15	25	25	3	8	8	10	16	16
g / C, Green / Cycle	0.09	0.25	0.47	0.22	0.38	0.38	0.05	0.13	0.13	0.16	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.06	0.21	0.10	0.19	0.21	0.21	0.02	0.07	0.09	0.12	0.05	0.14
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1841	1852	1870	1589	1781	3560	1653
c, Capacity [veh/h]	166	465	776	395	706	695	90	235	200	285	846	393
d1, Uniform Delay [s]	28.84	23.39	10.30	24.44	16.13	16.13	30.28	26.92	27.57	26.40	20.03	22.29
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.75	3.91	0.14	4.83	0.69	0.70	2.49	1.89	4.59	4.24	0.11	1.49
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	0.83	0.22	0.84	0.56	0.56	0.37	0.54	0.71	0.76	0.20	0.60
d, Delay for Lane Group [s/veh]	33.59	27.30	10.44	29.27	16.82	16.84	32.77	28.81	32.16	30.64	20.14	23.79
Lane Group LOS	C	C	B	C	B	B	C	C	C	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.85	5.76	1.31	5.14	4.35	4.29	0.54	1.85	2.25	3.25	0.91	3.02
50th-Percentile Queue Length [ft/ln]	46.19	144.01	32.65	128.40	108.75	107.26	13.49	46.34	56.31	81.24	22.79	75.46
95th-Percentile Queue Length [veh/ln]	3.33	9.70	2.35	8.85	7.77	7.69	0.97	3.34	4.05	5.85	1.64	5.43
95th-Percentile Queue Length [ft/ln]	83.14	242.41	58.77	221.31	194.26	192.19	24.29	83.42	101.35	146.23	41.03	135.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	33.59	27.30	10.44	29.27	16.83	16.84	32.77	28.81	32.16	30.64	20.14	23.79
Movement LOS	C	C	B	C	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	24.08			20.54			30.82			25.22		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	23.64											
Intersection LOS	C											
Intersection V/C	0.800											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	32.21	32.21	32.21	32.21
I_p,int, Pedestrian LOS Score for Intersection	2.825	2.559	2.456	2.754
Crosswalk LOS	C	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	494	659	565	635
d_b, Bicycle Delay [s]	24.09	19.11	21.89	19.79
I_b,int, Bicycle LOS Score for Intersection	2.660	2.478	1.808	2.072
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	12.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.010

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	411	10	1	492	0	0	0	0	4	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	411	10	1	492	0	0	0	0	4	0	0
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	117	3	0	140	0	0	0	0	1	0	0
Total Analysis Volume [veh/h]	0	467	11	1	559	0	0	0	0	5	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	8.29	0.00	0.00	0.00	0.00	9.97	12.60	0.00	9.73
Movement LOS		A	A	A	A	A			A	B		A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.79	0.00	0.79
d_A, Approach Delay [s/veh]	0.00			0.01			9.97			12.60		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	0.07											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	13.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┐‖┌			┐‖┌			┳			┳		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	436	19	6	481	2	1	0	3	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	436	19	6	481	2	1	0	3	0	0	0
Peak Hour Factor	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	122	5	2	135	1	0	0	1	0	0	0
Total Analysis Volume [veh/h]	4	489	21	7	540	2	1	0	3	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			Yes	Yes
Number of Storage Spaces in Median	0	0	2	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.49	0.00	0.00	8.40	0.00	0.00	13.31	0.00	9.94	12.85	0.00	9.72
Movement LOS	A	A	A	A	A	A	B		A	B		A
95th-Percentile Queue Length [veh/ln]	0.01	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.29	0.00	0.00	0.50	0.00	0.00	0.48	0.00	0.48	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.07			0.11			10.78			11.29		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.13											
Intersection LOS	B											

Intersection Level Of Service Report

Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	20.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.726

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	110	439	140	0	98	645	83	113	176	217	199	150	47
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	110	439	140	0	98	645	83	113	176	217	199	150	47
Peak Hour Factor	0.9600	0.9600	0.9600	1.000	0.960	0.960	0.960	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	114	36	0	26	168	22	29	46	57	52	39	12
Total Analysis Volume [veh/h]	115	457	146	0	102	672	86	118	183	226	207	156	49
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	35	0	0	16	37	0	12	31	0	13	32	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	53	53	53	53	53	53	53	53	53	53	53	53
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	14	14	5	13	13	6	10	10	8	12	12
g / C, Green / Cycle	0.11	0.26	0.26	0.10	0.25	0.25	0.11	0.19	0.19	0.15	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.06	0.13	0.09	0.06	0.19	0.05	0.06	0.05	0.14	0.12	0.04	0.03
s, saturation flow rate [veh/h]	1781	3560	1653	1781	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	193	912	423	184	894	399	203	690	308	272	850	365
d1, Uniform Delay [s]	22.54	16.84	16.10	22.62	18.34	15.73	22.47	18.48	20.35	21.55	16.44	16.25
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.92	0.43	0.48	2.59	1.30	0.27	2.63	0.20	3.39	4.38	0.10	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.60	0.50	0.34	0.55	0.75	0.22	0.58	0.27	0.73	0.76	0.18	0.13
d, Delay for Lane Group [s/veh]	25.46	17.27	16.58	25.21	19.65	16.00	25.10	18.68	23.74	25.92	16.54	16.41
Lane Group LOS	C	B	B	C	B	B	C	B	C	C	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.41	2.16	1.34	1.24	3.52	0.77	1.35	0.83	2.49	2.52	0.68	0.43
50th-Percentile Queue Length [ft/ln]	35.27	54.06	33.62	31.12	88.09	19.19	33.66	20.67	62.14	62.93	17.02	10.80
95th-Percentile Queue Length [veh/ln]	2.54	3.89	2.42	2.24	6.34	1.38	2.42	1.49	4.47	4.53	1.23	0.78
95th-Percentile Queue Length [ft/ln]	63.49	97.31	60.51	56.01	158.57	34.55	60.59	37.20	111.85	113.27	30.64	19.44

Movement, Approach, & Intersection Results

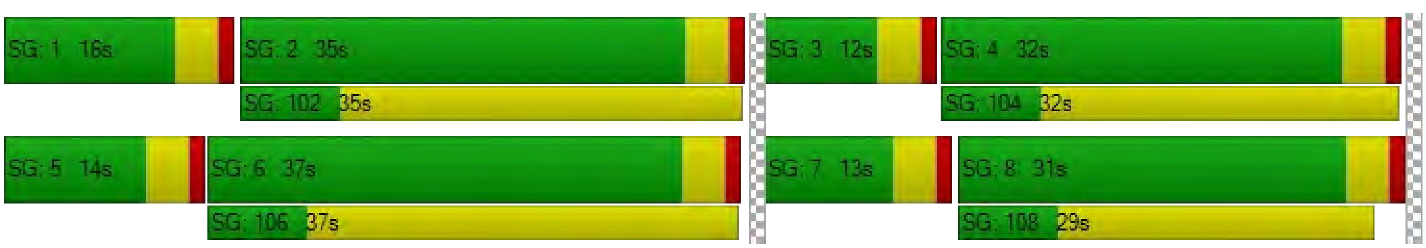
d_M, Delay for Movement [s/veh]	25.46	17.27	16.58	25.21	25.21	19.65	16.00	25.10	18.68	23.74	25.92	16.54	16.41
Movement LOS	C	B	B	C	C	B	B	C	B	C	C	B	B
d_A, Approach Delay [s/veh]	18.44			19.94				22.29			21.24		
Approach LOS	B			B				C			C		
d_I, Intersection Delay [s/veh]	20.22												
Intersection LOS	C												
Intersection V/C	0.726												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.850	2.909	2.671	2.615
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	653	695	568	589
d_b, Bicycle Delay [s]	21.56	20.23	24.34	23.63
I_b,int, Bicycle LOS Score for Intersection	2.152	2.185	1.994	1.900
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	19.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.687

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	295	694	0	0	782	367	0	0	0	222	8	158
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	295	694	0	0	782	367	0	0	0	222	8	158
Peak Hour Factor	0.9300	0.9300	0.9290	0.9290	0.9300	0.9300	0.9300	0.9290	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	79	187	0	0	210	99	0	0	0	60	2	42
Total Analysis Volume [veh/h]	317	746	0	0	841	395	0	0	0	239	9	170
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	14	35	0	0	21	0	11	0	0	0	14	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	38	24	24	0	10	10
g / C, Green / Cycle	0.17	0.63	0.40	0.40	0.00	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.17	0.21	0.23	0.24	0.00	0.14	0.11
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1813	1615
c, Capacity [veh/h]	315	2286	1442	644	4	303	270
d1, Uniform Delay [s]	25.11	5.14	14.21	14.44	0.00	24.23	23.38
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	25.50	0.38	1.73	4.33	0.00	5.45	2.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.01	0.33	0.58	0.61	0.00	0.82	0.63
d, Delay for Lane Group [s/veh]	50.61	5.52	15.94	18.77	0.00	29.69	25.80
Lane Group LOS	F	A	B	B	A	C	C
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	6.40	1.65	4.26	4.51	0.00	3.63	2.28
50th-Percentile Queue Length [ft/ln]	159.89	41.17	106.56	112.80	0.00	90.77	56.99
95th-Percentile Queue Length [veh/ln]	10.58	2.96	7.65	8.00	0.00	6.54	4.10
95th-Percentile Queue Length [ft/ln]	264.51	74.10	191.20	199.89	0.00	163.39	102.58

Movement, Approach, & Intersection Results

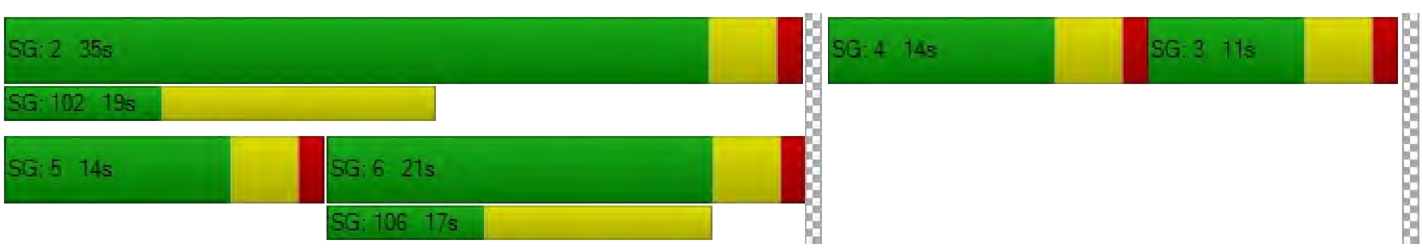
d_M, Delay for Movement [s/veh]	50.61	5.52	0.00	0.00	15.94	18.77	0.00	0.00	0.00	29.69	29.69	25.80
Movement LOS	F	A			B	B	A		A	C	C	C
d_A, Approach Delay [s/veh]	18.97			16.85			0.00			28.11		
Approach LOS	B			B			A			C		
d_I, Intersection Delay [s/veh]	19.41											
Intersection LOS	B											
Intersection V/C	0.687											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.044	1.896
Crosswalk LOS	F	F	B	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1033	567	0	333
d_b, Bicycle Delay [s]	7.01	15.41	30.00	20.83
I_b,int, Bicycle LOS Score for Intersection	2.437	2.579	4.132	2.249
Bicycle LOS	B	B	D	B

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	17.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.816

Intersection Setup

Name				Highland Spr Ave								
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	No			No			Yes			Yes		

Volumes

Name				Highland Spr Ave								
Base Volume Input [veh/h]	0	695	392	209	795	0	293	2	438	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	695	392	209	795	0	293	2	438	0	0	0
Peak Hour Factor	0.9510	0.9500	0.9500	0.9500	0.9500	0.9510	0.9500	0.9500	0.9500	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	183	103	55	209	0	77	1	115	0	0	0
Total Analysis Volume [veh/h]	0	732	413	220	837	0	308	2	461	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	21	0	12	33	0	0	27	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	62	62	62	62	62	62	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	20	20	9	33	21	21	
g / C, Green / Cycle	0.32	0.32	0.15	0.54	0.34	0.34	
(v / s)_i Volume / Saturation Flow Rate	0.19	0.26	0.12	0.23	0.17	0.29	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1207	518	283	1938	607	542	
d1, Uniform Delay [s]	17.76	19.22	25.33	8.70	16.53	19.17	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.50	2.87	4.58	0.15	0.67	3.89	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.61	0.80	0.78	0.43	0.51	0.85	
d, Delay for Lane Group [s/veh]	18.25	22.08	29.91	8.85	17.19	23.05	
Lane Group LOS	B	C	C	A	B	C	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	4.08	5.29	3.22	2.69	3.31	6.09	
50th-Percentile Queue Length [ft/ln]	101.92	132.23	80.55	67.30	82.66	152.34	
95th-Percentile Queue Length [veh/ln]	7.34	9.06	5.80	4.85	5.95	10.14	
95th-Percentile Queue Length [ft/ln]	183.45	226.52	144.98	121.14	148.79	253.55	

Movement, Approach, & Intersection Results

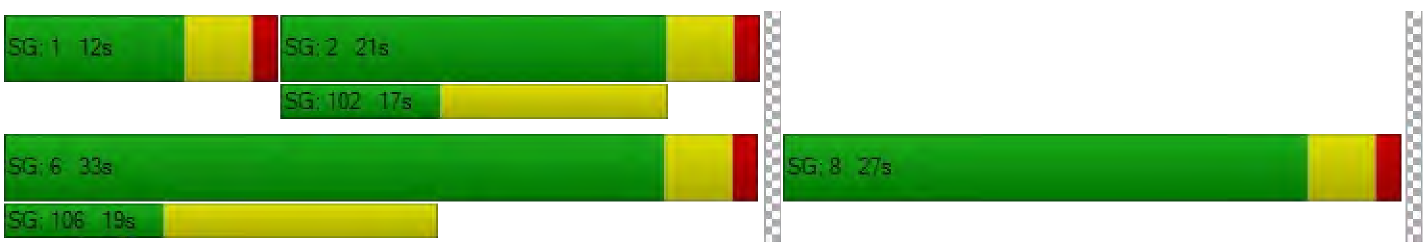
d_M, Delay for Movement [s/veh]	0.00	18.25	22.08	29.91	8.85	0.00	17.19	17.19	23.05	0.00	0.00	0.00
Movement LOS		B	C	C	A		B	B	C			
d_A, Approach Delay [s/veh]	19.64			13.23			20.70			0.00		
Approach LOS	B			B			C			A		
d_I, Intersection Delay [s/veh]	17.63											
Intersection LOS	B											
Intersection V/C	0.816											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.068	2.020
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	967	767	0
d_b, Bicycle Delay [s]	15.41	8.01	11.41	30.00
I_b,int, Bicycle LOS Score for Intersection	2.504	2.432	2.832	4.132
Bicycle LOS	B	B	C	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Scenario 1 Existing
3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	EB Left	0.813	23.2	C
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.003	16.5	C
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Left	0.087	17.3	C
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	EB Left	0.777	24.5	C
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	NB Left	0.753	22.9	C
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	SB Left	0.857	22.0	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	23.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.813

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	66	641	222	191	431	15	20	116	48	165	102	146
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	641	222	191	431	15	20	116	48	165	102	146
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	172	60	51	116	4	5	31	13	44	27	39
Total Analysis Volume [veh/h]	71	689	239	205	463	16	22	125	52	177	110	157
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	52	52	19	56	0	11	32	0	17	38	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	73	73	73	73	73	73	73	73	73	73	73	73
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	30	44	10	35	35	3	7	7	10	14	14
g / C, Green / Cycle	0.07	0.41	0.60	0.14	0.48	0.48	0.03	0.09	0.09	0.13	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.04	0.37	0.14	0.12	0.13	0.13	0.01	0.05	0.05	0.10	0.03	0.09
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1922	1852	1870	1691	1781	3560	1653
c, Capacity [veh/h]	131	766	990	256	897	923	64	174	158	240	687	319
d1, Uniform Delay [s]	32.67	20.18	6.88	30.26	11.31	11.31	34.45	31.56	31.67	30.39	24.55	26.29
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.48	4.18	0.13	5.71	0.15	0.15	3.11	2.36	2.98	4.43	0.11	1.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.54	0.90	0.24	0.80	0.26	0.26	0.34	0.52	0.55	0.74	0.16	0.49
d, Delay for Lane Group [s/veh]	36.16	24.36	7.00	35.98	11.46	11.46	37.57	33.93	34.64	34.81	24.66	27.46
Lane Group LOS	D	C	A	D	B	B	D	C	C	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.30	10.80	1.50	3.76	2.11	2.17	0.42	1.56	1.53	3.04	0.74	2.32
50th-Percentile Queue Length [ft/ln]	32.54	270.05	37.55	93.94	52.71	54.22	10.55	39.01	38.17	76.02	18.40	58.04
95th-Percentile Queue Length [veh/ln]	2.34	16.19	2.70	6.76	3.80	3.90	0.76	2.81	2.75	5.47	1.32	4.18
95th-Percentile Queue Length [ft/ln]	58.56	404.80	67.59	169.09	94.88	97.60	18.98	70.21	68.70	136.83	33.11	104.48

Movement, Approach, & Intersection Results

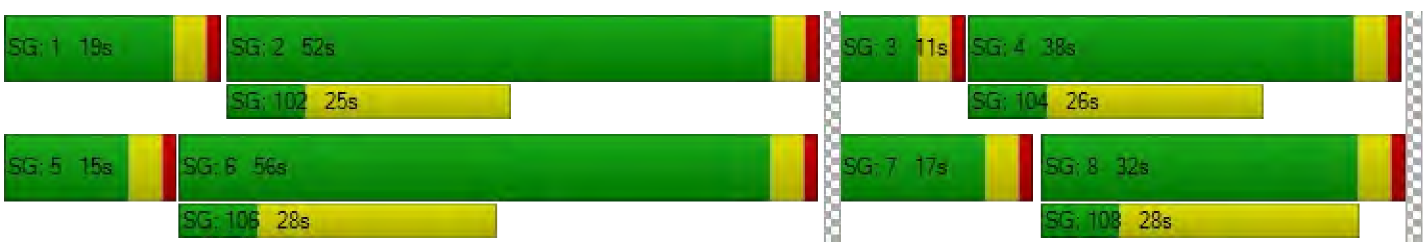
d_M, Delay for Movement [s/veh]	36.16	24.36	7.00	35.98	11.46	11.46	37.57	34.13	34.64	34.81	24.66	27.46
Movement LOS	D	C	A	D	B	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]		21.04			18.81			34.64			29.70	
Approach LOS		C			B			C			C	
d_I, Intersection Delay [s/veh]						23.20						
Intersection LOS						C						
Intersection V/C						0.813						

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	2.843	2.523	2.404	2.714
Crosswalk LOS	C	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	867	467	567
d_b, Bicycle Delay [s]	21.60	19.27	35.27	30.82
I_b,int, Bicycle LOS Score for Intersection	3.208	2.124	1.724	1.926
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	16.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.003

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	745	6	1	580	0	0	0	0	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	745	6	1	580	0	0	0	0	1	0	1
Peak Hour Factor	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	202	2	0	157	0	0	0	0	0	0	0
Total Analysis Volume [veh/h]	0	807	7	1	628	0	0	0	0	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.39	0.00	0.00	0.00	0.00	10.23	16.54	0.00	11.02
Movement LOS		A	A	A	A	A			B	C		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.37
d_A, Approach Delay [s/veh]	0.00			0.01			10.23			13.78		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.03											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	17.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.087

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	720	20	0	628	1	0	0	3	26	0	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	720	20	0	628	1	0	0	3	26	0	7
Peak Hour Factor	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	193	5	0	168	0	0	0	1	7	0	2
Total Analysis Volume [veh/h]	4	771	21	0	672	1	0	0	3	28	0	7
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			Yes	Yes
Number of Storage Spaces in Median	0	0	2	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.09	0.00	0.01
d_M, Delay for Movement [s/veh]	8.90	0.00	0.00	9.30	0.00	0.00	15.12	0.00	10.43	17.33	0.00	11.93
Movement LOS	A	A	A	A	A	A	C		B	C		B
95th-Percentile Queue Length [veh/ln]	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.33	0.00	0.33
95th-Percentile Queue Length [ft/ln]	0.32	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.34	8.14	0.00	8.14
d_A, Approach Delay [s/veh]	0.04			0.00			10.43			16.25		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.42											
Intersection LOS	C											

Intersection Level Of Service Report

Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	24.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.777

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	209	651	141	0	69	505	95	197	321	194	299	295	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	651	141	0	69	505	95	197	321	194	299	295	81
Peak Hour Factor	0.9400	0.9400	0.9400	1.000	0.940	0.940	0.940	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	173	38	0	18	134	25	52	85	52	80	78	22
Total Analysis Volume [veh/h]	222	693	150	0	73	537	101	210	341	206	318	314	86
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	20	47	0	0	14	41	0	18	33	0	26	41	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	63	63	63	63	63	63	63	63	63	63	63	63
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	17	17	5	12	12	9	11	11	13	15	15
g / C, Green / Cycle	0.16	0.28	0.28	0.08	0.20	0.20	0.15	0.17	0.17	0.22	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.12	0.19	0.09	0.04	0.15	0.06	0.11	0.09	0.12	0.18	0.08	0.05
s, saturation flow rate [veh/h]	1781	3560	1653	1781	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	282	988	459	144	712	318	271	634	283	384	891	382
d1, Uniform Delay [s]	25.41	20.35	18.02	27.66	23.66	21.46	25.81	23.75	24.63	23.51	19.78	19.14
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.86	0.92	0.41	2.75	1.65	0.57	4.73	0.71	3.57	4.59	0.24	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.70	0.33	0.51	0.75	0.32	0.78	0.54	0.73	0.83	0.35	0.22
d, Delay for Lane Group [s/veh]	30.27	21.27	18.43	30.41	25.31	22.02	30.54	24.46	28.21	28.10	20.02	19.43
Lane Group LOS	C	C	B	C	C	C	C	C	C	C	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.36	4.29	1.65	1.11	3.65	1.24	3.03	2.10	2.83	4.56	1.76	0.95
50th-Percentile Queue Length [ft/ln]	84.01	107.28	41.24	27.66	91.22	30.98	75.67	52.47	70.81	114.11	44.01	23.72
95th-Percentile Queue Length [veh/ln]	6.05	7.69	2.97	1.99	6.57	2.23	5.45	3.78	5.10	8.07	3.17	1.71
95th-Percentile Queue Length [ft/ln]	151.22	192.21	74.23	49.79	164.20	55.76	136.20	94.44	127.46	201.70	79.21	42.69

Movement, Approach, & Intersection Results

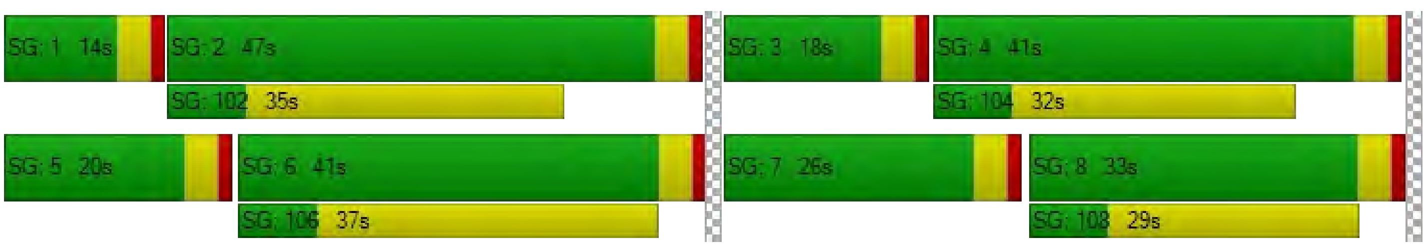
d_M, Delay for Movement [s/veh]	30.27	21.27	18.43	30.41	30.41	25.31	22.02	30.54	24.46	28.21	28.10	20.02	19.43
Movement LOS	C	C	B	C	C	C	C	C	C	C	C	C	B
d_A, Approach Delay [s/veh]	22.75			25.37				27.17			23.53		
Approach LOS	C			C				C			C		
d_I, Intersection Delay [s/veh]	24.52												
Intersection LOS	C												
Intersection V/C	0.777												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	2.904	2.946	2.806	2.710
Crosswalk LOS	C	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	717	617	483	617
d_b, Bicycle Delay [s]	24.70	28.70	34.50	28.70
I_b,int, Bicycle LOS Score for Intersection	2.438	2.086	2.184	2.152
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	22.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.753

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	338	972	0	0	826	313	0	0	0	340	10	307
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	338	972	0	0	826	313	0	0	0	340	10	307
Peak Hour Factor	0.9500	0.9500	0.9290	0.9290	0.9500	0.9500	0.9500	0.9290	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	89	256	0	0	217	82	0	0	0	89	3	81
Total Analysis Volume [veh/h]	356	1023	0	0	869	329	0	0	0	358	11	323
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	20	40	0	0	20	0	11	0	0	0	24	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	75	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	16	45	26	26	0	18	18
g / C, Green / Cycle	0.21	0.61	0.34	0.34	0.00	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.19	0.28	0.24	0.20	0.00	0.20	0.20
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1812	1615
c, Capacity [veh/h]	399	2186	1226	547	3	425	379
d1, Uniform Delay [s]	28.79	8.21	21.64	20.65	0.00	27.67	27.54
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.98	0.72	3.48	4.83	0.00	5.49	5.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.47	0.71	0.60	0.00	0.87	0.85
d, Delay for Lane Group [s/veh]	35.77	8.94	25.13	25.48	0.00	33.16	33.01
Lane Group LOS	D	A	C	C	A	C	C
Critical Lane Group	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	6.73	4.03	6.81	5.23	0.00	6.72	5.87
50th-Percentile Queue Length [ft/ln]	168.25	100.76	170.28	130.66	0.00	168.01	146.66
95th-Percentile Queue Length [veh/ln]	10.98	7.25	11.09	8.98	0.00	10.97	9.84
95th-Percentile Queue Length [ft/ln]	274.61	181.37	277.28	224.40	0.00	274.29	245.96

Movement, Approach, & Intersection Results

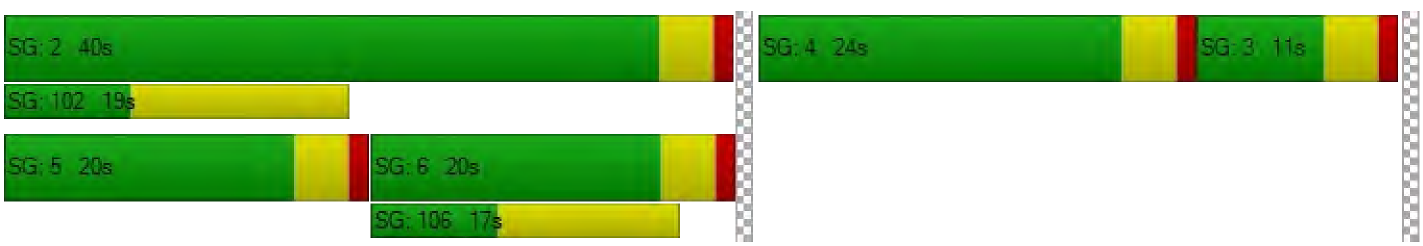
d_M, Delay for Movement [s/veh]	35.77	8.94	0.00	0.00	25.13	25.48	0.00	0.00	0.00	33.16	33.16	33.01
Movement LOS	D	A			C	C	A		A	C	C	C
d_A, Approach Delay [s/veh]	15.86			25.23			0.00			33.09		
Approach LOS	B			C			A			C		
d_I, Intersection Delay [s/veh]	22.94											
Intersection LOS	C											
Intersection V/C	0.753											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	27.31	27.31
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.044	2.042
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	960	427	0	533
d_b, Bicycle Delay [s]	10.14	23.21	37.50	20.17
I_b,int, Bicycle LOS Score for Intersection	2.697	2.548	4.132	2.701
Bicycle LOS	B	B	D	B

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	22.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.857

Intersection Setup

Name				Highland Spr Ave								
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	No			No			Yes			Yes		

Volumes

Name				Highland Spr Ave								
Base Volume Input [veh/h]	0	984	500	126	1039	0	326	3	551	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	984	500	126	1039	0	326	3	551	0	0	0
Peak Hour Factor	0.9510	0.9800	0.9800	0.9800	0.9800	0.9510	0.9800	0.9800	0.9800	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	251	128	32	265	0	83	1	141	0	0	0
Total Analysis Volume [veh/h]	0	1004	510	129	1060	0	333	3	562	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	44	0	13	57	0	0	48	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	82	82	82	82	82	82	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	31	31	7	43	32	32	
g / C, Green / Cycle	0.38	0.38	0.09	0.52	0.39	0.39	
(v / s)_i Volume / Saturation Flow Rate	0.27	0.32	0.07	0.29	0.19	0.35	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1423	611	170	1870	699	624	
d1, Uniform Delay [s]	21.80	23.36	36.72	13.65	19.10	23.86	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.65	3.10	6.79	0.27	0.51	5.07	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.71	0.84	0.76	0.57	0.48	0.90	
d, Delay for Lane Group [s/veh]	22.45	26.46	43.50	13.92	19.62	28.93	
Lane Group LOS	C	C	D	B	B	C	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	7.91	9.00	2.78	6.04	4.71	10.51	
50th-Percentile Queue Length [ft/ln]	197.74	224.89	69.40	150.93	117.76	262.78	
95th-Percentile Queue Length [veh/ln]	12.52	13.91	5.00	10.07	8.27	15.83	
95th-Percentile Queue Length [ft/ln]	313.05	347.86	124.91	251.67	206.74	395.71	

Movement, Approach, & Intersection Results

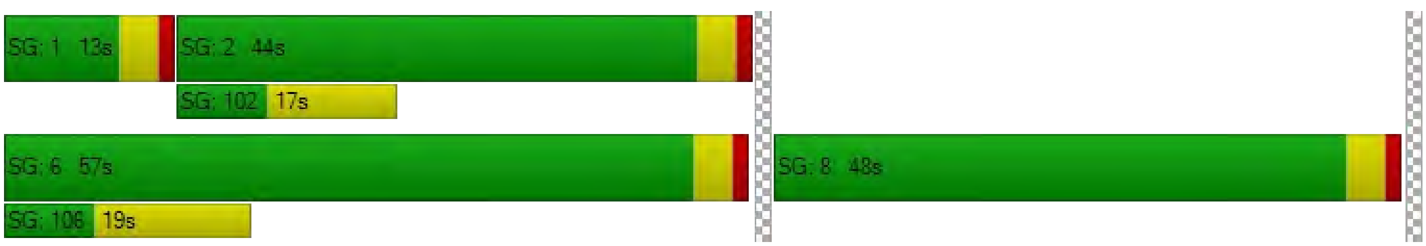
d_M, Delay for Movement [s/veh]	0.00	22.45	26.46	43.50	13.92	0.00	19.62	19.62	28.93	0.00	0.00	0.00
Movement LOS		C	C	D	B		B	B	C			
d_A, Approach Delay [s/veh]	23.80			17.13			25.45			0.00		
Approach LOS	C			B			C			A		
d_I, Intersection Delay [s/veh]	22.01											
Intersection LOS	C											
Intersection V/C	0.857											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	42.08	42.08
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.160	2.057
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	762	1010	838	0
d_b, Bicycle Delay [s]	20.12	12.88	17.72	52.50
I_b,int, Bicycle LOS Score for Intersection	2.809	2.541	3.041	4.132
Bicycle LOS	C	B	C	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



EXISTING (2021) PLUS PROJECT

Highland Springs Office-Commercial

Vistro File: G:\...\AME.vistro
Scenario 2 Existing Plus Project

Report File: G:\...\AMEp.pdf
3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	0.813	24.9	C
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.011	12.9	B
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Left	0.000	12.9	B
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	NB Left	0.743	20.7	C
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	NB Left	0.692	19.5	B
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	SB Left	0.818	17.9	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.813

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	101	347	152	299	591	112	30	113	128	196	149	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	1	0	5	0	0	0	25	4	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	101	350	153	299	596	112	30	113	153	200	149	213
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	97	43	83	166	31	8	31	43	56	41	59
Total Analysis Volume [veh/h]	112	389	170	332	662	124	33	126	170	222	166	237
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	25	25	18	32	0	11	28	0	14	31	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	17	32	15	26	26	3	10	10	11	18	18
g / C, Green / Cycle	0.09	0.25	0.47	0.22	0.38	0.38	0.05	0.14	0.14	0.16	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.06	0.21	0.10	0.19	0.21	0.21	0.02	0.07	0.11	0.12	0.05	0.14
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1842	1852	1870	1589	1781	3560	1653
c, Capacity [veh/h]	159	463	770	392	708	697	88	266	226	287	909	422
d1, Uniform Delay [s]	30.89	24.93	11.09	26.09	17.09	17.10	32.21	27.52	28.74	28.06	20.29	22.58
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.64	4.17	0.14	5.13	0.69	0.71	2.60	1.31	5.00	4.47	0.10	1.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.84	0.22	0.85	0.56	0.56	0.37	0.47	0.75	0.77	0.18	0.56
d, Delay for Lane Group [s/veh]	36.53	29.11	11.24	31.21	17.79	17.80	34.81	28.83	33.75	32.53	20.38	23.75
Lane Group LOS	D	C	B	C	B	B	C	C	C	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.01	6.27	1.44	5.54	4.73	4.66	0.58	1.92	2.88	3.57	0.96	3.14
50th-Percentile Queue Length [ft/ln]	50.22	156.68	36.04	138.42	118.14	116.57	14.45	47.94	71.99	89.17	23.88	78.38
95th-Percentile Queue Length [veh/ln]	3.62	10.37	2.59	9.40	8.29	8.20	1.04	3.45	5.18	6.42	1.72	5.64
95th-Percentile Queue Length [ft/ln]	90.39	259.32	64.87	234.89	207.27	205.10	26.01	86.29	129.58	160.51	42.99	141.08

Movement, Approach, & Intersection Results

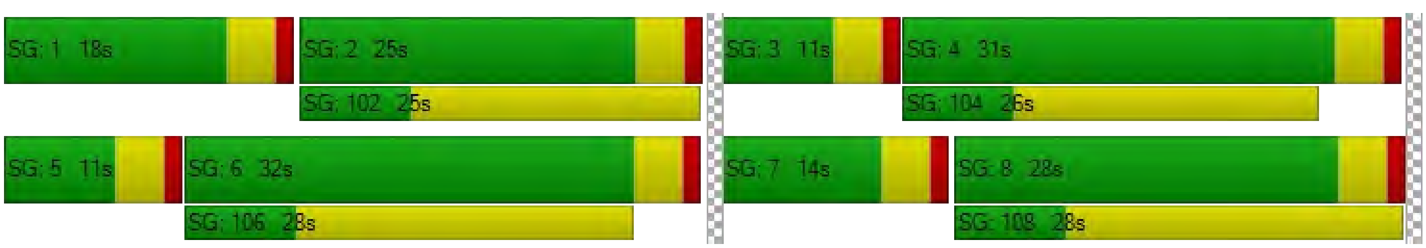
d_M, Delay for Movement [s/veh]	36.53	29.11	11.24	31.21	17.79	17.80	34.81	28.83	33.75	32.53	20.38	23.75
Movement LOS	D	C	B	C	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	25.82			21.78			31.97			25.97		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	24.95											
Intersection LOS	C											
Intersection V/C	0.813											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	32.21	32.21	32.21	32.21
I_p,int, Pedestrian LOS Score for Intersection	2.831	2.561	2.463	2.755
Crosswalk LOS	C	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	494	659	565	635
d_b, Bicycle Delay [s]	24.09	19.11	21.89	19.79
I_b,int, Bicycle LOS Score for Intersection	2.667	2.482	1.831	2.075
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	12.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.011

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	411	10	1	492	0	0	0	0	4	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	0	34	1	0	25	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	3	0	0	0	24	0	0	24	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	417	10	1	492	58	1	0	49	4	0	0
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	118	3	0	140	16	0	0	14	1	0	0
Total Analysis Volume [veh/h]	0	474	11	1	559	66	1	0	56	5	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.08	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	8.31	0.00	0.00	0.00	0.00	10.39	12.93	0.00	9.76
Movement LOS		A	A	A	A	A			B	B		A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.03	0.00	0.03
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	6.27	0.83	0.00	0.83
d_A, Approach Delay [s/veh]	0.00			0.01			10.39			12.93		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.56											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	12.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	436	19	6	481	2	1	0	3	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	25	0	0	0	0	0	0	0
Diverted Trips [veh/h]	-4	0	0	0	0	4	-1	0	1	0	0	0
Pass-by Trips [veh/h]	0	3	0	0	24	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	442	19	6	530	6	0	0	4	0	0	0
Peak Hour Factor	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	124	5	2	149	2	0	0	1	0	0	0
Total Analysis Volume [veh/h]	0	496	21	7	595	7	0	0	4	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	8.42	0.00	0.00	0.00	0.00	10.16	12.94	0.00	9.75
Movement LOS		A	A	A	A	A			B	B		A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.10			10.16			11.34		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.09											
Intersection LOS	B											

Intersection Level Of Service Report

Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	20.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	110	439	140	0	98	645	83	113	176	217	199	150	47
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	21	0	0	3	1	18	3	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	439	140	3	99	663	86	113	176	217	199	150	47
Peak Hour Factor	0.9600	0.9600	0.9600	1.000	0.960	0.960	0.960	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	114	36	1	26	173	22	29	46	57	52	39	12
Total Analysis Volume [veh/h]	136	457	146	3	103	691	90	118	183	226	207	156	49
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	35	0	0	16	37	0	12	31	0	13	32	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	54	54	54	54	54	54	54	54	54	54	54	54
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	14	14	6	14	14	6	10	10	8	12	12
g / C, Green / Cycle	0.11	0.26	0.26	0.10	0.26	0.26	0.11	0.18	0.18	0.15	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.08	0.13	0.09	0.06	0.19	0.06	0.06	0.05	0.14	0.12	0.04	0.03
s, saturation flow rate [veh/h]	1781	3560	1653	1782	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	201	943	438	184	910	406	200	685	306	271	848	364
d1, Uniform Delay [s]	23.12	16.82	16.09	23.19	18.67	15.95	23.07	18.97	20.89	22.08	16.84	16.64
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.94	0.39	0.44	2.81	1.34	0.27	2.78	0.21	3.51	4.49	0.10	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	0.48	0.33	0.57	0.76	0.22	0.59	0.27	0.74	0.76	0.18	0.13
d, Delay for Lane Group [s/veh]	27.06	17.21	16.53	26.00	20.00	16.22	25.85	19.17	24.39	26.57	16.94	16.81
Lane Group LOS	C	B	B	C	C	B	C	B	C	C	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.76	2.19	1.36	1.34	3.73	0.82	1.39	0.86	2.57	2.60	0.70	0.45
50th-Percentile Queue Length [ft/ln]	43.95	54.80	34.05	33.44	93.29	20.59	34.86	21.40	64.32	64.88	17.58	11.15
95th-Percentile Queue Length [veh/ln]	3.16	3.95	2.45	2.41	6.72	1.48	2.51	1.54	4.63	4.67	1.27	0.80
95th-Percentile Queue Length [ft/ln]	79.12	98.64	61.29	60.19	167.92	37.06	62.75	38.53	115.77	116.79	31.65	20.06

Movement, Approach, & Intersection Results

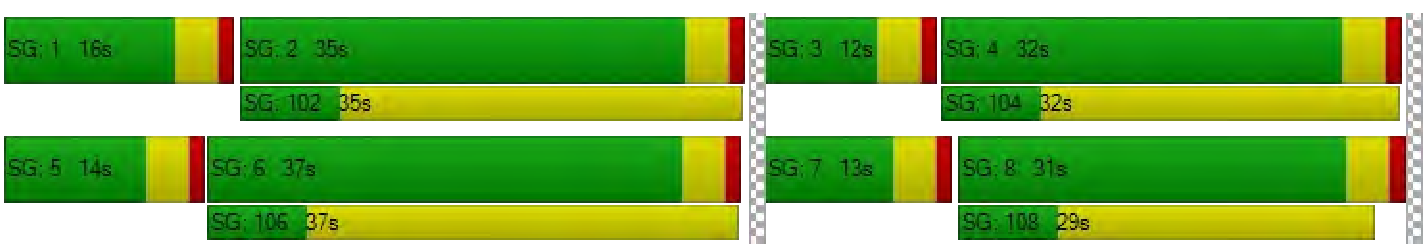
d_M, Delay for Movement [s/veh]	27.06	17.21	16.53	26.00	26.00	20.00	16.22	25.85	19.17	24.39	26.57	16.94	16.81
Movement LOS	C	B	B	C	C	C	B	C	B	C	C	B	B
d_A, Approach Delay [s/veh]	18.89			20.33				22.91			21.76		
Approach LOS	B			C				C			C		
d_I, Intersection Delay [s/veh]	20.68												
Intersection LOS	C												
Intersection V/C	0.743												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.856	2.807	2.677	2.615
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	653	695	568	589
d_b, Bicycle Delay [s]	21.56	20.23	24.34	23.63
I_b,int, Bicycle LOS Score for Intersection	2.169	2.206	1.994	1.900
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	19.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.692

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	295	694	0	0	782	367	0	0	0	222	8	158
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	13	0	0	11	7	0	0	0	0	0	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	295	707	0	0	793	374	0	0	0	222	8	166
Peak Hour Factor	0.9300	0.9300	0.9290	0.9290	0.9300	0.9300	0.9300	0.9290	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	79	190	0	0	213	101	0	0	0	60	2	45
Total Analysis Volume [veh/h]	317	760	0	0	853	402	0	0	0	239	9	178
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	14	35	0	0	21	0	11	0	0	0	14	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	38	24	24	0	10	10
g / C, Green / Cycle	0.17	0.63	0.40	0.40	0.00	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.17	0.21	0.24	0.25	0.00	0.14	0.11
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1813	1615
c, Capacity [veh/h]	315	2286	1442	644	4	303	270
d1, Uniform Delay [s]	25.11	5.17	14.27	14.52	0.00	24.23	23.51
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	25.50	0.39	1.79	4.53	0.00	5.45	2.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.01	0.33	0.59	0.62	0.00	0.82	0.66
d, Delay for Lane Group [s/veh]	50.61	5.56	16.06	19.05	0.00	29.68	26.26
Lane Group LOS	F	A	B	B	A	C	C
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	6.40	1.69	4.35	4.64	0.00	3.63	2.41
50th-Percentile Queue Length [ft/ln]	159.89	42.16	108.69	115.89	0.00	90.77	60.37
95th-Percentile Queue Length [veh/ln]	10.58	3.04	7.77	8.17	0.00	6.54	4.35
95th-Percentile Queue Length [ft/ln]	264.51	75.89	194.18	204.16	0.00	163.39	108.66

Movement, Approach, & Intersection Results

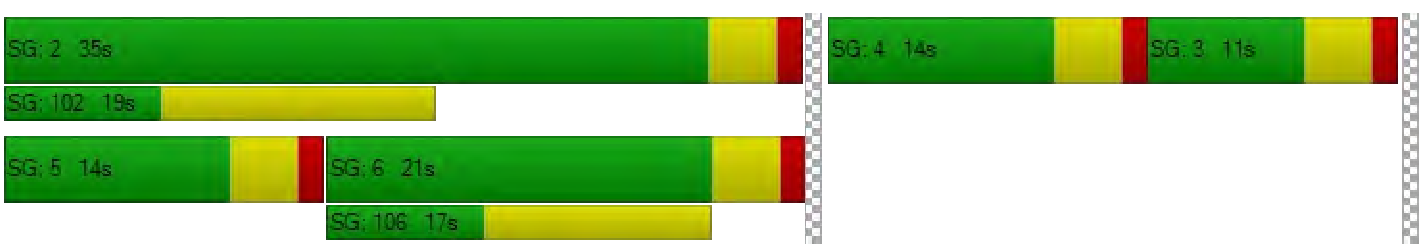
d_M, Delay for Movement [s/veh]	50.61	5.56	0.00	0.00	16.06	19.05	0.00	0.00	0.00	29.68	29.68	26.26
Movement LOS	F	A			B	B	A		A	C	C	C
d_A, Approach Delay [s/veh]	18.82			17.02			0.00			28.25		
Approach LOS	B			B			A			C		
d_I, Intersection Delay [s/veh]	19.46											
Intersection LOS	B											
Intersection V/C	0.692											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.047	1.900
Crosswalk LOS	F	F	B	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1033	567	0	333
d_b, Bicycle Delay [s]	7.01	15.41	30.00	20.83
I_b,int, Bicycle LOS Score for Intersection	2.448	2.595	4.132	2.263
Bicycle LOS	B	B	D	B

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	17.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.818

Intersection Setup

Name					Highland Spr Ave							
Approach		Northbound			Southbound			Eastbound			Westbound	
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			35.00			30.00			30.00	
Grade [%]		0.00			0.00			0.00			0.00	
Curb Present		No			No			No				
Crosswalk		No			No			Yes			Yes	

Volumes

Name					Highland Spr Ave							
Base Volume Input [veh/h]	0	695	392	209	795	0	293	2	438	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	7	4	0	8	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	700	392	216	799	0	301	2	438	0	0	0
Peak Hour Factor	0.9510	0.9500	0.9500	0.9500	0.9500	0.9510	0.9500	0.9500	0.9500	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	184	103	57	210	0	79	1	115	0	0	0
Total Analysis Volume [veh/h]	0	737	413	227	841	0	317	2	461	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	21	0	12	33	0	0	27	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	63	63	63	63	63	63	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	20	20	10	34	21	21	
g / C, Green / Cycle	0.32	0.32	0.15	0.54	0.33	0.33	
(v / s)_i Volume / Saturation Flow Rate	0.20	0.26	0.12	0.23	0.18	0.29	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1204	517	290	1946	606	541	
d1, Uniform Delay [s]	18.08	19.54	25.58	8.75	16.89	19.47	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.51	2.90	4.60	0.15	0.71	3.92	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.61	0.80	0.78	0.43	0.53	0.85	
d, Delay for Lane Group [s/veh]	18.59	22.43	30.18	8.90	17.60	23.39	
Lane Group LOS	B	C	C	A	B	C	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	4.20	5.39	3.37	2.75	3.49	6.21	
50th-Percentile Queue Length [ft/ln]	104.89	134.83	84.34	68.77	87.33	155.22	
95th-Percentile Queue Length [veh/ln]	7.55	9.20	6.07	4.95	6.29	10.30	
95th-Percentile Queue Length [ft/ln]	188.80	230.05	151.81	123.79	157.19	257.39	

Movement, Approach, & Intersection Results

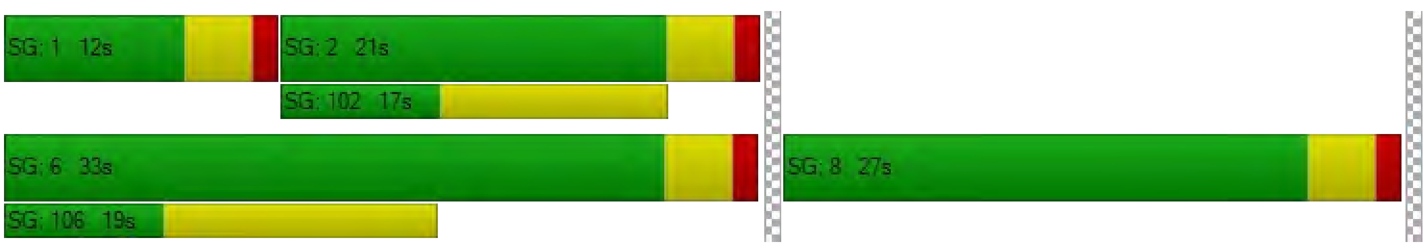
d_M, Delay for Movement [s/veh]	0.00	18.59	22.43	30.18	8.90	0.00	17.60	17.60	23.39	0.00	0.00	0.00
Movement LOS		B	C	C	A		B	B	C			
d_A, Approach Delay [s/veh]	19.97			13.43			21.02			0.00		
Approach LOS	B			B			C			A		
d_I, Intersection Delay [s/veh]	17.91											
Intersection LOS	B											
Intersection V/C	0.818											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.073	2.027
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	967	767	0
d_b, Bicycle Delay [s]	15.41	8.01	11.41	30.00
I_b,int, Bicycle LOS Score for Intersection	2.508	2.441	2.847	4.132
Bicycle LOS	B	B	C	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Scenario 2 Existing Plus Project

3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	EB Left	0.822	23.6	C
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.003	16.8	C
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Left	0.087	17.3	C
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	SB Left	0.787	25.3	C
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	NB Left	0.757	23.1	C
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	SB Left	0.858	22.4	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	23.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.822

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	66	641	222	191	431	15	20	116	48	165	102	146
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	3	0	0	0	17	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	644	222	191	434	15	20	116	65	167	102	146
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	173	60	51	117	4	5	31	17	45	27	39
Total Analysis Volume [veh/h]	71	692	239	205	467	16	22	125	70	180	110	157
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	52	52	19	56	0	11	32	0	17	38	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	74	74	74	74	74	74	74	74	74	74	74	74
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	30	44	11	35	35	3	7	7	10	14	14
g / C, Green / Cycle	0.07	0.41	0.60	0.14	0.48	0.48	0.03	0.09	0.09	0.14	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.04	0.37	0.14	0.12	0.13	0.13	0.01	0.05	0.06	0.10	0.03	0.09
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1923	1852	1870	1655	1781	3560	1653
c, Capacity [veh/h]	130	768	993	256	900	925	64	174	154	242	693	322
d1, Uniform Delay [s]	33.04	20.36	6.88	30.60	11.39	11.39	34.82	32.07	32.21	30.65	24.71	26.46
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.55	4.23	0.12	5.78	0.16	0.15	3.14	2.96	3.97	4.46	0.11	1.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.55	0.90	0.24	0.80	0.26	0.26	0.34	0.57	0.62	0.74	0.16	0.49
d, Delay for Lane Group [s/veh]	36.59	24.59	7.00	36.37	11.54	11.54	37.95	35.03	36.18	35.11	24.81	27.61
Lane Group LOS	D	C	A	D	B	B	D	D	D	D	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.32	11.00	1.51	3.80	2.15	2.21	0.43	1.78	1.73	3.13	0.74	2.34
50th-Percentile Queue Length [ft/ln]	32.96	274.93	37.84	95.12	53.79	55.34	10.67	44.38	43.21	78.22	18.59	58.61
95th-Percentile Queue Length [veh/ln]	2.37	16.44	2.72	6.85	3.87	3.98	0.77	3.20	3.11	5.63	1.34	4.22
95th-Percentile Queue Length [ft/ln]	59.32	410.89	68.12	171.22	96.82	99.61	19.20	79.88	77.77	140.80	33.46	105.50

Movement, Approach, & Intersection Results

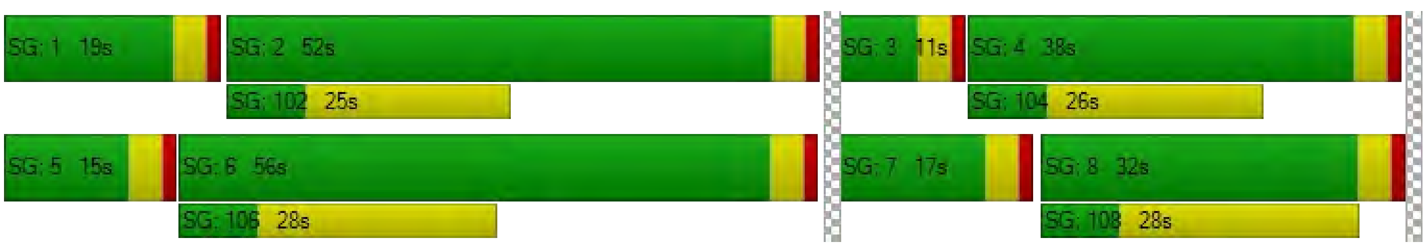
d_M, Delay for Movement [s/veh]	36.59	24.59	7.00	36.37	11.54	11.54	37.95	35.26	36.18	35.11	24.81	27.61
Movement LOS	D	C	A	D	B	B	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	21.25			18.94			35.83			29.94		
Approach LOS	C			B			D			C		
d_I, Intersection Delay [s/veh]	23.57											
Intersection LOS	C											
Intersection V/C	0.822											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	2.847	2.525	2.408	2.714
Crosswalk LOS	C	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	867	467	567
d_b, Bicycle Delay [s]	21.60	19.27	35.27	30.82
I_b,int, Bicycle LOS Score for Intersection	3.213	2.127	1.739	1.928
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	16.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.003

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	745	6	1	580	0	0	0	0	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	0	22	0	0	25	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	2	0	0	0	20	5	0	20	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	750	6	1	580	42	5	0	45	1	0	1
Peak Hour Factor	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	203	2	0	157	11	1	0	12	0	0	0
Total Analysis Volume [veh/h]	0	813	7	1	628	46	5	0	49	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.07	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.41	0.00	0.00	0.00	0.00	10.64	16.80	0.00	11.05
Movement LOS		A	A	A	A	A			B	C		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.01	0.00	0.01
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	5.74	0.37	0.00	0.37
d_A, Approach Delay [s/veh]	0.00			0.01			10.64			13.92		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.36											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	17.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.087

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	720	20	0	628	1	0	0	3	26	0	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	25	0	0	0	0	0	0	0
Diverted Trips [veh/h]	-4	0	0	0	0	4	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	2	0	0	20	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	725	20	0	673	5	0	0	3	26	0	7
Peak Hour Factor	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	194	5	0	180	1	0	0	1	7	0	2
Total Analysis Volume [veh/h]	0	776	21	0	721	5	0	0	3	28	0	7
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.09	0.00	0.01
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.32	0.00	0.00	0.00	0.00	10.66	17.33	0.00	11.95
Movement LOS		A	A	A	A	A			B	C		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.33	0.00	0.33
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	8.14	0.00	8.14
d_A, Approach Delay [s/veh]	0.00			0.00			10.66			16.25		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.38											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	25.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.787

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	209	651	141	0	69	505	95	197	321	194	299	295	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	15	0	0	3	2	17	3	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	224	651	141	3	71	522	98	197	321	194	299	295	81
Peak Hour Factor	0.9400	0.9400	0.9400	1.000	0.940	0.940	0.940	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	173	38	1	19	139	26	52	85	52	80	78	22
Total Analysis Volume [veh/h]	238	693	150	3	76	555	104	210	341	206	318	314	86
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	20	48	0	0	13	41	0	21	33	0	26	38	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	19	19	5	13	13	9	11	11	14	15	15
g / C, Green / Cycle	0.17	0.29	0.29	0.08	0.20	0.20	0.15	0.17	0.17	0.21	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.13	0.19	0.09	0.04	0.16	0.07	0.11	0.09	0.12	0.18	0.08	0.05
s, saturation flow rate [veh/h]	1781	3560	1653	1782	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	297	1027	477	146	725	324	269	627	280	382	883	379
d1, Uniform Delay [s]	26.07	20.46	18.12	28.69	24.46	22.09	26.82	24.74	25.66	24.46	20.63	19.96
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.97	0.78	0.37	3.07	1.72	0.57	4.90	0.74	3.75	4.79	0.24	0.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.67	0.31	0.54	0.77	0.32	0.78	0.54	0.74	0.83	0.36	0.23
d, Delay for Lane Group [s/veh]	31.04	21.24	18.50	31.76	26.18	22.66	31.73	25.47	29.41	29.25	20.87	20.26
Lane Group LOS	C	C	B	C	C	C	C	C	C	C	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.75	4.39	1.69	1.25	3.95	1.33	3.17	2.21	2.98	4.79	1.85	1.00
50th-Percentile Queue Length [ft/ln]	93.64	109.84	42.29	31.36	98.67	33.21	79.33	55.20	74.45	119.75	46.31	24.94
95th-Percentile Queue Length [veh/ln]	6.74	7.83	3.04	2.26	7.10	2.39	5.71	3.97	5.36	8.38	3.33	1.80
95th-Percentile Queue Length [ft/ln]	168.55	195.78	76.12	56.45	177.60	59.77	142.80	99.35	134.01	209.48	83.37	44.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.04	21.24	18.50	31.76	31.76	26.18	22.66	31.73	25.47	29.41	29.25	20.87	20.26
Movement LOS	C	C	B	C	C	C	C	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	23.02			26.28				28.28			24.51		
Approach LOS	C			C				C			C		
d_I, Intersection Delay [s/veh]	25.28												
Intersection LOS	C												
Intersection V/C	0.787												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	2.909	2.848	2.811	2.710
Crosswalk LOS	C	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	733	617	483	567
d_b, Bicycle Delay [s]	24.07	28.70	34.50	30.82
I_b,int, Bicycle LOS Score for Intersection	2.451	2.106	2.184	2.152
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	23.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.757

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	338	972	0	0	826	313	0	0	0	340	10	307
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	9	0	0	10	7	0	0	0	0	0	6
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	338	981	0	0	836	320	0	0	0	340	10	313
Peak Hour Factor	0.9500	0.9500	0.9290	0.9290	0.9500	0.9500	0.9500	0.9290	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	89	258	0	0	220	84	0	0	0	89	3	82
Total Analysis Volume [veh/h]	356	1033	0	0	880	337	0	0	0	358	11	329
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	75
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	21	42	0	0	21	0	11	0	0	0	22	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	75	75	75	75	75	75	75
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	16	46	26	26	0	17	17
g / C, Green / Cycle	0.21	0.61	0.34	0.34	0.00	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.19	0.29	0.24	0.21	0.00	0.20	0.20
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1812	1615
c, Capacity [veh/h]	401	2208	1244	555	1	415	370
d1, Uniform Delay [s]	28.68	7.99	21.37	20.43	0.00	28.02	28.02
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.76	0.71	3.41	4.87	0.00	6.58	7.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.47	0.71	0.61	0.00	0.89	0.89
d, Delay for Lane Group [s/veh]	35.44	8.70	24.78	25.30	0.00	34.60	35.33
Lane Group LOS	D	A	C	C	A	C	D
Critical Lane Group	Yes	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	6.69	4.00	6.85	5.34	0.00	6.87	6.20
50th-Percentile Queue Length [ft/ln]	167.35	99.97	171.33	133.47	0.00	171.83	155.09
95th-Percentile Queue Length [veh/ln]	10.94	7.20	11.15	9.13	0.00	11.17	10.29
95th-Percentile Queue Length [ft/ln]	273.43	179.95	278.66	228.21	0.00	279.32	257.21

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	35.44	8.70	0.00	0.00	24.78	25.30	0.00	0.00	0.00	34.60	34.60	35.33
Movement LOS	D	A			C	C	A		A	C	C	D
d_A, Approach Delay [s/veh]	15.55			24.92			0.00			34.94		
Approach LOS	B			C			A			C		
d_I, Intersection Delay [s/veh]	23.10											
Intersection LOS	C											
Intersection V/C	0.757											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	27.31	27.31
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.048	2.045
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1013	453	0	480
d_b, Bicycle Delay [s]	9.13	22.43	37.50	21.66
I_b,int, Bicycle LOS Score for Intersection	2.706	2.564	4.132	2.711
Bicycle LOS	B	B	D	B

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	22.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.858

Intersection Setup

Name				Highland Spr Ave								
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	No			No			Yes			Yes		

Volumes

Name				Highland Spr Ave								
Base Volume Input [veh/h]	0	984	500	126	1039	0	326	3	551	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	6	4	0	6	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	987	500	132	1043	0	332	3	551	0	0	0
Peak Hour Factor	0.9510	0.9800	0.9800	0.9800	0.9800	0.9510	0.9800	0.9800	0.9800	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	252	128	34	266	0	85	1	141	0	0	0
Total Analysis Volume [veh/h]	0	1007	510	135	1064	0	339	3	562	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	33	0	11	44	0	0	36	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	84	84	84	84	84	84	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	32	32	8	43	32	32	
g / C, Green / Cycle	0.38	0.38	0.09	0.52	0.39	0.39	
(v / s)_i Volume / Saturation Flow Rate	0.27	0.32	0.07	0.29	0.19	0.35	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1420	609	177	1877	699	623	
d1, Uniform Delay [s]	22.22	23.79	37.13	13.77	19.52	24.28	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.67	3.14	6.73	0.27	0.53	5.13	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.71	0.84	0.76	0.57	0.49	0.90	
d, Delay for Lane Group [s/veh]	22.89	26.93	43.86	14.04	20.05	29.41	
Lane Group LOS	C	C	D	B	C	C	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	8.11	9.18	2.94	6.17	4.91	10.72	
50th-Percentile Queue Length [ft/ln]	202.80	229.61	73.61	154.17	122.85	268.05	
95th-Percentile Queue Length [veh/ln]	12.78	14.15	5.30	10.24	8.55	16.09	
95th-Percentile Queue Length [ft/ln]	319.57	353.86	132.50	255.98	213.74	402.30	

Movement, Approach, & Intersection Results

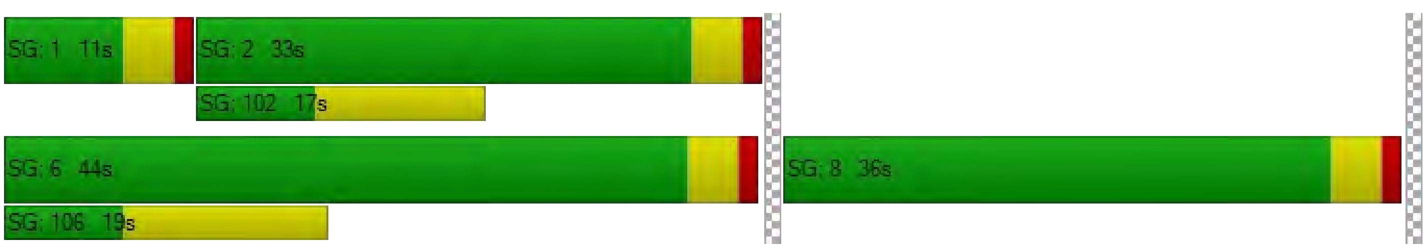
d_M, Delay for Movement [s/veh]	0.00	22.89	26.93	43.86	14.04	0.00	20.05	20.05	29.41	0.00	0.00	0.00
Movement LOS		C	C	D	B		C	C	C			
d_A, Approach Delay [s/veh]	24.25			17.40			25.87			0.00		
Approach LOS	C			B			C			A		
d_I, Intersection Delay [s/veh]	22.38											
Intersection LOS	C											
Intersection V/C	0.858											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	29.76	29.76
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.149	2.049
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	725	1000	800	0
d_b, Bicycle Delay [s]	16.26	10.00	14.40	40.00
I_b,int, Bicycle LOS Score for Intersection	2.811	2.549	3.051	4.132
Bicycle LOS	C	B	C	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



OPENING YEAR (2022) WITHOUT PROJECT

Highland Springs Office-Commercial

Vistro File: G:\...\AME.vistro
Report File: G:\...\AMOY.pdf

Scenario 3 Opening Year (2022) Without Project
3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	0.898	38.6	D
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.016	16.7	C
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	EB Left	0.004	19.8	C
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	NB Left	0.795	24.4	C
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	WB Left	0.935	42.1	D
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	SB Left	0.932	46.2	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	38.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.898

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	101	347	152	299	591	112	30	113	128	196	149	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	154	40	17	261	0	0	0	0	81	0	11
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	101	515	198	328	876	112	30	113	128	285	149	233
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	143	55	91	243	31	8	31	36	79	41	65
Total Analysis Volume [veh/h]	112	572	220	364	973	124	33	126	142	317	166	259
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	30	30	18	37	0	12	33	0	14	35	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	119	119	119	119	119	119	119	119	119	119	119	119
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	39	68	27	57	57	5	13	13	24	33	33
g / C, Green / Cycle	0.08	0.33	0.57	0.22	0.48	0.48	0.04	0.11	0.11	0.20	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.06	0.31	0.13	0.20	0.29	0.29	0.02	0.07	0.09	0.18	0.05	0.16
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1871	1852	1870	1589	1781	3560	1653
c, Capacity [veh/h]	141	618	935	399	890	890	72	205	175	359	970	450
d1, Uniform Delay [s]	54.14	38.63	13.02	45.24	23.21	23.31	56.24	50.83	52.05	46.37	33.21	37.54
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.76	6.55	0.13	8.28	0.69	0.71	4.43	2.96	8.81	7.16	0.08	1.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.93	0.24	0.91	0.61	0.62	0.46	0.61	0.81	0.88	0.17	0.58
d, Delay for Lane Group [s/veh]	63.91	45.18	13.15	53.52	23.90	24.02	60.67	53.79	60.86	53.53	33.29	38.71
Lane Group LOS	E	D	B	D	C	C	E	D	E	D	C	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.69	17.06	2.96	11.38	11.36	11.52	1.06	3.74	4.55	9.56	1.80	6.47
50th-Percentile Queue Length [ft/ln]	92.24	426.46	74.00	284.41	283.94	287.98	26.40	93.48	113.70	238.88	45.07	161.64
95th-Percentile Queue Length [veh/ln]	6.64	23.83	5.33	16.91	16.88	17.09	1.90	6.73	8.05	14.62	3.24	10.64
95th-Percentile Queue Length [ft/ln]	166.03	595.79	133.19	422.70	422.11	427.13	47.51	168.27	201.14	365.62	81.12	265.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.91	45.18	13.15	53.52	23.95	24.02	60.67	53.79	60.86	53.53	33.29	38.71
Movement LOS	E	D	B	D	C	C	E	D	E	D	C	D
d_A, Approach Delay [s/veh]		39.71			31.32			57.88			43.83	
Approach LOS		D			C			E			D	
d_I, Intersection Delay [s/veh]	38.62											
Intersection LOS	D											
Intersection V/C	0.898											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.922	2.700	2.462	2.809
Crosswalk LOS	C	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	547	695	611	653
d_b, Bicycle Delay [s]	25.06	20.23	22.93	21.56
I_b,int, Bicycle LOS Score for Intersection	3.051	2.765	1.808	2.172
Bicycle LOS	C	C	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	16.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	411	10	1	492	0	0	0	0	4	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	229	0	0	357	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	657	10	1	869	0	0	0	0	4	0	0
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	187	3	0	247	0	0	0	0	1	0	0
Total Analysis Volume [veh/h]	0	747	11	1	988	0	0	0	0	5	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.18	0.00	0.00	0.00	0.00	11.84	16.69	0.00	10.90
Movement LOS		A	A	A	A	A			B	C		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	1.22	0.00	1.22
d_A, Approach Delay [s/veh]	0.00			0.01			11.84			16.69		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.05											
Intersection LOS	C											

Intersection Level Of Service Report

Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	19.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	436	19	6	481	2	1	0	3	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	229	0	0	357	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	683	20	6	857	2	1	0	3	0	0	0
Peak Hour Factor	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	192	6	2	240	1	0	0	1	0	0	0
Total Analysis Volume [veh/h]	4	767	22	7	962	2	1	0	3	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			Yes	Yes
Number of Storage Spaces in Median	0	0	2	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.01	0.00	0.00	9.32	0.00	0.00	19.76	0.00	11.79	16.97	0.00	10.80
Movement LOS	B	A	A	A	A	A	C		B	C		B
95th-Percentile Queue Length [veh/ln]	0.02	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.42	0.00	0.00	0.63	0.00	0.00	0.73	0.00	0.73	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.05			0.07			13.79			13.89		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.09											
Intersection LOS	C											

Intersection Level Of Service Report

Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	24.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.795

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	110	439	140	0	98	645	83	113	176	217	199	150	47
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	183	17	0	56	300	0	0	0	0	3	0	15
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	110	640	163	0	158	971	83	113	176	217	210	150	64
Peak Hour Factor	0.9600	0.9600	0.9600	1.000	0.960	0.960	0.960	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	167	42	0	41	253	22	29	46	57	55	39	17
Total Analysis Volume [veh/h]	115	667	170	0	165	1011	86	118	183	226	219	156	67
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	35	0	0	16	37	0	12	31	0	13	32	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	68	68	68	68	68	68	68	68	68	68	68	68
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	21	21	8	23	23	6	12	12	10	16	16
g / C, Green / Cycle	0.09	0.32	0.32	0.12	0.34	0.34	0.09	0.18	0.18	0.15	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.06	0.19	0.10	0.09	0.28	0.05	0.06	0.05	0.14	0.12	0.04	0.04
s, saturation flow rate [veh/h]	1781	3560	1653	1781	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	163	1123	522	214	1227	548	170	649	290	275	880	378
d1, Uniform Delay [s]	30.11	19.67	17.82	29.09	20.46	15.49	30.04	24.41	26.88	27.82	20.70	20.70
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.54	0.50	0.36	5.74	1.46	0.13	4.97	0.24	4.55	5.26	0.10	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.59	0.33	0.77	0.82	0.16	0.69	0.28	0.78	0.80	0.18	0.18
d, Delay for Lane Group [s/veh]	35.66	20.17	18.18	34.83	21.92	15.62	35.02	24.64	31.42	33.08	20.79	20.92
Lane Group LOS	D	C	B	C	C	B	D	C	C	C	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.01	4.20	1.96	2.84	6.96	0.88	1.95	1.18	3.51	3.62	0.93	0.81
50th-Percentile Queue Length [ft/ln]	50.17	105.08	48.92	71.02	174.00	22.11	48.71	29.46	87.85	90.41	23.31	20.35
95th-Percentile Queue Length [veh/ln]	3.61	7.57	3.52	5.11	11.29	1.59	3.51	2.12	6.32	6.51	1.68	1.47
95th-Percentile Queue Length [ft/ln]	90.30	189.14	88.05	127.83	282.17	39.80	87.68	53.04	158.12	162.74	41.96	36.64

Movement, Approach, & Intersection Results

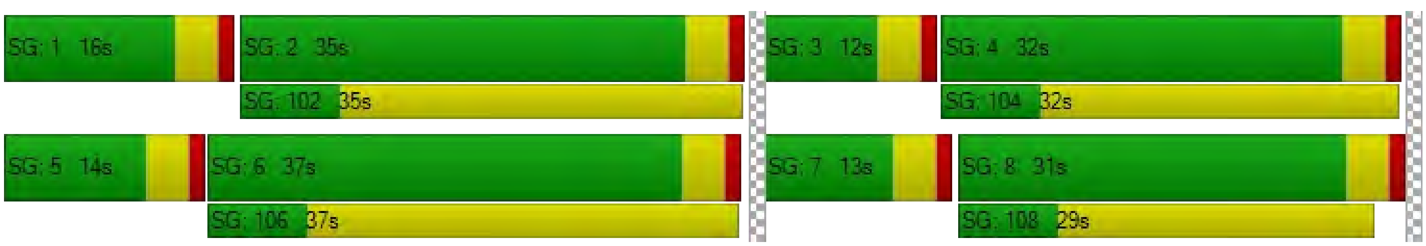
d_M, Delay for Movement [s/veh]	35.66	20.17	18.18	34.83	34.83	21.92	15.62	35.02	24.64	31.42	33.08	20.79	20.92
Movement LOS	D	C	B	C	C	C	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]	21.69			23.18				29.88			26.90		
Approach LOS	C			C				C			C		
d_I, Intersection Delay [s/veh]	24.36												
Intersection LOS	C												
Intersection V/C	0.795												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.932	2.985	2.671	2.637
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	653	695	568	589
d_b, Bicycle Delay [s]	21.56	20.23	24.34	23.63
I_b,int, Bicycle LOS Score for Intersection	2.345	2.465	1.994	1.924
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	42.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.935

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	295	694	0	0	782	367	0	0	0	222	8	158
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.00	1.00	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	12	195	0	0	189	131	0	0	0	138	0	32
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	319	917	0	0	1003	513	0	0	0	369	8	196
Peak Hour Factor	0.9300	0.9300	0.9290	0.9290	0.9300	0.9300	0.9300	0.9290	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	86	247	0	0	270	138	0	0	0	99	2	53
Total Analysis Volume [veh/h]	343	986	0	0	1078	552	0	0	0	397	9	211
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	14	35	0	0	21	0	11	0	0	0	14	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	38	24	24	0	10	10
g / C, Green / Cycle	0.17	0.63	0.40	0.40	0.00	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.18	0.27	0.30	0.34	0.00	0.22	0.13
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1811	1615
c, Capacity [veh/h]	315	2286	1441	643	4	303	270
d1, Uniform Delay [s]	25.11	5.62	15.54	16.58	0.00	25.11	24.06
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	52.31	0.60	3.59	13.88	0.00	158.33	4.91
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.09	0.43	0.75	0.86	0.00	1.34	0.78
d, Delay for Lane Group [s/veh]	77.42	6.21	19.13	30.45	0.00	183.44	28.97
Lane Group LOS	F	A	B	C	A	F	C
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.74	2.39	6.21	8.48	0.00	17.33	3.05
50th-Percentile Queue Length [ft/ln]	218.45	59.86	155.29	211.99	0.00	433.19	76.17
95th-Percentile Queue Length [veh/ln]	14.13	4.31	10.30	13.26	0.00	27.36	5.48
95th-Percentile Queue Length [ft/ln]	353.17	107.75	257.48	331.38	0.00	683.99	137.10

Movement, Approach, & Intersection Results

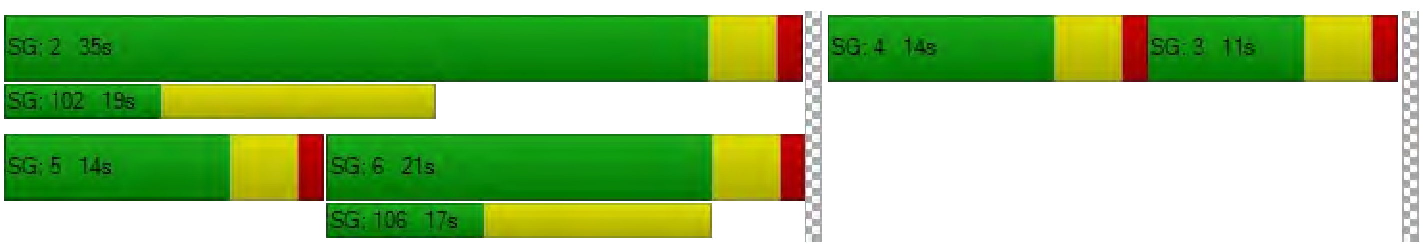
d_M, Delay for Movement [s/veh]	77.42	6.21	0.00	0.00	19.13	30.45	0.00	0.00	0.00	183.44	183.44	28.97
Movement LOS	F	A			B	C	A		A	F	F	C
d_A, Approach Delay [s/veh]	24.59			22.97			0.00			130.61		
Approach LOS	C			C			A			F		
d_I, Intersection Delay [s/veh]	42.14											
Intersection LOS	D											
Intersection V/C	0.935											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.133	1.993
Crosswalk LOS	F	F	B	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1033	567	0	333
d_b, Bicycle Delay [s]	7.01	15.41	30.00	20.83
I_b,int, Bicycle LOS Score for Intersection	2.656	2.904	4.132	2.578
Bicycle LOS	B	C	D	B

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	46.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.932

Intersection Setup

Name				Highland Spr Ave								
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	No			No			Yes			Yes		

Volumes

Name				Highland Spr Ave								
Base Volume Input [veh/h]	0	695	392	209	795	0	293	2	438	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	144	43	48	279	0	74	0	190	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	867	451	265	1106	0	379	2	646	0	0	0
Peak Hour Factor	0.9510	0.9500	0.9500	0.9500	0.9500	0.9510	0.9500	0.9500	0.9500	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	228	119	70	291	0	100	1	170	0	0	0
Total Analysis Volume [veh/h]	0	913	475	279	1164	0	399	2	680	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	21	0	12	33	0	0	27	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	163	163	163	163	163	163	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	53	53	27	83	72	72	
g / C, Green / Cycle	0.32	0.32	0.16	0.51	0.44	0.44	
(v / s)_i Volume / Saturation Flow Rate	0.24	0.29	0.15	0.32	0.22	0.42	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1215	522	306	1845	798	712	
d1, Uniform Delay [s]	49.44	53.04	67.27	28.93	32.77	44.06	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.16	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.96	6.54	10.48	0.36	0.49	10.92	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.75	0.91	0.91	0.63	0.50	0.95	
d, Delay for Lane Group [s/veh]	50.40	59.58	77.75	29.29	33.26	54.99	
Lane Group LOS	D	E	E	C	C	D	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	16.92	19.66	12.31	16.49	11.67	28.53	
50th-Percentile Queue Length [ft/ln]	423.04	491.44	307.67	412.14	291.82	713.21	
95th-Percentile Queue Length [veh/ln]	23.67	26.93	18.06	23.14	17.28	37.29	
95th-Percentile Queue Length [ft/ln]	591.70	673.23	451.50	578.61	431.90	932.20	

Movement, Approach, & Intersection Results

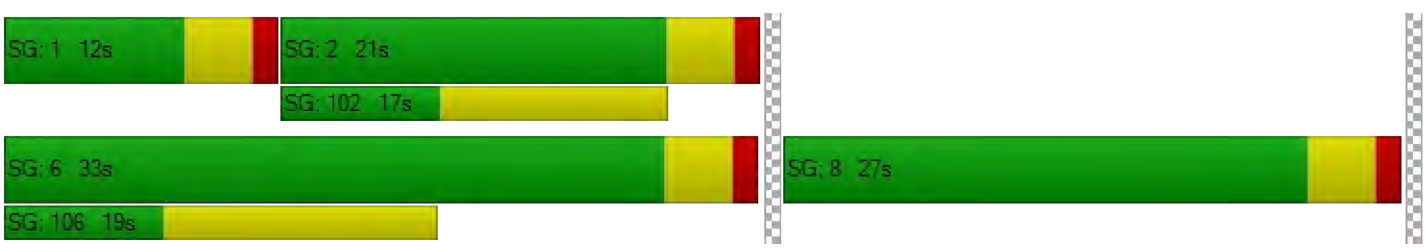
d_M, Delay for Movement [s/veh]	0.00	50.40	59.58	77.75	29.29	0.00	33.26	33.26	54.99	0.00	0.00	0.00
Movement LOS		D	E	E	C		C	C	D			
d_A, Approach Delay [s/veh]	53.54			38.66			46.93			0.00		
Approach LOS	D			D			D			A		
d_I, Intersection Delay [s/veh]	46.22											
Intersection LOS	D											
Intersection V/C	0.932											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.219	2.138
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	967	767	0
d_b, Bicycle Delay [s]	15.41	8.01	11.41	30.00
I_b,int, Bicycle LOS Score for Intersection	2.705	2.750	3.343	4.132
Bicycle LOS	B	C	C	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Highland Springs Office-Commercial

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Scenario 3 Opening Year (2022) Without Project

Report File: G:\...\PMOY.pdf
3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	1.030	74.0	E
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.008	33.0	D
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Left	0.215	38.7	E
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	SB Left	0.862	37.7	D
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	NB Left	0.873	37.3	D
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	SB Left	1.043	48.3	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	74.0
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.030

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	66	641	222	191	431	15	20	116	48	165	102	146
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	411	80	25	294	0	0	0	0	71	0	30
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	1078	311	224	742	15	20	116	48	243	102	182
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	290	84	60	199	4	5	31	13	65	27	49
Total Analysis Volume [veh/h]	71	1159	334	241	798	16	22	125	52	261	110	196
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	39	39	11	39	0	11	32	0	13	34	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	215	215	215	215	215	215	215	215	215	215	215	215
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	120	158	31	141	141	5	13	13	35	43	43
g / C, Green / Cycle	0.05	0.56	0.74	0.15	0.65	0.65	0.02	0.06	0.06	0.16	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.04	0.62	0.20	0.14	0.21	0.21	0.01	0.05	0.05	0.15	0.03	0.12
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1932	1852	1870	1691	1781	3560	1653
c, Capacity [veh/h]	87	1044	1219	259	1225	1265	44	115	104	286	706	328
d1, Uniform Delay [s]	101.26	47.45	9.29	90.78	16.28	16.28	103.61	99.37	99.69	88.75	71.25	78.34
k, delay calibration	0.11	0.50	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	16.87	63.19	0.12	14.10	0.15	0.15	8.51	10.86	15.34	11.24	0.10	1.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	1.11	0.27	0.93	0.33	0.33	0.50	0.78	0.83	0.91	0.16	0.60
d, Delay for Lane Group [s/veh]	118.14	110.64	9.42	104.88	16.44	16.43	112.12	110.23	115.03	99.98	71.35	80.09
Lane Group LOS	F	F	A	F	B	B	F	F	F	F	E	F
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.39	73.91	5.41	14.44	9.09	9.39	1.33	5.36	5.29	15.14	2.52	10.01
50th-Percentile Queue Length [ft/ln]	109.86	1847.76	135.17	360.91	227.31	234.77	33.32	134.08	132.20	378.38	63.11	250.29
95th-Percentile Queue Length [veh/ln]	7.83	96.15	9.22	20.67	14.04	14.42	2.40	9.16	9.06	21.52	4.54	15.20
95th-Percentile Queue Length [ft/ln]	195.81	2403.81	230.51	516.69	350.94	360.42	59.98	229.03	226.49	537.89	113.61	380.02

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	118.14	110.64	9.42	104.88	16.44	16.43	112.12	111.57	115.03	99.98	71.35	80.09
Movement LOS	F	F	A	F	B	B	F	F	F	F	E	F
d_A, Approach Delay [s/veh]		89.36			36.64			112.53			87.55	
Approach LOS		F			D			F			F	
d_I, Intersection Delay [s/veh]	73.99											
Intersection LOS	E											
Intersection V/C	1.030											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.969	2.726	2.392	2.764
Crosswalk LOS	C	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	737	737	589	632
d_b, Bicycle Delay [s]	18.95	18.95	23.63	22.24
I_b,int, Bicycle LOS Score for Intersection	4.140	2.430	1.724	2.027
Bicycle LOS	D	B	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	33.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	745	6	1	580	0	0	0	0	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	561	0	0	386	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1336	6	1	989	0	0	0	0	1	0	1
Peak Hour Factor	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	362	2	0	268	0	0	0	0	0	0	0
Total Analysis Volume [veh/h]	0	1447	7	1	1072	0	0	0	0	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	12.65	0.00	0.00	0.00	0.00	12.28	32.99	0.00	14.85
Movement LOS		A	A	B	A	A			B	D		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.79	0.00	0.79
d_A, Approach Delay [s/veh]	0.00			0.01			12.28			23.92		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.02											
Intersection LOS	D											

Intersection Level Of Service Report
Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	38.7
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.215

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	720	20	0	628	1	0	0	3	26	0	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	561	0	0	386	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	1310	21	0	1039	1	0	0	3	27	0	7
Peak Hour Factor	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	351	6	0	278	0	0	0	1	7	0	2
Total Analysis Volume [veh/h]	4	1403	22	0	1112	1	0	0	3	29	0	7
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			Yes	Yes
Number of Storage Spaces in Median	0	0	2	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.22	0.00	0.02
d_M, Delay for Movement [s/veh]	10.71	0.00	0.00	12.44	0.00	0.00	24.13	0.00	12.55	38.68	0.00	21.30
Movement LOS	B	A	A	B	A	A	C		B	E		C
95th-Percentile Queue Length [veh/ln]	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.86	0.00	0.86
95th-Percentile Queue Length [ft/ln]	0.48	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.47	21.57	0.00	21.57
d_A, Approach Delay [s/veh]	0.03			0.00			12.55			35.30		
Approach LOS	A			A			B			E		
d_I, Intersection Delay [s/veh]	0.52											
Intersection LOS	E											

Intersection Level Of Service Report
Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	37.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.862

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	209	651	141	0	69	505	95	197	321	194	299	295	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	477	53	0	51	300	0	0	0	0	9	0	39
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	1154	200	0	123	825	95	197	321	194	320	295	123
Peak Hour Factor	0.9400	0.9400	0.9400	1.000	0.940	0.940	0.940	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	307	53	0	33	219	25	52	85	52	85	78	33
Total Analysis Volume [veh/h]	222	1228	213	0	131	878	101	210	341	206	340	314	131
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	18	46	0	0	13	41	0	21	33	0	28	40	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	108	108	108	108	108	108	108	108	108	108	108	108
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	16	43	43	10	37	37	14	16	16	23	25	25
g / C, Green / Cycle	0.15	0.40	0.40	0.09	0.34	0.34	0.13	0.15	0.15	0.21	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.12	0.34	0.13	0.07	0.25	0.06	0.11	0.09	0.12	0.19	0.08	0.08
s, saturation flow rate [veh/h]	1781	3560	1653	1781	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	259	1407	653	164	1216	543	248	561	251	379	853	366
d1, Uniform Delay [s]	44.98	30.12	22.65	47.99	31.04	24.97	45.61	42.76	44.35	41.29	34.90	34.81
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.95	1.84	0.29	8.62	0.83	0.16	7.71	1.07	6.62	7.64	0.27	0.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.86	0.87	0.33	0.80	0.72	0.19	0.85	0.61	0.82	0.90	0.37	0.36
d, Delay for Lane Group [s/veh]	52.93	31.96	22.94	56.61	31.86	25.13	53.33	43.82	50.97	48.93	35.17	35.40
Lane Group LOS	D	C	C	E	C	C	D	D	D	D	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.32	14.61	3.77	3.82	9.93	1.84	5.82	4.18	5.59	9.39	3.45	2.90
50th-Percentile Queue Length [ft/ln]	158.03	365.31	94.26	95.60	248.33	45.94	145.53	104.45	139.81	234.71	86.15	72.54
95th-Percentile Queue Length [veh/ln]	10.44	20.88	6.79	6.88	15.10	3.31	9.78	7.52	9.47	14.41	6.20	5.22
95th-Percentile Queue Length [ft/ln]	261.11	522.03	169.67	172.08	377.54	82.69	244.45	188.02	236.77	360.34	155.06	130.57

Movement, Approach, & Intersection Results

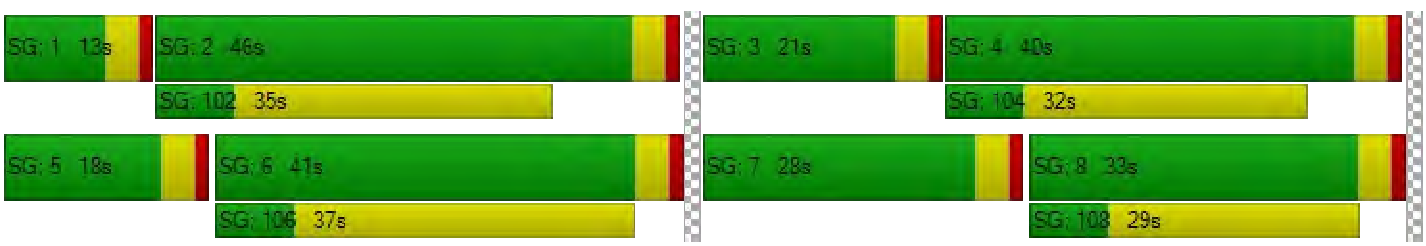
d_M, Delay for Movement [s/veh]	52.93	31.96	22.94	56.61	56.61	31.86	25.13	53.33	43.82	50.97	48.93	35.17	35.40
Movement LOS	D	C	C	E	E	C	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	33.61			34.17				48.40			41.17		
Approach LOS	C			C				D			D		
d_I, Intersection Delay [s/veh]	37.72												
Intersection LOS	D												
Intersection V/C	0.862												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	3.038	3.066	2.806	2.745
Crosswalk LOS	C	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	700	617	483	600
d_b, Bicycle Delay [s]	25.35	28.70	34.50	29.40
I_b,int, Bicycle LOS Score for Intersection	2.932	2.367	2.184	2.207
Bicycle LOS	C	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	37.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.873

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	338	972	0	0	826	313	0	0	0	340	10	307
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.00	1.00	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	15	518	0	0	212	127	0	0	0	61	0	74
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	367	1529	0	0	1071	453	0	0	0	415	10	393
Peak Hour Factor	0.9500	0.9500	0.9290	0.9290	0.9500	0.9500	0.9500	0.9290	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	402	0	0	282	119	0	0	0	109	3	103
Total Analysis Volume [veh/h]	386	1609	0	0	1127	477	0	0	0	437	11	414
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	33	56	0	0	23	0	11	0	0	0	38	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	24	63	36	36	0	30	30
g / C, Green / Cycle	0.22	0.60	0.34	0.34	0.00	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.21	0.44	0.31	0.30	0.00	0.25	0.26
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1812	1615
c, Capacity [veh/h]	423	2185	1234	551	1	510	454
d1, Uniform Delay [s]	39.72	14.84	33.13	32.36	0.00	36.05	36.49
k, delay calibration	0.24	0.50	0.50	0.50	0.11	0.28	0.30
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	15.55	2.26	11.80	16.55	0.00	11.88	17.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.74	0.91	0.87	0.00	0.88	0.91
d, Delay for Lane Group [s/veh]	55.27	17.10	44.92	48.92	0.00	47.93	53.69
Lane Group LOS	E	B	D	D	A	D	D
Critical Lane Group	Yes	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	11.41	13.23	15.38	13.58	0.00	12.45	12.24
50th-Percentile Queue Length [ft/ln]	285.31	330.81	384.53	339.55	0.00	311.20	306.05
95th-Percentile Queue Length [veh/ln]	16.95	19.20	21.81	19.63	0.00	18.23	17.98
95th-Percentile Queue Length [ft/ln]	423.81	479.95	545.32	490.65	0.00	455.85	449.50

Movement, Approach, & Intersection Results

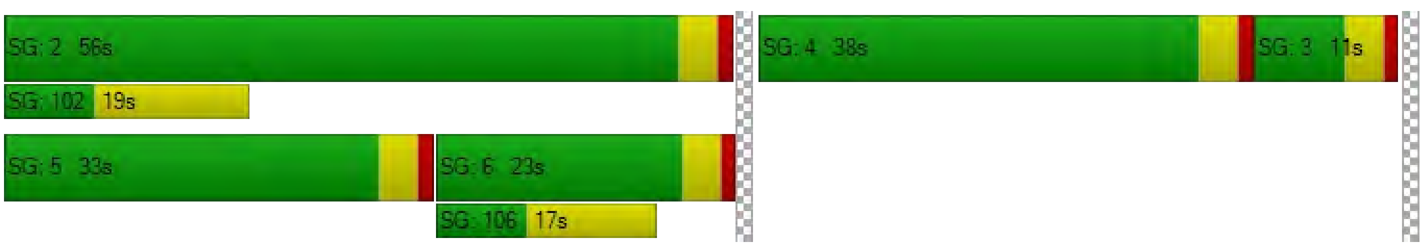
d_M, Delay for Movement [s/veh]	55.27	17.10	0.00	0.00	44.92	48.92	0.00	0.00	0.00	47.93	47.93	53.69
Movement LOS	E	B			D	D	A		A	D	D	D
d_A, Approach Delay [s/veh]	24.49			46.11			0.00			50.70		
Approach LOS	C			D			A			D		
d_I, Intersection Delay [s/veh]	37.33											
Intersection LOS	D											
Intersection V/C	0.873											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	42.08	42.08
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.148	2.142
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	990	362	0	648
d_b, Bicycle Delay [s]	13.38	35.22	52.50	24.00
I_b,int, Bicycle LOS Score for Intersection	3.205	2.883	4.132	2.982
Bicycle LOS	C	C	D	C

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	48.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.043

Intersection Setup

Name				Highland Spr Ave								
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	No			No			Yes			Yes		

Volumes

Name				Highland Spr Ave								
Base Volume Input [veh/h]	0	984	500	126	1039	0	326	3	551	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	397	148	62	211	0	169	0	79	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1421	668	193	1292	0	508	3	652	0	0	0
Peak Hour Factor	0.9510	0.9800	0.9800	0.9800	0.9800	0.9510	0.9800	0.9800	0.9800	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	363	170	49	330	0	130	1	166	0	0	0
Total Analysis Volume [veh/h]	0	1450	682	197	1318	0	518	3	665	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	53	0	16	69	0	0	51	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	120	120	120	120	120	120	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	49	49	12	65	47	47	
g / C, Green / Cycle	0.41	0.41	0.10	0.54	0.39	0.39	
(v / s)_i Volume / Saturation Flow Rate	0.39	0.42	0.10	0.36	0.29	0.41	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1535	659	189	1961	709	632	
d1, Uniform Delay [s]	34.28	35.59	54.07	19.84	31.26	36.59	
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	13.08	44.35	41.22	1.86	1.51	32.35	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.94	1.03	1.04	0.67	0.74	1.05	
d, Delay for Lane Group [s/veh]	47.36	79.94	95.29	21.70	32.77	68.93	
Lane Group LOS	D	F	F	C	C	F	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	22.68	26.89	7.84	13.13	13.04	23.78	
50th-Percentile Queue Length [ft/ln]	567.04	672.35	195.95	328.25	325.97	594.39	
95th-Percentile Queue Length [veh/ln]	30.49	36.31	12.62	19.07	18.96	32.93	
95th-Percentile Queue Length [ft/ln]	762.30	907.73	315.48	476.82	474.02	823.35	

Movement, Approach, & Intersection Results

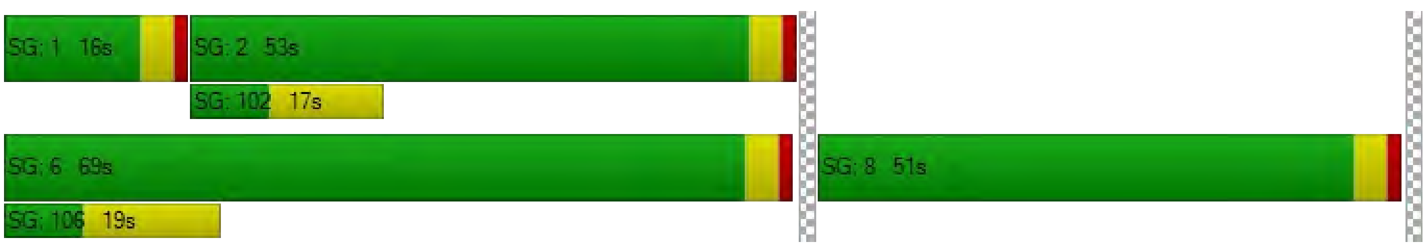
d_M, Delay for Movement [s/veh]	0.00	47.36	79.94	95.29	21.70	0.00	32.77	32.77	68.93	0.00	0.00	0.00
Movement LOS		D	F	F	C		C	C	F			
d_A, Approach Delay [s/veh]	57.78			31.27			53.05			0.00		
Approach LOS	E			C			D			A		
d_I, Intersection Delay [s/veh]	48.31											
Intersection LOS	D											
Intersection V/C	1.043											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.307	2.297
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	817	1083	783	0
d_b, Bicycle Delay [s]	21.00	12.60	22.20	60.00
I_b,int, Bicycle LOS Score for Intersection	3.319	2.809	3.517	4.132
Bicycle LOS	C	C	D	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



OPENING YEAR (2022) WITH PROJECT

Highland Springs Office-Commercial

Vistro File: G:\...\AME.vistro
Scenario 4 Opening Year (2022) With Project

Report File: G:\...\AMOYp.pdf
3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	0.909	42.8	D
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.017	17.3	C
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Left	0.000	17.1	C
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	NB Left	0.807	25.3	C
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	WB Left	0.940	42.2	D
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	SB Left	0.934	47.7	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	42.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.909

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	101	347	152	299	591	112	30	113	128	196	149	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	1	0	5	0	0	0	25	4	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	154	40	17	261	0	0	0	0	81	0	11
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	101	518	199	328	881	112	30	113	153	289	149	233
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	144	55	91	245	31	8	31	43	80	41	65
Total Analysis Volume [veh/h]	112	576	221	364	979	124	33	126	170	321	166	259
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	30	30	18	37	0	12	33	0	14	35	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	133	133	133	133	133	133	133	133	133	133	133	133
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	44	75	30	63	63	5	17	17	27	39	39
g / C, Green / Cycle	0.08	0.33	0.56	0.22	0.47	0.47	0.04	0.13	0.13	0.20	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.06	0.31	0.13	0.20	0.29	0.30	0.02	0.07	0.11	0.18	0.05	0.16
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1871	1852	1870	1589	1781	3560	1653
c, Capacity [veh/h]	139	618	929	396	888	888	69	235	200	359	1033	480
d1, Uniform Delay [s]	60.43	43.17	14.75	50.62	26.00	26.11	62.86	54.59	57.01	51.78	35.20	39.79
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.52	7.08	0.13	8.96	0.71	0.72	5.10	1.90	9.74	7.83	0.07	0.95
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.93	0.24	0.92	0.62	0.62	0.48	0.54	0.85	0.89	0.16	0.54
d, Delay for Lane Group [s/veh]	70.95	50.25	14.88	59.58	26.71	26.83	67.96	56.49	66.75	59.61	35.27	40.74
Lane Group LOS	E	D	B	E	C	C	E	E	E	E	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.13	19.41	3.43	12.81	13.00	13.19	1.19	4.07	6.10	10.93	1.98	7.09
50th-Percentile Queue Length [ft/ln]	103.29	485.24	85.67	320.23	325.07	329.85	29.70	101.68	152.41	273.33	49.57	177.13
95th-Percentile Queue Length [veh/ln]	7.44	26.63	6.17	18.68	18.92	19.15	2.14	7.32	10.15	16.36	3.57	11.45
95th-Percentile Queue Length [ft/ln]	185.92	665.87	154.20	466.97	472.91	478.78	53.46	183.03	253.65	408.90	89.23	286.26

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.95	50.25	14.88	59.58	26.76	26.83	67.96	56.49	66.75	59.61	35.27	40.74
Movement LOS	E	D	B	E	C	C	E	E	E	E	D	D
d_A, Approach Delay [s/veh]	44.20			34.91			62.94			47.64		
Approach LOS	D			C			E			D		
d_I, Intersection Delay [s/veh]	42.78											
Intersection LOS	D											
Intersection V/C	0.909											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.928	2.702	2.468	2.810
Crosswalk LOS	C	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	547	695	611	653
d_b, Bicycle Delay [s]	25.06	20.23	22.93	21.56
I_b,int, Bicycle LOS Score for Intersection	3.059	2.770	1.831	2.175
Bicycle LOS	C	C	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	17.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.017

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	411	10	1	492	0	0	0	0	4	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	0	34	1	0	25	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	3	0	0	0	24	0	0	24	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	229	0	0	357	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	663	10	1	869	58	1	0	49	4	0	0
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	188	3	0	247	16	0	0	14	1	0	0
Total Analysis Volume [veh/h]	0	753	11	1	988	66	1	0	56	5	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.11	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.20	0.00	0.00	0.00	0.00	12.65	17.30	0.00	10.95
Movement LOS		A	A	A	A	A			B	C		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.05	0.00	0.05
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	8.88	1.28	0.00	1.28
d_A, Approach Delay [s/veh]	0.00			0.01			12.65			17.30		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.43											
Intersection LOS	C											

Intersection Level Of Service Report

Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	17.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	436	19	6	481	2	1	0	3	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	25	0	0	0	0	0	0	0
Diverted Trips [veh/h]	-4	0	0	0	0	4	-1	0	1	0	0	0
Pass-by Trips [veh/h]	0	3	0	0	24	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	229	0	0	357	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	689	20	6	906	6	0	0	4	0	0	0
Peak Hour Factor	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	193	6	2	254	2	0	0	1	0	0	0
Total Analysis Volume [veh/h]	0	773	22	7	1017	7	0	0	4	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	12.08	17.05	0.00	10.83
Movement LOS		A	A	A	A	A			B	C		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.06			12.08			13.94		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.06											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	25.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.807

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	110	439	140	0	98	645	83	113	176	217	199	150	47
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	21	0	0	3	1	18	3	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	183	17	0	56	300	0	0	0	0	3	0	15
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	640	163	3	159	989	86	113	176	217	210	150	64
Peak Hour Factor	0.9600	0.9600	0.9600	1.000	0.960	0.960	0.960	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	167	42	1	41	258	22	29	46	57	55	39	17
Total Analysis Volume [veh/h]	136	667	170	3	166	1030	90	118	183	226	219	156	67
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	35	0	0	16	37	0	12	31	0	13	32	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	71	71	71	71	71	71	71	71	71	71	71	71
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	23	23	9	25	25	6	12	12	11	17	17
g / C, Green / Cycle	0.10	0.33	0.33	0.12	0.35	0.35	0.09	0.17	0.17	0.15	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.08	0.19	0.10	0.09	0.29	0.06	0.06	0.05	0.14	0.12	0.04	0.04
s, saturation flow rate [veh/h]	1781	3560	1653	1781	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	179	1163	540	218	1240	554	165	643	287	273	880	378
d1, Uniform Delay [s]	31.20	19.87	18.00	30.32	21.28	16.03	31.56	25.59	28.17	29.12	21.60	21.61
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.51	0.45	0.33	5.88	1.51	0.14	5.69	0.24	4.79	5.48	0.10	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.76	0.57	0.31	0.78	0.83	0.16	0.72	0.28	0.79	0.80	0.18	0.18
d, Delay for Lane Group [s/veh]	37.71	20.32	18.33	36.20	22.79	16.17	37.25	25.83	32.96	34.60	21.70	21.83
Lane Group LOS	D	C	B	D	C	B	D	C	C	C	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.51	4.34	2.02	3.05	7.49	0.97	2.08	1.25	3.72	3.81	0.98	0.86
50th-Percentile Queue Length [ft/ln]	62.80	108.56	50.53	76.27	187.23	24.32	51.90	31.20	92.94	95.28	24.59	21.46
95th-Percentile Queue Length [veh/ln]	4.52	7.76	3.64	5.49	11.98	1.75	3.74	2.25	6.69	6.86	1.77	1.54
95th-Percentile Queue Length [ft/ln]	113.05	194.00	90.95	137.29	299.43	43.77	93.41	56.16	167.29	171.50	44.26	38.62

Movement, Approach, & Intersection Results

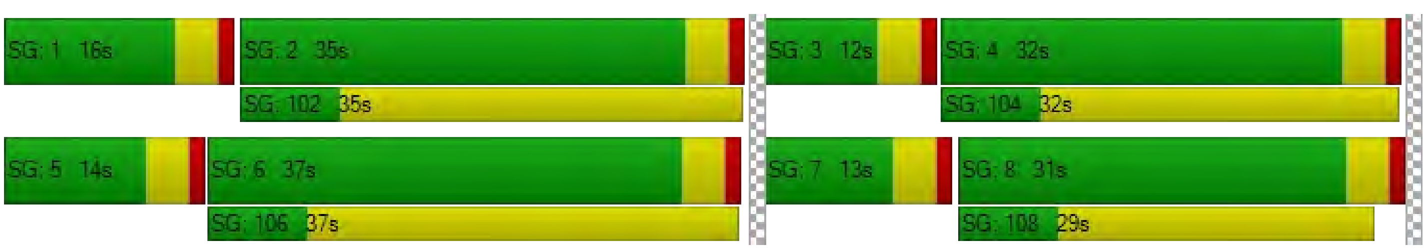
d_M, Delay for Movement [s/veh]	37.71	20.32	18.33	36.20	36.20	22.79	16.17	37.25	25.83	32.96	34.60	21.70	21.83
Movement LOS	D	C	B	D	D	C	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]	22.40			24.09				31.45			28.11		
Approach LOS	C			C				C			C		
d_I, Intersection Delay [s/veh]	25.33												
Intersection LOS	C												
Intersection V/C	0.807												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.937	2.894	2.677	2.637
Crosswalk LOS	C	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	653	695	568	589
d_b, Bicycle Delay [s]	21.56	20.23	24.34	23.63
I_b,int, Bicycle LOS Score for Intersection	2.362	2.486	1.994	1.924
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	42.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.940

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	295	694	0	0	782	367	0	0	0	222	8	158
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.00	1.00	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	13	0	0	11	7	0	0	0	0	0	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	12	195	0	0	189	131	0	0	0	138	0	32
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	319	930	0	0	1014	520	0	0	0	369	8	204
Peak Hour Factor	0.9300	0.9300	0.9290	0.9290	0.9300	0.9300	0.9300	0.9290	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	86	250	0	0	273	140	0	0	0	99	2	55
Total Analysis Volume [veh/h]	343	1000	0	0	1090	559	0	0	0	397	9	219
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	14	35	0	0	21	0	11	0	0	0	14	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	38	24	24	0	10	10
g / C, Green / Cycle	0.17	0.63	0.40	0.40	0.00	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.18	0.28	0.30	0.35	0.00	0.22	0.14
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1811	1615
c, Capacity [veh/h]	315	2286	1441	643	4	303	270
d1, Uniform Delay [s]	25.11	5.65	15.62	16.69	0.00	25.11	24.19
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	52.31	0.61	3.75	14.81	0.00	158.33	5.80
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.09	0.44	0.76	0.87	0.00	1.34	0.81
d, Delay for Lane Group [s/veh]	77.42	6.26	19.36	31.49	0.00	183.44	29.99
Lane Group LOS	F	A	B	C	A	F	C
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.74	2.44	6.33	8.76	0.00	17.33	3.23
50th-Percentile Queue Length [ft/ln]	218.45	61.06	158.25	219.05	0.00	433.19	80.77
95th-Percentile Queue Length [veh/ln]	14.13	4.40	10.46	13.62	0.00	27.36	5.82
95th-Percentile Queue Length [ft/ln]	353.17	109.91	261.41	340.42	0.00	683.99	145.38

Movement, Approach, & Intersection Results

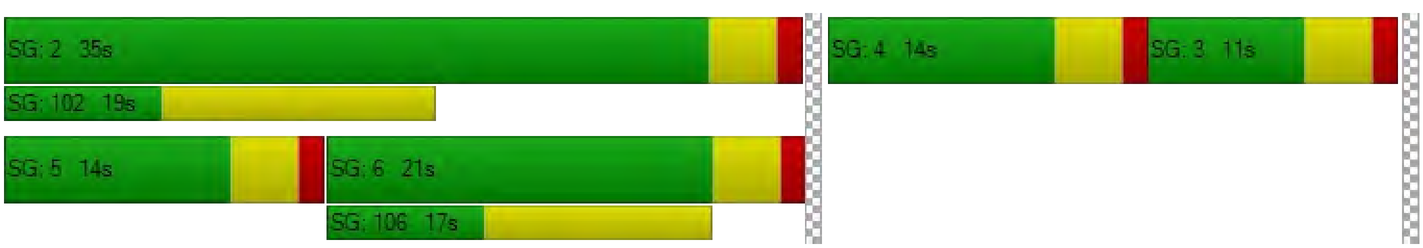
d_M, Delay for Movement [s/veh]	77.42	6.26	0.00	0.00	19.36	31.49	0.00	0.00	0.00	183.44	183.44	29.99
Movement LOS	F	A			B	C	A		A	F	F	C
d_A, Approach Delay [s/veh]	24.43			23.47			0.00			129.67		
Approach LOS	C			C			A			F		
d_I, Intersection Delay [s/veh]	42.18											
Intersection LOS	D											
Intersection V/C	0.940											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.136	1.997
Crosswalk LOS	F	F	B	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1033	567	0	333
d_b, Bicycle Delay [s]	7.01	15.41	30.00	20.83
I_b,int, Bicycle LOS Score for Intersection	2.668	2.920	4.132	2.591
Bicycle LOS	B	C	D	B

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	47.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.934

Intersection Setup

Name				Highland Spr Ave								
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	No			No			Yes			Yes		

Volumes

Name				Highland Spr Ave								
Base Volume Input [veh/h]	0	695	392	209	795	0	293	2	438	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	7	4	0	8	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	144	43	48	279	0	74	0	190	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	872	451	272	1110	0	387	2	646	0	0	0
Peak Hour Factor	0.9510	0.9500	0.9500	0.9500	0.9500	0.9510	0.9500	0.9500	0.9500	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	229	119	72	292	0	102	1	170	0	0	0
Total Analysis Volume [veh/h]	0	918	475	286	1168	0	407	2	680	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	21	0	12	33	0	0	27	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	168	168	168	168	168	168	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	54	54	28	86	74	74	
g / C, Green / Cycle	0.32	0.32	0.17	0.51	0.44	0.44	
(v / s)_i Volume / Saturation Flow Rate	0.24	0.29	0.15	0.32	0.23	0.42	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1212	520	312	1852	797	712	
d1, Uniform Delay [s]	51.08	54.71	68.99	29.59	33.99	45.44	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.17	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.99	6.68	10.68	0.36	0.51	11.73	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.76	0.91	0.92	0.63	0.51	0.96	
d, Delay for Lane Group [s/veh]	52.08	61.39	79.67	29.95	34.50	57.17	
Lane Group LOS	D	E	E	C	C	E	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	17.62	20.31	13.00	17.05	12.38	29.59	
50th-Percentile Queue Length [ft/ln]	440.41	507.64	325.08	426.37	309.54	739.71	
95th-Percentile Queue Length [veh/ln]	24.50	27.70	18.92	23.83	18.15	38.51	
95th-Percentile Queue Length [ft/ln]	612.49	692.39	472.92	595.69	453.81	962.73	

Movement, Approach, & Intersection Results

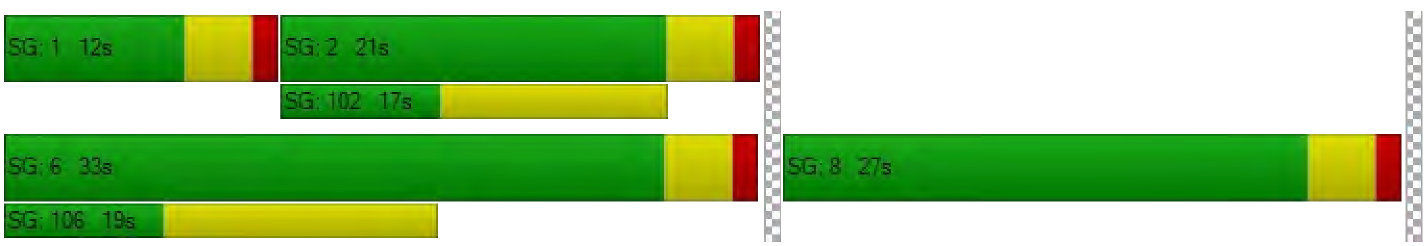
d_M, Delay for Movement [s/veh]	0.00	52.08	61.39	79.67	29.95	0.00	34.50	34.50	57.17	0.00	0.00	0.00
Movement LOS		D	E	E	C		C	C	E			
d_A, Approach Delay [s/veh]	55.25			39.73			48.66			0.00		
Approach LOS	E			D			D			A		
d_I, Intersection Delay [s/veh]	47.69											
Intersection LOS	D											
Intersection V/C	0.934											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	20.01	20.01
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.223	2.145
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	567	967	767	0
d_b, Bicycle Delay [s]	15.41	8.01	11.41	30.00
I_b,int, Bicycle LOS Score for Intersection	2.709	2.759	3.356	4.132
Bicycle LOS	B	C	C	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Scenario 4 Opening Year (2022) With Project

3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs Ave (NS) at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	1.038	77.0	E
2	Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)	Two-way stop	HCM 2010	WB Left	0.008	33.5	D
3	Highland Springs Ave (NS) at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Left	0.214	38.4	E
4	Highland Springs Ave (NS) at 6th St/Ramsey St (EW)	Signalized	HCM 6th Edition	SB Left	0.864	38.4	D
5	Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)	Signalized	HCM 6th Edition	NB Left	0.875	38.3	D
6	Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)	Signalized	HCM 6th Edition	NB Right	1.046	50.1	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Highland Springs Ave (NS) at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	77.0
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.038

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	66	641	222	191	431	15	20	116	48	165	102	146
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	3	0	0	0	17	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	411	80	25	294	0	0	0	0	71	0	30
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	1081	311	224	745	15	20	116	65	245	102	182
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	291	84	60	200	4	5	31	17	66	27	49
Total Analysis Volume [veh/h]	71	1162	334	241	801	16	22	125	70	263	110	196
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	38	38	12	39	0	11	32	0	13	34	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	217	217	217	217	217	217	217	217	217	217	217	217
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	120	159	32	141	141	5	15	15	35	45	45
g / C, Green / Cycle	0.05	0.55	0.73	0.15	0.65	0.65	0.02	0.07	0.07	0.16	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.04	0.62	0.20	0.14	0.21	0.21	0.01	0.05	0.06	0.15	0.03	0.12
s, saturation flow rate [veh/h]	1781	1870	1653	1781	1870	1932	1852	1870	1655	1781	3560	1653
c, Capacity [veh/h]	86	1033	1210	258	1213	1253	44	127	112	287	731	340
d1, Uniform Delay [s]	102.39	48.63	9.78	91.80	17.07	17.07	104.78	99.71	100.13	89.64	70.75	77.79
k, delay calibration	0.11	0.50	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.01	69.13	0.12	14.23	0.16	0.15	8.65	10.31	15.65	11.34	0.09	1.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	1.13	0.28	0.93	0.33	0.33	0.50	0.79	0.85	0.92	0.15	0.58
d, Delay for Lane Group [s/veh]	119.41	117.76	9.91	106.03	17.23	17.22	113.43	110.02	115.78	100.98	70.85	79.34
Lane Group LOS	F	F	A	F	B	B	F	F	F	F	E	E
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.44	75.59	5.62	14.60	9.44	9.75	1.35	5.98	5.85	15.43	2.53	10.02
50th-Percentile Queue Length [ft/ln]	111.10	1889.67	140.39	365.09	236.07	243.83	33.72	149.45	146.26	385.75	63.24	250.50
95th-Percentile Queue Length [veh/ln]	7.90	99.15	9.50	20.87	14.48	14.87	2.43	9.99	9.82	21.87	4.55	15.21
95th-Percentile Queue Length [ft/ln]	197.53	2478.64	237.55	521.77	362.06	371.87	60.69	249.70	245.43	546.80	113.83	380.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	119.41	117.76	9.91	106.03	17.23	17.22	113.43	111.17	115.78	100.98	70.85	79.34
Movement LOS	F	F	A	F	B	B	F	F	F	F	E	E
d_A, Approach Delay [s/veh]		94.85			37.45			112.89			87.70	
Approach LOS		F			D			F			F	
d_I, Intersection Delay [s/veh]	77.00											
Intersection LOS	E											
Intersection V/C	1.038											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	2.972	2.728	2.396	2.764
Crosswalk LOS	C	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	716	737	589	632
d_b, Bicycle Delay [s]	19.58	18.95	23.63	22.24
I_b,int, Bicycle LOS Score for Intersection	4.145	2.432	1.739	2.029
Bicycle LOS	D	B	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 2: Highland Springs Ave (NS) at N DWY/Memorial Dr (EW)

Control Type:	Two-way stop	Delay (sec / veh):	33.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			N Driveway					
Base Volume Input [veh/h]	0	745	6	1	580	0	0	0	0	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	0	22	0	0	25	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	2	0	0	0	20	5	0	20	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	561	0	0	386	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1341	6	1	989	42	5	0	45	1	0	1
Peak Hour Factor	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230	0.9230
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	363	2	0	268	11	1	0	12	0	0	0
Total Analysis Volume [veh/h]	0	1453	7	1	1072	46	5	0	49	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.10	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	12.69	0.00	0.00	0.00	0.00	13.08	33.49	0.00	14.90
Movement LOS		A	A	B	A	A			B	D		B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.33	0.03	0.00	0.03
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	8.21	0.80	0.00	0.80
d_A, Approach Delay [s/veh]	0.00			0.01			13.08			24.19		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.27											
Intersection LOS	D											

Intersection Level Of Service Report
Intersection 3: Highland Springs Ave (NS) at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	38.4
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.214

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	720	20	0	628	1	0	0	3	26	0	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	25	0	0	0	0	0	0	0
Diverted Trips [veh/h]	-4	0	0	0	0	4	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	2	0	0	20	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	561	0	0	386	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1315	21	0	1084	5	0	0	3	27	0	7
Peak Hour Factor	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	352	6	0	290	1	0	0	1	7	0	2
Total Analysis Volume [veh/h]	0	1408	22	0	1161	5	0	0	3	29	0	7
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.21	0.00	0.02
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	12.48	0.00	0.00	0.00	0.00	12.87	38.41	0.00	21.24
Movement LOS		A	A	B	A	A			B	E		C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.86	0.00	0.86
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	21.42	0.00	21.42
d_A, Approach Delay [s/veh]	0.00			0.00			12.87			35.07		
Approach LOS	A			A			B			E		
d_I, Intersection Delay [s/veh]	0.49											
Intersection LOS	E											

Intersection Level Of Service Report

Intersection 4: Highland Springs Ave (NS) at 6th St/Ramsey St (EW)

Control Type:	Signalized	Delay (sec / veh):	38.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.864

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Approach	Northbound			Southbound				Eastbound			Westbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	13.00	12.00	12.00	12.00	12.00	14.00	13.00	15.00	12.00	16.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.0	100.0	100.0	100.0	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				45.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Curb Present	No			No				No			No		
Crosswalk	Yes			Yes				Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave				6th St			Ramsey St		
Base Volume Input [veh/h]	209	651	141	0	69	505	95	197	321	194	299	295	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	15	0	0	3	2	17	3	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	477	53	0	51	300	0	0	0	0	9	0	39
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	224	1154	200	3	125	842	98	197	321	194	320	295	123
Peak Hour Factor	0.9400	0.9400	0.9400	1.000	0.940	0.940	0.940	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	307	53	1	33	224	26	52	85	52	85	78	33
Total Analysis Volume [veh/h]	238	1228	213	3	133	896	104	210	341	206	340	314	131
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0				0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0				0			0		
v_co, Outbound Pedestrian Volume crossing	0			0				0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0				0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0				0			0		
Bicycle Volume [bicycles/h]	0			0				0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Prote	Permi	Permi	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	0	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	0	0	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	47	0	0	13	41	0	21	33	0	27	39	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	0	30	0	0	22	0	0	25	0
Rest In Walk		No				No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No			No	No		No	No		No	No	
Maximum Recall	No	No			No	No		No	No		No	No	
Pedestrian Recall	No	No			No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	109	109	109	109	109	109	109	109	109	109	109	109
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	43	43	10	36	36	15	16	16	23	25	25
g / C, Green / Cycle	0.15	0.39	0.39	0.09	0.33	0.33	0.13	0.15	0.15	0.21	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.13	0.34	0.13	0.08	0.25	0.07	0.11	0.09	0.12	0.19	0.08	0.08
s, saturation flow rate [veh/h]	1781	3560	1653	1782	3560	1589	1852	3703	1653	1781	3703	1589
c, Capacity [veh/h]	275	1404	652	169	1192	532	248	560	250	379	852	366
d1, Uniform Delay [s]	44.96	30.50	22.93	48.32	32.21	25.79	46.10	43.23	44.84	41.75	35.29	35.20
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.00	1.87	0.29	8.63	0.98	0.18	7.81	1.07	6.71	7.74	0.27	0.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.87	0.33	0.80	0.75	0.20	0.85	0.61	0.82	0.90	0.37	0.36
d, Delay for Lane Group [s/veh]	52.96	32.36	23.22	56.95	33.19	25.97	53.92	44.30	51.55	49.48	35.56	35.79
Lane Group LOS	D	C	C	E	C	C	D	D	D	D	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.84	14.81	3.82	4.01	10.47	1.94	5.89	4.23	5.66	9.51	3.49	2.94
50th-Percentile Queue Length [ft/ln]	170.95	370.30	95.54	100.19	261.71	48.55	147.32	105.76	141.56	237.63	87.23	73.45
95th-Percentile Queue Length [veh/ln]	11.13	21.12	6.88	7.21	15.77	3.50	9.87	7.60	9.56	14.56	6.28	5.29
95th-Percentile Queue Length [ft/ln]	278.16	528.09	171.96	180.34	394.36	87.39	246.85	190.09	239.12	364.03	157.02	132.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.96	32.36	23.22	56.95	56.95	33.19	25.97	53.92	44.30	51.55	49.48	35.56	35.79
Movement LOS	D	C	C	E	E	C	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	34.12			35.37				48.94			41.63		
Approach LOS	C			D				D			D		
d_I, Intersection Delay [s/veh]	38.38												
Intersection LOS	D												
Intersection V/C	0.864												

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	3.042	2.984	2.811	2.746
Crosswalk LOS	C	C	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	717	617	483	583
d_b, Bicycle Delay [s]	24.70	28.70	34.50	30.10
I_b,int, Bicycle LOS Score for Intersection	2.945	2.387	2.184	2.207
Bicycle LOS	C	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Highland Springs Ave (NS) at I-10 FWY WB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	38.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.875

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			5th St (5th leg)			I-10 WB		
Base Volume Input [veh/h]	338	972	0	0	826	313	0	0	0	340	10	307
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.00	1.00	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	9	0	0	10	7	0	0	0	0	0	6
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	15	518	0	0	212	127	0	0	0	61	0	74
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	367	1538	0	0	1081	460	0	0	0	415	10	399
Peak Hour Factor	0.9500	0.9500	0.9290	0.9290	0.9500	0.9500	0.9500	0.9290	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	405	0	0	284	121	0	0	0	109	3	105
Total Analysis Volume [veh/h]	386	1619	0	0	1138	484	0	0	0	437	11	420
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Split	Split
Signal group	5	2	0	0	6	0	3	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	7	7	0	0	7	0	7	0	0	0	7	0
Maximum Green [s]	30	30	0	0	30	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Split [s]	35	58	0	0	23	0	11	0	0	0	41	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	0	7	0
Pedestrian Clearance [s]	0	12	0	0	10	0	0	0	0	0	0	0
Rest In Walk		No			No		No				No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No		No				No	
Maximum Recall	No	No			No		No				No	
Pedestrian Recall	No	No			No		No				No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	C	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	67	38	38	0	31	31
g / C, Green / Cycle	0.22	0.61	0.35	0.35	0.00	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.21	0.45	0.31	0.30	0.00	0.25	0.26
s, saturation flow rate [veh/h]	1882	3618	3618	1615	1900	1812	1615
c, Capacity [veh/h]	422	2190	1248	557	1	516	460
d1, Uniform Delay [s]	41.67	15.51	34.46	33.73	0.00	37.37	38.01
k, delay calibration	0.25	0.50	0.50	0.50	0.11	0.26	0.29
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	16.26	2.29	11.59	16.71	0.00	10.25	16.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.74	0.91	0.87	0.00	0.87	0.91
d, Delay for Lane Group [s/veh]	57.92	17.80	46.05	50.44	0.00	47.61	54.67
Lane Group LOS	E	B	D	D	A	D	D
Critical Lane Group	Yes	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	12.02	14.12	16.22	14.42	0.00	12.76	12.90
50th-Percentile Queue Length [ft/ln]	300.53	353.12	405.58	360.49	0.00	319.02	322.47
95th-Percentile Queue Length [veh/ln]	17.71	20.29	22.83	20.65	0.00	18.62	18.79
95th-Percentile Queue Length [ft/ln]	442.68	507.21	570.72	516.18	0.00	465.48	469.72

Movement, Approach, & Intersection Results

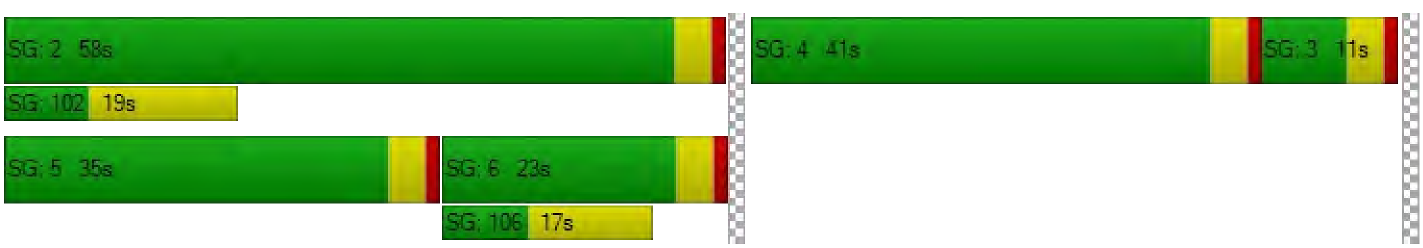
d_M, Delay for Movement [s/veh]	57.92	17.80	0.00	0.00	46.05	50.44	0.00	0.00	0.00	47.61	47.61	54.67
Movement LOS	E	B			D	D	A		A	D	D	D
d_A, Approach Delay [s/veh]	25.52			47.36			0.00			51.03		
Approach LOS	C			D			A			D		
d_I, Intersection Delay [s/veh]	38.33											
Intersection LOS	D											
Intersection V/C	0.875											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.154	2.148
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	982	345	0	673
d_b, Bicycle Delay [s]	14.25	37.64	55.00	24.22
I_b,int, Bicycle LOS Score for Intersection	3.214	2.898	4.132	2.992
Bicycle LOS	C	C	D	C

Sequence

Ring 1	-	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Highland Springs Ave (NS) at I-10 FWY EB Ramps (EW)

Control Type:	Signalized	Delay (sec / veh):	50.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.046

Intersection Setup

Name				Highland Spr Ave								
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	14.00	12.00	14.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	No			No			Yes			Yes		

Volumes

Name				Highland Spr Ave								
Base Volume Input [veh/h]	0	984	500	126	1039	0	326	3	551	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.04	1.04	1.04	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	6	4	0	6	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	397	148	62	211	0	169	0	79	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1424	668	199	1296	0	514	3	652	0	0	0
Peak Hour Factor	0.9510	0.9800	0.9800	0.9800	0.9800	0.9510	0.9800	0.9800	0.9800	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	363	170	51	331	0	131	1	166	0	0	0
Total Analysis Volume [veh/h]	0	1453	682	203	1322	0	524	3	665	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	2	0	1	6	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	7	7	0	0	7	0	0	0	0
Maximum Green [s]	0	120	0	120	120	0	0	120	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	52	0	17	69	0	0	51	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	12	0	0	0	0	0	0	0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	C	R	
C, Cycle Length [s]	120	120	120	120	120	120	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	48	48	13	65	47	47	
g / C, Green / Cycle	0.40	0.40	0.11	0.54	0.39	0.39	
(v / s)_i Volume / Saturation Flow Rate	0.39	0.42	0.11	0.37	0.29	0.41	
s, saturation flow rate [veh/h]	3762	1615	1882	3618	1810	1615	
c, Capacity [veh/h]	1504	646	205	1961	709	632	
d1, Uniform Delay [s]	35.29	36.09	53.50	19.87	31.41	36.59	
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	16.42	51.23	26.86	1.88	1.57	32.35	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

X, volume / capacity	0.97	1.06	0.99	0.67	0.74	1.05	
d, Delay for Lane Group [s/veh]	51.71	87.31	80.36	21.75	32.98	68.93	
Lane Group LOS	D	F	F	C	C	F	
Critical Lane Group	No	Yes	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	23.72	27.62	7.59	13.20	13.26	23.78	
50th-Percentile Queue Length [ft/ln]	592.92	690.58	189.75	329.88	331.47	594.39	
95th-Percentile Queue Length [veh/ln]	31.70	37.71	12.11	19.15	19.23	32.93	
95th-Percentile Queue Length [ft/ln]	792.59	942.82	302.70	478.81	480.77	823.35	

Movement, Approach, & Intersection Results

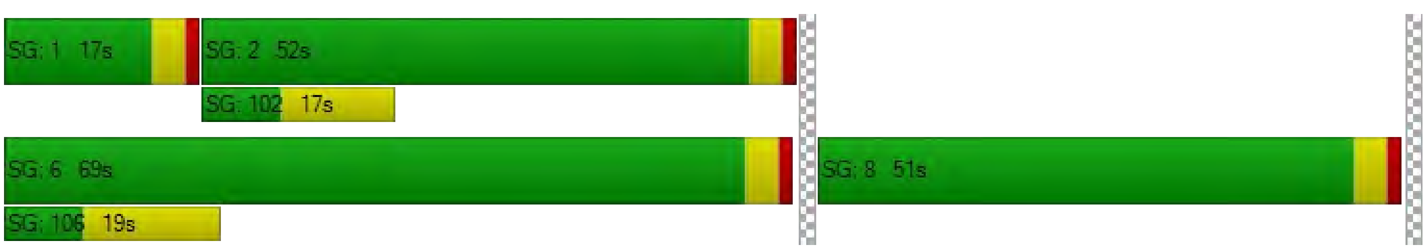
d_M, Delay for Movement [s/veh]	0.00	51.71	87.31	80.36	21.75	0.00	32.98	32.98	68.93	0.00	0.00	0.00
Movement LOS		D	F	F	C		C	C	F			
d_A, Approach Delay [s/veh]	63.08			29.55			53.04			0.00		
Approach LOS	E			C			D			A		
d_I, Intersection Delay [s/veh]	50.08											
Intersection LOS	D											
Intersection V/C	1.046											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	2.310	2.303
Crosswalk LOS	F	F	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	1083	783	0
d_b, Bicycle Delay [s]	21.60	12.60	22.20	60.00
I_b,int, Bicycle LOS Score for Intersection	3.321	2.818	3.526	4.132
Bicycle LOS	C	C	D	D

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



OPENING YEAR (2022) WITHOUT PROJECT

WITH IMPROVEMENTS

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Scenario 6 WB RT_Opening Year (2022) Wo Project
3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs (Ave) NS at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	0.809	26.9	C
3	Highland Springs (Ave) NS at S DWY (EW)	Two-way stop	HCM 6th Edition	EB Right	0.007	11.8	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs (Ave) NS at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	26.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.809

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	101	347	152	299	591	112	30	113	128	196	149	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	154	40	17	261	0	0	0	0	81	0	11
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	101	515	198	328	876	112	30	113	128	285	149	233
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	143	55	91	243	31	8	31	36	79	41	65
Total Analysis Volume [veh/h]	112	572	220	364	973	124	33	126	142	317	166	259
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	30	30	18	37	0	12	33	0	11	35	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	73	73	73	73	73	73	73	73	73	73	73	73
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	15	35	17	26	26	3	9	9	16	21	21
g / C, Green / Cycle	0.09	0.21	0.48	0.24	0.36	0.36	0.05	0.12	0.12	0.22	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.06	0.16	0.13	0.20	0.29	0.29	0.02	0.07	0.09	0.18	0.05	0.16
s, saturation flow rate [veh/h]	1781	3560	1653	1781	1870	1871	1852	1870	1589	1781	3560	1653
c, Capacity [veh/h]	153	738	790	422	670	670	87	229	194	385	1039	482
d1, Uniform Delay [s]	32.82	27.55	11.57	26.94	21.40	21.48	34.02	30.39	31.13	27.48	19.36	21.89
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.66	1.79	0.19	5.36	2.48	2.61	2.71	2.07	5.21	4.43	0.07	0.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.78	0.28	0.86	0.81	0.82	0.38	0.55	0.73	0.82	0.16	0.54
d, Delay for Lane Group [s/veh]	39.48	29.34	11.76	32.30	23.87	24.09	36.74	32.46	36.34	31.92	19.43	22.82
Lane Group LOS	D	C	B	C	C	C	D	C	D	C	B	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.17	4.71	2.01	6.43	8.33	8.47	0.61	2.13	2.59	5.26	0.96	3.47
50th-Percentile Queue Length [ft/ln]	54.15	117.76	50.31	160.80	208.28	211.64	15.35	53.25	64.69	131.60	23.95	86.69
95th-Percentile Queue Length [veh/ln]	3.90	8.27	3.62	10.59	13.06	13.24	1.11	3.83	4.66	9.03	1.72	6.24
95th-Percentile Queue Length [ft/ln]	97.48	206.75	90.55	264.78	326.62	330.93	27.63	95.84	116.45	225.67	43.10	156.04

Movement, Approach, & Intersection Results

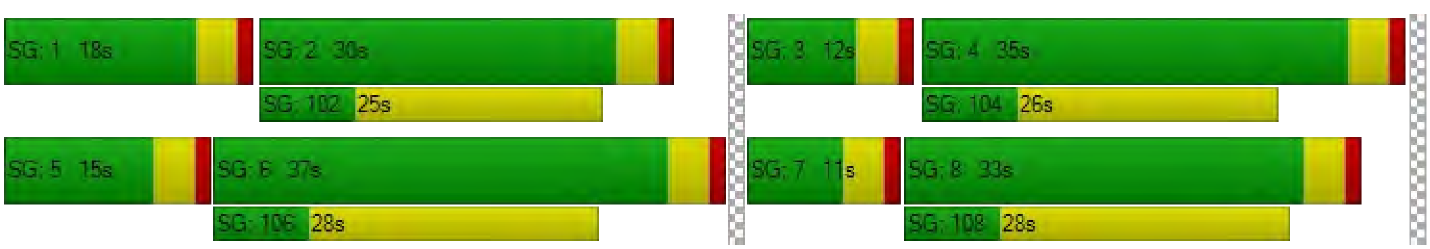
d_M, Delay for Movement [s/veh]	39.48	29.34	11.76	32.30	23.97	24.09	36.74	32.46	36.34	31.92	19.43	22.82
Movement LOS	D	C	B	C	C	C	D	C	D	C	B	C
d_A, Approach Delay [s/veh]	26.32			26.05			34.76			25.95		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	26.87											
Intersection LOS	C											
Intersection V/C	0.809											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	3.012	2.755	2.462	2.809
Crosswalk LOS	C	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	547	695	611	653
d_b, Bicycle Delay [s]	25.06	20.23	22.93	21.56
I_b,int, Bicycle LOS Score for Intersection	2.305	2.765	1.808	2.172
Bicycle LOS	B	C	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Highland Springs (Ave) NS at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	11.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.007

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	436	19	6	481	2	1	0	3	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	-4	0	0	0	0	4	-1	0	1	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	229	0	0	357	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	683	20	6	857	6	0	0	4	0	0	0
Peak Hour Factor	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	192	6	2	240	2	0	0	1	0	0	0
Total Analysis Volume [veh/h]	0	767	22	7	962	7	0	0	4	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.32	0.00	0.00	0.00	0.00	11.76	0.00	0.00	10.80
Movement LOS		A	A	A	A	A			B			B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.07			11.76			10.80		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.06											
Intersection LOS	B											

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs (Ave) NS at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	EB Left	0.810	24.9	C
3	Highland Springs (Ave) NS at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Right	0.095	15.5	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs (Ave) NS at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			30.00			35.00			45.00	
Grade [%]		0.00			0.00			0.00			0.00	
Curb Present		No			No			No			No	
Crosswalk		Yes			Yes			Yes			Yes	

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	66	641	222	191	431	15	20	116	48	165	102	146
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	411	80	25	294	0	0	0	0	71	0	30
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	1078	311	224	742	15	20	116	48	243	102	182
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	290	84	60	199	4	5	31	13	65	27	49
Total Analysis Volume [veh/h]	71	1159	334	241	798	16	22	125	52	261	110	196
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing		0			0			0			0	
v_di, Inbound Pedestrian Volume crossing m		0			0			0			0	
v_co, Outbound Pedestrian Volume crossing		0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi		0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	38	38	12	39	0	17	32	0	13	34	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	86	86	86	86	86	86	86	86	86	86	86	86
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	33	53	14	41	41	3	7	7	16	20	20
g / C, Green / Cycle	0.07	0.39	0.62	0.16	0.48	0.48	0.03	0.08	0.08	0.18	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.04	0.33	0.20	0.14	0.21	0.21	0.01	0.05	0.05	0.15	0.03	0.12
s, saturation flow rate [veh/h]	1781	3560	1653	1781	1870	1932	1852	1870	1691	1781	3560	1653
c, Capacity [veh/h]	119	1383	1021	287	904	933	62	151	136	325	818	380
d1, Uniform Delay [s]	38.84	23.73	7.83	34.83	14.55	14.55	40.49	38.04	38.16	33.52	26.22	28.82
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.72	1.42	0.18	6.44	0.34	0.33	3.42	3.77	4.87	4.62	0.07	1.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.60	0.84	0.33	0.84	0.44	0.44	0.36	0.60	0.64	0.80	0.13	0.52
d, Delay for Lane Group [s/veh]	43.56	25.16	8.02	41.27	14.89	14.88	43.90	41.81	43.03	38.14	26.29	29.91
Lane Group LOS	D	C	A	D	B	B	D	D	D	D	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.58	10.28	2.65	5.26	4.87	5.03	0.50	1.93	1.90	5.27	0.84	3.39
50th-Percentile Queue Length [ft/ln]	39.55	256.95	66.16	131.60	121.87	125.82	12.52	48.31	47.46	131.65	21.11	84.77
95th-Percentile Queue Length [veh/ln]	2.85	15.54	4.76	9.03	8.50	8.71	0.90	3.48	3.42	9.03	1.52	6.10
95th-Percentile Queue Length [ft/ln]	71.19	388.40	119.09	225.66	212.39	217.80	22.54	86.97	85.42	225.73	38.00	152.58

Movement, Approach, & Intersection Results

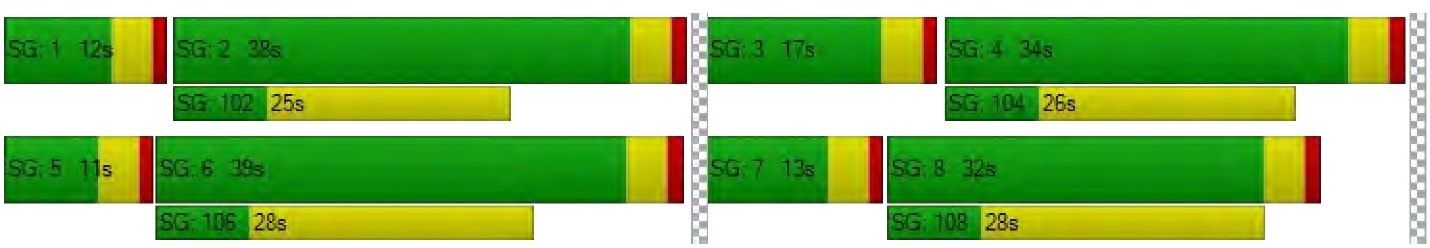
d_M, Delay for Movement [s/veh]	43.56	25.16	8.02	41.27	14.89	14.88	43.90	42.15	43.03	38.14	26.29	29.91
Movement LOS	D	C	A	D	B	B	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	22.33			20.92			42.57			33.00		
Approach LOS	C			C			D			C		
d_I, Intersection Delay [s/veh]	24.87											
Intersection LOS	C											
Intersection V/C	0.810											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	3.054	2.776	2.392	2.764
Crosswalk LOS	C	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	716	737	589	632
d_b, Bicycle Delay [s]	19.58	18.95	23.63	22.24
I_b,int, Bicycle LOS Score for Intersection	2.850	2.430	1.724	2.027
Bicycle LOS	C	B	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Highland Springs (Ave) NS at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	15.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.095

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	720	20	0	628	1	0	0	3	26	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	27	0	0	0	0	0	0	0	-27	0	0
Pass-by Trips [veh/h]	-4	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	561	0	0	386	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1337	21	0	1039	1	0	0	3	0	0	34
Peak Hour Factor	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	358	6	0	278	0	0	0	1	0	0	9
Total Analysis Volume [veh/h]	0	1431	22	0	1112	1	0	0	3	0	0	36
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.10
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	12.63	0.00	0.00	0.00	0.00	12.55	0.00	0.00	15.54
Movement LOS		A	A	B	A	A			B			C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.31
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	7.85
d_A, Approach Delay [s/veh]	0.00			0.00			12.55			15.54		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.23											
Intersection LOS	C											

OPENING YEAR (2022) WITH PROJECT

WITH IMPROVEMENTS

Highland Springs Office-Commercial

Vistro File: G:\...\AMOY_Imprv.vistro
Scenario 5 WB RT_Opening Year (2022) With Project

Report File: G:\...\AMOYp_IMPRV_WBRt.pdf
3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs (Ave) NS at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	NB Left	0.821	28.6	C
3	Highland Springs (Ave) NS at S DWY (EW)	Two-way stop	HCM 6th Edition	EB Right	0.008	12.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs (Ave) NS at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	28.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.821

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	101	347	152	299	591	112	30	113	128	196	149	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	5	0	0	0	25	4	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	154	40	17	261	0	0	0	0	81	0	11
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	101	518	198	328	881	112	30	113	153	289	149	233
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	144	55	91	245	31	8	31	43	80	41	65
Total Analysis Volume [veh/h]	112	576	220	364	979	124	33	126	170	321	166	259
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	30	30	18	37	0	12	33	0	11	35	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	78	78	78	78	78	78	78	78	78	78	78	78
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	16	37	18	28	28	4	11	11	17	24	24
g / C, Green / Cycle	0.08	0.21	0.47	0.23	0.36	0.36	0.05	0.14	0.14	0.22	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.06	0.16	0.13	0.20	0.29	0.30	0.02	0.07	0.11	0.18	0.05	0.16
s, saturation flow rate [veh/h]	1781	3560	1653	1781	1870	1871	1852	1870	1589	1781	3560	1653
c, Capacity [veh/h]	148	733	783	419	669	669	85	259	220	386	1101	511
d1, Uniform Delay [s]	35.19	29.51	12.55	28.85	22.90	22.99	36.34	31.20	32.58	29.36	19.63	22.19
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.65	1.91	0.19	5.65	2.57	2.71	2.85	1.41	5.65	4.70	0.06	0.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.76	0.79	0.28	0.87	0.82	0.83	0.39	0.49	0.77	0.83	0.15	0.51
d, Delay for Lane Group [s/veh]	42.84	31.43	12.74	34.50	25.47	25.70	39.19	32.61	38.24	34.06	19.69	22.97
Lane Group LOS	D	C	B	C	C	C	D	C	D	C	B	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.35	5.13	2.22	6.94	9.08	9.23	0.66	2.21	3.32	5.78	1.01	3.63
50th-Percentile Queue Length [ft/ln]	58.79	128.36	55.38	173.62	226.96	230.74	16.49	55.26	82.93	144.38	25.16	90.69
95th-Percentile Queue Length [veh/ln]	4.23	8.85	3.99	11.27	14.02	14.21	1.19	3.98	5.97	9.72	1.81	6.53
95th-Percentile Queue Length [ft/ln]	105.81	221.27	99.68	281.66	350.50	355.30	29.68	99.47	149.28	242.91	45.29	163.24

Movement, Approach, & Intersection Results

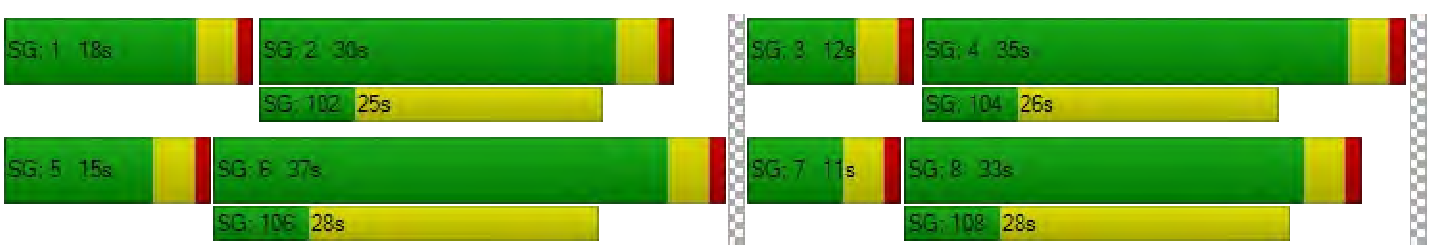
d_M, Delay for Movement [s/veh]	42.84	31.43	12.74	34.50	25.57	25.70	39.19	32.61	38.24	34.06	19.69	22.97
Movement LOS	D	C	B	C	C	C	D	C	D	C	B	C
d_A, Approach Delay [s/veh]	28.31			27.80			36.18			27.01		
Approach LOS	C			C			D			C		
d_I, Intersection Delay [s/veh]	28.56											
Intersection LOS	C											
Intersection V/C	0.821											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	3.018	2.757	2.468	2.810
Crosswalk LOS	C	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	547	695	611	653
d_b, Bicycle Delay [s]	25.06	20.23	22.93	21.56
I_b,int, Bicycle LOS Score for Intersection	2.309	2.770	1.831	2.175
Bicycle LOS	B	C	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Highland Springs (Ave) NS at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	12.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	436	19	6	481	2	1	0	3	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	26	0	0	0	0	0	0	0
Diverted Trips [veh/h]	-4	0	0	0	0	4	-1	0	1	0	0	0
Pass-by Trips [veh/h]	0	3	0	0	24	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	229	0	0	357	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	689	20	6	907	6	0	0	4	0	0	0
Peak Hour Factor	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910	0.8910
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	193	6	2	254	2	0	0	1	0	0	0
Total Analysis Volume [veh/h]	0	773	22	7	1018	7	0	0	4	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	9.35	0.00	0.00	0.00	0.00	12.05	0.00	0.00	10.83
Movement LOS		A	A	A	A	A			B			B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.06			12.05			10.83		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.06											
Intersection LOS	B											

Highland Springs Office-Commercial

Vistro File: G:\...\PMOY_Imprv.vistro

Report File: G:\...\PMOYp_Imprv_WBRt.pdf

Scenario 5 WBRT Opening Year (2022) With Project

3/5/2021

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Highland Springs (Ave) NS at 8th St/Wilson St (EW)	Signalized	HCM 6th Edition	EB Right	0.817	25.4	C
3	Highland Springs (Ave) NS at S DWY (EW)	Two-way stop	HCM 6th Edition	WB Right	0.096	15.6	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Highland Springs (Ave) NS at 8th St/Wilson St (EW)

Control Type:	Signalized	Delay (sec / veh):	25.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.817

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	19.00	12.00	12.00	18.00	13.00	12.00	12.00	12.00	12.00	18.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			Wilson St			8th St		
Base Volume Input [veh/h]	66	641	222	191	431	15	20	116	48	165	102	146
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.04	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	3	0	0	0	17	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	411	80	25	294	0	0	0	0	71	0	30
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	1081	311	224	745	15	20	116	65	245	102	182
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	291	84	60	200	4	5	31	17	66	27	49
Total Analysis Volume [veh/h]	71	1162	334	241	801	16	22	125	70	263	110	196
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups			2,7									
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	7	7	7	7	7	0	7	7	0	7	7	0
Maximum Green [s]	120	120	120	120	120	0	120	120	0	120	120	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	38	38	12	39	0	17	32	0	13	34	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	18	18	0	21	0	0	21	0	0	19	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No	No	No	No		No	No		No	No	
Maximum Recall	No	No	No	No	No		No	No		No	No	
Pedestrian Recall	No	No	No	No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	C	L	C	R
C, Cycle Length [s]	87	87	87	87	87	87	87	87	87	87	87	87
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	34	54	14	42	42	3	7	7	16	20	20
g / C, Green / Cycle	0.07	0.39	0.62	0.16	0.48	0.48	0.03	0.08	0.08	0.18	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.04	0.33	0.20	0.14	0.21	0.21	0.01	0.05	0.06	0.15	0.03	0.12
s, saturation flow rate [veh/h]	1781	3560	1653	1781	1870	1932	1852	1870	1655	1781	3560	1653
c, Capacity [veh/h]	118	1384	1021	287	904	934	62	156	138	326	831	386
d1, Uniform Delay [s]	39.61	24.19	7.98	35.49	14.80	14.80	41.23	38.69	38.85	34.12	26.43	29.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.90	1.44	0.18	6.53	0.34	0.33	3.45	4.31	5.94	4.69	0.07	1.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.60	0.84	0.33	0.84	0.44	0.44	0.36	0.64	0.69	0.81	0.13	0.51
d, Delay for Lane Group [s/veh]	44.51	25.63	8.17	42.01	15.15	15.14	44.68	43.00	44.80	38.81	26.51	30.10
Lane Group LOS	D	C	A	D	B	B	D	D	D	D	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.62	10.54	2.71	5.37	5.00	5.17	0.51	2.20	2.15	5.42	0.86	3.44
50th-Percentile Queue Length [ft/ln]	40.41	263.52	67.86	134.26	125.07	129.14	12.76	54.96	53.73	135.48	21.45	86.00
95th-Percentile Queue Length [veh/ln]	2.91	15.87	4.89	9.17	8.67	8.89	0.92	3.96	3.87	9.24	1.54	6.19
95th-Percentile Queue Length [ft/ln]	72.74	396.63	122.16	229.27	216.78	222.32	22.96	98.93	96.71	230.93	38.60	154.79

Movement, Approach, & Intersection Results

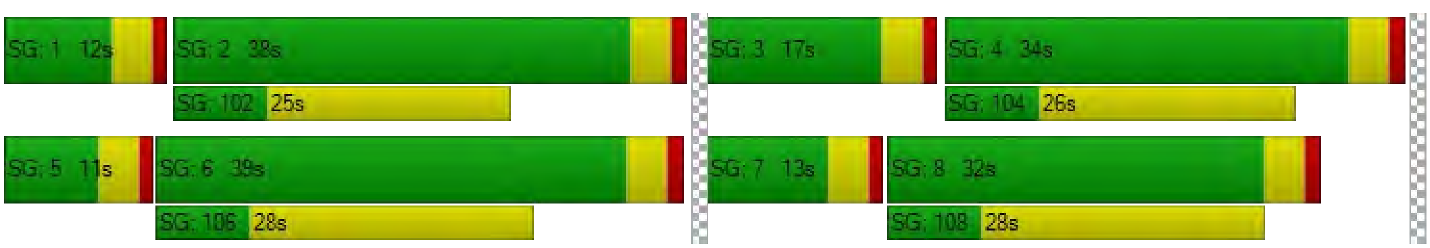
d_M, Delay for Movement [s/veh]	44.51	25.63	8.17	42.01	15.14	15.14	44.68	43.36	44.80	38.81	26.51	30.10
Movement LOS	D	C	A	D	B	B	D	D	D	D	C	C
d_A, Approach Delay [s/veh]		22.77			21.26			43.96			33.43	
Approach LOS		C			C			D			C	
d_I, Intersection Delay [s/veh]	25.43											
Intersection LOS	C											
Intersection V/C	0.817											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	37.14	37.14
I_p,int, Pedestrian LOS Score for Intersection	3.057	2.778	2.396	2.764
Crosswalk LOS	C	C	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	716	737	589	632
d_b, Bicycle Delay [s]	19.58	18.95	23.63	22.24
I_b,int, Bicycle LOS Score for Intersection	2.852	2.432	1.739	2.029
Bicycle LOS	C	B	A	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Highland Springs (Ave) NS at S DWY (EW)

Control Type:	Two-way stop	Delay (sec / veh):	15.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.096

Intersection Setup

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name	Highland Spr Ave			Highland Spr Ave			S Driveway					
Base Volume Input [veh/h]	4	720	20	0	628	1	0	0	3	26	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	25	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	27	0	0	0	0	0	0	0	-27	0	0
Pass-by Trips [veh/h]	-4	2	0	0	20	4	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	561	0	0	386	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1342	21	0	1084	5	0	0	3	0	0	34
Peak Hour Factor	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340	0.9340
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	359	6	0	290	1	0	0	1	0	0	9
Total Analysis Volume [veh/h]	0	1437	22	0	1161	5	0	0	3	0	0	36
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.10
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	12.67	0.00	0.00	0.00	0.00	12.84	0.00	0.00	15.59
Movement LOS		A	A	B	A	A			B			C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.32
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	7.89
d_A, Approach Delay [s/veh]	0.00			0.00			12.84			15.59		
Approach LOS	A			A			B			C		
d_I, Intersection Delay [s/veh]	0.23											
Intersection LOS	C											

APPENDIX F

TRAFFIC SIGNAL WARRANT WORKSHEETS

PEAK HOUR VOLUME WARRANT
(Rural Areas)

Opening Year (2022) With Project - AM

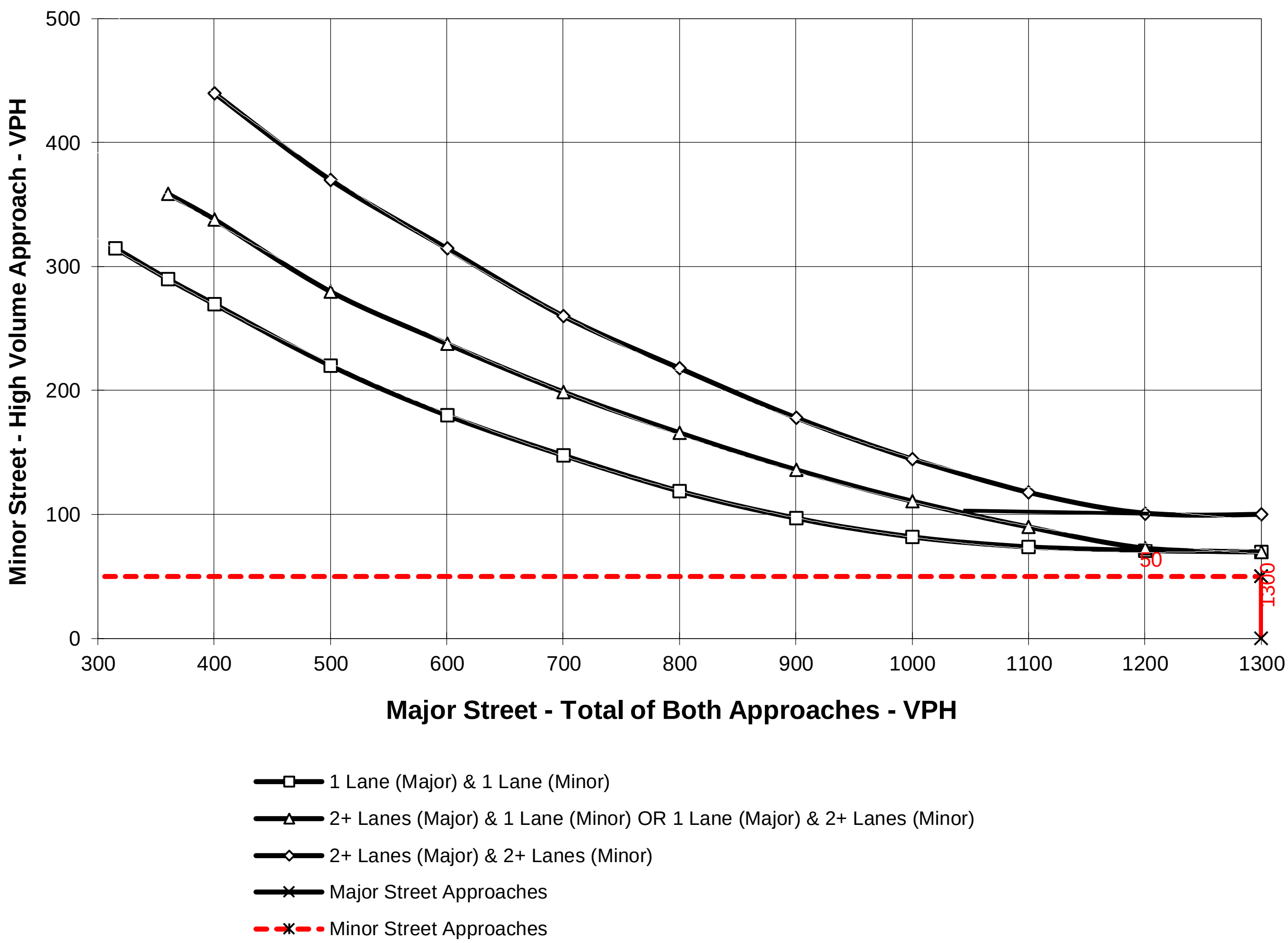
Major Street Name = **Highland Springs Avenue** Total of Both Approaches (VPH) = **1595**

Number of Approach Lanes Major Street = **1**

Minor Street Name = **Project North Driveway** High Volume Approach (VPH) = **50**

Number of Approach Lanes Minor Street = **2**

SIGNAL WARRANT NOT SATISFIED



** NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

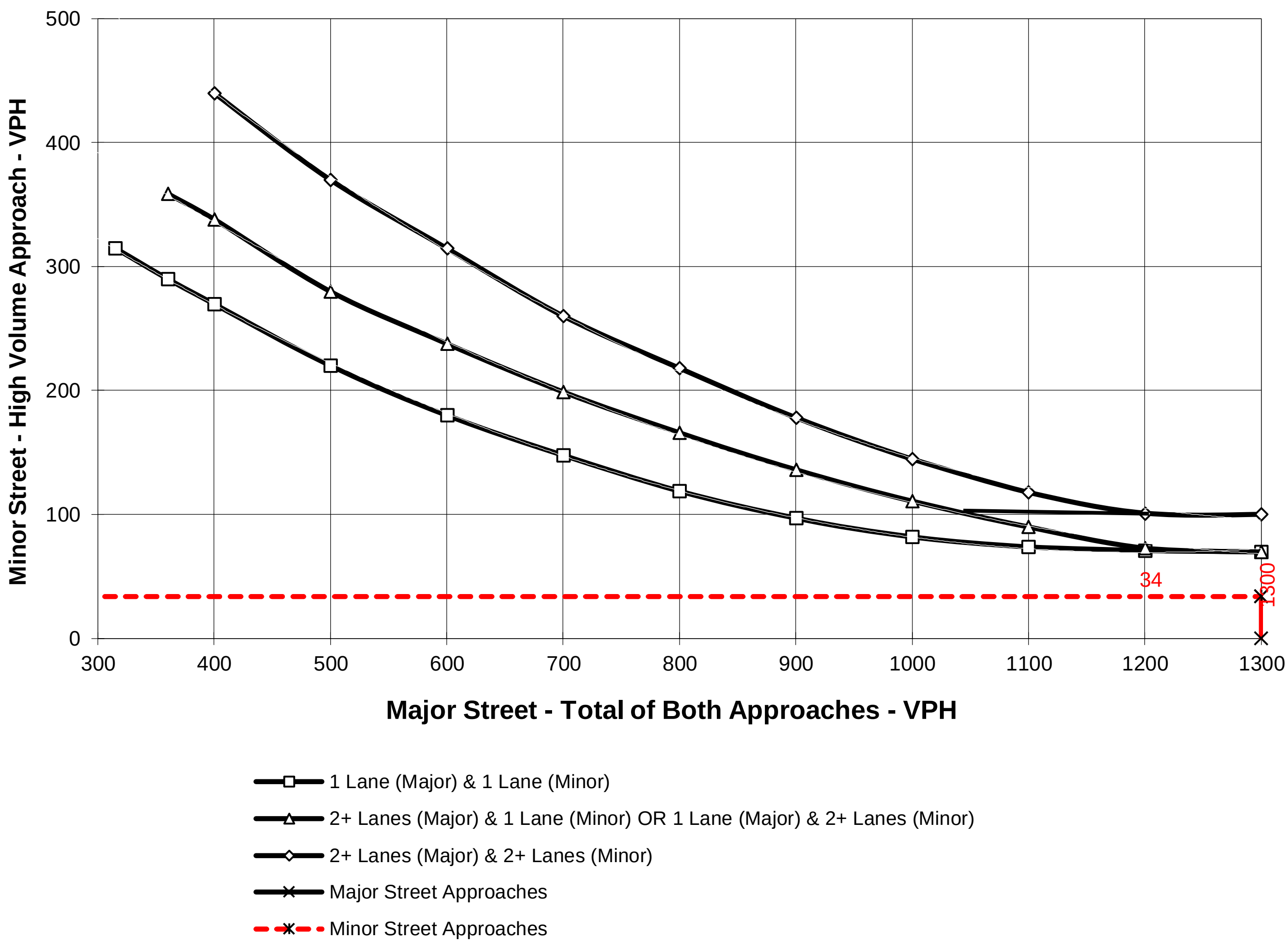
PEAK HOUR VOLUME WARRANT
(Rural Areas)

Opening Year (2022) With Project - PM

Major Street Name = **Highland Springs Avenue** Total of Both Approaches (VPH) = **2456**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Project South Driveway** High Volume Approach (VPH) = **34**
Number of Approach Lanes Minor Street = **2**

SIGNAL WARRANT NOT SATISFIED



** NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

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