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October 13, 2021

Casey Shorrock
Remy Moose Manley, LLP
555 Capitol Mall, Suite 800
Sacramento, CA 95814

Subject: Greenhouse Gas Emissions Calculations for the Sierra View Project

Dear Ms. Shorrock:

At your request, Raney has prepared the following memorandum to present the anticipated greenhouse gas (GHG) emissions associated with construction and operation of the Sierra View Project (proposed project), and to compare such estimates to the applicable thresholds of significance.

Project Summary

The approximately 23.10-acre project site is located east of the Sierra View Country Club, at 360 Diamond Oaks Road, in Roseville, California (see Figure 1). The site is comprised of two parcels: Infill Planning Parcel 3 and Infill Planning Parcel 100. The project site is bound by Shasta Street to the north and Diamond Oaks Road to the south. Surrounding land uses primarily consist of single-family housing to the north, east, and south. The project site is currently undeveloped and ungraded, but has been subject to previous disturbance from maintenance and emergency access roads. The majority of the project site, identified as Infill Planning Parcel 100, is designated in the City of Roseville General Plan for Medium Density Residential and zoned for R3 (Multi-Family Housing). The northernmost portion of the project site, identified as Infill Parcel 3, is designated in the City's General Plan as Low Density Residential and zoned for R1 (Single-Family Residential).

The proposed project would consist of amending the General Plan land use designation and modifying the zoning for the project site in order to reduce the property's existing planned housing density. The majority of Infill Planning Parcel 100 would be redesignated from Medium Density Residential to Low Density Residential and rezoned from R3 (Multi-Family Housing) to RS/DS (Small Lot Residential with Development Standards). A portion of Infill Planning Parcel 3 would be rezoned from R1 (Single-Family Residential) to RS/DS. A Tentative Subdivision Map is proposed to divide the project site into 86 total lots for future development of 75 low density residential units (see Figure 2).

The proposed project would require the following approvals and entitlements:

- Approval of the Mitigated Negative Declaration;
- General Plan Amendment for a portion of Infill Planning Parcel 100 from Medium Density Residential to Low Density Residential;
- Rezoning for a portion of Infill Planning Parcel 100 from R3 to RS/DS and a portion of Infill Planning Parcel 3 from R1 to RS/DS;
- Tentative Subdivision Map including 75 single-family residential lots; and
- Tree Permit.

Figure 1
Project Site Location

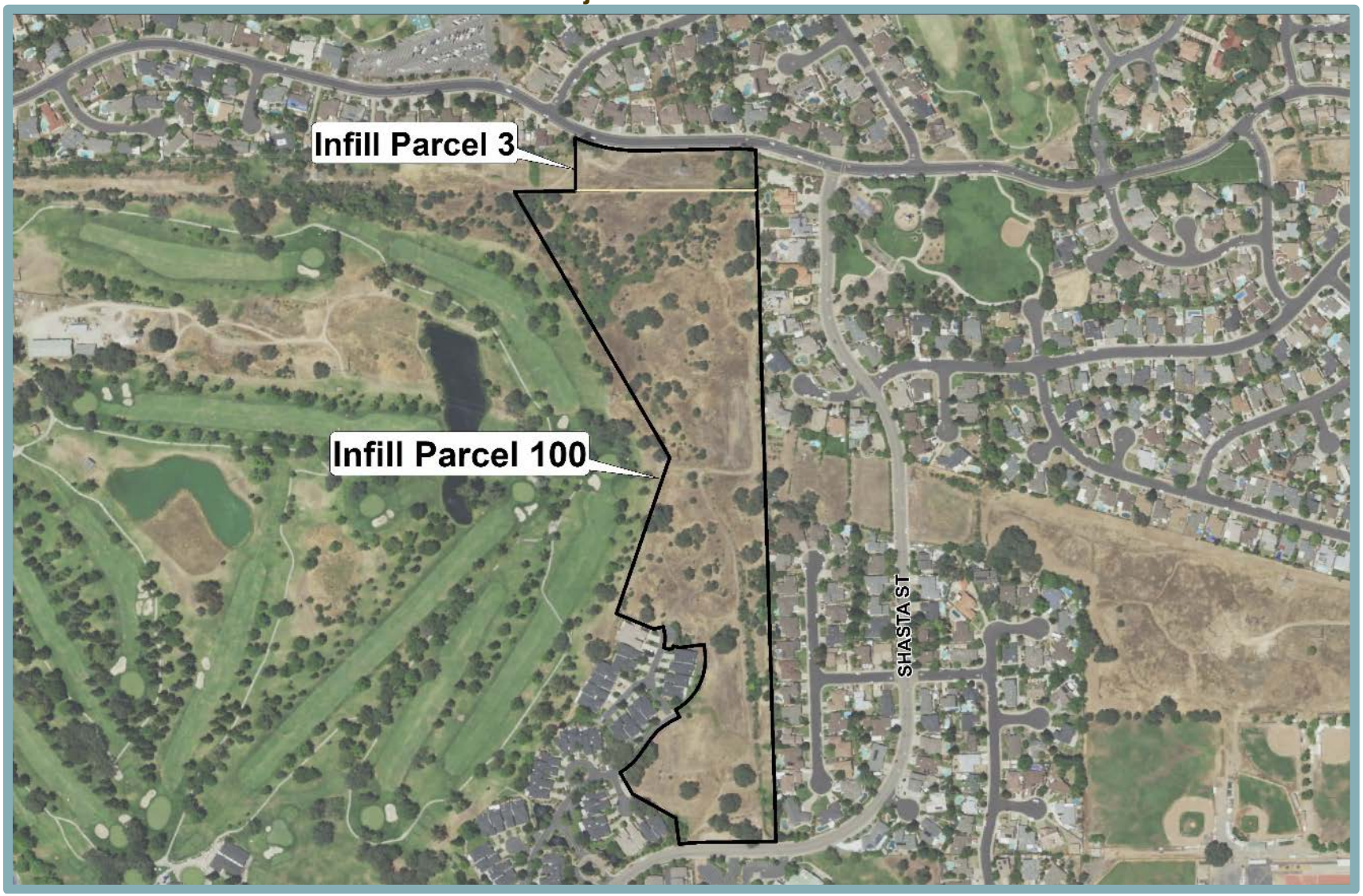
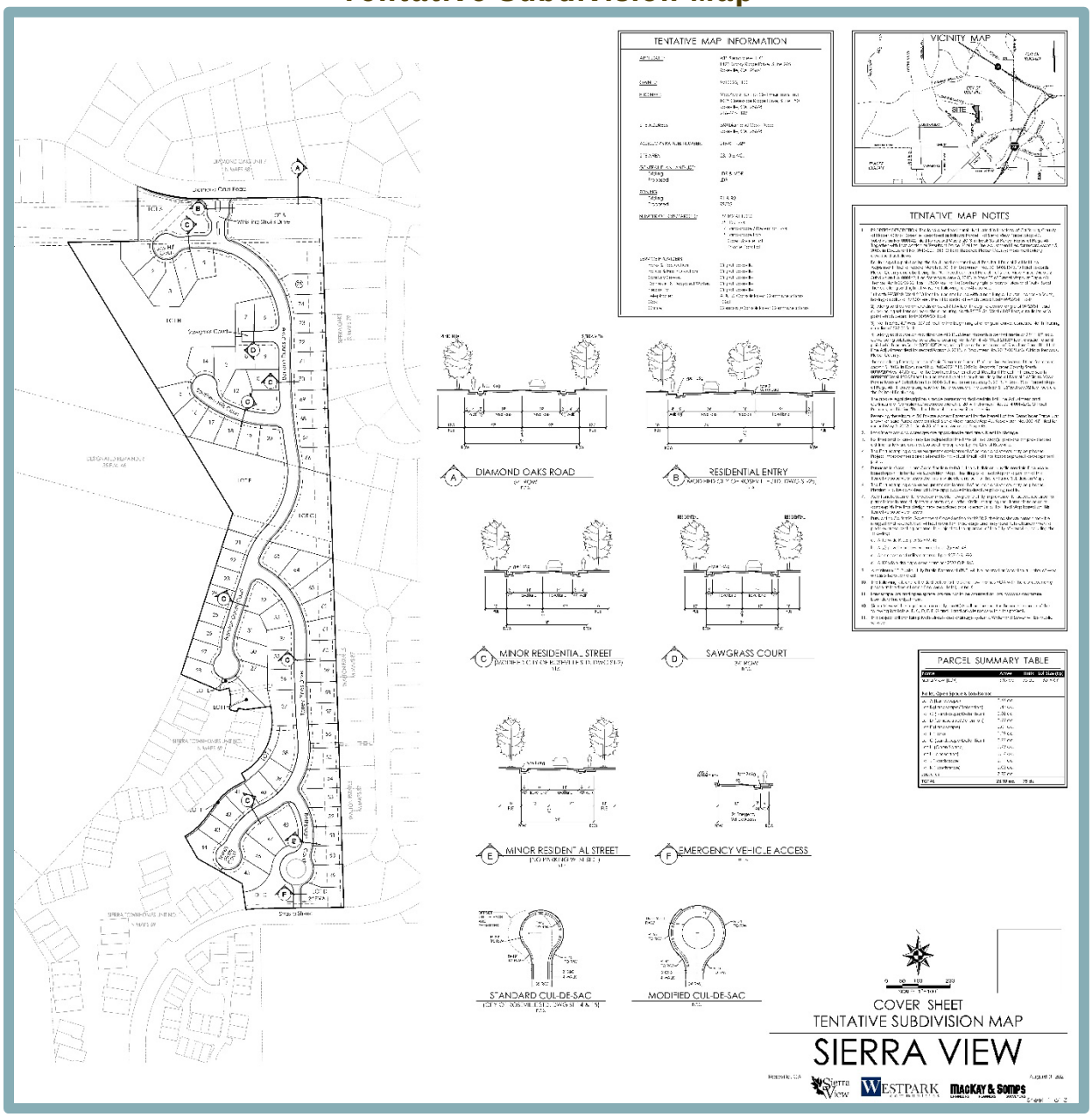


Figure 2
Tentative Subdivision Map



Background

GHGs are gases that absorb and emit radiation within the thermal infrared range, trapping heat in the earth's atmosphere. Some GHGs occur naturally and are emitted into the atmosphere through both natural processes and human activities. Other GHGs are created and emitted solely through human activities. The principal GHGs that enter the atmosphere due to human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated carbons. Other common GHGs include water vapor, ozone, and aerosols. The increase in atmospheric concentrations of GHG due to human activities has resulted in more heat being held within the atmosphere, which is the accepted explanation for global climate change.

The project site is located within the Sacramento Valley Air Basin and is under the jurisdiction of the Placer County Air Pollution Control District (PCAPCD). On October 13, 2016, the PCAPCD adopted GHG emissions thresholds. The thresholds were designed to analyze a project's compliance with applicable State laws including Assembly Bill (AB) 32 and Senate Bill (SB) 32.[1] As noted in Appendix A, Implementation Measures (Operational Air Quality and Greenhouse Gas Emissions), of the City's General Plan, the City of Roseville relies on PCAPCD thresholds for determining significance conclusions.[2] As a result, this analysis uses PCAPCD thresholds of significance.

The PCAPCD's GHG thresholds include a bright-line threshold for the construction and operational phases of land use projects and stationary source projects, a screening level threshold for the operational phase of land use projects, and efficiency thresholds for the operational phase of land use projects that result in GHG emissions that fall between the bright-line threshold and the screening level threshold. Any project with GHG emissions below the screening level threshold of 1,100 $MTCO_2e$/yr is judged by the PCAPCD as having a less-than-significant impact related to GHG emissions, and would not conflict with any State or regional GHG emissions reduction goals.

Construction GHG Emissions

The unmitigated maximum annual construction-related emissions from the proposed project were estimated to be 719.07 $MTCO_2e$/yr over the approximately two-year construction period. In total, construction of the proposed project would generate approximately 1,467.67 $MTCO_2e$.

As compared to the PCAPCD's bright-line threshold of 10,000 $MTCO_2e$/yr, the maximum annual emissions related to implementation of the proposed project would be well below the PCAPCD's threshold, and project construction would not be considered to result in a cumulatively considerable contribution to global climate change.

Operational GHG Emissions

The estimated operational GHG emissions in the first year of full buildout (2024), are presented in Table 1. As shown in the table, the proposed project would result in operational GHG emissions below the PCAPCD's 1,100 $MTCO_2e$/yr operational screening threshold of significance. Thus, operations of the proposed project would not be considered to result in a cumulatively considerable contribution to global climate change.

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1 Placer County Air Pollution Control District. *California Environmental Quality Act Thresholds of Significance: Justification Report*. October 2016.

2 City of Roseville. *City of Roseville General Plan 2035, Appendix A: Implementation Measures* [page A-21]. August 2020.

Table 1 Unmitigated Operational GHG Emissions (Year 2024)	
Emission Source	**GHG Emissions ($MTCO_2e$/yr)**
Area	54.41
Energy	95.25
Mobile	705.26
Solid Waste	38.92
Water	12.80
TOTAL ANNUAL GHG EMISSIONS	**906.65**
PCAPCD Threshold of Significance	**1,100**
Exceeds Threshold?	**NO**
Source: CalEEMod, October 2021 (see Attachment).	

Conclusion

Based on the information presented above, construction and operations of the proposed project would not be considered to generate GHG emissions that would have a significant impact on the environment and, therefore, would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Consequently, the project would not result in a cumulatively considerable incremental contribution to impacts related to GHG emissions or climate change and the project's impact would be less than significant.

If you have any questions regarding the contents of this document, please do not hesitate to contact me at (916) 372-6100, or via email at rods@raneymanagement.com.

Best Regards,

Rod Stinson

Vice President

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RANEY PLANNING & MANAGEMENT, INC. 20 years

Attachment 1
CalEEMod Results

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Sierra View Project

Placer County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	75.00	Dwelling Unit	23.10	135,000.00	215

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	74
Climate Zone	2			**Operational Year**	2024
Utility Company	Roseville Electric				
CO2 Intensity (lb/MWhr)	384.66	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor adjusted per the RPS projections used in City's GP EIR.

Land Use - Lot acreage adjusted per site plan.

Construction Phase - Architectural coating assumed to occur concerrent to building construction.

Trips and VMT -

Grading -

Area Mitigation - Only natural gas hearth and low VOC paints per PCAPCD regulations

Energy Mitigation -

Water Mitigation - Outdoor water conservation strategy applied to reflect complaince with MWELO.

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstructionPhase	NumDays	20.00	370.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblGrading	MaterialExported	0.00	65,000.00
tblGrading	MaterialImported	0.00	23,000.00
tblLandUse	LotAcreage	24.35	23.10
tblProjectCharacteristics	CO2IntensityFactor	471.98	384.66

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2022	0.4315	3.1062	2.4513	7.6500e-003	0.4057	0.1148	0.5204	0.1534	0.1069	0.2603	0.0000	700.1845	700.1845	0.0979	0.0552	719.0709
2023	0.9794	3.4737	4.4481	7.7900e-003	0.1309	0.1674	0.2983	0.0340	0.1567	0.1906	0.0000	682.8449	682.8449	0.1594	7.4200e-003	689.0393
2024	0.1048	0.2813	0.3846	6.7000e-004	0.0113	0.0130	0.0242	2.9300e-003	0.0121	0.0151	0.0000	59.0427	59.0427	0.0135	6.1000e-004	59.5633
Maximum	**0.9794**	**3.4737**	**4.4481**	**7.7900e-003**	**0.4057**	**0.1674**	**0.5204**	**0.1534**	**0.1567**	**0.2603**	**0.0000**	**700.1845**	**700.1845**	**0.1594**	**0.0552**	**719.0709**

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					
2022	0.4315	3.1062	2.4513	7.6500e-003	0.4057	0.1148	0.5204	0.1534	0.1069	0.2603	0.0000	700.1842	700.1842	0.0979	0.0552	719.0705
2023	0.9794	3.4737	4.4481	7.7900e-003	0.1309	0.1674	0.2983	0.0340	0.1567	0.1906	0.0000	682.8442	682.8442	0.1594	7.4200e-003	689.0386
2024	0.1048	0.2813	0.3846	6.7000e-004	0.0113	0.0130	0.0242	2.9300e-003	0.0121	0.0151	0.0000	59.0426	59.0426	0.0135	6.1000e-004	59.5633
Maximum	**0.9794**	**3.4737**	**4.4481**	**7.7900e-003**	**0.4057**	**0.1674**	**0.5204**	**0.1534**	**0.1567**	**0.2603**	**0.0000**	**700.1842**	**700.1842**	**0.1594**	**0.0552**	**719.0705**

Sierra View Project - Placer County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	**6-1-2022**	**8-31-2022**	1.9137	1.9137
2	**9-1-2022**	**11-30-2022**	1.1709	1.1709
3	**12-1-2022**	**2-28-2023**	1.1315	1.1315
4	**3-1-2023**	**5-31-2023**	1.1253	1.1253
5	**6-1-2023**	**8-31-2023**	1.1247	1.1247
6	**9-1-2023**	**11-30-2023**	1.1138	1.1138
7	**12-1-2023**	**2-29-2024**	0.7569	0.7569
		Highest	1.9137	1.9137

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	5.3344	0.0983	6.3657	0.0106		0.8176	0.8176		0.8176	0.8176	77.4718	33.4002	110.8720	0.0724	6.0900e-003	114.4971
Energy	9.5700e-003	0.0818	0.0348	5.2000e-004		6.6100e-003	6.6100e-003		6.6100e-003	6.6100e-003	0.0000	198.1647	198.1647	0.0107	2.8100e-003	199.2700
Mobile	0.3859	0.5758	3.6589	7.3900e-003	0.7372	6.6100e-003	0.7438	0.1975	6.2100e-003	0.2037	0.0000	693.2450	693.2450	0.0432	0.0367	705.2599
Waste						0.0000	0.0000		0.0000	0.0000	15.7115	0.0000	15.7115	0.9285	0.0000	38.9246
Water						0.0000	0.0000		0.0000	0.0000	1.5503	6.4947	8.0450	0.1598	3.8300e-003	13.1801
Total	**5.7299**	**0.7558**	**10.0594**	**0.0185**	**0.7372**	**0.8308**	**1.5680**	**0.1975**	**0.8304**	**1.0279**	**94.7336**	**931.3046**	**1,026.0382**	**1.2146**	**0.0494**	**1,071.1317**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.6338	0.0523	0.5762	3.2000e-004		6.8000e-003	6.8000e-003		6.8000e-003	6.8000e-003	0.0000	54.0760	54.0760	1.8900e-003	9.7000e-004	54.4138
Energy	9.5700e-003	0.0818	0.0348	5.2000e-004		6.6100e-003	6.6100e-003		6.6100e-003	6.6100e-003	0.0000	94.6893	94.6893	1.8100e-003	1.7400e-003	95.2520
Mobile	0.3859	0.5758	3.6589	7.3900e-003	0.7372	6.6100e-003	0.7438	0.1975	6.2100e-003	0.2037	0.0000	693.2450	693.2450	0.0432	0.0367	705.2599
Waste						0.0000	0.0000		0.0000	0.0000	15.7115	0.0000	15.7115	0.9285	0.0000	38.9246
Water						0.0000	0.0000		0.0000	0.0000	1.5503	6.1184	7.6687	0.1598	3.8200e-003	12.8019
Total	**1.0293**	**0.7098**	**4.2699**	**8.2300e-003**	**0.7372**	**0.0200**	**0.7572**	**0.1975**	**0.0196**	**0.2171**	**17.2618**	**848.1287**	**865.3905**	**1.1352**	**0.0432**	**906.6521**

	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	**82.04**	**6.09**	**57.55**	**55.42**	**0.00**	**97.59**	**51.71**	**0.00**	**97.64**	**78.88**	**81.78**	**8.93**	**15.66**	**6.54**	**12.55**	**15.36**

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	6/1/2022	6/14/2022	5	10	
2	Grading	Grading	6/15/2022	8/2/2022	5	35	
3	Paving	Paving	8/3/2022	8/30/2022	5	20	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4	Building Construction	Building Construction	8/31/2022	1/30/2024	5	370	
5	Architectural Coating	Architectural Coating	9/14/2022	2/13/2024	5	370	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 105

Acres of Paving: 0

Residential Indoor: 273,375; Residential Outdoor: 91,125; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Pavers	2	8.00	130	0.42
Building Construction	Paving Equipment	2	8.00	132	0.36
Building Construction	Rollers	2	8.00	80	0.38
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	11,000.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	15	27.00	8.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	15	27.00	8.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 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					
Fugitive Dust					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0159	0.1654	0.0985	1.9000e-004		8.0600e-003	8.0600e-003		7.4200e-003	7.4200e-003	0.0000	16.7197	16.7197	5.4100e-003	0.0000	16.8549
Total	**0.0159**	**0.1654**	**0.0985**	**1.9000e-004**	**0.0983**	**8.0600e-003**	**0.1064**	**0.0505**	**7.4200e-003**	**0.0579**	**0.0000**	**16.7197**	**16.7197**	**5.4100e-003**	**0.0000**	**16.8549**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 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	2.5000e-004	1.8000e-004	2.2000e-003	1.0000e-005	7.1000e-004	0.0000	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5730	0.5730	2.0000e-005	2.0000e-005	0.5783
Total	**2.5000e-004**	**1.8000e-004**	**2.2000e-003**	**1.0000e-005**	**7.1000e-004**	**0.0000**	**7.1000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5730**	**0.5730**	**2.0000e-005**	**2.0000e-005**	**0.5783**

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					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0159	0.1654	0.0985	1.9000e-004		8.0600e-003	8.0600e-003		7.4200e-003	7.4200e-003	0.0000	16.7197	16.7197	5.4100e-003	0.0000	16.8549
Total	**0.0159**	**0.1654**	**0.0985**	**1.9000e-004**	**0.0983**	**8.0600e-003**	**0.1064**	**0.0505**	**7.4200e-003**	**0.0579**	**0.0000**	**16.7197**	**16.7197**	**5.4100e-003**	**0.0000**	**16.8549**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 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	2.5000e-004	1.8000e-004	2.2000e-003	1.0000e-005	7.1000e-004	0.0000	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5730	0.5730	2.0000e-005	2.0000e-005	0.5783
Total	**2.5000e-004**	**1.8000e-004**	**2.2000e-003**	**1.0000e-005**	**7.1000e-004**	**0.0000**	**7.1000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5730**	**0.5730**	**2.0000e-005**	**2.0000e-005**	**0.5783**

3.3 Grading - 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					
Fugitive Dust					0.1660	0.0000	0.1660	0.0647	0.0000	0.0647	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0634	0.6798	0.5082	1.0900e-003		0.0286	0.0286		0.0263	0.0263	0.0000	95.4356	95.4356	0.0309	0.0000	96.2072
Total	**0.0634**	**0.6798**	**0.5082**	**1.0900e-003**	**0.1660**	**0.0286**	**0.1947**	**0.0647**	**0.0263**	**0.0910**	**0.0000**	**95.4356**	**95.4356**	**0.0309**	**0.0000**	**96.2072**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 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	0.0215	0.8742	0.1780	3.4800e-003	0.0926	8.1500e-003	0.1008	0.0255	7.8000e-003	0.0333	0.0000	333.6929	333.6929	9.1000e-004	0.0524	349.3433
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.7000e-004	6.8000e-004	8.5600e-003	2.0000e-005	2.7500e-003	1.0000e-005	2.7600e-003	7.3000e-004	1.0000e-005	7.4000e-004	0.0000	2.2282	2.2282	7.0000e-005	6.0000e-005	2.2490
Total	**0.0224**	**0.8749**	**0.1865**	**3.5000e-003**	**0.0954**	**8.1600e-003**	**0.1035**	**0.0262**	**7.8100e-003**	**0.0340**	**0.0000**	**335.9210**	**335.9210**	**9.8000e-004**	**0.0525**	**351.5923**

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					0.1660	0.0000	0.1660	0.0647	0.0000	0.0647	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0634	0.6798	0.5082	1.0900e-003		0.0286	0.0286		0.0263	0.0263	0.0000	95.4354	95.4354	0.0309	0.0000	96.2071
Total	**0.0634**	**0.6798**	**0.5082**	**1.0900e-003**	**0.1660**	**0.0286**	**0.1947**	**0.0647**	**0.0263**	**0.0910**	**0.0000**	**95.4354**	**95.4354**	**0.0309**	**0.0000**	**96.2071**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Grading - 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	0.0215	0.8742	0.1780	3.4800e-003	0.0926	8.1500e-003	0.1008	0.0255	7.8000e-003	0.0333	0.0000	333.6929	333.6929	9.1000e-004	0.0524	349.3433
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.7000e-004	6.8000e-004	8.5600e-003	2.0000e-005	2.7500e-003	1.0000e-005	2.7600e-003	7.3000e-004	1.0000e-005	7.4000e-004	0.0000	2.2282	2.2282	7.0000e-005	6.0000e-005	2.2490
Total	**0.0224**	**0.8749**	**0.1865**	**3.5000e-003**	**0.0954**	**8.1600e-003**	**0.1035**	**0.0262**	**7.8100e-003**	**0.0340**	**0.0000**	**335.9210**	**335.9210**	**9.8000e-004**	**0.0525**	**351.5923**

3.4 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	0.0110	0.1113	0.1458	2.3000e-004		5.6800e-003	5.6800e-003		5.2200e-003	5.2200e-003	0.0000	20.0276	20.0276	6.4800e-003	0.0000	20.1895
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0110**	**0.1113**	**0.1458**	**2.3000e-004**		**5.6800e-003**	**5.6800e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**20.0276**	**20.0276**	**6.4800e-003**	**0.0000**	**20.1895**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 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	4.2000e-004	2.9000e-004	3.6700e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	0.9549	0.9549	3.0000e-005	3.0000e-005	0.9639
Total	**4.2000e-004**	**2.9000e-004**	**3.6700e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1800e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**0.9549**	**0.9549**	**3.0000e-005**	**3.0000e-005**	**0.9639**

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	0.0110	0.1113	0.1458	2.3000e-004		5.6800e-003	5.6800e-003		5.2200e-003	5.2200e-003	0.0000	20.0275	20.0275	6.4800e-003	0.0000	20.1895
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0110**	**0.1113**	**0.1458**	**2.3000e-004**		**5.6800e-003**	**5.6800e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**20.0275**	**20.0275**	**6.4800e-003**	**0.0000**	**20.1895**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 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	4.2000e-004	2.9000e-004	3.6700e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	0.9549	0.9549	3.0000e-005	3.0000e-005	0.9639
Total	**4.2000e-004**	**2.9000e-004**	**3.6700e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1800e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**0.9549**	**0.9549**	**3.0000e-005**	**3.0000e-005**	**0.9639**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1236	1.1766	1.3615	2.1900e-003		0.0606	0.0606		0.0565	0.0565	0.0000	190.0804	190.0804	0.0529	0.0000	191.4035
Total	**0.1236**	**1.1766**	**1.3615**	**2.1900e-003**		**0.0606**	**0.0606**		**0.0565**	**0.0565**	**0.0000**	**190.0804**	**190.0804**	**0.0529**	**0.0000**	**191.4035**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3100e-003	0.0379	0.0113	1.5000e-004	7.8200e-003	3.5000e-004	8.1700e-003	2.1200e-003	3.3000e-004	2.4500e-003	0.0000	14.1473	14.1473	6.0000e-005	2.1400e-003	14.7866
Worker	6.6000e-003	4.6400e-003	0.0581	1.6000e-004	0.0348	1.0000e-004	0.0349	8.9200e-003	9.0000e-005	9.0100e-003	0.0000	15.1260	15.1260	4.7000e-004	4.4000e-004	15.2678
Total	**7.9100e-003**	**0.0425**	**0.0694**	**3.1000e-004**	**0.0426**	**4.5000e-004**	**0.0430**	**0.0110**	**4.2000e-004**	**0.0115**	**0.0000**	**29.2734**	**29.2734**	**5.3000e-004**	**2.5800e-003**	**30.0544**

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	0.1236	1.1766	1.3615	2.1900e-003		0.0606	0.0606		0.0565	0.0565	0.0000	190.0801	190.0801	0.0529	0.0000	191.4033
Total	**0.1236**	**1.1766**	**1.3615**	**2.1900e-003**		**0.0606**	**0.0606**		**0.0565**	**0.0565**	**0.0000**	**190.0801**	**190.0801**	**0.0529**	**0.0000**	**191.4033**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3100e-003	0.0379	0.0113	1.5000e-004	7.8200e-003	3.5000e-004	8.1700e-003	2.1200e-003	3.3000e-004	2.4500e-003	0.0000	14.1473	14.1473	6.0000e-005	2.1400e-003	14.7866
Worker	6.6000e-003	4.6400e-003	0.0581	1.6000e-004	0.0348	1.0000e-004	0.0349	8.9200e-003	9.0000e-005	9.0100e-003	0.0000	15.1260	15.1260	4.7000e-004	4.4000e-004	15.2678
Total	**7.9100e-003**	**0.0425**	**0.0694**	**3.1000e-004**	**0.0426**	**4.5000e-004**	**0.0430**	**0.0110**	**4.2000e-004**	**0.0115**	**0.0000**	**29.2734**	**29.2734**	**5.3000e-004**	**2.5800e-003**	**30.0544**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3387	3.1950	4.0077	6.4700e-003		0.1573	0.1573		0.1466	0.1466	0.0000	561.6954	561.6954	0.1559	0.0000	565.5926
Total	**0.3387**	**3.1950**	**4.0077**	**6.4700e-003**		**0.1573**	**0.1573**		**0.1466**	**0.1466**	**0.0000**	**561.6954**	**561.6954**	**0.1559**	**0.0000**	**565.5926**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3900e-003	0.0961	0.0305	4.2000e-004	0.0231	5.8000e-004	0.0237	6.2700e-003	5.5000e-004	6.8200e-003	0.0000	40.3939	40.3939	1.2000e-004	6.1100e-003	42.2170
Worker	0.0181	0.0122	0.1597	4.7000e-004	0.1027	2.8000e-004	0.1030	0.0264	2.5000e-004	0.0266	0.0000	43.5324	43.5324	1.2700e-003	1.2000e-003	43.9210
Total	**0.0205**	**0.1082**	**0.1902**	**8.9000e-004**	**0.1258**	**8.6000e-004**	**0.1267**	**0.0326**	**8.0000e-004**	**0.0334**	**0.0000**	**83.9264**	**83.9264**	**1.3900e-003**	**7.3100e-003**	**86.1380**

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	0.3387	3.1950	4.0077	6.4700e-003		0.1573	0.1573		0.1466	0.1466	0.0000	561.6948	561.6948	0.1559	0.0000	565.5920
Total	**0.3387**	**3.1950**	**4.0077**	**6.4700e-003**		**0.1573**	**0.1573**		**0.1466**	**0.1466**	**0.0000**	**561.6948**	**561.6948**	**0.1559**	**0.0000**	**565.5920**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3900e-003	0.0961	0.0305	4.2000e-004	0.0231	5.8000e-004	0.0237	6.2700e-003	5.5000e-004	6.8200e-003	0.0000	40.3939	40.3939	1.2000e-004	6.1100e-003	42.2170
Worker	0.0181	0.0122	0.1597	4.7000e-004	0.1027	2.8000e-004	0.1030	0.0264	2.5000e-004	0.0266	0.0000	43.5324	43.5324	1.2700e-003	1.2000e-003	43.9210
Total	**0.0205**	**0.1082**	**0.1902**	**8.9000e-004**	**0.1258**	**8.6000e-004**	**0.1267**	**0.0326**	**8.0000e-004**	**0.0334**	**0.0000**	**83.9264**	**83.9264**	**1.3900e-003**	**7.3100e-003**	**86.1380**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0271	0.2527	0.3387	5.5000e-004		0.0119	0.0119		0.0111	0.0111	0.0000	47.5326	47.5326	0.0132	0.0000	47.8615
Total	**0.0271**	**0.2527**	**0.3387**	**5.5000e-004**		**0.0119**	**0.0119**		**0.0111**	**0.0111**	**0.0000**	**47.5326**	**47.5326**	**0.0132**	**0.0000**	**47.8615**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-004	8.0800e-003	2.5400e-003	3.0000e-005	1.9600e-003	5.0000e-005	2.0000e-003	5.3000e-004	5.0000e-005	5.8000e-004	0.0000	3.3504	3.3504	1.0000e-005	5.1000e-004	3.5017
Worker	1.4300e-003	9.2000e-004	0.0127	4.0000e-005	8.6900e-003	2.0000e-005	8.7100e-003	2.2300e-003	2.0000e-005	2.2500e-003	0.0000	3.5908	3.5908	1.0000e-004	9.0000e-005	3.6215
Total	**1.6300e-003**	**9.0000e-003**	**0.0152**	**7.0000e-005**	**0.0107**	**7.0000e-005**	**0.0107**	**2.7600e-003**	**7.0000e-005**	**2.8300e-003**	**0.0000**	**6.9412**	**6.9412**	**1.1000e-004**	**6.0000e-004**	**7.1231**

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	0.0271	0.2527	0.3387	5.5000e-004		0.0119	0.0119		0.0111	0.0111	0.0000	47.5325	47.5325	0.0132	0.0000	47.8614
Total	**0.0271**	**0.2527**	**0.3387**	**5.5000e-004**		**0.0119**	**0.0119**		**0.0111**	**0.0111**	**0.0000**	**47.5325**	**47.5325**	**0.0132**	**0.0000**	**47.8614**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-004	8.0800e-003	2.5400e-003	3.0000e-005	1.9600e-003	5.0000e-005	2.0000e-003	5.3000e-004	5.0000e-005	5.8000e-004	0.0000	3.3504	3.3504	1.0000e-005	5.1000e-004	3.5017
Worker	1.4300e-003	9.2000e-004	0.0127	4.0000e-005	8.6900e-003	2.0000e-005	8.7100e-003	2.2300e-003	2.0000e-005	2.2500e-003	0.0000	3.5908	3.5908	1.0000e-004	9.0000e-005	3.6215
Total	**1.6300e-003**	**9.0000e-003**	**0.0152**	**7.0000e-005**	**0.0107**	**7.0000e-005**	**0.0107**	**2.7600e-003**	**7.0000e-005**	**2.8300e-003**	**0.0000**	**6.9412**	**6.9412**	**1.1000e-004**	**6.0000e-004**	**7.1231**

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	0.1781					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0549	0.0707	1.2000e-004		3.1900e-003	3.1900e-003		3.1900e-003	3.1900e-003	0.0000	9.9577	9.9577	6.5000e-004	0.0000	9.9739
Total	**0.1861**	**0.0549**	**0.0707**	**1.2000e-004**		**3.1900e-003**	**3.1900e-003**		**3.1900e-003**	**3.1900e-003**	**0.0000**	**9.9577**	**9.9577**	**6.5000e-004**	**0.0000**	**9.9739**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	5.4000e-004	3.8000e-004	4.7700e-003	1.0000e-005	1.5300e-003	1.0000e-005	1.5400e-003	4.1000e-004	1.0000e-005	4.2000e-004	0.0000	1.2414	1.2414	4.0000e-005	4.0000e-005	1.2530
Total	**5.4000e-004**	**3.8000e-004**	**4.7700e-003**	**1.0000e-005**	**1.5300e-003**	**1.0000e-005**	**1.5400e-003**	**4.1000e-004**	**1.0000e-005**	**4.2000e-004**	**0.0000**	**1.2414**	**1.2414**	**4.0000e-005**	**4.0000e-005**	**1.2530**

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	0.1781					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9800e-003	0.0549	0.0707	1.2000e-004		3.1900e-003	3.1900e-003		3.1900e-003	3.1900e-003	0.0000	9.9577	9.9577	6.5000e-004	0.0000	9.9739
Total	**0.1861**	**0.0549**	**0.0707**	**1.2000e-004**		**3.1900e-003**	**3.1900e-003**		**3.1900e-003**	**3.1900e-003**	**0.0000**	**9.9577**	**9.9577**	**6.5000e-004**	**0.0000**	**9.9739**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	5.4000e-004	3.8000e-004	4.7700e-003	1.0000e-005	1.5300e-003	1.0000e-005	1.5400e-003	4.1000e-004	1.0000e-005	4.2000e-004	0.0000	1.2414	1.2414	4.0000e-005	4.0000e-005	1.2530
Total	**5.4000e-004**	**3.8000e-004**	**4.7700e-003**	**1.0000e-005**	**1.5300e-003**	**1.0000e-005**	**1.5400e-003**	**4.1000e-004**	**1.0000e-005**	**4.2000e-004**	**0.0000**	**1.2414**	**1.2414**	**4.0000e-005**	**4.0000e-005**	**1.2530**

3.6 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5936					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0249	0.1694	0.2355	3.9000e-004		9.2100e-003	9.2100e-003		9.2100e-003	9.2100e-003	0.0000	33.1923	33.1923	1.9900e-003	0.0000	33.2419
Total	**0.6185**	**0.1694**	**0.2355**	**3.9000e-004**		**9.2100e-003**	**9.2100e-003**		**9.2100e-003**	**9.2100e-003**	**0.0000**	**33.1923**	**33.1923**	**1.9900e-003**	**0.0000**	**33.2419**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6800e-003	1.1300e-003	0.0148	4.0000e-005	5.1000e-003	3.0000e-005	5.1300e-003	1.3600e-003	2.0000e-005	1.3800e-003	0.0000	4.0308	4.0308	1.2000e-004	1.1000e-004	4.0668
Total	**1.6800e-003**	**1.1300e-003**	**0.0148**	**4.0000e-005**	**5.1000e-003**	**3.0000e-005**	**5.1300e-003**	**1.3600e-003**	**2.0000e-005**	**1.3800e-003**	**0.0000**	**4.0308**	**4.0308**	**1.2000e-004**	**1.1000e-004**	**4.0668**

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	0.5936					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0249	0.1694	0.2354	3.9000e-004		9.2100e-003	9.2100e-003		9.2100e-003	9.2100e-003	0.0000	33.1923	33.1923	1.9900e-003	0.0000	33.2419
Total	**0.6185**	**0.1694**	**0.2354**	**3.9000e-004**		**9.2100e-003**	**9.2100e-003**		**9.2100e-003**	**9.2100e-003**	**0.0000**	**33.1923**	**33.1923**	**1.9900e-003**	**0.0000**	**33.2419**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6800e-003	1.1300e-003	0.0148	4.0000e-005	5.1000e-003	3.0000e-005	5.1300e-003	1.3600e-003	2.0000e-005	1.3800e-003	0.0000	4.0308	4.0308	1.2000e-004	1.1000e-004	4.0668
Total	**1.6800e-003**	**1.1300e-003**	**0.0148**	**4.0000e-005**	**5.1000e-003**	**3.0000e-005**	**5.1300e-003**	**1.3600e-003**	**2.0000e-005**	**1.3800e-003**	**0.0000**	**4.0308**	**4.0308**	**1.2000e-004**	**1.1000e-004**	**4.0668**

3.6 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0731					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8900e-003	0.0195	0.0290	5.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	4.0852	4.0852	2.3000e-004	0.0000	4.0910
Total	**0.0760**	**0.0195**	**0.0290**	**5.0000e-005**		**9.7000e-004**	**9.7000e-004**		**9.7000e-004**	**9.7000e-004**	**0.0000**	**4.0852**	**4.0852**	**2.3000e-004**	**0.0000**	**4.0910**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.2000e-004	1.7000e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.4836	0.4836	1.0000e-005	1.0000e-005	0.4877
Total	**1.9000e-004**	**1.2000e-004**	**1.7000e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.4836**	**0.4836**	**1.0000e-005**	**1.0000e-005**	**0.4877**

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	0.0731					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8900e-003	0.0195	0.0290	5.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	4.0852	4.0852	2.3000e-004	0.0000	4.0910
Total	**0.0760**	**0.0195**	**0.0290**	**5.0000e-005**		**9.7000e-004**	**9.7000e-004**		**9.7000e-004**	**9.7000e-004**	**0.0000**	**4.0852**	**4.0852**	**2.3000e-004**	**0.0000**	**4.0910**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Architectural Coating - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.2000e-004	1.7000e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.4836	0.4836	1.0000e-005	1.0000e-005	0.4877
Total	**1.9000e-004**	**1.2000e-004**	**1.7000e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.4836**	**0.4836**	**1.0000e-005**	**1.0000e-005**	**0.4877**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.3859	0.5758	3.6589	7.3900e-003	0.7372	6.6100e-003	0.7438	0.1975	6.2100e-003	0.2037	0.0000	693.2450	693.2450	0.0432	0.0367	705.2599
Unmitigated	0.3859	0.5758	3.6589	7.3900e-003	0.7372	6.6100e-003	0.7438	0.1975	6.2100e-003	0.2037	0.0000	693.2450	693.2450	0.0432	0.0367	705.2599

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	708.00	715.50	641.25	2,003,850	2,003,850
Total	708.00	715.50	641.25	2,003,850	2,003,850

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
Single Family Housing	10.80	7.30	7.50	42.60	21.00	36.40	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.466187	0.061512	0.210180	0.153350	0.034639	0.008391	0.014417	0.011935	0.000556	0.000412	0.031993	0.000977	0.005450

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Percent of Electricity Use Generated with Renewable 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	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	103.4754	103.4754	8.8800e-003	1.0800e-003	104.0180
NaturalGas Mitigated	9.5700e-003	0.0818	0.0348	5.2000e-004		6.6100e-003	6.6100e-003		6.6100e-003	6.6100e-003	0.0000	94.6893	94.6893	1.8100e-003	1.7400e-003	95.2520
NaturalGas Unmitigated	9.5700e-003	0.0818	0.0348	5.2000e-004		6.6100e-003	6.6100e-003		6.6100e-003	6.6100e-003	0.0000	94.6893	94.6893	1.8100e-003	1.7400e-003	95.2520

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
Single Family Housing	1.77441e+006	9.5700e-003	0.0818	0.0348	5.2000e-004		6.6100e-003	6.6100e-003		6.6100e-003	6.6100e-003	0.0000	94.6893	94.6893	1.8100e-003	1.7400e-003	95.2520
Total		**9.5700e-003**	**0.0818**	**0.0348**	**5.2000e-004**		**6.6100e-003**	**6.6100e-003**		**6.6100e-003**	**6.6100e-003**	**0.0000**	**94.6893**	**94.6893**	**1.8100e-003**	**1.7400e-003**	**95.2520**

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					
Single Family Housing	1.77441e+006	9.5700e-003	0.0818	0.0348	5.2000e-004		6.6100e-003	6.6100e-003		6.6100e-003	6.6100e-003	0.0000	94.6893	94.6893	1.8100e-003	1.7400e-003	95.2520
Total		**9.5700e-003**	**0.0818**	**0.0348**	**5.2000e-004**		**6.6100e-003**	**6.6100e-003**		**6.6100e-003**	**6.6100e-003**	**0.0000**	**94.6893**	**94.6893**	**1.8100e-003**	**1.7400e-003**	**95.2520**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	593054	103.4754	8.8800e-003	1.0800e-003	104.0180
Total		**103.4754**	**8.8800e-003**	**1.0800e-003**	**104.0180**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Sierra View Project - Placer County APCD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

	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	0.6338	0.0523	0.5762	3.2000e-004		6.8000e-003	6.8000e-003		6.8000e-003	6.8000e-003	0.0000	54.0760	54.0760	1.8900e-003	9.7000e-004	54.4138
Unmitigated	5.3344	0.0983	6.3657	0.0106		0.8176	0.8176		0.8176	0.8176	77.4718	33.4002	110.8720	0.0724	6.0900e-003	114.4971

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0845					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.5272					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	4.7060	0.0919	5.8090	0.0105		0.8145	0.8145		0.8145	0.8145	77.4718	32.4906	109.9624	0.0715	6.0900e-003	113.5657
Landscaping	0.0167	6.4100e-003	0.5567	3.0000e-005		3.0900e-003	3.0900e-003		3.0900e-003	3.0900e-003	0.0000	0.9097	0.9097	8.7000e-004	0.0000	0.9315
Total	**5.3344**	**0.0983**	**6.3657**	**0.0106**		**0.8176**	**0.8176**		**0.8176**	**0.8176**	**77.4718**	**33.4002**	**110.8720**	**0.0724**	**6.0900e-003**	**114.4971**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.0845					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.5272					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	5.3700e-003	0.0459	0.0195	2.9000e-004		3.7100e-003	3.7100e-003		3.7100e-003	3.7100e-003	0.0000	53.1664	53.1664	1.0200e-003	9.7000e-004	53.4823
Landscaping	0.0167	6.4100e-003	0.5567	3.0000e-005		3.0900e-003	3.0900e-003		3.0900e-003	3.0900e-003	0.0000	0.9097	0.9097	8.7000e-004	0.0000	0.9315
Total	**0.6338**	**0.0523**	**0.5762**	**3.2000e-004**		**6.8000e-003**	**6.8000e-003**		**6.8000e-003**	**6.8000e-003**	**0.0000**	**54.0760**	**54.0760**	**1.8900e-003**	**9.7000e-004**	**54.4138**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	7.6687	0.1598	3.8200e-003	12.8019
Unmitigated	8.0450	0.1598	3.8300e-003	13.1801

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	4.88655 / 3.08065	8.0450	0.1598	3.8300e-003	13.1801
Total		**8.0450**	**0.1598**	**3.8300e-003**	**13.1801**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	4.88655 / 2.46452	7.6687	0.1598	3.8200e-003	12.8019
Total		**7.6687**	**0.1598**	**3.8200e-003**	**12.8019**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	15.7115	0.9285	0.0000	38.9246
Unmitigated	15.7115	0.9285	0.0000	38.9246

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	77.4	15.7115	0.9285	0.0000	38.9246
Total		**15.7115**	**0.9285**	**0.0000**	**38.9246**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	77.4	15.7115	0.9285	0.0000	38.9246
Total		**15.7115**	**0.9285**	**0.0000**	**38.9246**

9.0 Operational Offroad

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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS

TECHNICAL MEMORANDUM

DATE: August 3, 2021

TO: City of Roseville

FROM: Cindy Gwaltney

CC: Ryan O'Keefe, WP Sierra View, LLC.; Allison Wathen, Eric Crow

SUBJECT: Preliminary Storm Drainage Evaluation for Sierra View

REGISTERED PROFESSIONAL ENGINEER
STEPHEN D. SMITH
No. 35474
CIVIL
STATE OF CALIFORNIA

Introduction & Overview

This Technical Memorandum (TM) is a technical drainage assessment for a proposed development project on the ±23.1-acre Sierra View site in the City of Roseville, which documents the existing (current) conditions prior to construction of the Sierra View development and the proposed drainage conveyance and mitigation systems. The existing conditions modeled herein will establish performance criteria for the proposed conditions to pose no impact on the surrounding properties. This Technical Memorandum provides a tentative map level of analysis.

The contributary area analyzed for Sierra View is comprised of offsite development area including low density residential, medium density residential, a school, park, golf course, and undeveloped land. The site is located north of Shasta Street, east of Sierra View Country Club Golf Course, south of Diamond Oaks Road, and west of Shasta Street (Figure 1). The Sierra View site lies between an existing golf course and previously developed residential areas. The existing topography drains to both the north and south, eventually finding a release path north of the Sierra View Country Club golf course into the Pleasant Grove Creek South Branch Sierra View Tributary (Exhibit 1, Appendix A).

Purpose

This TM is a drainage evaluation that supports the project entitlements for Sierra View. This TM evaluates the site's existing conditions, proposed project conditions, and provides a preliminary assessment of the storm drainage infrastructure as well as mitigation measures for flood control, hydromodification, and storm water quality.

Previous Studies

No previous studies were utilized in the preparation of this report.

Topography

The topography for the site is from two sources: aerial topography which was specifically flown for the Sierra View site and LiDAR topography provided by the City of Roseville. The aerial topography covers the future development site and the LiDAR covers areas outside of the flown topography. The datum for the survey is based on NAD83 California Zone II in US-FT. The LiDAR topography was received in grid and was converted to ground to correspond with the project's horizontal positioning. The factor used for the conversion from grid to ground is 1.000072779. These topographies were combined in AutoCAD Civil 3D to create a surface for input into HEC-RAS. The topography was exported from AutoCAD with a 1-foot grid spacing for detailed mapping accuracy within HEC-RAS. Both sources of topography are in the North American Vertical Datum of 1988 (NAVD88).

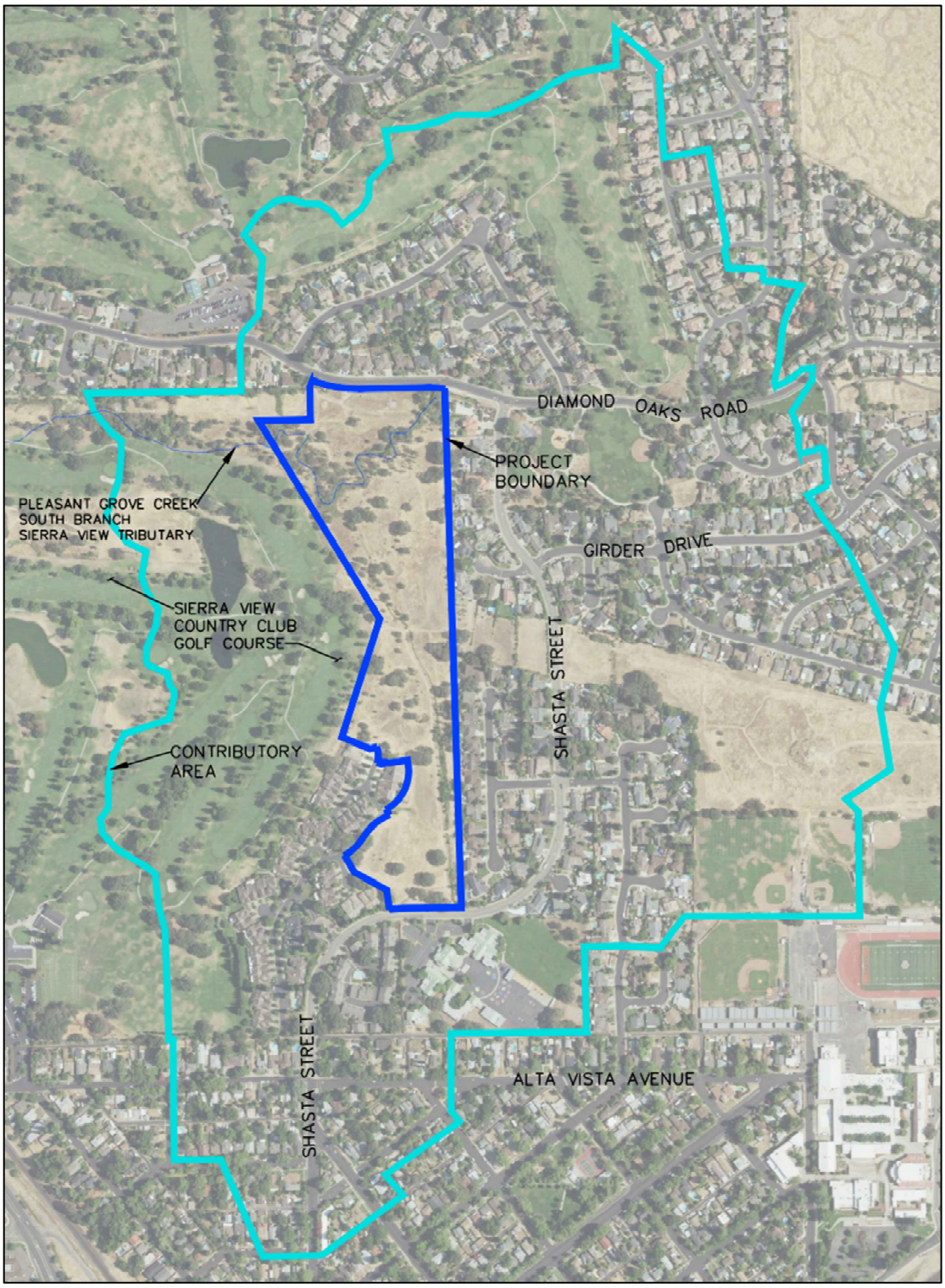


Figure 1. Project Boundary, Contributory Area, and Site Location

Soils Information

The soil type for the study area is entirely D type soil. D type soil has a low infiltration rate which will produce the greatest runoff for the hydraulic model and is therefore the most conservative soil type for mapping purposes. The USGS Web Soil Survey for the project site and surrounding area can be seen below in Figure 2. Areas highlighted in red are D type soil.

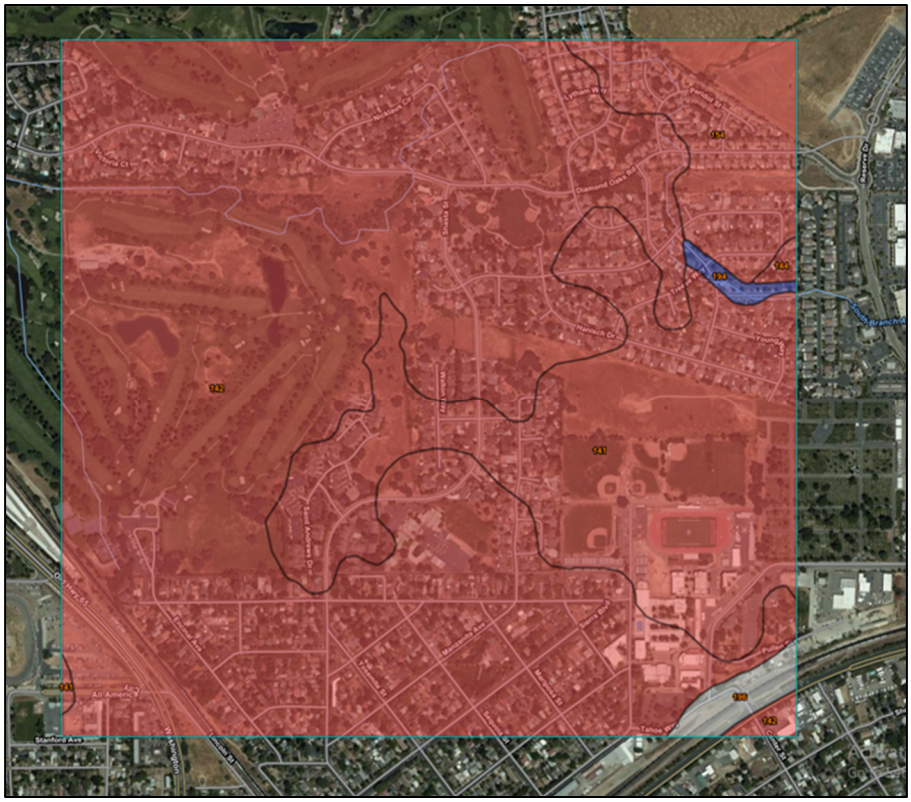


Figure 2. Project Soil Map

ULOP

In 2007, the State of California enacted six bills to improve flood management, one of which pertains to the Sacramento and San Joaquin river basins. Senate Bill 5 (SB5) is intended to bolster the relationship between local land use planning decisions and flood management practices. The requirement of SB5 is that an Urban Level of Flood Protection (ULOP) be given in specific areas of the Sacramento and San Joaquin river basins. ULOP is defined as the level of protection necessary to withstand a 1-in-200 chance of flooding in any given year. There are five location criteria that all must be met in order for the ULOP to apply. The site was evaluated to ascertain the applicability of the ULOP criteria and determined that the proposed project does not meet the criterion of having watersheds with a contributing area of 10 or more square miles (6400 acres), and therefore, the project is not subject to SB5 legislation.

FEMA Information

The Federal Emergency Management Agency's (FEMA) Flood Insurance Study (FIS) Flood Insurance Rate Map (FIRM) encompassing the project area is FIRM Panel ID# 06061C0943H, effective November 2, 2018. As is shown in Figure 2 below, no established regulatory floodplains are located within, or adjacent to, the subject site. A Letter of Map Revision for the existing conditions floodplain is not required for this project due to having less than 1 square mile of contributary area to a conveyance system on or adjacent to the property.

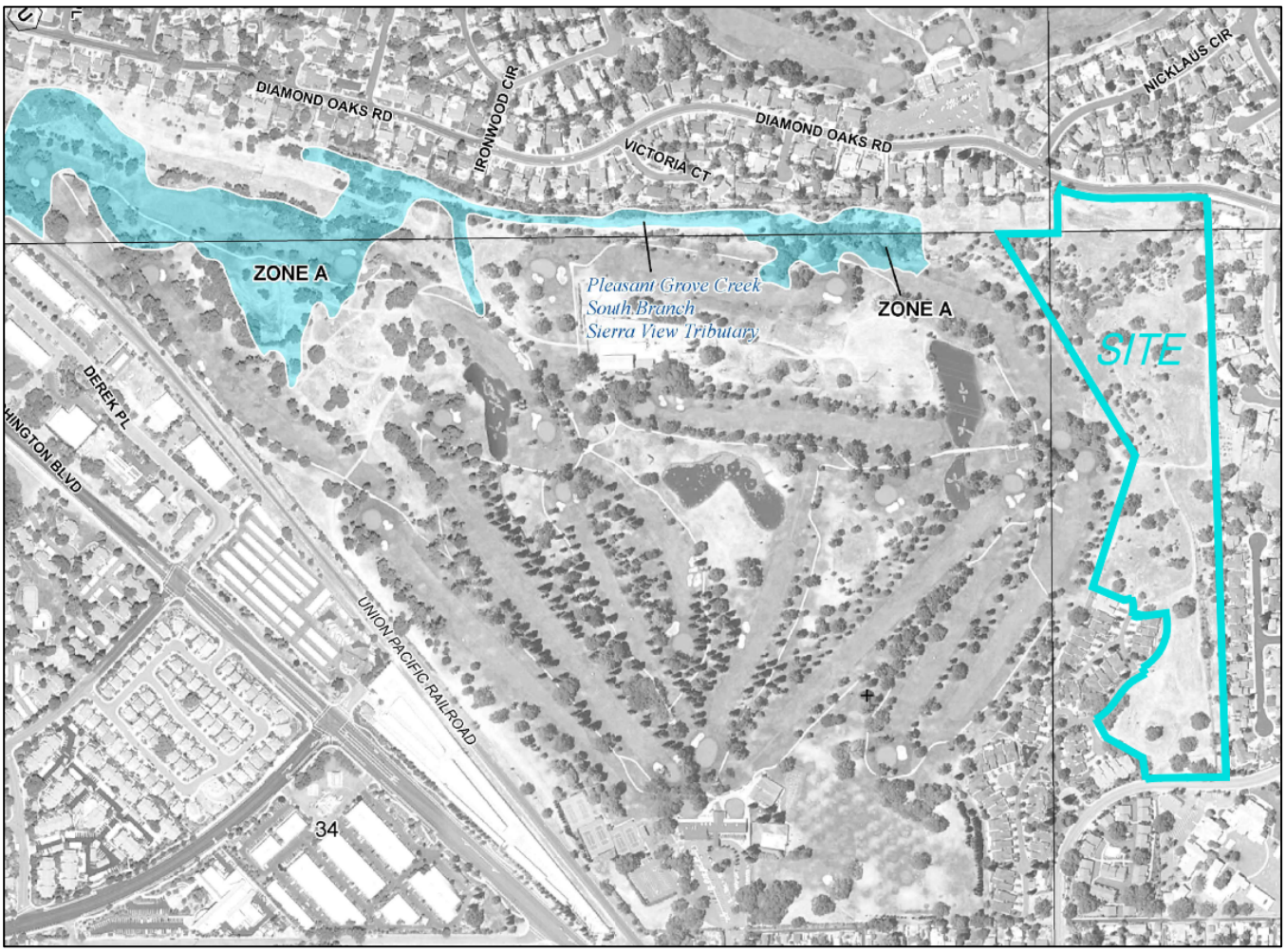


Figure 3. Portion of FEMA FIRM 06061C0943H

Methodologies and Assumptions

Model Selections and Standards

In accordance with the City and County standards, several hydrologic and hydraulic models were utilized to evaluate the impacts of the proposed development. Section 10 Drainage of the City's Design Standards was referenced for the development of the analysis herein. In addition to the City's standards, the hydrologic and hydraulic methods and standards included in the Placer County Flood Control and Water Conservation District Stormwater Management Manual (SWMM) were referenced as needed. The following report subsections provide an overview of the software, data, and parameters used in the modeling presented herein.

Floodplain Hydrologic and Hydraulic Modeling

Several hydrologic and hydraulic models were utilized to evaluate the floodplain in the existing and proposed conditions. For the floodplain analysis, this TM utilizes a two-step modeling process:

1. **Hydrology.** The runoff for each watershed was determined by using the US Army Corps of Engineers' Hydrologic Engineering Center HEC-1 Flood Hydrograph Package and Placer County's preprocessor PDP2 software for generating design event precipitation. The HEC-1 model was created without precipitation data (PI) cards to be run through the Placer County PDP2 Preprocessor. The Preprocessor takes elevation data,

project location, recurrence interval, and storm centering as input and produces a set of PI cards for each watershed. The project location is set west of the Sierras, the recurrence intervals modeled are the 1% or the 100-year storm, 10% or the 10-year storm, and the 50% or the 2-year storm. After the Preprocessor runs, the HEC-1 program is run normally and a data storage system (dss) file is produced which contains all hydrographs for the study area. The HEC-1 file, including results and input, can be found in Appendix B.

2. **Hydraulics.** The hydrographs generated in HEC-1 were incorporated into a US Army Corps of Engineers' Hydraulic Engineering Center (HEC) River Analysis System (RAS) software package (HEC-RAS 2D program version 5.0.7). Due to the site's topography, a 2D model was chosen instead of a 1D model to better capture the multiple flow paths for the site. An unsteady state analysis was used to determine the peak flow and water surface elevations using the geometry of the respective existing and proposed topographies. The results of this step are the stage and flow hydrographs at the compliance points identified on Exhibits 1 and 2 (Appendix A). Also resulting are 100-year 24-hour inundation boundaries shown on Exhibits 1 and 2, respectively.

These two steps were utilized in a comprehensive, iterative approach for both flood control and hydromodification analyses. First, the existing conditions hydrology was prepared. Then existing conditions hydraulic analysis was prepared to evaluate the existing conditions floodplain information—the baseline for existing flooding conditions. In parallel, HEC-1 and HEC-RAS modeling for the existing conditions 2-year 24-hour event was analyzed to determine the hydromodification baseline information.

Next, the proposed conditions hydrology and hydraulics were established. This information was then used to verify that sufficient flood control and hydromodification mitigation is proposed onsite.

HEC-1 Modeling Parameters

Impervious Cover

Impervious cover for the offsite watersheds was determined using the parcel map for the surrounding development. Areas with low density residential lots were assumed to be 40% impervious cover, medium density residential lots and school sites were assumed to have 50% impervious cover, parks and golf course assumed to have 5% impervious cover, and open space assumed to be 2% cover. While most sheds fall into a single impervious cover type, some sheds cover multiple impervious conditions. In sheds that contain more than one condition, the area of each land use type was measured in AutoCAD and a composite rate was established for the watershed.

The impervious cover for the proposed onsite watersheds consists of low density residential at 40% impervious cover, roadway corridor at 85% impervious cover, park and graded areas at 5% impervious cover, and open space at 2%. The offsite watershed impervious rates remain unchanged for the proposed conditions modeling.

Watershed Routing

Watershed routing is performed in HEC-1 using the Muskingum-Cunge routing method. UK and RD cards were used to model the sheet flow and channel flow of each watershed to its terminus. The UK card for sheet flow is input with a maximum length of 300-feet for natural conditions and an average lot depth length for proposed conditions watersheds. The RD card was used to model the remaining watercourse length to the end of the watershed. For piped systems, the largest diameter pipe was used to avoid constricting the flow and the slope of the overland route was used for the pipe slope if the slope was unknown. For natural sheds EX08 and EX10, the RD card for the watercourse length ended in the middle of the watershed. This is done due to the method in which the resultant hydrograph would be input into HEC-RAS. The hydrograph input location in HEC-RAS would be over many cells in the center of the watershed. By this method, if the HEC-1 routing were to be taken to the terminus of the watershed, it would overestimate the time of concentration of the watershed. Watershed routing is depicted on Exhibits 1 and 2 included in Appendix A.

In the proposed conditions, there are a couple of clarifications regarding how some sheds were modeled. Small sheds consisting of rear draining lots were combined with adjacent sheds to ensure that sheds are large enough for HEC-1 to properly process whilst preserving the flood control element of the watershed. Additionally, the existing shed, EX04, which discharges to the site in a 21-inch pipe on the eastern boundary of the project in the existing conditions is routed in HEC-1 through shed DEV09 and then combined with DEV09 prior to discharging into the detention basin DBC proposed to be located at roughly the center of the project.

In both the existing conditions and proposed conditions, sheds EX02 and EX03, discharge to a natural channel in the northeast corner of the project. No detailed drainage study is available for this offsite area. It is assumed, through study of the topography, that the runoff of these sheds, both piped and from overland release, discharge to the same location.

Storm Centering

Storm centering is not applied since the contributary shed area is under 0.5-square miles. Per Table 5-1 in the SWMM, an area of 0.5-square miles and less for the 10-year and larger events do not require storm centering. Although storm centering would influence the 2-year 24-hour event, this event is for comparison purposes only so there is no risk in removing the storm centering aspect of the hydrology.

HEC-RAS Modeling Parameters

2D Cell Spacing

Once the topography was imported into HEC-RAS, a 2D surface area was established which covered the open space from Shasta Street north to the golf course. The 2D area was set to a cell spacing of 4-feet. This spacing captures the low-flow channel onsite while allowing for timely model runs. A decreased cell size would greatly increase the computational time required for the model without adding increased accuracy. While an increased cell size would decrease the time required to run the model, increased cell sizes run the risk of not fully capturing the low-flow channel. With these considerations, a 4-foot cell spacing was used in the model.

The 2D area limits are higher in elevation than what is inundated by the 100-year event with the exception of two locations. The first location is the downstream limit of the model where a boundary condition is used to end the model. The second location is at the southwest corner of the Sierra View property near the existing 18-inch storm drain system. Shasta Street was prevented from flooding to establish a conservative floodplain onsite. If Shasta Street were to flood, there is an overland release route down Sierraview Drive to the same location as the 18-inch culvert discharges.

Manning's 'n' Values

The model contains a single composite manning's 'n' value of 0.06. The existing floodplain conditions are grasses with occasional trees or brush, consistent with a 'n' value of 0.06 in the overbank. The channel itself could be considered to have a lower 'n' value due to the straight and uniform nature of the channel, as well as the limited vegetation in stretches of the channel. However, portions of the channel do exhibit brushy growth which will inhibit flows of all stages. Due to the sporadic areas of increased vegetation the channel was also modeled with a 'n' value of 0.06. This roughness value is carried through in the proposed conditions modeling.

Hydrograph Input

There are two types of hydrographs input into the HEC-RAS model: point discharge hydrographs and natural area discharge hydrographs. The point discharge hydrographs are hydrographs which are applied at a single (or few) cell(s). They are input as flow hydrographs and are a result of a storm drain outfall entering the HEC-RAS model at one location. The second type of hydrograph input, the natural area hydrographs, are input over many cells in HEC-RAS. These hydrographs are also input as flow hydrographs but they cover many cells in the open space and simulate that rainfall occurs over a large area, not at a single point.

Downstream Conditions

The downstream condition of the HEC-RAS model is a normal depth of 0.0065. This was calculated using the slope of the downstream channel.

Existing Conditions

The existing Sierra View site has four contributing storm drain outfalls from the adjacent previously developed residential areas. The model area contains an additional three existing storm drain outfalls outside of the Sierra View property boundary. Each outfall has a contributing watershed which was developed from the existing storm drain system maps and topography. The drainage system map and Exhibit 1, which shows the topography, are included in Appendix A. Further detail on the watersheds and their characteristics is discussed in the Hydrology section below.

The Sierra View site itself is a moderately sloped site which drains to a central channel. The existing man-made channel conveys flow from south to north, eventually turning west towards the golf course. There is an additional drainage path in the southwest corner of the site which drains a small portion of the land area to a low point and an 18-inch storm drain which drains the site west through an existing development. The southern drainage eventually releases towards the north and re-joins the main conveyance path north of the golf course. Just downstream of the confluence is the end of the hydrologic and hydraulic models. This location was chosen as a boundary condition due to the topography creating a single discharge location which could be easily compared to the proposed condition for compliance.

Existing Watersheds

A total of 10 watersheds were established for the hydrologic analysis of the site's existing conditions. Seven of these watersheds are already developed and contribute to the site through their existing storm drain systems. The remaining three watersheds are primarily open space watersheds, two of which are onsite and one of which is downstream of the Sierra View site. Exhibit 1 included with this TM depicts the hydrologic data utilized herein.

HEC-RAS Model Hydraulic Features

The existing conditions HEC-RAS model contains limited hydraulic features, three culverts. The first two culverts, culvert 1 and culvert 2, are small culverts in the man-made channel for off-road crossings. These culverts are both short in length and are inserted into the model at the channel invert. The culverts are modeled with a Manning's 'n' value of 0.02 to account for sedimentation and overgrowth. Both culverts have limited capacity and overtop in the 100-year event. The third culvert is the storm drain system which conveys flow from the southwest portion of the Sierra View property west through an existing residential development. The storm drain system was modeled as a single full-length culvert of the smallest diameter pipe, 18-inch. An initial model run with a 'n' value of 0.015 was performed but was later changed in the final model run to a value of 0.02 to account for bend losses through manholes. The 18-inch culvert drains the low point in the topography and discharges to the west into the golf course.

Proposed Conditions

The proposed Sierra View development site consists of 23.1-acres of which 18.9-acres are proposed to have an increase in imperviousness. The overall watershed analyzed herein consists of 255.2-acres at an impervious rate of 25% of which the proposed project site is a part of. The proposed development includes the addition of 76 low density residential lots, supporting roadways, a park site, and detention facilities which, since the proposed development is a small fraction of the overall watershed, the impervious rate minimally increases from 25% to 28% in the proposed conditions.

Proposed Watersheds

The offsite watersheds shown on Exhibits 1 and 2 remain unchanged from the existing conditions analysis. The watersheds within the project boundary are adjusted to reflect the development and grading proposed with the Sierra View project. Exhibit 2 depicts the proposed conditions watersheds.

Proposed Storm Drain Infrastructure

The proposed project would utilize surface and subsurface infrastructure to convey flows to storm water quality facilities and detention basins before discharging from the site. For the onsite storm drainage infrastructure, a spreadsheet was used to calculate runoff and to perform hydraulic calculations for the proposed development. The Unit Peak Discharge Method was used to calculate the 10-year and the 100-year events' peak flows while Manning's equations were used for the hydraulic calculations. The drainage system is analyzed assuming full buildout of all contributary areas and includes upstream contributary areas as applicable. The impervious rates for the contributary watersheds are the same as utilized in the HEC-1 hydrologic modeling.

The modeling parameters for the onsite storm drainage infrastructure utilize a Manning's 'n' value of 0.015 and a minimum pipe flowing full velocity of 2.0 feet-per-second. The 10-year hydraulic grade line shall stay at a minimum 1-foot below all manhole rims and inlet grates. For the 100-year event, local streets shall not have more than 4-inches above the top back of curb. The design tailwater for each outfall is the water surface elevation developed in the HEC-RAS model at the outfall pipe location.

The existing offsite sheds, EX02 and EX03, discharge to a natural channel in the northeast corner of the project upstream of a proposed roadway crossing. These sheds are conveyed to this location via pipes and overland release grading. To convey the flows under the proposed roadway crossing without creating an adverse impact to the existing upstream systems, large box culverts are proposed under the roadway. The intent of the culvert crossing, as sized, is to not raise water surface elevations further upstream at the existing pipes' outfalls above the existing conditions elevations.

Two existing offsite sheds, EX04 and EX05, are proposed to be conveyed in pipes through the proposed project. The analysis shows that the proposed development can adequately convey offsite discharges through the project with no adverse effects. Pipes proposed are sized to avoid increased backwater effect on the existing storm drain systems which discharge to the site.

Existing shed EX04 discharges to the proposed project on the east boundary via a 21-inch existing outfall pipe. This outfall pipe is proposed to directly connect to proposed infrastructure and conveyed north before being discharged.

Existing shed EX05 discharges from a 24-inch pipe in the south that will be allowed to pond onsite before getting picked up and conveyed north in pipes. A portion of this flow goes to the existing 18-inch pipe in the southwest corner of the proposed project site. Flows contributing to the existing 18-inch pipe and to the proposed pipe that discharges to the north, are split so that water surface elevations and discharges in the proposed condition are less than or equal to that in the existing conditions for the events analyzed herein. Results at this location are included in Appendix C. Exhibit 3 shows the proposed storm drain system, sheds, and pertinent results.

HEC-RAS Model Hydraulic Features

The proposed conditions HEC-RAS model includes the proposed grading for the site as well as several pipes and culverts. The topography outside of the project boundary remain the same as in existing conditions. The changes to the HEC-RAS model for the proposed conditions geometry include the proposed roadway crossings, areas of fill, and excavation for detention mitigation basins. Pipes were added for conveyance and to achieve the timing from routing through pipes for the sheds that do not include the routing within the HEC-1 hydrologic modeling. The splitting of flows between the existing conditions 18-inch pipe in the southwest and the proposed 36-inch pipe is an example of flows routed within pipes in HEC-RAS. The 18-inch pipe in the proposed conditions remains the same as it is

modeled in the existing conditions. In that same area, a 36-inch pipe is proposed to pickup the discharges from the offsite shed EX05 which were previously split between the existing 18-inch pipe and an existing ditch that flowed north through the project. The proposed 36-inch pipe is intended to convey flows that previously were conveyed in the existing ditch. These flows, as in the existing conditions, will be conveyed north through the project. The length and slope are the total pipe run length proposed with a composite slope determined by the outfall invert downstream, the most upstream invert and the total length of pipe.

Proposed Project Detention Mitigation

With the addition of impervious area and infrastructure to a site without mitigation measures in place, peak flows, volumes, and velocities are anticipated to increase. While the proposed project would add impervious area and would use conveyance systems that concentrate flows, it would also utilize features to mitigate the predicted increases in flows, volumes, and velocities. Increases in peak flows and volumes would be mitigated by detention basins for the 10-year and 100-year 24-hour events. Increases in velocities may be mitigated with rock outfall protection or other dissipation features suitable to site conditions. The conversion of sheet flows to concentrated flows can also reduce the natural infiltration of runoff into the soil. Adding landscaped areas and storm water quality measures, discussed later in this TM, can increase infiltration of a developed site. The rates used in Placer County per the County's Stormwater Management Manual show that the infiltration rates for landscaping such as lawns and shrubs is higher than that of open space for all soil types. This includes areas such as parks and planted roadsides. Although the total area available for infiltration would decrease due to the addition of impervious cover, these landscaped areas can assist, along with the addition of storm water quality measures, in balancing the overall infiltration for a developed site. The criteria used for the development of detention within this study are summarized below.

- Detention facilities shall be used to control the post-development 2-year, 10-year, and 100-year 24-hour event peak flow.
- All storage facilities shall drawdown within 72-hours.
- Basins shall have a minimum of 1-foot of freeboard above the high water level on the emergency spillway or 2-feet of freeboard above the 100-year high water level in the basin, whichever is more stringent.

To attenuate the proposed conditions peak flow rates to be less than existing conditions peak flow rates, detention for the 2-year 24-hour, 10-year 24-hour, and 100-year 24-hour events is needed. One basin is necessary to mitigate the flood control events for the proposed project. Basin DBC located in the central portion of the project detains flows by way of a road crossing and a discharge culvert. The discharge culvert is sized to detain sufficient flows to mitigate for flood control for the proposed site.

Detention is also occurring due to the proposed road crossing of the floodplain in the northern part of the proposed site. To not create a backwater effect on the existing outfall pipes from sheds EX02 and EX03, the culverts crossing under the roadway in the northern part of the site are sized to minimize the amount of water detained, however, some detention does occur. Grading upstream of these culverts is proposed to provide volume due to the reduction of the floodplain from the road crossing. The preliminary results of these areas are shown below in Table 1.

Table 1: Preliminary Detention Facility Results

Detention Facility	DBC	DBN
10-Yr Peak Inflow (cfs)	56	200
100-Yr Peak Inflow (cfs)	120	347
10-Yr Peak Outflow (cfs)	29	171
100-Yr Peak Outflow (cfs)	46	294
10-Yr Water Surface Elev. (ft)	162.6	158.7
100-Yr Water Surface Elev. (ft)	163.9	159.3

Storm Water Quality & Hydromodification

Storm water is a valuable resource and it is the intention of the proposed project to maintain storm water quality using source controls and Low Impact Development (LID) measures. These measures, through structures and operations, infiltration, evapotranspiration, and biotreatment can provide water quality treatment and recharge groundwater supplies, protect and enhance natural habitat and biodiversity, and add aesthetic value to new development.

The proposed project would create more than one acre of impervious surface. Due to this, it is considered a Hydromodification Management Project per the Phase II MS4 Permit and is required to provide storm water treatment for the 85th percentile event and hydromodification for the 2-year event. A multi-layered approach is taken to ensure that these requirements are met per the SWQDM. The discussion below outlines the types of measures that could be incorporated into the project to meet the requirements of the SWQDM.

To evaluate the storm water quality provisions and hydromodification management for the development, the West Placer Storm Water Quality Design Manual (SWQDM) was referenced and utilized in this analysis. While the storm water quality calculations follow the procedures outlined within that manual by utilizing the provided templates, hydromodification compliance was proven by comparing the existing conditions to the proposed conditions peak flows at the project boundary as determined in the HEC-RAS model for the 2-year 24-hour event.

The first line of defense in maintaining storm water quality is to keep urban runoff from commingling with clean water through the use of Source Controls. This can be done using structural and operational measures at the pollutant source. At this level of analysis, source control measures are not included however, measures may be specified at the improvement plan level of design and implemented with construction.

Potential structural measures may include covering of trash receptacles and using efficient irrigation to reduce overspray. Operational measures may include using good housekeeping measures to minimize the generation of pollutants, make stormwater pollution prevention measures a part of standard operating procedures, and employee training programs.

Storm water runoff into local creeks could introduce pollutants and could cause hydromodification, which would be mitigated by implementing various LID features including trees, soil amendments, disconnected impervious areas, vegetated swales, and bioretention. These LID measures not only treat runoff through natural physical and biological treatment processes but also reduce the amount of runoff through infiltration and evapotranspiration. This will keep developed flows from degrading downstream creek systems due to erosion; while, at the same time, capture and remove urban pollutants from runoff flows from the developed areas prior to discharging the treated flows from the site.

The proposed project would also incorporate tree plantings throughout the site. Trees, at a minimum, decrease storm water runoff volume, reduce amount of pollutants to reach downstream, are aesthetically pleasing, as well as have a cooling effect through shade and evapotranspiration.

Soil quality amendments would also be added at a rate of 9 square-feet of 1-foot deep soil amendment per each tree planting, thus assisting the trees in becoming established as well as improving the soil. Additional soil amendments of 200 square-feet at 1-foot deep per rear draining lot is also proposed. Soil quality amendments improve soil infiltration rates, reduce surface runoff quantities and erosion, improve soil filtration capabilities and pollutant removal, enhance plant survival rates and health, and decrease the need for landscape irrigation and fertilization.

Disconnecting impervious areas is another technique that would be implemented with the project. This includes rooftops or other hard surfaces such as streets/parking lots or sidewalks that drain directly to pervious areas such as landscape. The rooftop disconnection is achieved through disconnected roof drains that route the rooftop flows into pervious areas. The design parameter of twice the area of impervious to pervious area is used. For the proposed project, an estimated amount of 1500 square-feet of rooftop per lot is assumed. Disconnected impervious areas

have the following benefits of decreasing runoff volume, reducing peak flow rates, and encouraging groundwater recharge.

A vegetated swale would also be implemented with this project. Vegetated swales are known to reduce peak flows, decrease total runoff volume, and trap, filter and infiltrate particulates and associated pollutants. Figure 4 shows a typical vegetated swale cross-section.

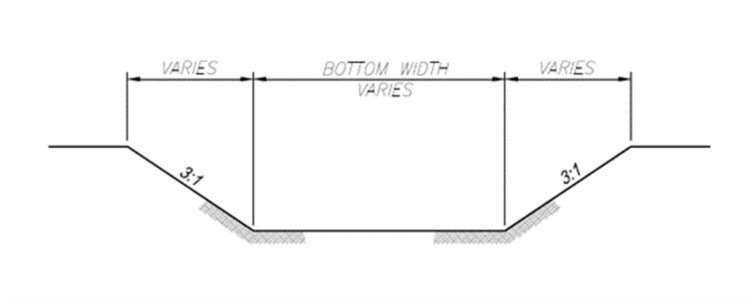


Figure 4. Typical Vegetated Swale Cross-Section

Bioretention facilities would also be constructed to protect and improve water quality by removing pollutants from stormwater runoff, reduce surface runoff volume, attenuate peak flows, improve air quality and reduce heat island effects, increase groundwater recharge, and increase biodiversity. The key design parameters for the bioretention facilities proposed herein are a 3.5-foot bottom layer of coarse gravel, covered by 3-inches of pea gravel which is then topped with 1.5-feet of bioretention soil mix. Plants are an integral part of a bioretention facility. A list of plants appropriate for planting within a bioretention facility are listed within the West Placer Storm Water Quality Design Manual in Fact Sheet TR-1. The bioretention facilities require irrigation to establish the plantings and may require irrigation to maintain the health of the plantings during the dry season.

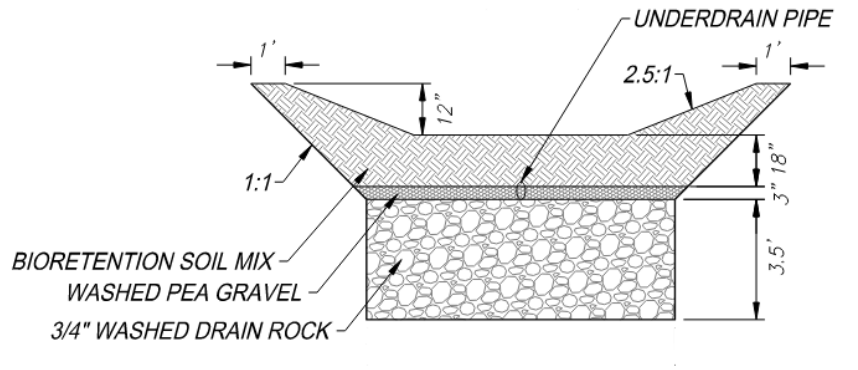


Figure 5. Typical Bioretention Cross-Section

The SWQDM Template was completed using the preliminary shed information presented herein and is included with this assessment in Appendix E. The SWQ sheds correspond to the sheds depicted on Exhibit 3. Storm water quality compliance is demonstrated on Form 3-5 with having zero water quality volume and flow in Items 5 and 6 or on Form 3-6 with having zero untreated volume in Item 14.

Hydromodification for the 2-year 24-hour event was analyzed with the inclusion of Low Impact Development (LID) measures. To meet stormwater quality requirements outlined within the West Placer Storm Water Quality Design Manual, a sufficient amount of LID features and facilities must be incorporated into a proposed site to bring the 85th percentile and 2-year event to at or below that of existing conditions. Therefore, to assess this event with LID measures applied, the percent imperviousness for proposed development within the Sierra View boundaries were reduced to

that of existing conditions. Hydrographs for the 2-year event showing compliance with hydromodification are included in Appendix C.

Existing and Proposed Project Analysis

In addition to stormwater quality and hydromodification compliance requirements, the traditional requirement for no adverse downstream impacts due to increasing peak storm drainage flows from a development must be met. Two points of discharge are identified to aid in the comparison of the existing site to the proposed site conditions. These two comparison points are at locations close to the property boundary and allow for the assessment of the mitigation measures needed to assuage the potential impacts of the proposed project on the downstream properties. Exhibits 1 and 2 show the locations of the comparison points. The comparison point locations in the proposed project conditions are in the same location as identified for the existing project conditions. This was done for ease in identifying the proposed project's potential impacts on the downstream conveyance systems.

Compliance Point 1 (CP1) is located at the southeast corner of the project and Compliance Point 2 (CP2) is located just downstream of the confluence of the major conveyance systems in the existing conditions (Exhibits 1 and 2). At these locations, the existing and proposed site conditions' peak flow rates and water surface elevations are compared. Shown in Figure 6 are the flow hydrographs for the existing and proposed conditions at the downstream limit of the model for the 100-year 24-hour event.

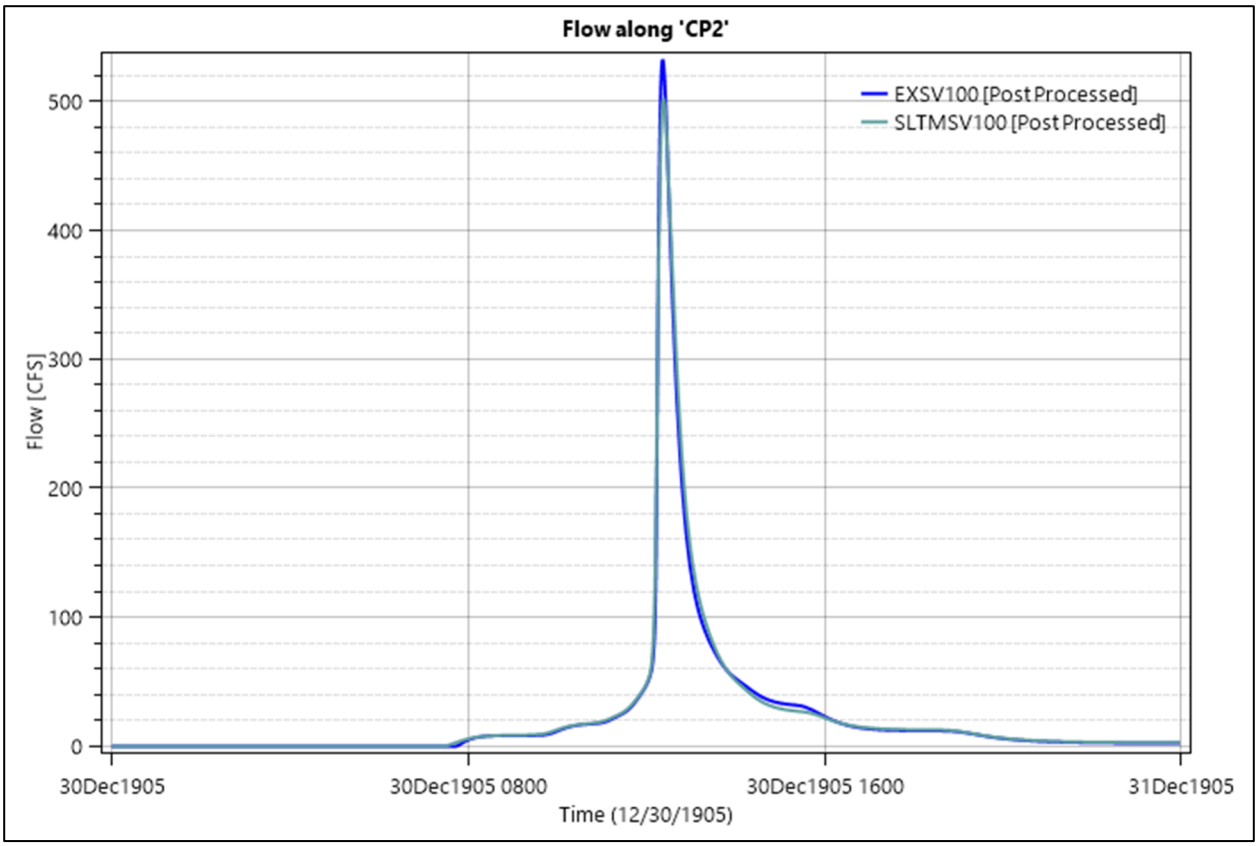


Figure 6. Flow at Downstream Limit of Model

Tables 2 and 3 summarize the comparative results for the 2-year 24-hour, 10-year 24-hour, and 100-year 24-hour events at the compliance points. As can be observed below, the post-development peak flow rates and water surface

elevations are lower than the existing conditions. Inundation boundaries for the 100-year 24-hour event for both the existing conditions and proposed conditions are shown on Exhibits 1 and 2, respectively (Appendix A). Stage and flow hydrographs for each compliance point are in Appendix C.

Table 2: Existing vs. Proposed Project Peak Flows at Comparison Points

Comparison Point	Existing Condition			Proposed Project		
	2-Year 24-Hour (cfs)	10-Year 24-Hour (cfs)	100-Year 24-Hour (cfs)	2-Year 24-Hour (cfs)	10-Year 24-Hour (cfs)	100-Year 24-Hour (cfs)
CP1	6	13	11	4	6	8
CP2	112	227	532	101	210	502

Table 3: Existing vs. Proposed Project Water Surface Elevations at Comparison Points

Comparison Point	Existing Condition			Proposed Project		
	2-Year 24-Hour (ft)	10-Year 24-Hour (ft)	100-Year 24-Hour (ft)	2-Year 24-Hour (ft)	10-Year 24-Hour (ft)	100-Year 24-Hour (ft)
CP1	163.8	165.0	165.9	162.3	163.0	164.4
CP2	149.7	150.1	151.0	149.6	150.1	150.9

Conclusion

This TM provides a preliminary assessment for the proposed project to identify potential mitigation measures for storm water quality, hydromodification, and flood control. The drainage solutions for the site include a combination of LID, bioretention, and detention basins which treat and mitigate the small increase in impervious area with the proposed project. The LID measures and bioretention facilities provide storm water quality treatment and hydromodification for the 85th percentile event and the 2-year 24-hour event, respectively. The detention basins are sized to mitigate for the peak flow increases as a result of the minimal amount of increased runoff from the proposed project.

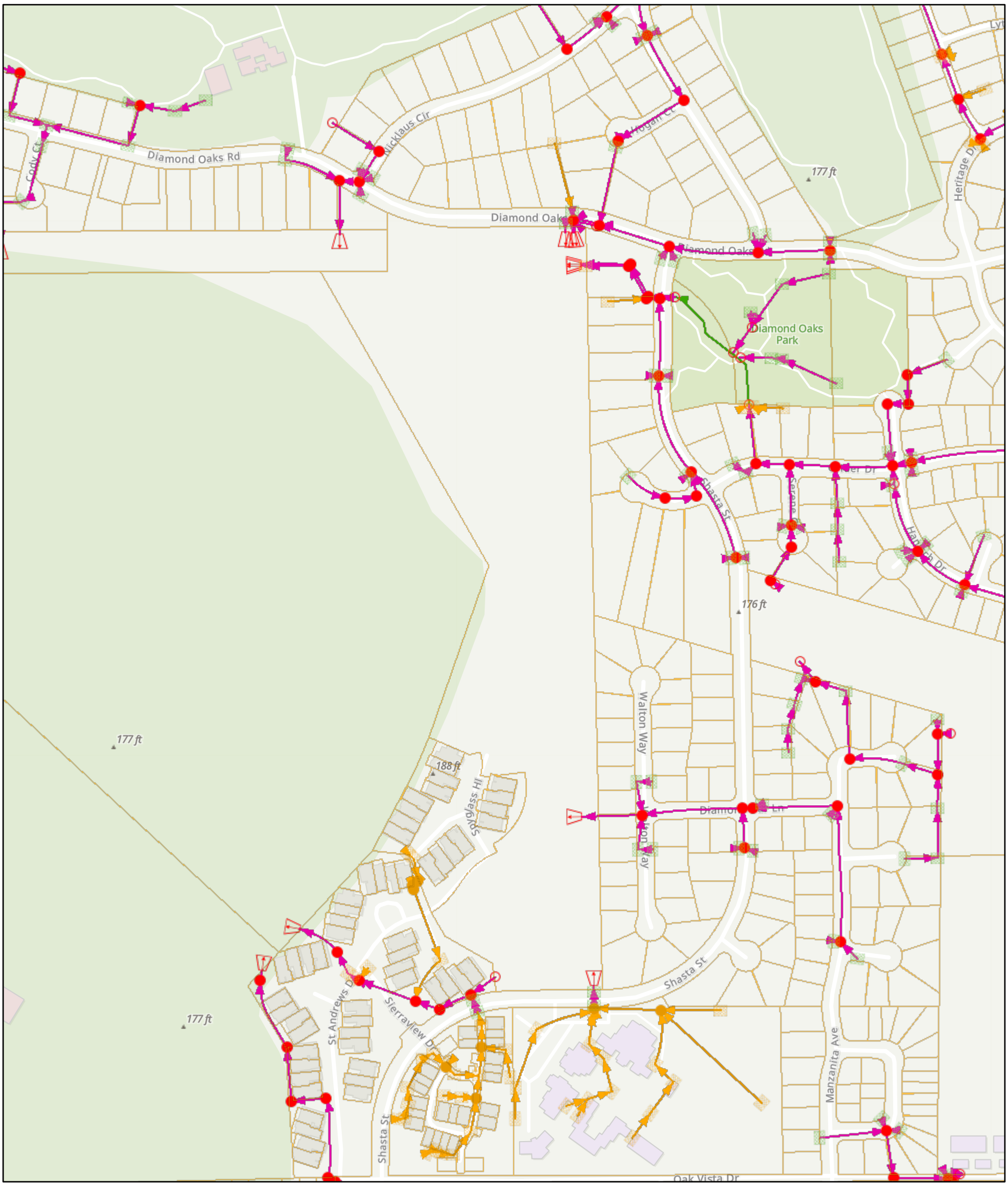
This technical memorandum establishes the existing conditions model and floodplain as well as demonstrates a developed conditions solution at a tentative map level for storm water quality, hydromodification, and flood control. Modeling of the existing conditions floodplain through the Sierra View project area results in a narrow floodplain through most of the development. Only the southernmost and northernmost portions of the property contain widened floodplain conditions. For the southern portion of the development, the proposed drainage solution includes a combination of LID, storm water quality features, and detention pond, DBC, which could treat and mitigate the proposed contributory area. At the northern end of the project the post-development drainage solutions propose LID and storm water quality measures distributed throughout the project to provide treatment prior to discharge into the open space elements of the project. For flood control and peak flow attenuation in the northern part of the project, volume created via grading adjacent to the creek system is utilized to mitigate for peak flow increases as a result of the increased runoff from development as well as reduced natural floodplain storage as a result of the development.

The analyses presented in this TM shows that the proposed site can be sufficiently conveyed, treated, and mitigated without adverse impacts upstream or downstream. It adequately details the development's drainage characteristics and is suitable for submittal to the City of Roseville.

Appendix A

Exhibits

Storm Drainage



8/13/2020, 6:38:23 AM

1:4,514

0 0.04 0.07 0.15 mi

0 0.05 0.1 0.2 km

Placer Parcel	Main	Fitting
<all other values>	No	No
Roseville	Yes	Yes

Low Impact Dev Feature	Proprietary Device	Manhole
No	No	No
Yes	Yes	Yes

Channel	Outfall	Drainage Inlet
<all other values>	No	No
No	Yes	Yes
Yes		

Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
City of Roseville

Copyright: City of Roseville

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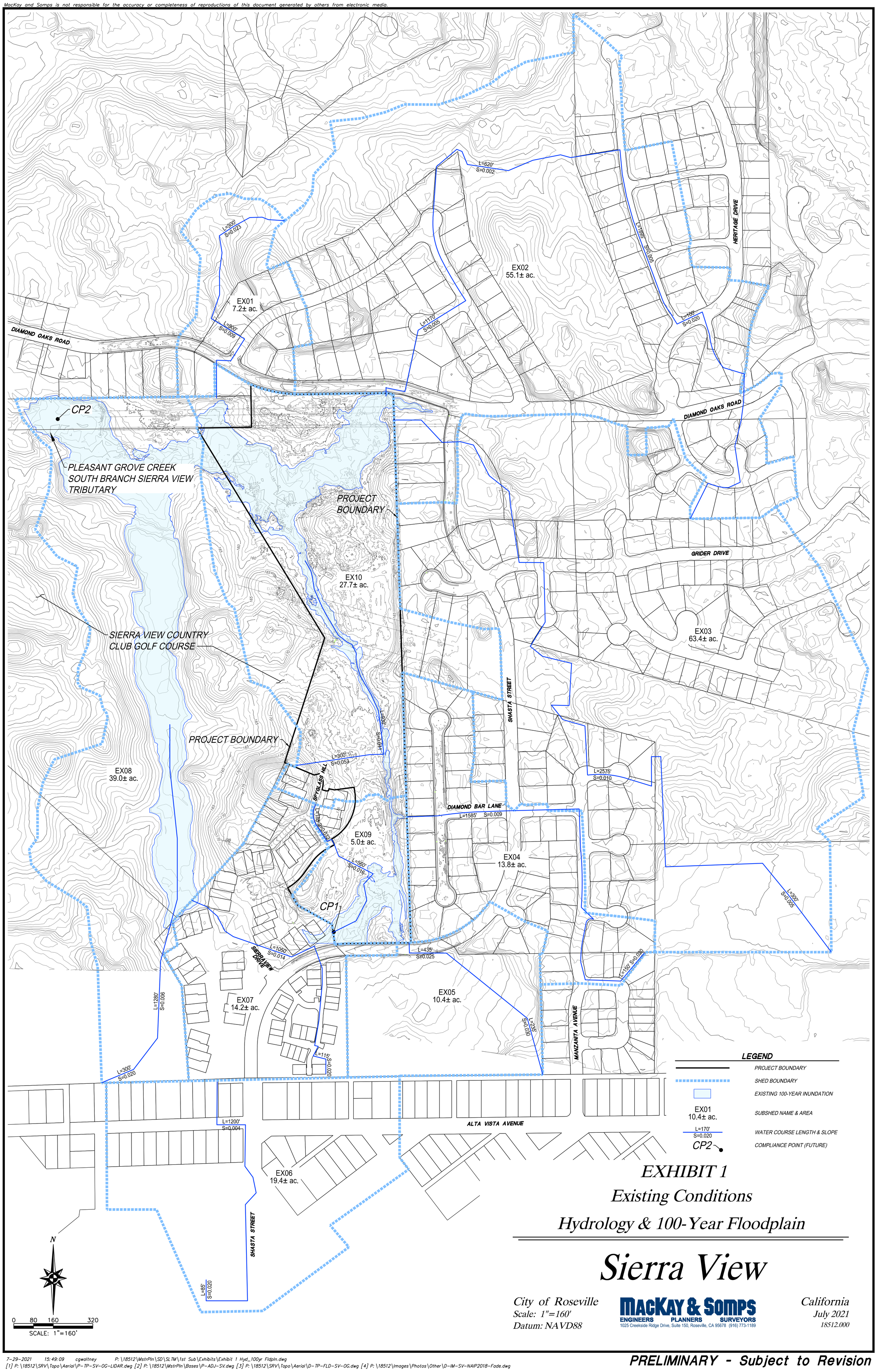

EXHIBIT 1

Existing Conditions

Hydrology & 100-Year Floodplain

Sierra View

City of Roseville
Scale: 1"=160'
Datum: NAVD88

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

California
July 2021
18512.000

7-29-2021 15:49:09 cgwaltney P:\18512\MstrPln\SD\SLTM\1st Sub\Exhibits\Exhibit 1 Hyd_100yr Fldpln.dwg
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PRELIMINARY - Subject to Revision

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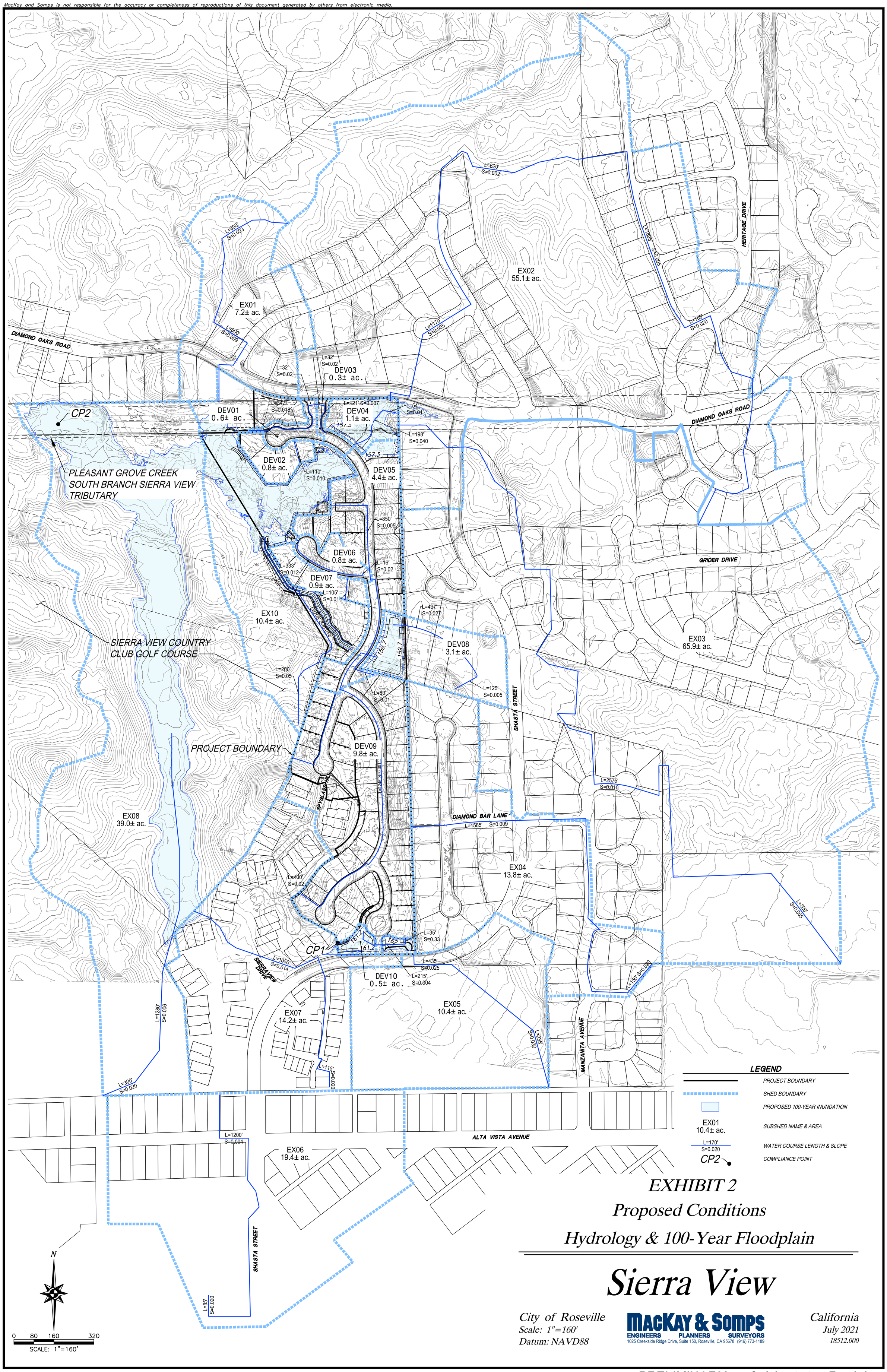

EXHIBIT 2

Proposed Conditions

Hydrology & 100-Year Floodplain

Sierra View

City of Roseville
Scale: 1"=160'
Datum: NAVD88

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

California
July 2021
18512.000

7-29-2021 17:11:33 ddenzer P:\18512\MstrPln\SD\SLTM\1st Sub\Exhibits\Exhibit 2 Hyd_100yr DEVFldpln.dwg
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PRELIMINARY - Subject to Revision

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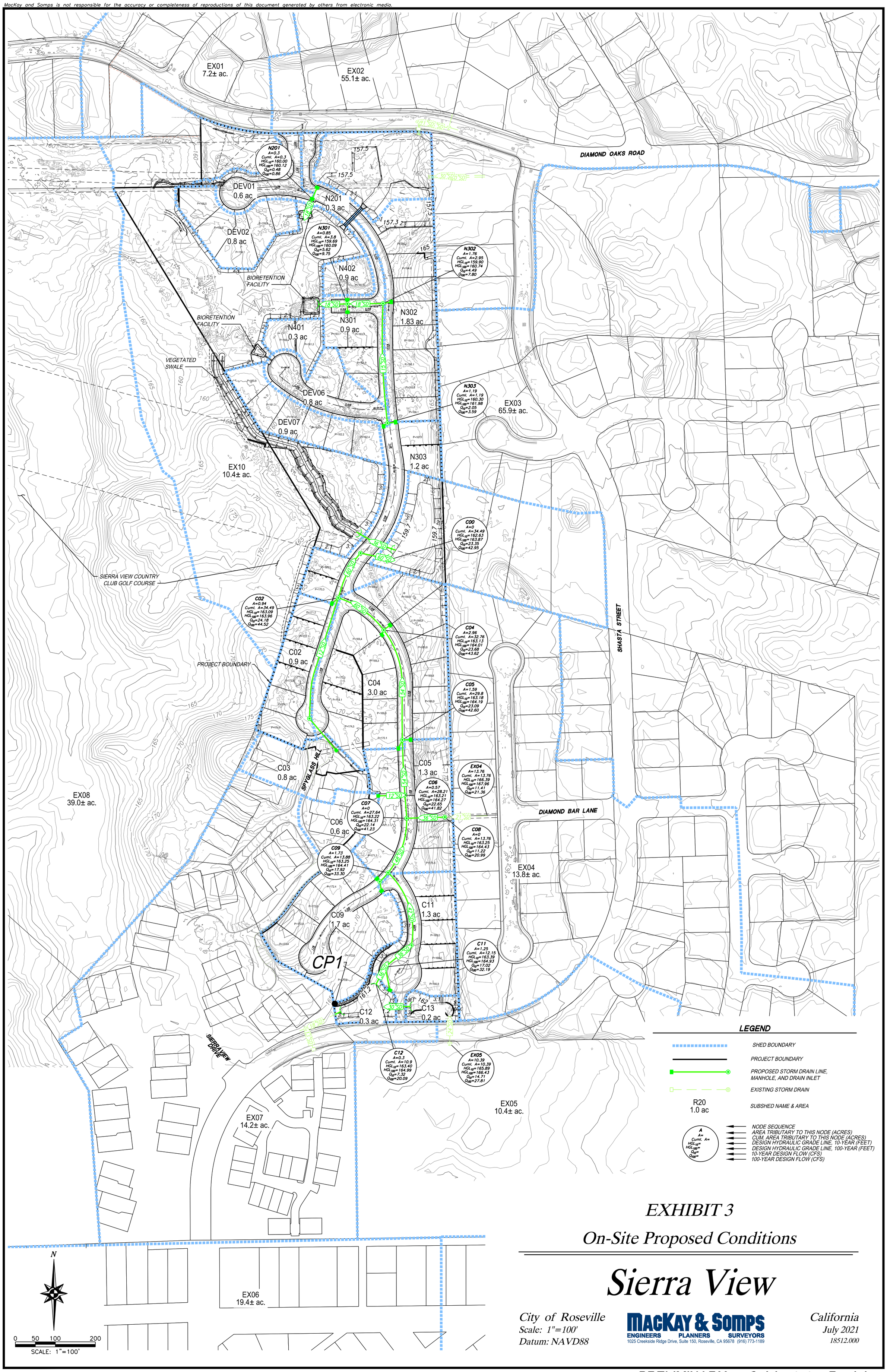

EXHIBIT 3

On-Site Proposed Conditions

Sierra View

City of Roseville
Scale: 1"=100'
Datum: NAVD88

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

California
July 2021
18512.000

PRELIMINARY - Subject to Revision

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Appendix B

HEC-1

Existing Conditions

```
IDSIERRA VIEW WATERSHED MODEL
IDSIERRA VIEW HYDROLOGICAL STUDY MAY 2021
IDModel created by MacKay & Somps
IDfor City of Roseville
IDMuskingum-Cunge hydrograph method used
IDMuskingum-Cunge routing
IDNo storm centering applied
IDEXISTING CONDITIONS - TRIB TO SOUTH BRANCH PGC SIERRA VIEW TRIB
*DIAGRAM
IT     1 30DEC05       0    1440
IO     1
KK  EX02
KMSubshed EX02
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BA0.0861
PB
* pi e=167
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UK   100    0.02    0.11     100
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RD   620  0.0016   0.045       2    TRAP      10      10
RD  1170  0.0034   0.015       3    CIRC       3
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KK  EX03
KMSubshed EX03
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PB
* pi e=174.5
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LU     0    0.07   26.04
UK   300    0.01    0.11     100
RD  1936   0.009    0.06            TRAP      10      10
RD  1631   0.001   0.015            CIRC    3.33
```

```
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KK JCN23
KMCOMBINE EX02-03
HC     2
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KK  EX04
KMSubshed EX04
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PB
* pi e=176.5
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UK   150    0.02    0.11     100
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KK  EX10
KMSubshed EX10
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PB
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UK   300    0.05    0.11     100
RD   927   0.011    0.08            TRAP      10      10
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ZW        B=EX10  C=FLOW   F=0YR
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Existing Conditions

```
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KMCOMBINE EX02-04, 10
HC     3
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KMSubshed EX05
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PB
* pi e=175
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LU     0    0.07      50
UK   235    0.03    0.11     100
RD   435   0.009   0.015            CIRC       2       0
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KK  EX09
KMSubshed EX09
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BA0.0079
PB
* pi e=169.5
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LU     0    0.07    6.77
UK   188    0.03   0.025     100
RD   560   0.016    0.08            TRAP      15      20
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KK JCN59
KMCOMBINE EX05 AND EX09
```

Existing Conditions

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KMSubshed EX06
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UK    85    0.02   0.025     100
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RD   730   0.015   0.015            CIRC     3.5
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Existing Conditions

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KKJCNOFF
KMCOMBINE EX06-08
HC     3
*
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ZW      B=JCNOFF  C=FLOW   F=0YR
*
KK  EX01
KMSubshed EX01
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BA0.0113
PB
* pi e=167
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LU     0    0.07   25.66
UK   300    0.02    0.11     100
RD   330   0.009    0.06            TRAP      10      10
RD   470  0.0055   0.015            CIRC     1.5
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KK   CP2
KMCOMBINE EX06-08
HC     4
*
* WRITE AS HYDROGRAPH TO DSS
ZW         B=CP2  C=FLOW   F=0YR
```

Existing Conditions

*

ZZ

Proposed Conditions

```
IDSIERRA VIEW WATERSHED MODEL
IDSIERRA VIEW HYDROLOGICAL STUDY MARCH 2021
IDModel created by MacKay & Somps
IDfor City of Roseville
IDMuskingum-Cunge hydrograph method used
IDMuskingum-Cunge routing
IDNo storm centering applied
IDDEVELOPED CONDITIONS - TRIB TO SOUTH BRANCH PGC SIERRA VIEW TRIB
*DIAGRAM
IT     1 30DEC05       0    1440
IO     1
KK  EX01
KMSubshed EX01
* 7.2 Ac
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PB
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BF0.0113       0       0
LU     0    0.07   25.66
UK   300    0.02    0.11     100
RD   330   0.009    0.06            TRAP      10      10
RD   470  0.0055   0.015            CIRC     1.5
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UK   100    0.02    0.11     100
RD  1895  0.0047   0.015       1    CIRC     2.5       0
RD   620  0.0016   0.045       2    TRAP      10      10
RD  1170  0.0034   0.015       3    CIRC       3
```

Proposed Conditions

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KMSubshed EX03
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PB
* pi e=174.5
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LU     0    0.07   26.04
UK   300    0.01    0.11     100
RD  1936   0.009    0.06            TRAP      10      10
RD  1631   0.001   0.015            CIRC    3.33
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* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX03  C=FLOW   F=0YR
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KK  EX05
KMSubshed EX05
* 10.39 Ac
BA0.0162
PB
* pi e=175
BF0.0162       0       0
LU     0    0.07      50
UK   235    0.03    0.11     100
RD   435   0.009   0.015            CIRC       2       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX05  C=FLOW   F=0YR
*
KK  EX06
KMSubshed EX06
* 19.41 Ac
BA0.0303
PB
```

Proposed Conditions

```
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BF0.0303       0       0
LU     0    0.07      50
UK    85    0.02   0.025     100
RD  1200   0.004   0.015            CIRC     3.5       0
RD   730   0.015   0.015            CIRC     3.5
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX06  C=FLOW   F=0YR
*
KK  EX07
KMSubshed EX07
* 14.17 Ac
BA0.0221
PB
* pi e=158
BF0.0221       0       0
LU     0    0.07      50
UK   115    0.02    0.11     100
RD  1050   0.014   0.015            CIRC     3.5       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX07  C=FLOW   F=0YR
*
KK  EX08
KMSubshed EX08
* 39.01 Ac
BA 0.061
PB
* pi e=154
BF 0.061       0       0
LU     0    0.07       5
UK   300    0.02    0.11     100
RD  1280   0.006    0.08            TRAP      10      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX08  C=FLOW   F=0YR
*
```

Proposed Conditions

```
KK  EX10
KMSubshed EX10
* 10.42 Ac
BA0.0163
PB
* pi e=163.5
BF0.0163       0       0
LU     0    0.07    2.32
UK   200    0.05    0.11     100
RD   705   0.014    0.08            TRAP      10      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX10  C=FLOW   F=0YR
*
KK   JEX
KMCombine Ex
HC     8
*
KK DEV01
KMSubshed DEV01
* 0.55 Ac
BA0.0009
PB
* pi e=160.5
BF0.0009       0       0
LU     0    0.07   55.91
UK    32    0.02    0.11     100
RD   347   0.018   0.015            TRAP       3       3
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV01  C=FLOW   F=0YR
*
KK DEV02
KMSubshed DEV02
* 0.84 Ac
BA0.0013
PB
* pi e=161
```

```
BF0.0013       0       0
LU     0    0.07      40
UK    90    0.01    0.24     100
RD    20    0.01    0.04            TRAP       3      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV02  C=FLOW   F=0YR
*
KK DEV03
KMSubshed DEV03
* 0.3 Ac
BA0.0005
PB
* pi e=163.6
BF0.0005       0       0
LU     0    0.07      77
UK    32    0.02    0.11     100
RD   121   0.007   0.015            TRAP       0      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV03  C=FLOW   F=0YR
*
KK DEV04
KMSubshed DEV04
* 1.12 Ac
BA0.0018
PB
* pi e=161
BF0.0018       0       0
LU     0    0.07    2.75
UK    54    0.01     0.4     100
RD   198    0.04    0.06            TRAP      20      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV04  C=FLOW   F=0YR
*
KK DEV05
KMSubshed DEV05
```

Proposed Conditions

```
* 4.36 Ac
BA0.0068
PB
* pi e=164.75
BF0.0068       0       0
LU     0    0.07   45.37
UK    80    0.01    0.24     100
RD   850   0.005   0.015            CIRC     1.5       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV05  C=FLOW   F=0YR
*
KK DEV06
KMSubshed DEV06
* 0.76 Ac
BA0.0012
PB
* pi e=160.35
BF0.0012       0       0
LU     0    0.07   57.17
UK    16    0.02    0.11     100
RD   333   0.012   0.015            TRAP       0      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV06  C=FLOW   F=0YR
*
KK DEV07
KMSubshed DEV07
* 0.85 Ac
BA0.0013
PB
* pi e=162.2
BF0.0013       0       0
LU     0    0.07      40
UK    85    0.01    0.24     100
RD    20    0.01    0.04            TRAP       3      10
*
* WRITE AS HYDROGRAPH TO DSS
```

Proposed Conditions

```
ZW       B=DEV07  C=FLOW   F=0YR
*
KK DEV08
KMSubshed DEV08
* 3.14 Ac
BA0.0049
PB
* pi e=166
BF0.0049       0       0
LU     0    0.07    2.63
UK   125    0.05     0.4     100
RD   497   0.027    0.04            TRAP      10      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV08  C=FLOW   F=0YR
*
KK  JDEV
KMCombine Dev
HC     9
*
KK DEV10
KMSubshed DEV10
* 0.51 Ac
BA0.0008
PB
* pi e=164.5
BF0.0008       0       0
LU     0    0.07       5
UK    35    0.33     0.4     100
RD   215   0.004    0.04            TRAP       3      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV10  C=FLOW   F=0YR
*
KK  EX04
KMSubshed EX04
* 13.76 Ac
BA0.0215
```

Proposed Conditions

```
PB
* pi e=176.5
BF0.0215       0       0
LU     0    0.07      40
UK   150    0.02    0.11     100
RD  1585   0.008   0.015            CIRC    1.75       0
*
KK REX04
KMRoute EX04 thru DEV09
RD   952  0.0004   0.015            CIRC       3
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=REX04  C=FLOW   F=0YR
*
KK DEV09
KMSubshed DEV09
* 9.83 Ac
BA0.0154
PB
* pi e=170.3
BF0.0154       0       0
LU     0    0.07   42.16
UK   100    0.02    0.24     100
RD  1245   0.001   0.015            CIRC       5       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV09  C=FLOW   F=0YR
*
KK  JCNC
KMEX04 and DEV09
HC     2
*
KK RJCNC
KMRoute EX04 and DEV09
RD   113  0.0208   0.015            CIRC       5
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=RJCNC  C=FLOW   F=0YR
```

Proposed Conditions

*

ZZ

Proposed Conditions LID

```
IDSIERRA VIEW WATERSHED MODEL
IDSIERRA VIEW HYDROLOGICAL STUDY MARCH 2021
IDModel created by MacKay & Somps
IDfor City of Roseville
IDMuskingum-Cunge hydrograph method used
IDMuskingum-Cunge routing
IDNo storm centering applied
IDDEVELOPED CONDITIONS - TRIB TO SOUTH BRANCH PGC SIERRA VIEW TRIB
*DIAGRAM
IT     1 30DEC05       0    1440
IO     1
KK  EX01
KMSubshed EX01
* 7.2 Ac
BA0.0113
PB
* pi e=167
BF0.0113       0       0
LU     0    0.07   25.66
UK   300    0.02    0.11     100
RD   330   0.009    0.06            TRAP      10      10
RD   470  0.0055   0.015            CIRC     1.5
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX01  C=FLOW   F=0YR
*
KK  EX02
KMSubshed EX02
* 55.13 Ac
BA0.0861
PB
* pi e=167
BF0.0861       0       0
LU     0    0.07      27
UK   100    0.02    0.11     100
RD  1895  0.0047   0.015       1    CIRC     2.5       0
RD   620  0.0016   0.045       2    TRAP      10      10
RD  1170  0.0034   0.015       3    CIRC       3
```

```
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX02  C=FLOW   F=0YR
*
KK  EX03
KMSubshed EX03
* 63.44 Ac
BA0.0991
PB
* pi e=174.5
BF0.0991       0       0
LU     0    0.07   26.04
UK   300    0.01    0.11     100
RD  1936   0.009    0.06            TRAP      10      10
RD  1631   0.001   0.015            CIRC    3.33
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX03  C=FLOW   F=0YR
*
KK  EX05
KMSubshed EX05
* 10.39 Ac
BA0.0162
PB
* pi e=175
BF0.0162       0       0
LU     0    0.07      50
UK   235    0.03    0.11     100
RD   435   0.009   0.015            CIRC       2       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX05  C=FLOW   F=0YR
*
KK  EX06
KMSubshed EX06
* 19.41 Ac
BA0.0303
PB
```

```
* pi e=161
BF0.0303       0       0
LU     0    0.07      50
UK    85    0.02   0.025     100
RD  1200   0.004   0.015            CIRC     3.5       0
RD   730   0.015   0.015            CIRC     3.5
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX06  C=FLOW   F=0YR
*
KK  EX07
KMSubshed EX07
* 14.17 Ac
BA0.0221
PB
* pi e=158
BF0.0221       0       0
LU     0    0.07      50
UK   115    0.02    0.11     100
RD  1050   0.014   0.015            CIRC     3.5       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX07  C=FLOW   F=0YR
*
KK  EX08
KMSubshed EX08
* 39.01 Ac
BA 0.061
PB
* pi e=154
BF 0.061       0       0
LU     0    0.07       5
UK   300    0.02    0.11     100
RD  1280   0.006    0.08            TRAP      10      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX08  C=FLOW   F=0YR
*
```

Proposed Conditions LID

```
KK  EX10
KMSubshed EX10
* 10.42 Ac
BA0.0163
PB
* pi e=163.5
BF0.0163       0       0
LU     0    0.07    2.32
UK   200    0.05    0.11     100
RD   705   0.014    0.08            TRAP      10      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW        B=EX10  C=FLOW   F=0YR
*
KK   JEX
KMCombine Ex
HC     8
*
KK DEV01
KMSubshed DEV01
* 0.55 Ac
BA0.0009
PB
* pi e=160.5
BF0.0009       0       0
LU     0    0.07       2
UK    32    0.02    0.11     100
RD   347   0.018   0.015            TRAP       3       3
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV01  C=FLOW   F=0YR
*
KK DEV02
KMSubshed DEV02
* 0.84 Ac
BA0.0013
PB
* pi e=161
```

```
BF0.0013       0       0
LU     0    0.07       2
UK    90    0.01    0.24     100
RD    20    0.01    0.04            TRAP       3      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV02  C=FLOW   F=0YR
*
KK DEV03
KMSubshed DEV03
* 0.3 Ac
BA0.0005
PB
* pi e=163.6
BF0.0005       0       0
LU     0    0.07       2
UK    32    0.02    0.11     100
RD   121   0.007   0.015            TRAP       0      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV03  C=FLOW   F=0YR
*
KK DEV04
KMSubshed DEV04
* 1.12 Ac
BA0.0018
PB
* pi e=161
BF0.0018       0       0
LU     0    0.07       2
UK    54    0.01     0.4     100
RD   198    0.04    0.06            TRAP      20      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV04  C=FLOW   F=0YR
*
KK DEV05
KMSubshed DEV05
```

Proposed Conditions LID

```
* 4.36 Ac
BA0.0068
PB
* pi e=164.75
BF0.0068       0       0
LU     0    0.07       2
UK    80    0.01    0.24     100
RD   850   0.005   0.015            CIRC     1.5       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV05  C=FLOW   F=0YR
*
KK DEV06
KMSubshed DEV06
* 0.76 Ac
BA0.0012
PB
* pi e=160.35
BF0.0012       0       0
LU     0    0.07       2
UK    16    0.02    0.11     100
RD   333   0.012   0.015            TRAP       0      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV06  C=FLOW   F=0YR
*
KK DEV07
KMSubshed DEV07
* 0.85 Ac
BA0.0013
PB
* pi e=162.2
BF0.0013       0       0
LU     0    0.07       2
UK    85    0.01    0.24     100
RD    20    0.01    0.04            TRAP       3      10
*
* WRITE AS HYDROGRAPH TO DSS
```

```
ZW       B=DEV07  C=FLOW   F=0YR
*
KK DEV08
KMSubshed DEV08
* 3.14 Ac
BA0.0049
PB
* pi e=166
BF0.0049       0       0
LU     0    0.07       2
UK   125    0.05     0.4     100
RD   497   0.027    0.04            TRAP      10      10
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV08  C=FLOW   F=0YR
*
KK  JDEV
KMCombine Dev
HC     9
*
KK DEV10
KMSubshed DEV10
* 0.51 Ac
BA0.0008
PB
* pi e=164.5
BF0.0008       0       0
LU     0    0.07       5
UK    15    0.33     0.4     100
RD   215   0.004    0.04            TRAP       3      20
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV10  C=FLOW   F=0YR
*
KK  EX04
KMSubshed EX04
* 13.76 Ac
BA0.0215
```

Proposed Conditions LID

```
PB
* pi e=176.5
BF0.0215       0       0
LU     0    0.07      40
UK   150    0.02    0.11     100
RD  1585   0.008   0.015            CIRC    1.75       0
*
KK REX04
KMRoute EX04 thru DEV09
RD   952  0.0004   0.015            CIRC       3
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=REX04  C=FLOW   F=0YR
*
KK DEV09
KMSubshed DEV09
* 9.83 Ac
BA0.0154
PB
* pi e=170.3
BF0.0154       0       0
LU     0    0.07    8.64
UK   100    0.02    0.24     100
RD  1245   0.001   0.015            CIRC       5       0
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=DEV09  C=FLOW   F=0YR
*
KK  JCNC
KMEX04 and DEV09
HC     2
*
KK RJCNC
KMRoute EX04 and DEV09
RD   113  0.0208   0.015            CIRC       5
*
* WRITE AS HYDROGRAPH TO DSS
ZW       B=RJCNC  C=FLOW   F=0YR
```

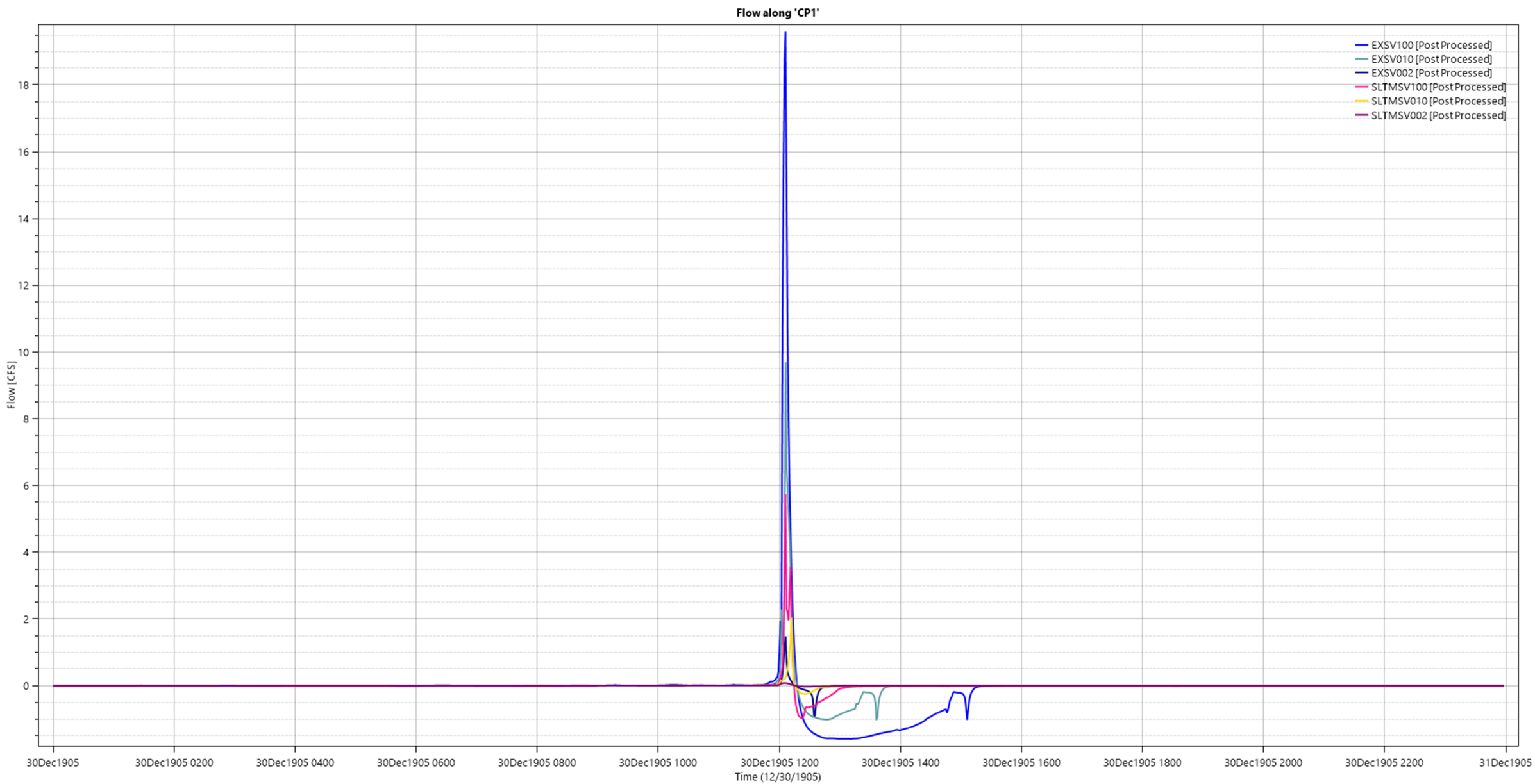
Proposed Conditions LID

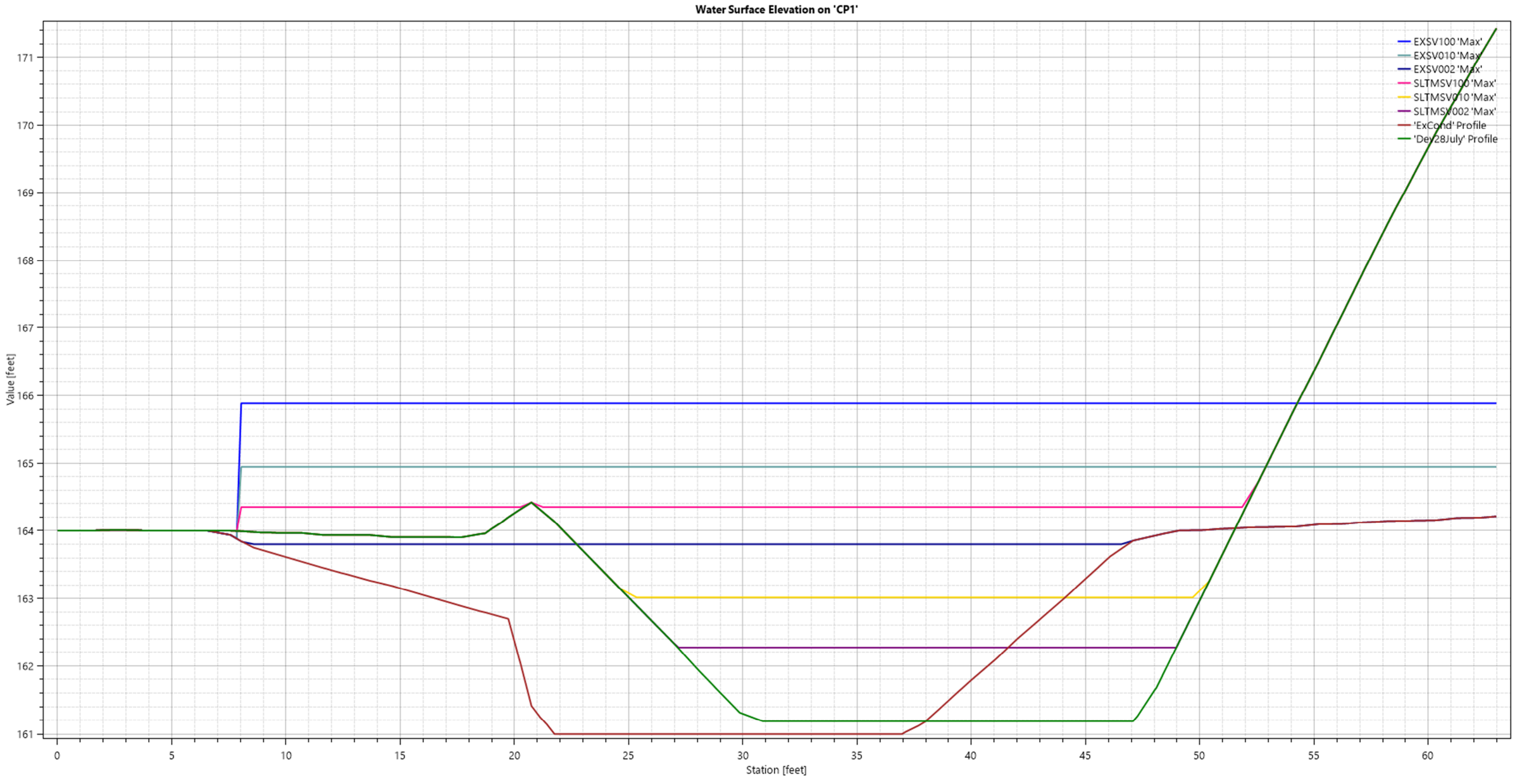
*

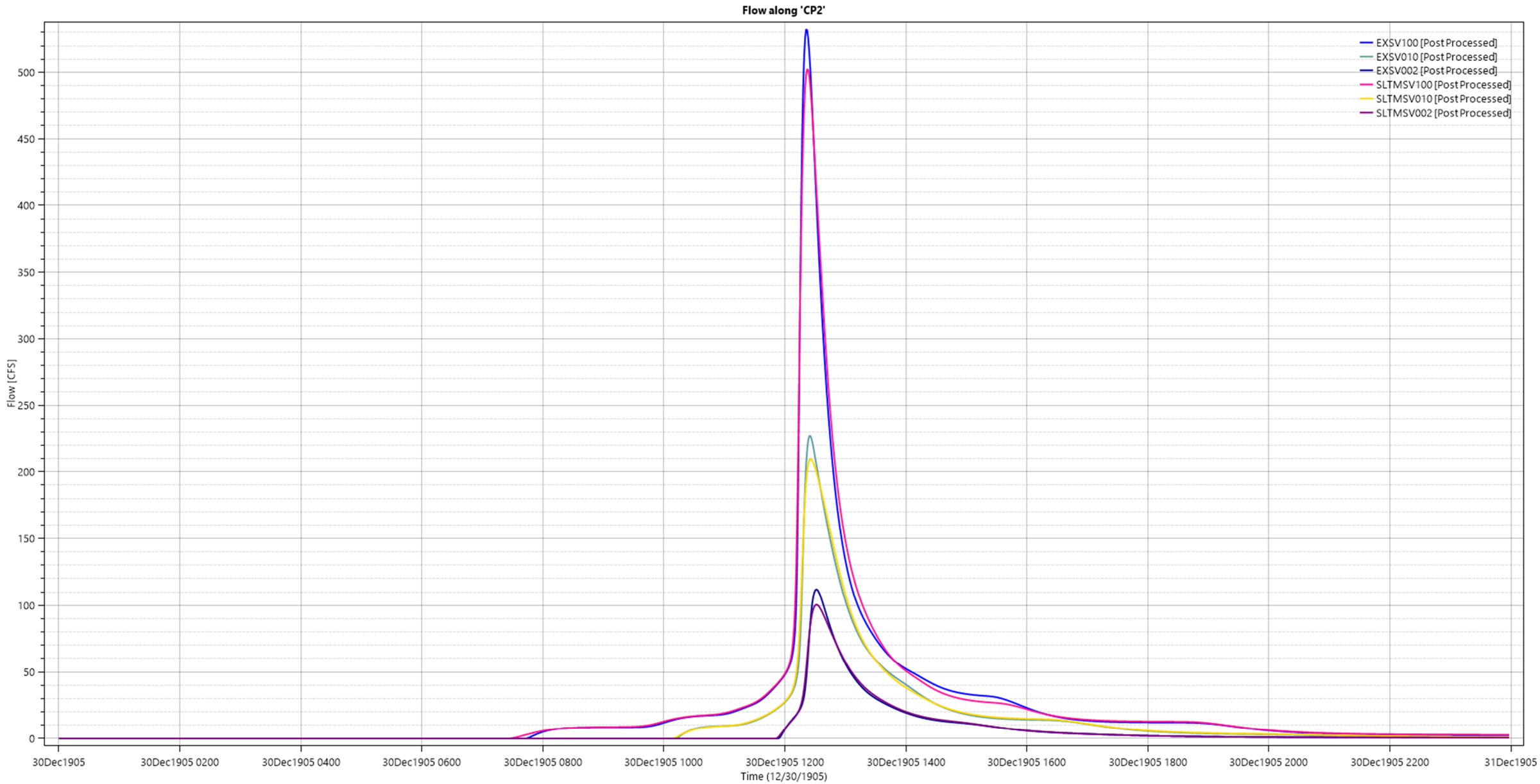
ZZ

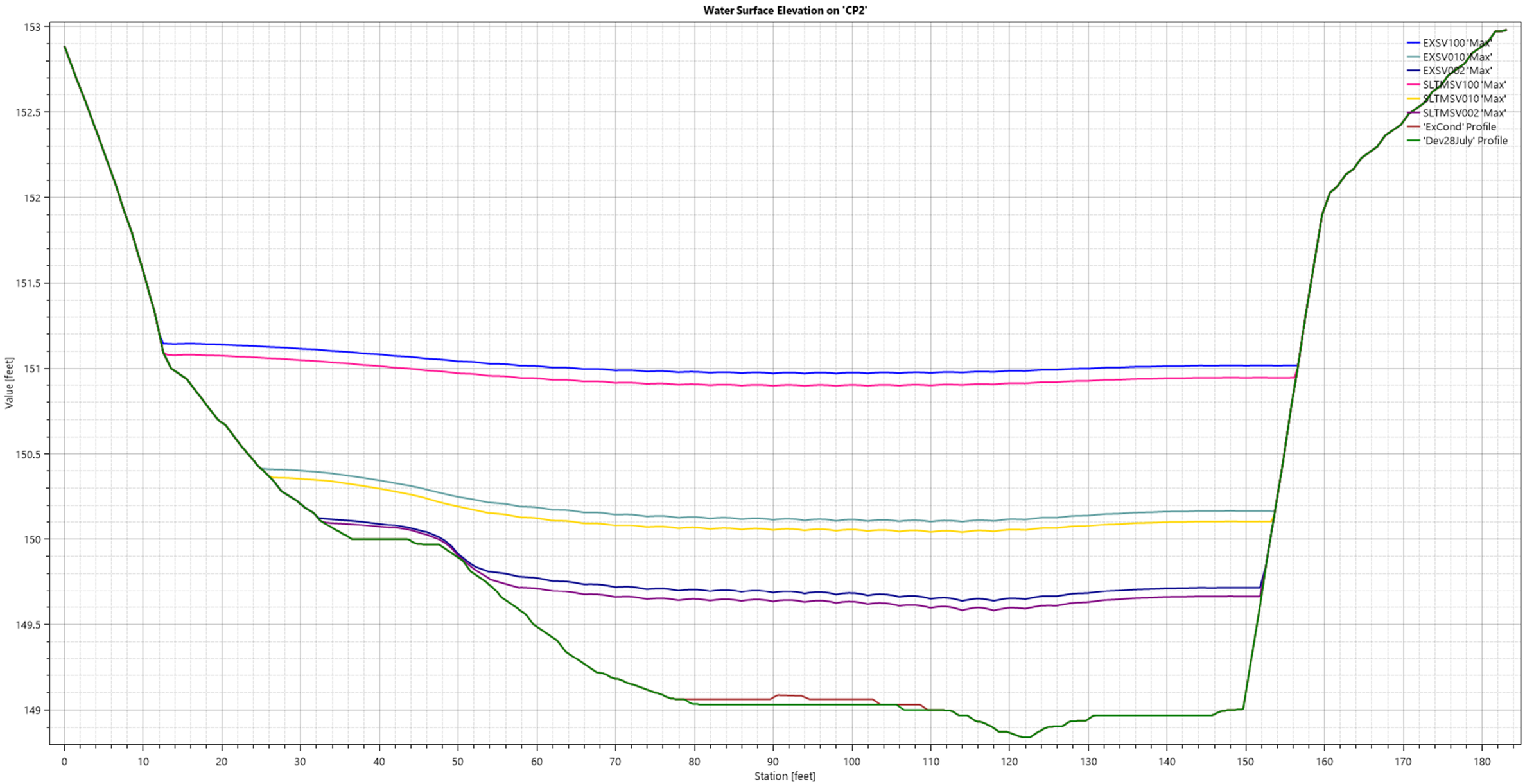
Appendix C

HEC-RAS

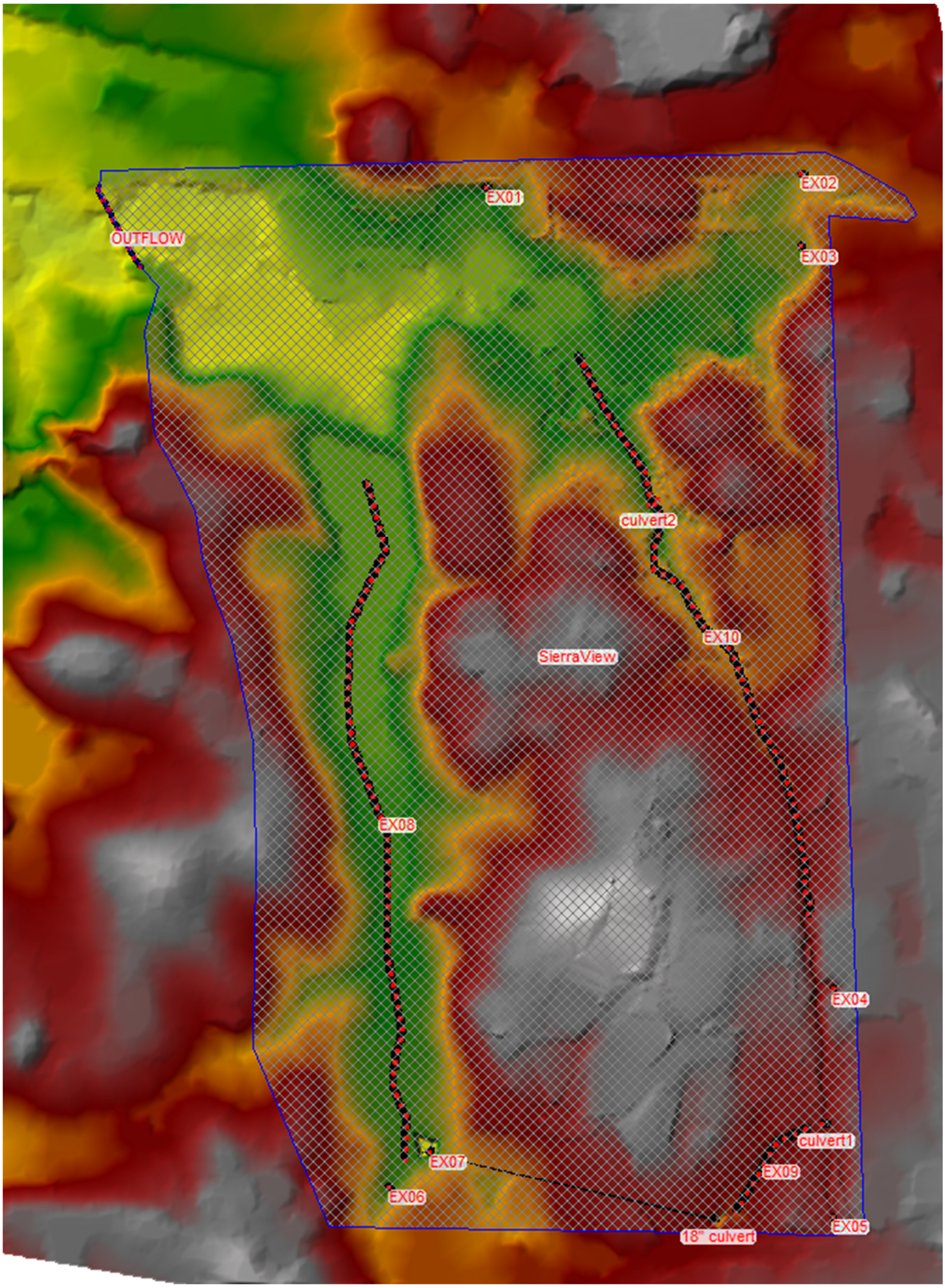

Flow along 'CP1'
EXSV100 [Post Processed]
EXSV010 [Post Processed]
EXSV002 [Post Processed]
SLTMSV100 [Post Processed]
SLTMSV010 [Post Processed]
SLTMSV002 [Post Processed]
Flow [CFS]
18
16
14
12
10
8
6
4
2
0
30Dec1905
30Dec1905 0200
30Dec1905 0400
30Dec1905 0600
30Dec1905 0800
30Dec1905 1000
30Dec1905 1200
30Dec1905 1400
30Dec1905 1600
30Dec1905 1800
30Dec1905 2000
30Dec1905 2200
31Dec1905
Time (12/30/1905)


Water Surface Elevation on 'CP1'
EXSV100 'Max'
EXSV010 'Max'
EXSV002 'Max'
SLTMSV100 'Max'
SLTMSV010 'Max'
SLTMSV002 'Max'
'ExCond' Profile
'Dev28July' Profile
Value [feet]
171
170
169
168
167
166
165
164
163
162
161
0
5
10
15
20
25
30
35
40
45
50
55
60
Station [feet]

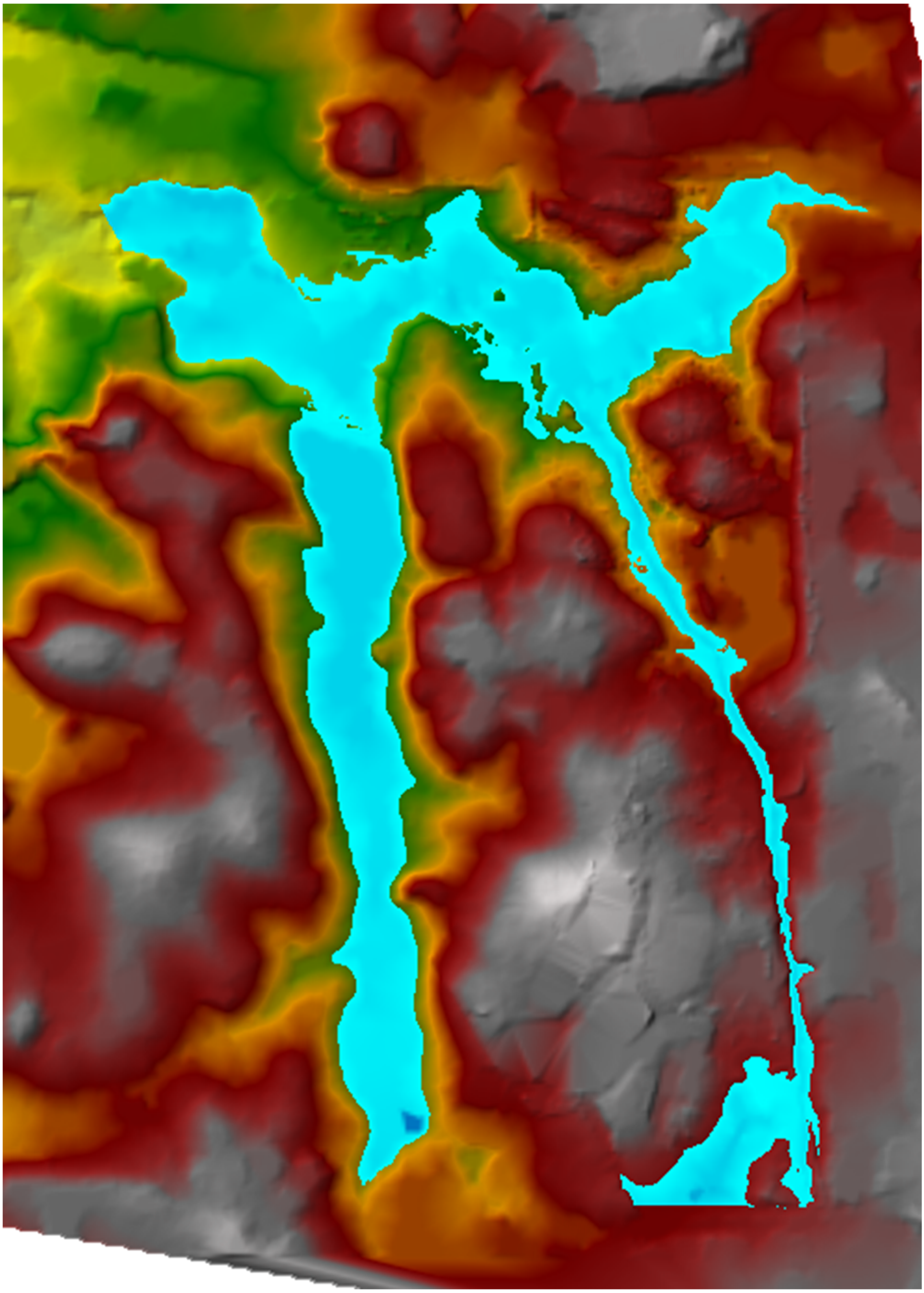

Flow along 'CP2'
EXSV100 [Post Processed]
EXSV010 [Post Processed]
EXSV002 [Post Processed]
SLTMSV100 [Post Processed]
SLTMSV010 [Post Processed]
SLTMSV002 [Post Processed]
Flow [CFS]
0
50
100
150
200
250
300
350
400
450
500
30Dec1905
30Dec1905 0200
30Dec1905 0400
30Dec1905 0600
30Dec1905 0800
30Dec1905 1000
30Dec1905 1200
30Dec1905 1400
30Dec1905 1600
30Dec1905 1800
30Dec1905 2000
30Dec1905 2200
31Dec1905
Time (12/30/1905)


Water Surface Elevation on 'CP2'
EXSV100 'Max'
EXSV010 'Max'
EXSV002 'Max'
SLTMSV100 'Max'
SLTMSV010 'Max'
SLTMSV002 'Max'
'ExCond' Profile
'Dev28July' Profile
Value [feet]
153
152.5
152
151.5
151
150.5
150
149.5
149
Station [feet]
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180

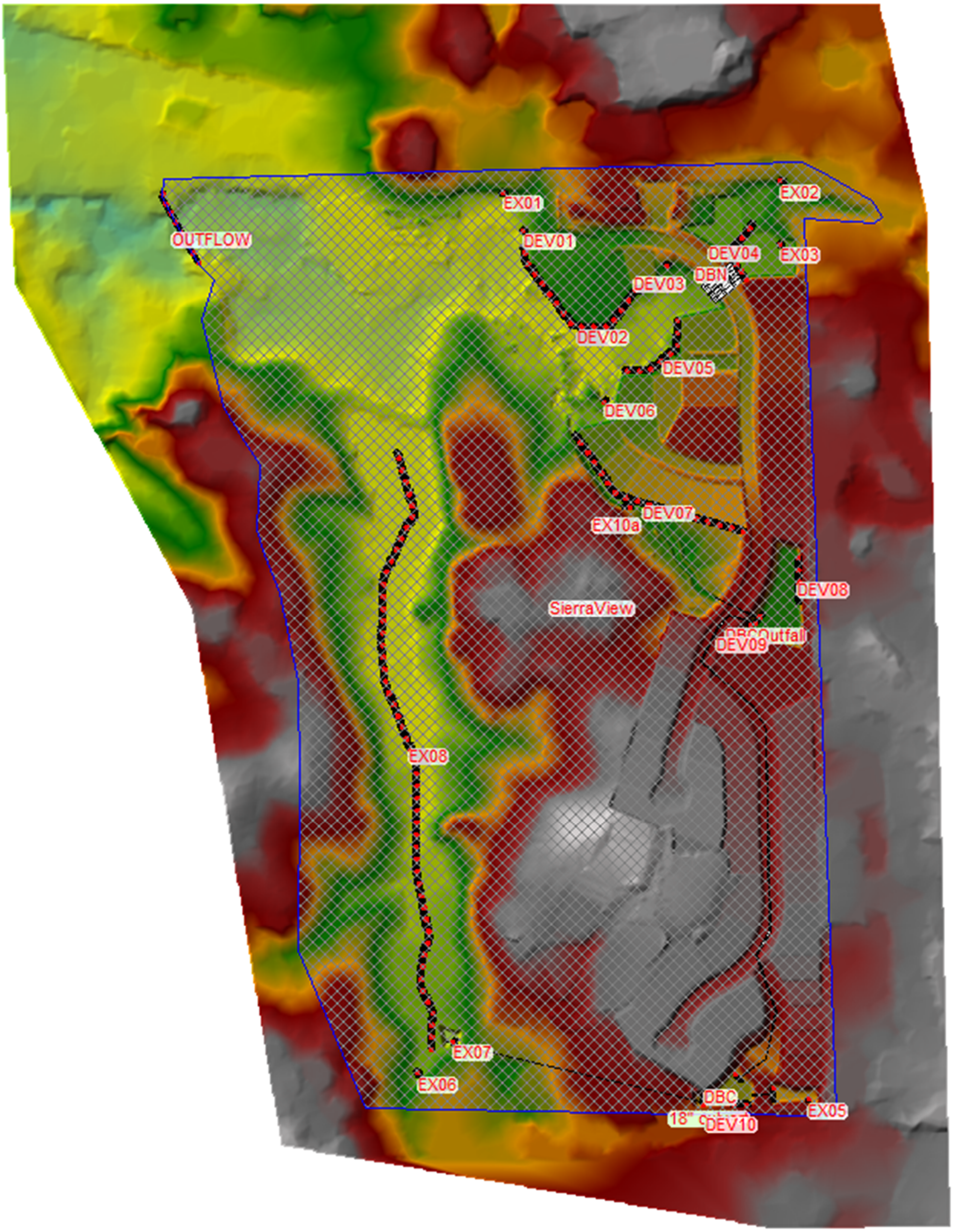
Existing Conditions HEC-RAS Model



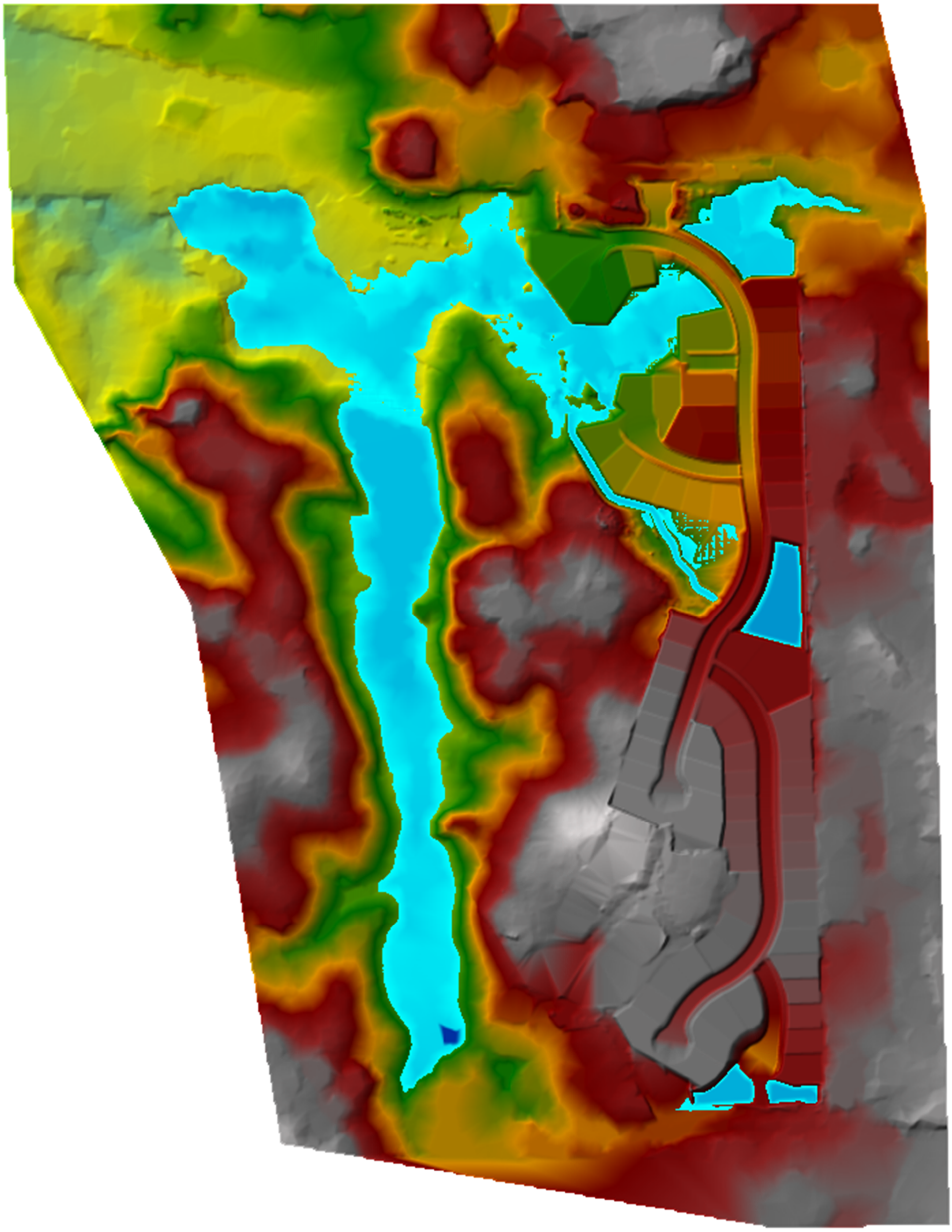
Existing Conditions 100-Year Floodplain



Proposed Conditions HEC-RAS Model



Proposed Conditions 100-Year Floodplain



Appendix D

Pipe Analysis

Land Use

Shed/ SubShed	Area	Percent Impervious Calculator			Percent Impervious Values				
		Land Use Description	Soils Group	Composite % Imperv.	Highway, Street, Parking	Resdntl. 6-8 du/ac, MDR, School, PQP	Resdntl. 4-6 du/ac, LDR	Resdntl. <0.2 du/ac, Recreation, Landscape, Park	Open space Grassland, Ag
	AC		D Soils %		85%	50%	40%	5%	2%
Pipe Subsheds (Ultimate built-out conditions)									
EX04	13.76	Residential	100%	40.0%			13.76		
EX05	10.39	Residential, School	100%	50.0%		10.39			
C03	0.79	Existing Residential (4.5 lots)	100%	50%		0.79			
C06	0.57	Existing Residential (2.5 lots)	100%	50%		0.57			
Total Offsite	**25.51**		**Composite % Imperv.:**	**45%**					
C02	0.94	Proposed Residential	100%	40%			0.94		
C04	2.96	Proposed Residential	100%	40%			2.96		
C05	1.59	Proposed Residential	100%	40%			1.59		
C09	1.73	Proposed Residential	100%	40%			1.73		
C11	1.25	Proposed Residential	100%	46%	0.17		1.08		
C12	0.30	graded area	100%	5%				0.30	
C13	0.21	graded area	100%	5%				0.21	
Total C Sheds	**8.98**		**Composite % Imperv.:**	**39%**					
N201	0.30	Roadway and overbank	100%	77%	0.27			0.03	
Total N2 Sheds	**0.30**		**Composite % Imperv.:**	**77%**					
N301	0.85	Proposed Residential, roadway, and landscape	100%	51.6%	0.22		0.63		
N302	1.76	Proposed Residential	100%	40.0%			1.76		
N303	1.19	Proposed Residential, roadway, and landscape	100%	51.3%	0.30		0.89		
Total N3 Sheds	**3.80**		**Composite % Imperv.:**	**46%**					

Peak Discharge and Pipe Calculations
10-Year

Nodes		Hydrologic Data & Results																		Hydraulic Data & Results													
U/S Node Name	D/S Node Name	Area (ac)	Cumul. Area (ac)	10-yr Adjusted 'Qp' (Eqn 10-5) (cfs)	Composite % Imperv.	Cumul. Composite % Imperv.	10-yr Unit Peak Runoff 'q' (Eqn 10-3) (cfs/ac)	10-yr Cumul. Response Time 'tr' (min)	10-yr Response Time 'tr' (min)	Surface Collector Response Time 'tc' (Eqn 5-4) (min)	Manning's 'V' (ft/s) (Eqn 7-35a Brater & King)	Surface Collector Flow Length (ft)	Surface Collector Slope 's' (ft/ft)	Surface Collector Roughness Factor (n value)	10-yr Overland Response Time 'to' (Eqn 10-2) (min)	Average Overland Flow Length (ft)	Overland Slope 's' (ft/ft)	Overland Roughness Factor (n value)	Total Infiltration (cfs)	Pipe Length (ft)	Calculated Pipe Diameter (ft) (Eqn 6-26e Brater & King)	Design Pipe Diameter (ft)	Pipe Slope (ft/ft)	Design Pipe Capacity (cfs) (Eqn 6-26b Brater & King)	Design Velocity (ft/s) (Eqn 6-26a Brater & King)	Pipe Response Time[1] (L/V/60s) (min)	10-yr HGL Slope (ft/ft) (Eqn 6-26d Brater & King)	Calc'd U/S HGL (ft)	HGL_{10}	U/S Rim/Grate Elevation (ft)	U/S Pipe Invert Elevation (ft)	D/S Pipe Invert Elevation (ft)	Freeboard (ft)	10-Year Depth in Pipe (ft)
C01	C00	0.00	34.49	23.35	0%	48%	0.79	36.12	0.00	0.00	0.00				0.00				3.74	65	3.90	5.00	0.0004	45.13	2.3	0.47	0.0001	162.64	162.99	168.1	159.03	159.00	5.11	3.96
C02	C01	0.94	34.49	24.18	40%	48%	0.81	34.88	10.14	2.89	2.02	350	0.019	0.015	7.25	90	0.020	0.240	3.74	171	3.96	5.00	0.0004	45.13	2.3	1.24	0.0001	163.00	163.09	168.8	159.10	159.03	5.71	3.99
C03	C02	0.79	0.79	1.64	50%	50%	2.18	7.08	7.08	0.80	2.93	140	0.040	0.015	6.28	100	0.020	0.170	0.08	312	1.02	1.00	0.0026	1.57	2.0	2.59	0.0028	163.97	163.97	173.4	159.92	159.10	9.43	1.02
C04	C02	2.96	32.76	23.68	40%	48%	0.83	33.86	11.21	3.71	2.02	450	0.019	0.015	7.49	95	0.020	0.240	3.54	141	3.93	5.00	0.0004	45.13	2.3	1.02	0.0001	163.11	163.13	168.1	159.16	159.10	4.97	3.97
C05	C04	1.59	29.80	23.09	40%	49%	0.88	31.64	13.88	6.15	0.87	320	0.004	0.015	7.73	100	0.020	0.240	3.17	285	3.89	4.50	0.0004	34.07	2.1	2.22	0.0002	163.18	163.18	169.2	159.28	159.16	6.02	3.84
C06	C05	0.57	28.21	22.65	50%	50%	0.91	30.57	8.96	2.31	0.87	120	0.004	0.024	6.65	110	0.020	0.170	2.97	138	3.86	4.50	0.0004	34.07	2.1	1.07	0.0002	163.21	163.21	169.8	159.34	159.28	6.59	3.82
C07	C06	0.00	27.64	22.14	0%	43%	0.92	30.12	0.00	0.00	0.00				0.00				3.29	58	3.83	4.50	0.0004	34.07	2.1	0.45	0.0002	163.22	163.22	171.0	159.37	159.34	7.78	3.79
C08	C07	0.00	13.76	11.22	0%	40%	0.94	29.35	0.00	0.00	0.00				0.00				1.73	93	2.75	3.00	0.0006	14.15	2.0	0.77	0.0004	163.25	163.25	170.0	159.43	159.37	6.75	2.69
EX04	C08	13.76	13.76	11.41	40%	40%	0.95	28.86	28.86	19.00	1.39	1585	0.009	0.015	9.86	150	0.020	0.240	1.73	146	1.72	1.75	0.0076	11.97	5.0	0.49	0.0069	164.26	166.39	168.20	164.72	163.61	1.81	1.67
C09	C07	1.73	13.88	17.92	40%	47%	1.40	17.08	12.63	4.91	1.04	305	0.005	0.015	7.73	100	0.020	0.240	1.55	147	3.39	4.00	0.0005	27.83	2.2	1.11	0.0002	163.25	163.25	170.4	159.45	159.37	7.15	3.36
C10	C09	0.00	12.15	16.59	0%	48%	1.48	15.45	0.00	0.00	0.00				0.00				1.34	199	3.29	3.50	0.0005	19.49	2.0	1.64	0.0004	163.32	163.32	167.4	159.55	159.45	4.08	3.21
C11	C10	1.25	12.15	17.02	46%	48%	1.51	14.74	10.44	2.71	1.97	320	0.018	0.015	7.73	100	0.020	0.240	1.34	85	3.21	3.00	0.0006	14.15	2.0	0.71	0.0009	163.39	163.39	165.7	159.61	159.55	2.31	3.21
C12	C11	0.30	10.90	7.32	5%	48%	1.51	14.68	2.77	1.61	1.04	100	0.005	0.024	1.16	15	0.250	0.240	1.19	49	1.11	3.00	0.0324	104.09	14.7	0.06	0.0002	163.40	163.40	164.5	161.20	159.61	1.10	1.46
C12	Ex18in	0.30	10.90	7.98	5%	48%	1.51	14.68	2.77	1.61	1.04	100	0.005	0.024	1.16	15	0.250	0.240	1.19	675	1.34	1.50	0.0141	10.80	6.1	1.84	0.0077	163.40	163.40	164.5	161.2	151.7	1.10	1.31
C13	C12	0.21	10.60	14.96	5%	49%	1.52	14.60	2.77	1.61	1.04	100	0.005	0.024	1.16	15	0.250	0.240	1.13	48	1.64	2.50	0.0167	45.88	9.4	0.09	0.0018	163.49	163.75	166.2	162.00	161.20	2.45	1.75
EX05	C13	10.39	10.39	14.71	50%	50%	1.52	14.55	14.55	3.13	2.32	435	0.025	0.015	11.43	235	0.030	0.240	1.09	15	1.84	2.00	0.0087	18.25	5.8	0.04	0.0056	163.84	165.89	167.52	164.09	163.96	1.63	1.80
N201	N200	0.30	0.30	0.48	77%	77%	1.65	12.38	12.38	4.65	0.87	242	0.004	0.015	7.73	100	0.020	0.240	0.01	31	0.70	1.50	0.0016	3.64	2.1	0.25	0.0000	158.40	160.00	163.50	159.15	159.10	3.50	0.85
N301	N300	0.85	3.80	5.62	52%	46%	1.59	13.26	12.01	4.28	1.04	266	0.005	0.015	7.73	100	0.020	0.240	0.43	73	1.77	1.50	0.0016	3.64	2.1	0.59	0.0038	157.43	159.69	162.80	157.92	157.80	3.11	1.77
N302	N301	1.76	2.95	4.49	40%	45%	1.64	12.54	12.52	4.79	1.05	301	0.005	0.015	7.73	100	0.020	0.240	0.34	89	1.62	1.50	0.0016	3.64	2.1	0.72	0.0024	159.90	159.90	163.10	158.07	157.92	3.20	1.62
N303	N302	1.19	1.19	2.05	51%	51%	1.83	10.09	10.09	5.94	1.23	437	0.007	0.015	4.15	50	0.020	0.170	0.12	300	1.16	1.25	0.0020	2.50	2.0	2.45	0.0013	160.30	160.30	164.90	158.92	158.32	4.60	1.13

			Tailwater:
C00		162.63	162.63
Ex18in		158.21	158.21
N200		158.40	158.40
N300		157.15	157.15

Notes:
1. Collector Response time for the pipes is based upon a pipe flowing full.

Constants used in calculations:	
Infiltration Rate for D soils:	0.12
Infiltration Factor 'Fi' (cfs/acre)	0.21
Average Elevation:	167

Peak Discharge and Pipe Calculations
100-Year

Nodes		Hydrologic Data & Results																		Hydraulic Data & Results													
U/S Node Name	D/S Node Name	Area (ac)	Cumul. Area (ac)	100-yr Adjusted 'Qp' (Eqn 10-5) (cfs)	Composite % Imperv.	Cumul. Composite % Imperv.	100-yr Unit Peak Runoff 'q' (Eqn 10-3) (cfs/ac)	100-yr Cumul. Response Time 'tr' (min)	100-yr Response Time 't_r' (min)	Surface Collector Response Time 't_{tc}' (Eqn 5-4) (min)	Manning's 'V' (ft/s) (Eqn 7-35a Brater & King)	Surface Collector Flow Length (ft)	Surface Collector Slope 's' (ft/ft)	Surface Collector Roughness Factor (n value)	100-yr Overland Response Time 't_{to}' (Eqn 10-2) (min)	Average Overland Flow Length (ft)	Overland Slope 's' (ft/ft)	Overland Roughness Factor (n value)	Total Infiltration (cfs)	Pipe Length (ft)	Calculated Pipe Diameter (ft) (Eqn 6-26e Brater & King)	Design Pipe Diameter (ft)	Pipe Slope (ft/ft)	Design Pipe Capacity (cfs) (Eqn 6-26b Brater & King)	Design Velocity (ft/s) (Eqn 6-26a Brater & King)	Pipe Response Time[1] (L/V/60s) (min)	100-yr HGL Slope (ft/ft) (Eqn 6-26d Brater & King)	Calc'd U/S HGL (ft)	HGL_{100}	U/S Rim/Grate Elevation (ft)	U/S Pipe Invert Elevation (ft)	D/S Pipe Invert Elevation (ft)	Freeboard (ft)	100-Year Depth in Pipe (ft)
C01	C00	0	34.49	42.95	0%	48%	1.35	33.16	0.00	0.00	0.0	0	0.0000	0	0.00	0	0.00	0	3.74	65	4.91	5.00	0.0004	45.13	2.30	0.47	0.0004	163.89	163.89	168.1	159.03	159.00	4.21	4.78
C02	C01	0.94	34.49	44.52	40%	48%	1.40	31.92	7.97	2.89	2.0	350	0.0190	0.015	5.08	90	0.02	0.24	3.74	171	4.97	5.00	0.0004	45.13	2.30	1.24	0.0004	163.96	163.96	168.8	159.10	159.03	4.84	4.86
C03	C02	0.79	0.79	3.13	50%	50%	4.07	5.19	5.19	0.80	2.9	140	0.0400	0.015	4.40	100	0.02	0.17	0.08	312	1.29	1.00	0.0026	1.57	2.01	2.59	0.0103	167.17	167.17	173.4	159.92	159.10	6.23	1.29
C04	C02	2.96	32.76	43.62	40%	48%	1.44	30.90	8.96	3.71	2.0	450	0.0190	0.015	5.25	95	0.02	0.24	3.54	141	4.94	5.00	0.0004	45.13	2.30	1.02	0.0004	164.01	164.01	168.1	159.16	159.10	4.09	4.81
C05	C04	1.59	29.8	42.60	40%	49%	1.54	28.69	11.56	6.15	0.9	320	0.0035	0.015	5.41	100	0.02	0.24	3.17	285	4.89	4.50	0.0004	34.07	2.14	2.22	0.0006	164.19	164.19	169.2	159.28	159.16	5.01	4.89
C06	C05	0.57	28.21	41.82	50%	50%	1.59	27.62	6.96	2.31	0.9	120	0.0035	0.024	4.66	110	0.02	0.17	2.97	138	4.86	4.50	0.0004	34.07	2.14	1.07	0.0006	164.27	164.27	169.8	159.34	159.28	5.53	4.86
C07	C06	0	27.64	41.23	0%	43%	1.61	27.16	0.00	0.00	0.0	0	0.0000	0	0.00	0	0.00	0	3.29	58	4.83	4.50	0.0004	34.07	2.14	0.45	0.0006	164.31	164.31	171.0	159.37	159.34	6.69	4.83
C08	C07	0	13.76	20.99	0%	40%	1.65	26.39	0.00	0.00	0.0	0	0.0000	0	0.00	0	0.00	0	1.73	93	3.48	3.00	0.0006	14.15	2.00	0.77	0.0013	164.43	164.43	170.0	159.43	159.37	5.57	3.48
EX04	C08	13.76	13.76	21.36	40%	40%	1.68	25.90	25.90	19.00	1.4	1585	0.0090	0.015	6.90	150	0.02	0.24	1.73	146	2.17	1.75	0.0076	11.97	4.98	0.49	0.0242	167.96	167.96	168.2	164.72	163.61	0.24	2.17
C09	C07	1.73	13.88	33.30	40%	47%	2.51	13.65	10.32	4.91	1.0	305	0.0050	0.015	5.41	100	0.02	0.24	1.55	147	4.28	4.00	0.0005	27.83	2.22	1.11	0.0007	164.41	164.41	170.4	159.45	159.37	5.99	4.28
C10	C09	0	12.15	31.19	0%	48%	2.68	12.02	0.00	0.00	0.0	0	0.0000	0	0.00	0	0.00	0	1.34	199	4.17	3.50	0.0005	19.49	2.03	1.64	0.0013	164.67	164.67	167.4	159.55	159.45	2.73	4.17
C11	C10	1.25	12.15	32.19	46%	48%	2.76	11.31	8.12	2.71	2.0	320	0.0180	0.015	5.41	100	0.02	0.24	1.34	85	4.08	3.00	0.0006	14.15	2.00	0.71	0.0031	164.93	164.93	165.7	159.61	159.55	0.77	4.08
C12	C11	0.3	10.9	20.09	5%	48%	2.77	11.26	2.42	1.61	1.0	100	0.0050	0.024	0.81	15	0.25	0.24	1.19	49	1.62	3.00	0.0324	104.09	14.74	0.06	0.0012	164.99	164.99	164.5	161.20	159.61	0.00	1.85
C12	Ex18in	0.3	10.9	8.87	5%	48%	2.77	11.26	2.42	1.61	1.0	100	0.0050	0.024	0.81	15	0.25	0.24	1.19	675	1.39	1.50	0.0141	10.80	6.11	1.84	0.0095	164.99	164.99	164.5	161.20	151.70	0.00	1.36
C13	C12	0.21	10.6	28.30	5%	49%	2.78	11.17	2.42	1.61	1.0	100	0.0050	0.024	0.81	15	0.25	0.24	1.13	48	2.09	2.50	0.0167	45.88	9.35	0.09	0.0063	165.29	165.29	166.2	162.00	161.20	0.91	2.08
EX05	C13	10.39	10.39	27.81	50%	50%	2.78	11.13	11.13	3.13	2.3	435	0.0250	0.015	8.00	235	0.03	0.24	1.09	15	2.34	2.00	0.0087	18.25	5.81	0.04	0.0201	165.60	166.43	167.5	164.09	163.96	1.09	2.34
N201	N200	0.3	0.3	0.86	77%	77%	2.93	10.06	10.06	4.65	0.9	242	0.0035	0.015	5.41	100	0.02	0.24	0.01	31	0.87	1.50	0.0016	3.64	2.06	0.25	0.0001	158.50	160.12	163.5	159.15	159.10	3.38	0.97
N301	N300	0.85	3.8	9.75	52%	46%	2.68	12.01	9.69	4.28	1.0	266	0.0050	0.015	5.41	100	0.02	0.24	0.43	73	2.17	1.50	0.0016	3.64	2.06	0.59	0.0115	158.35	160.09	162.8	157.92	157.80	2.71	2.17
N302	N301	1.76	2.95	7.80	40%	45%	2.76	11.29	10.20	4.79	1.0	301	0.0051	0.015	5.41	100	0.02	0.24	0.34	89	2.00	1.50	0.0016	3.64	2.06	0.72	0.0073	160.74	160.74	163.1	158.07	157.92	2.36	2.00
N303	N302	1.19	1.19	3.59	51%	51%	3.12	8.84	8.84	5.94	1.2	437	0.0070	0.015	2.90	50	0.02	0.17	0.12	300	1.43	1.25	0.0020	2.50	2.04	2.45	0.0041	161.98	161.98	164.9	158.92	158.32	2.92	1.43
																												Tailwater	Tailwater:					

C00		163.87	163.87
Ex18in		158.59	158.59
N200		158.50	158.50
N300		157.51	157.51

Notes:
1. Collector Response time for the pipes is based upon a pipe flowing full.

Constants used in calculations:	
Infiltration Rate for D soils:	0.12
Infiltration Factor 'Fi' (cfs/acre)	0.21
Average Elevation:	167

Appendix E

Storm Water Quality Template

Post-Construction
Storm Water Quality Plan

For:

Sierra View Small Lot Tentative Map
City of Roseville

Prepared by:

MacKay & Somps Civil Engineering, Inc.
1025 Creekside Ridge Dr., Ste 150
Roseville, CA 95678
916-773-1189

Preparation Date: July 2021

Approval Date:_____

Section 1 General Project Information

The undersigned owner of the subject property, is responsible for the implementation of the provisions of this plan, including ongoing operations and maintenance (O&M), consistent with the requirements of the West Placer Storm Water Quality Design Manual and the State of California Phase II Small MS4 General Permit (Order No: 2013-0001-DWQ). If the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement the SWQP.

For all Regulated Projects (As identified in Form 1-2 below), the undersigned owner hereby grants access to all representatives of the Jurisdictional Agency for the sole purpose of performing O&M inspections of the installed treatment system(s) and hydromodification control(s) if any.

A copy of the final signed and fully approved SWQP shall be available on the subject site for the duration of construction and then stored with the project approval documentation and improvement plans in perpetuity.

Form 1-1 Project Identification and Owner's Certification

Project Site Address:	360 Diamond Oaks Road	
Owner Name:	Ryan O'Keefe	
Title		
Company	WP Sierra View, LLC	
Address	1420 Rocky Ridge Drive, Suite 265	
City, State, Zip Code	Roseville, CA 95661	
Email	ryan@wpcommunities.com	
Telephone #	916-990-1071	
Signature	Date	
Engineer:*	Steve Smith	PE Stamp* (Required for all Regulated Projects)
Title	Project Manager	
Company	MacKay & Somps Civil Engineering, Inc.	
Address	1025 Creekside Ridge Dr., Ste 150	
City, State, Zip Code	Roseville, CA 95678	
Email	ssmith@msce.com	
Telephone #	916-773-1189	
Signature		
Brief Description of Project: (Attach additional sheets as necessary)	+/- 23.1 acre project	

* Not required for Small Projects as determined in Form 1-2 below. Project owners are responsible for ensuring that all storm water facilities are designed by an appropriately licensed and qualified professional.

Form 1-2 Project Category	
Development Category (Select all that apply)	
[1]**Small Project** – All projects, except LUPs, that create and/or replace between 2,500-5,000 ft^2 of impervious surface or detached single family homes that create and/or replace 2,500 ft^2 or more of impervious surface and are not part of a larger plan of development.	
[2]Enter total new and/or replaced impervious surface (ft^2)	
[3]**Regulated Project** – All projects that create and/or replace 5,000 ft^2 or more of impervious surface.	X
[4]**Regulated Redevelopment Project** with equal to, or greater than 50 percent increase in impervious area	X
[5]**Regulated Redevelopment Project** with less than 50 percent increase in impervious area	
[6]Enter total pre-project impervious surface (ft^2)	0
[7]Enter total new and/or replaced impervious surface (ft^2)	310,252
[8]**Regulated Road or linear underground/overhead project (LUP)** creating 5,000 ft^2 or more of newly constructed contiguous impervious surface.	
[9]Enter total new and/or replaced impervious surface (ft^2)	
[10]**Regulated Hydromodification Management Project** – Regulated projects that create and/or replace 1 acre or more of impervious surface. A project that does not increase impervious surface area over the pre-project condition is not a hydromodification management project.	X
[11]Enter total new and/or replaced impervious surface (ft^2)	310,252

Section 3 Regulated Projects

Section 3 forms are to be completed for all Regulated Projects.

Form 3-1 Site Location and Hydrologic Features

Site coordinates: *Take GPS measurement at approximate center of site*	[1] Latitude	[2] Longitude	[3] Elevation (ft. above sea level)	[4] 85th Percentile, 24 Hour Design Storm Depth (in):
	38°45'51"N	121°16'58"W	167	0.9

[5] Receiving waters *Name of stream, lake or other downstream waterbody to which the site runoff eventually drains*	Pleasant Grove Creek South Branch Sierra View Tributary
[6] 303(d) listed pollutants of concern *Refer to State Water Resources Control Board website* www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired	Bifenthrin, cyfluthrin, cypermethrin, toxicity
[7] Is Project going to be phased? *If yes, ensure that the SWQP evaluates each phase with distinct DMAs, requiring LID BMPs to address runoff at time of completion*	No

[8] *Use this form to show a conceptual schematic depicting DMAs and conveyance features connecting DMAs to the site outlet(s). An example is provided below that can be modified for the proposed project or a drawing clearly showing DMAs and flow routing may be attached.*

Example only
Modify for project specific SWQP
Use separate sheet if necessary

See Exhibit

Form 3-2 Site Assessment and Layout Documentation

	Has this Item been considered in the Site Layout and depicted in the Site Plan?	
	Yes	**Not Applicable (Include brief explanation)**
Define the development envelope and protected areas, identifying areas that are most suitable for development areas to be left undisturbed.	X	
Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.		N/A, all of the site is on Type D soils
Limit overall impervious coverage of the site with paving and roofs.		N/A, conforming to local impervious coverage ordinances
Set back development from creeks, wetlands, and riparian habitats.	X	
Preserve significant trees.	X	
Conform site layout along natural landforms.	X	
Avoid excessive grading and disturbance of vegetation and soils.		N/A, site has previously been disturbed
Replicate the site's natural drainage patterns.	X	
Detain and retain runoff throughout the site.	X	

Attach a Site Plan that incorporates the applicable considerations above. Ensure that the following items are included in the Site Plan:

Site Boundary
Soil types and areal extents, test pit and infiltration test locations
Topographic data with 1 ft. contours
Existing natural hydrologic features (depressions, watercourses, wetlands, riparian corridors)
Environmentally sensitive areas and areas to be preserved.
Proposed locations and footprints of improvements creating new, or replaced, impervious surfaces
Potential pollutant sources and locations
Entire site divided into separate DMAs with unique identifiers
Existing and proposed site drainage network with flow directions and site run-on and discharge locations
Proposed design features and surface treatments used to minimize imperviousness and reduce runoff
Proposed locations and footprints of treatment and hydromodification management facilities
Design features for managing authorized non-stormwater discharges
Areas of soil and/or groundwater contamination
Existing utilities and easements
Maintenance areas

Form 3-3 Source Control Measures

Potential Pollutant Generating Activity or Source	Check One		Describe the source control measures to be implemented for each potential pollutant generating activity or source present on the project as listed in Appendix C and in the CASQA Fact Sheets. Include any special features, materials, or methods of construction that will be used.
	Present	Not Applicable	
Accidental spills or leaks	☐	☑	
Interior floor drains	☐	☑	
Parking/storage areas and maintenance	☐	☑	
Indoor and structural pest control	☐	☑	
Pools, spas, ponds, decorative fountains, and other water features	☐	☑	
Landscape/outdoor pesticide use	☑	☐	All manufacturer recommendations and regulations will be followed. Minimum amounts will be used.
Restaurants, grocery stores, and other food service operations	☐	☑	
Refuse areas	☐	☑	
Industrial Processes	☐	☑	
Outdoor storage of equipment or materials	☐	☑	
Vehicle and equipment cleaning	☐	☑	
Vehicle and equipment repair and maintenance	☐	☑	
Fuel dispensing areas	☐	☑	
Loading docks	☐	☑	
Fire sprinkler test water	☐	☑	
Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources	☐	☑	
Unauthorized non-storm water discharges	☐	☑	
Building and grounds maintenance	☐	☑	

The source control measures identified in this table shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment[1], or from another equivalent manual.

[1] California Stormwater BMP Handbook New Development and Redevelopment. California Stormwater Quality Association (CASQA). January 2003.

Form 3-4 Runoff Reduction Calculator for Site Design Measures on Regulated Projects

		[1]DMA ID No.	DEV01		DEV02		N201	
Site Design Measure	**Runoff Reduction Parameters**			**Runoff Reduction (ft3)**		**Runoff Reduction (ft3)**		**Runoff Reduction (ft3)**
[2] Adjacent/On-Site Stream Setbacks and Buffers	A_{imp} (ft^2)	*impervious drainage area*	-	-	-	-	-	-
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.81		0.8		0.8	
[3] Soil Quality Improvement and Maintenance	A_{pond} (ft^2)	*ponding area*	0	-	0	372.8	0	-
	D_{pond} (ft)	*ponding depth*						
	A_{sa} (ft^2)	*soil amendment area*	0		1065		0	
	D_{sa} (ft)	*depth of amended soil*	1.0		1.0		1.0	
	n	*porosity of amended soil*	0.35		0.35		0.35	
[4] Tree Planting and Preservation	n_e	*number of new evergreen trees*	0	-	5	110.4	0	-
	n_d	*number of new deciduous trees*	0		5		0	
	A_{tc} (ft^2)	*canopy area of existing trees to remain on the property*						
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8		0.8	
[5] Rooftop and Impervious Area Disconnection	A_{imp} (ft^2)	*impervious drainage area*	-	-	7,500	506.3	-	-
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8		0.8	
[6] Porous Pavement	A_{res} (ft^2)	*area of gravel storage layer*		-	0	-		-
	D_{res} (ft)	*depth of gravel storage layer*						
	n_{agg}	*porosity of aggregate*						
	C	*efficiency factor*						
[7] Vegetated Swales	A_{imp} (ft^2)	*impervious drainage area*		-		-		-
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8		0.8	
[8] Rain Barrels and Cisterns	N	*number of rain barrels and/or cisterns*		-	0	-	0	-
	V_a (ft^3)	*volume of each rain barrel and/or cistern*						
[9] Do all Site Design Measures meet the design requirements outlined in the Fact Sheets?					Yes	X	No	
[10] Total Volume Reduction (ft^3)			-		989		-	
[11] Effective Treated Impervious Area (ft^2)			-		14,657		-	

Form 3-4 Runoff Reduction Calculator for Site Design Measures on Regulated Projects

		[1]DMA ID No.	N3 Sheds		N4 Sheds		DEV06	
Site Design Measure	**Runoff Reduction Parameters**			**Runoff Reduction (ft3)**		**Runoff Reduction (ft3)**		**Runoff Reduction (ft3)**
[2] Adjacent/On-Site Stream Setbacks and Buffers	A_{imp} (ft^2)	*impervious drainage area*		-		-		-
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8		0.8	
[3] Soil Quality Improvement and Maintenance	A_{pond} (ft^2)	*ponding area*		107.1		172		9
	D_{pond} (ft)	*ponding depth*						
	A_{sa} (ft^2)	*soil amendment area*	306		492		27	
	D_{sa} (ft)	*depth of amended soil*	1.0		1.0		1.0	
	n	*porosity of amended soil*	0.35		0.35		0.35	
[4] Tree Planting and Preservation	n_e	*number of new evergreen trees*	17	375.2	4	88	2	33
	n_d	*number of new deciduous trees*	17		4		2	
	A_{tc} (ft^2)	*canopy area of existing trees to remain on the property*						
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8		0.8	
[5] Rooftop and Impervious Area Disconnection	A_{imp} (ft^2)	*impervious drainage area*	25,500	1,721.3	6,000	405	2,250	152
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8		0.8	
[6] Porous Pavement	A_{res} (ft^2)	*area of gravel storage layer*		-		-		-
	D_{res} (ft)	*depth of gravel storage layer*						
	n_{agg}	*porosity of aggregate*						
	C	*efficiency factor*						
[7] Vegetated Swales	A_{imp} (ft^2)	*impervious drainage area*		-		-		-
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8		0.8	
[8] Rain Barrels and Cisterns	N	*number of rain barrels and/or cisterns*		-		-		-
	V_a (ft^3)	*volume of each rain barrel and/or cistern*						
[9] Do all Site Design Measures meet the design requirements outline								
[10] Total Volume Reduction (ft^3)			**2,204**		**665**		**194**	
[11] Effective Treated Impervious Area (ft^2)			**32,646**		**9,859**		**2,881**	

Form 3-4 Runoff Reduction Calculator for Site Design Measures on Regulated Projects

		[1]DMA ID No.	DEV07 + C Sheds w/o Swale		DEV07 + C Sheds w/ Swale	
Site Design Measure	**Runoff Reduction Parameters**			**Runoff Reduction (ft3)**		**Runoff Reduction (ft3)**
[2] Adjacent/On-Site Stream Setbacks and Buffers	A_{imp} (ft^2)	*impervious drainage area*		-		-
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8	
[3] Soil Quality Improvement and Maintenance	A_{pond} (ft^2)	*ponding area*		306		306
	D_{pond} (ft)	*ponding depth*				
	A_{sa} (ft^2)	*soil amendment area*	873		873	
	D_{sa} (ft)	*depth of amended soil*	1.0		1.0	
	n	*porosity of amended soil*	0.35		0.35	
[4] Tree Planting and Preservation	n_e	*number of new evergreen trees*	48	1,067	48	1,067
	n_d	*number of new deciduous trees*	49		49	
	A_{tc} (ft^2)	*canopy area of existing trees to remain on the property*				
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8	
[5] Rooftop and Impervious Area Disconnection	A_{imp} (ft^2)	*impervious drainage area*	72,750	4,911	72,750	4,911
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8	
[6] Porous Pavement	A_{res} (ft^2)	*area of gravel storage layer*		-		-
	D_{res} (ft)	*depth of gravel storage layer*				
	n_{agg}	*porosity of aggregate*				
	C	*efficiency factor*				
[7] Vegetated Swales	A_{imp} (ft^2)	*impervious drainage area*		-	167,366	11,297
	V_{85} (in)	*runoff volume from 85th percentile, 24-hour storm*	0.8		0.8	
[8] Rain Barrels and Cisterns	N	*number of rain barrels and/or cisterns*		-		-
	V_a (ft^3)	*volume of each rain barrel and/or cistern*				
[9] Do all Site Design Measures meet the design requirements outline						
[10] Total Volume Reduction (ft^3)				**6,283**		**17,580**
[11] Effective Treated Impervious Area (ft^2)				**93,082**		**260,448**

Form 3-5 Computation of Water Quality Design Criteria for Stormwater Treatment and Baseline Hydromodification Measures

DMA ID No.	DEV01	DEV02	N201	N3 Sheds	N4 Sheds	DEV06	DEV07 + C Sheds w/o Swale	DEV07 + C Sheds w/ Swale
[1]Total impervious area requiring treatment	13,416	14,636	10,062	76,143	9,757	18,870	167,366	167,366
[2] Impervious area untreated by Site Design Measures (ft^2) *Item 1 – Form 3-4 Item 11*	13,416	-	10,062	43,497	-	15,990	74,285	-
[3]Additional pervious area draining to BMP (ft^2)	10,542	21,954	3,006	89,385	14,636	14,235	260,829	260,829
[4] Composite DMA Runoff Coefficient (Rc) *Enter area weighted composite runoff coefficient representing entire DMA*	0.34	0.00	0.53	0.17	0.00	0.29	0.12	0.00
[5] Water Quality Volume (WQV) (ft^3) *WQV = 1/12 * [Item 2 + Item 3) *Item 4] * Unit WQV*	441	-	372	1,188	-	472	2,093	-
[6] Water Quality Flow (WQF) (cfs) *WQF = 1/43,200 * [0.2* (Item 2 + Item 3) * Item4]*	0.038	0.000	0.032	0.102	0.000	0.040	0.179	0.000

Form 3-6 Volume-Based Infiltrating Bioretention Measures			
[1]**DMA ID No.** *If combining multiple DMAs from Form 3-5, enter a new unique DMA ID No.*	**N201**	**N3 Sheds**	**DEV06**
[2]WQV (ft^3) *Item 5 in Form 3-5* *If combining multiple DMAs from Form 3-5, enter the sum of their respective WQVs.*	372	1188	472
[3]Surface Loading Rate *Maximum 5.0 in/hr*	5	5	5
[4]BMP Surface Area (ft^2) *Top of BMP*	258	950	347
[5]Infiltration rate of underlying soils (in/hr)	0.07	0.07	0.07
[6]Maximum ponding depth (ft) *BMP specific, see BMP design details*	0.5	0.5	0.5
[7]Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 5 * 48 hrs) or Item 6*	0.28	0.28	0.28
[8]Infiltrating surface area, SA_{BMP} (ft^2) *Bottom of BMP*	215	792	289
[9]Planting media depth, d_{media} (ft)	1.5	1.5	1.5
[10]Planting media porosity	0.35	0.35	0.35
[11]Gravel depth, d_{media} (ft) *Only included in certain BMP types*	3.5	3.5	3.5
[12]Gravel porosity	0.30	0.30	0.30
[13]Retention Volume (ft^3) $V_{retention}$ *= Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (1.5* (Item 5 / 12))]*	401	1,476	539
[14]Untreated Volume (ft^3) $V_{untreated}$ *= Item 2 – Item 13* *If greater than zero, adjust BMP sizing variables and re-compute retention volume*	0	0	0
[15] Treated Flow Rate (ft^3/s) $Q_{treated}$ *= 1/43,200*(Item 3 * Item 4)*	0.0299	0.1100	0.0401
[16]Total Treated Flow Rate for Project (ft^3/s) Q_{total} *= Sum of Item 15 for all DMAs*	0.217		
[17]Is WQV for each DMA treated on-site?	**X**	**No**	

Form 5-1 BMP Inspection and Maintenance		
BMP	**Inspection Point and Frequency**	**Maintenance Activity Required**
Veg Swale	Embankments and channel/Twice a year or as needed	Repair erosion problems, remove debris and sediment
	Channel/Annual or as needed	Mow grass to no shorter than 6-inches, reseed to maintain dense turf
Bioretention Facilities	Inlets and outlets/ Twice a year	Remove debris, sediment, and litter
	Plants/Monthly or as needed	Irrigate, weed control, replace dead plants
	Standing water in excess of 72-hours/Annual or as needed	Remove accumulated sediment and flush drainage including underdrain
	Erosion, holes or voids/Annual or as needed	Repair erosion and stabilize, inspect underdrain and replace soil if needed
Trees	At each tree/as necessary	Irrigate to establish and maintain
	At each tree/annually	Remove fallen leaves and debris
	At each tree/regularly	Prune dead vegetation from trees
	At each tree/as needed	Minimize the use of chemical fertilizers
	At each tree/as necessary	Maintain lawn and turf at least 24-inches from trunk of tree
	At each tree/as necessary	Remove and replace dead trees
Soil Amended Areas	At each amended soil area/annually	Inspect for signs of compaction, waterlogging. Add soil amendments or mechanically aerate as needed.
	At each amended soil area/annually	Inspect for loss of vegetative cover and erosion. Repair eroded areas and replant vegetation as needed.

Form 6-1 Post-Construction Stormwater BMPs

Following is a summary of all BMPs included in the Project design. This checklist must be included on the cover sheet of the Improvement Plans for all Regulated Projects.

BMP		Plan Sheet Number(s)
Structural Source Controls (list BMPs)		
Site Design Measures	Stream Setbacks and Buffers	
	Soil Quality Improvement and Maintenance	**Sierra View SLTM**
	Tree Planting and Preservation	**Sierra View SLTM**
	Rooftop and Impervious Area Disconnection	**Sierra View SLTM**
	Porous Pavement	
	Vegetated Swales	**Sierra View SLTM**
	Rain Barrels and Cisterns	
Stormwater Treatment and Baseline Hydromodification Measures	Bioretention with Infiltration	**Sierra View SLTM**
	Flow-Through Planters, Tree Box Filters and Media Filters	
Hydromodification Management Measures	Supplemental Detention	**Sierra View SLTM**

Vegetated Swale
Data and Results

Swale Name	Contributing Area (ac)	SWQ Flow[1] (cfs)	Slope (ft/ft)	Manning's 'n'	Maximum Depth (ft)	Side Slope (ft:ft)	Minimum Bottom Width of each bay (ft)	No. of Bays	Minimum Length (ft)	Area per Bay (ft^2)	Wetted Perimeter per Bay (ft)	Hydraulic Radius per Bay (ft)	Velocity (fps)	Contact Time (min)	Overall Bottom Width (ft)
DEV07 + C Sheds	9.83	0.179	0.005	0.25	0.33	3	3	1	104	1.33	5.05	0.26	0.17	10.05	3.0

FEHR PEERS

TECHNICAL MEMORANDUM

Date: September 7, 2021
To: Jack Varozza, PE – City of Roseville
From: John Gard, PE – Fehr & Peers
Subject: ***Transportation Impact Study for Sierra View Residential Project***

RS21-4081

This memorandum analyzes the transportation impacts associated with construction of the Sierra View Residential Project, which would be situated west of Shasta Street and south of Diamond Oaks Road in Roseville, CA. Refer to **Figure 1** for project location and **Figure 2** for project site plan. This memorandum consists of the following sections:

- Existing Conditions
- Existing Plus Project Conditions
- Cumulative Conditions
- Vehicle Miles Traveled
- Review of Project Access

Existing Conditions

The project site would be served by the following roadways:

- Diamond Oaks Road – is an east-west, two-lane residential street with a posted speed limit of 25 miles per hour (mph) that extends 1.8 miles from Washington Boulevard to Reserve Drive. Single-family residences front the vast majority of this street. It is used to access local residences, the Diamond Oaks Golf Course, and is also used by some motorists as a cut-through route to access various destinations including Roseville High School. A motorist traveling the entirety of this roadway would encounter three all-way stop-controlled intersections, including at Diamond Oaks Road/Shasta Street.
- Shasta Street – is a north-south two-lane residential street with a posted speed limit of 25 mph that extends 1.0 miles from Diamond Oaks Road to Sierra Drive, which provides access to the "crooked bridge" connecting to Old Town Roseville. It also connects to Yosemite Avenue, which provides access to Atlantic Street and downtown Roseville and Interstate 80. Land uses along this segment include single-family (front-on) dwelling units, multi-family units, Ferris Spanger Elementary School, and Diamond Oaks Park. Similar to Diamond Oaks Road, Shasta Street is used for a variety of trip purposes.

Due to the COVID-19 pandemic and the resulting changes to travel patterns due to the statewide stay-at- home directive implemented in March 2020, existing traffic counts were not collected. Instead, traffic count data was obtained from a "Big Data" vendor, StreetLight Data, Inc. StreetLight Data captures anonymized location records from smart phones and navigation devices in connected cars and trucks. Because StreetLight Data collects location records at all times of the day and year, providing for a much larger data set when compared to a traditional data collection effort on a single day.

Table 1 displays the resulting Average Daily Traffic (ADT) on the study roadways. This data is also shown geographically on **Figure 3**. Mid-week (Tuesday through Thursday) traffic data was obtained from September and October 2019 to establish existing conditions. Data was collected for all movements at the Diamond Oaks Road/Shasta Street intersection for a typical 24-hour mid-week period. From this data, it was possible to identify both the amount of daily traffic on each roadway segment and the amount of AM and PM peak hour traffic at the intersection by turning movement. For quality control purposes, pre-COVID traffic data was obtained at the Diamond Oaks Road/Washington Boulevard signalized intersection using the City's Intelligent Transportation System (ITS) count database to confirm that the volume of traffic on Diamond Oaks Road between Washington Boulevard and Shasta Street was similar for each source. This was found to be the case.

Table 1: Average Daily Traffic (ADT) on Study Roadways – Existing Conditions

Segment	ADT [1]
Diamond Oaks Road west of Shasta Street	5,200
Diamond Oaks Road east of Shasta Street	4,300
Shasta Street south of Diamond Oaks Road	4,200
Shasta Street south of Ferris Spanger Elementary School [2]	4,500

Notes:

1. Data represents pre-COVID conditions (i.e., September/October 2019).
2. Estimated based on directionality of trips in/out of Ferris Spanger Elementary School and known usage of the Diamond Bar Lane-Manzanita Avenue route by Roseville High School students.

Values rounded to the nearest one hundred.
Source: Fehr & Peers, 2021.

Existing Plus Project Conditions

Project Description

According to the project site plan (*Sierra View Tentative Subdivision Map*, MacKay & Somps, April 2021), the project would consist of 75 single-family dwelling units in a gated community. All streets within the community would be private.

Vehicular access would be provided by a private street (shown as Whistling Straits Drive on the site plan) situated on the south side of Diamond Oaks Road about 550 feet west of Shasta Street. This access would have a turn-around area for vehicles that are turned away at the gate. An emergency vehicle access (EVA) would be provided on Shasta Street opposite Ferris Spanger Elementary School. Sidewalks would be provided on one side of each access street to connect the neighborhood to the adjacent public street.

Preliminary analyses of the project focused on the benefits and drawbacks of four distinct scenarios consisting of full, partial, and no vehicular access from the Diamond Oaks Road and Shasta Street access points. Below is a summary of how these options were evaluated (Appendix A provides additional details regarding site constraints and evaluation of the options):

- Two of the four options consisted of full access onto Shasta Street with varying levels of access on Diamond Oaks Road. These two options were removed from further consideration because they would have substantially increased vehicular conflicts with Ferris Spanger Elementary School and would have introduced a sight distance constraint (i.e., horizontal curvature of Shasta Street) that may have proven difficult to solve.
- A third option consisting of full access on Diamond Oaks Road and partial access on Shasta Street, allowing for exiting movements only (along with an EVA) was also considered. This was also rejected because of the potential for wrong-way travel as well as continued conflicts with school traffic.
- The fourth option is the proposed project.

Trip Generation

The project's trip generation was calculated based on trip rates and methodologies published in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 10th Edition* (2017). Because the project consists of single-family detached units, the "Single-Family Detached Housing" land use category was used to estimate daily and peak hour trips generated by the project.

Table 2 shows the project's trip generation on a daily basis and during the AM and PM peak hours. As shown, the project would generate approximately 710 daily trips, with 56 occurring during the AM peak hour and 75 occurring during the PM peak hour.

Table 2: Project Trip Generation

Land Use[2]	Quantity	Units[1]	Daily Total	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Single-Family Detached Housing (Code 210)	75	du	708	14	42	56	47	28	75

Notes:
1. "du" represents dwelling units
2. Based on trip rates from *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017).

Source: Fehr & Peers, 2021.

Trip Distribution and Trip Assignment

Streetlight Data, Inc. offers another innovative data product consisting of quantification of the spatial distribution of trips generated by a given neighborhood. This data was obtained for this study, focusing on the neighborhood immediately north of the northerly terminus of Shasta Street (i.e., Nicklaus Circle).

Because the project would be situated in close proximity to this neighborhood, it would presumably have similar trip distribution characteristics. **Figure 4** displays the expected daily distribution of project trips based on the characteristics of these neighborhoods. This figure shows that the majority of trips (75 percent) are expected to be distributed to/from the east or west on Diamond Oaks Road. This makes sense because these routes provide access to a variety of retail destinations and employment centers.

Project trips were added to existing volumes to yield the Existing Plus Project roadway segment daily volumes shown on **Figure 5.** Key findings from this figure are:

1. The largest increase in project trips would occur on the segment of Diamond Oaks Road between Shasta Street and the project access. The volume on this segment would increase from 5,200 to 5,670 vehicles, a nine percent increase.[1] During the PM peak hour, the volume on this segment would increase by about 50 vehicles, or one additional vehicle per minute.

[1] To put this increase in perspective, it is typical to see fluctuations of five to ten percent in traffic from one weekday to the next.

2. The daily traffic volume on Diamond Oaks Road east of Shasta Street would increase from 4,300 to 4,590 vehicles, a seven percent increase.
3. Project-related traffic volumes on Shasta Street south of Diamond Oaks Road would be modest at about 200 vehicles per day.

The City of Roseville does not use roadway ADT values to analyze project impacts. This information has been prepared for informational purposes so that reviewers of the project understand how traffic volumes on surrounding roadways would change if the project was constructed.

Given the project's size and expected travel characteristics, it was deemed unnecessary to study any nearby intersections. During the PM peak hour, the project would add 26 trips to the Washington Boulevard/Diamond Oaks Road intersection, which is a small percentage of the current volume at the intersection. The intersection is in the midst of being widened to provide more capacity along Washington Boulevard. Analysis of that intersection would not have yielded the need for any additional improvements. The project would add 30 PM peak hour trips to Reserve Drive, which would be distributed either to the north toward Roseville Parkway or the south toward Berry Street. Again, this modest level of traffic increase would not materially affect operations at those locations.

Instruction at Ferris Spanger Elementary School begins at 8:15 AM and ends at 2:35 PM. During the schools' two peak hours (i.e., 8-9 AM and 2-3 PM), the project would add 11 and 12 trips, respectively, along the school frontage. This would represent about a three percent increase over the existing volumes during each school peak hour. This level of increase is less than the daily fluctuation in traffic on streets such has this, and thus would not be noticeable to most drivers.

Cumulative Conditions

Traffic forecasts were developed for cumulative conditions using the City of Roseville 2035 travel demand model. This model considers reasonably foreseeable land uses and roadway network improvements throughout the City as well as adjacent cities. Noteworthy improvements include the widening of Washington Boulevard from two to four lanes from south of Pleasant Grove Boulevard to Sawtell Road. This is an important alternate route to Shasta Street and Diamond Oaks Road.

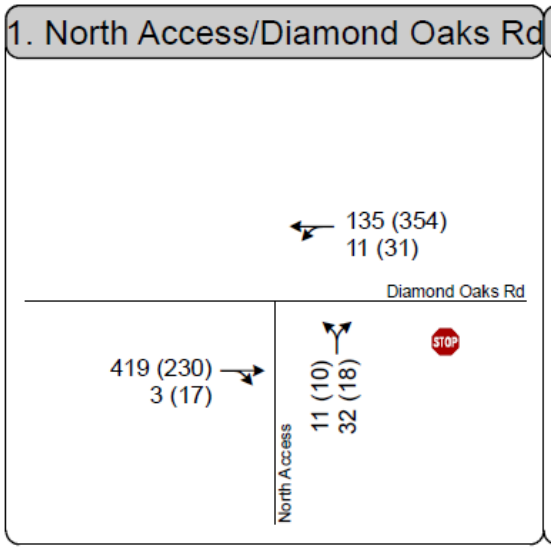
Figure 6 shows the Cumulative No Project ADT volumes on the study roadways. A comparison of these volumes to existing conditions shows the greatest growth in background traffic (about 800 ADT) would occur on Diamond Oaks Road west of Shasta Street.

Project trips were added to those volumes to yield the Cumulative Plus Project daily volumes also shown on that figure. Consistent with the earlier findings, project trips would be distributed in a fairly even manner on all three routes, with the most project trips (470 ADT) added to the short segment of Diamond Oaks Road between the project access and Shasta Street.

Evaluation of Project Access

Vehicular Access on Diamond Oaks Road

Shown below is the weekday AM (without parentheses) and PM (with parentheses) peak hour traffic volumes at the Diamond Oaks/Project Access intersection under Existing Plus Project conditions.



The following is recommended based on the traffic volumes shown above:

- Operate the Diamond Oaks/Project Access intersection with side-street stop-control.

A review of sight distance was conducted for motorists desiring to turn left from westbound Diamond Oaks Road into the project site. To the west of the access, Diamond Oaks Road features a gradual horizontal curve. Field observations indicate that motorists operating their vehicles at normal operating speeds would be visible for in excess of 7.5-seconds before passing the project access. This sight value, often referred to as the 7.5-second rule, is associated with adequate sight distance. Adequate sight distance would also be provided for motorists exiting the project site (provided that no shrubs or monuments or placed within the intersection sight triangle).

It is also noted that the project access intersection has been positioned such that the beam of a vehicle's headlights exiting the project would not be directed towards residents' windows on the north side of the street.

Emergency Vehicle Access on Shasta Street

A gate would be constructed at this access to prohibit travel by all motorists except emergency vehicles. Pedestrians and bicyclists would be able to access the project through a gated walkway. The project site plan shows the placement of landscaping and a detention basin along the project frontage of Shasta Street. This would effectively preclude the undesired current practice whereby parents park on the west side of the street and walk across Shasta Street to pick-up or drop-off their student. The following is recommended:

- Post "No Stopping" signs within the short EVA driveway apron.

Vehicle Miles Traveled (VMT)

Page 4.3-29 of the *City of Roseville General Plan Update Final EIR* (2020) contains the following statements regarding VMT analysis:

> "*Quantitative analysis would not be required if it can be demonstrated that a project is consistent with the General Plan and would generate VMT which is equivalent to or less than what was assumed in this General Plan EIR*."

Page TI 16-22 of the *January 2021 Amendments to the City of Roseville Design and Constructions Standards* contains the following statements regarding VMT analysis:

> "*A project may be screened from additional VMT analysis if it meets one or more of the following criteria. These criteria are based on the Governor's Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA (December 2018)*."
>
> 1. *<u>Within Scope of Prior CEQA Analysis</u> – The VMT generated by the project is within the scope of a prior CEQA analysis, and is therefore covered by a prior analysis, Prior analysis includes analysis performed for the General Plan.*

The project site would be situated within infill zone 100, which has an R3 zoning and Medium Density Residential land use designation. According to data from the City, there are 170 remaining units among the 223 units (i.e., 32.98 acres at 6.8 units per acre) that were allocated. Since the proposed project, which would include a rezone from Medium to Low Density Residential, proposes only 75

units, it would generate less VMT than what was assumed in the General Plan. Accordingly, VMT impacts would be less than significant.

We hope this information is helpful. Please with any questions or comments.

Appendix A – Vehicular Access Options for Sierra View Residential Project

Part 1 – Summary of Issues at Shasta Street Access

Proximity of the Ferris Spanger Elementary School

This school is situated directly across Shasta Street from the project site. Field observations during school hours revealed the following:

- Moderate queuing and congestion were observed along Shasta Street.
- Some parents/guardians were observed to park on the opposite side of Shasta Street from the school to pick-up students. This resulted in moderate numbers of pedestrian crossings.

The photos below illustrate existing conditions.

Image 1: Photo of pedestrians crossing Shasta Street during student pick-up.

Image 2: Photo of queued vehicles on northbound Shasta Street during student pick-up.

Horizontal Curvature of Shasta Street

The project's southerly access point would be directly south of a portion of Shasta Street that features a horizontal curve. Additionally, shrubs and tree branches and fencing also limit the line of sight. Refer to photo below for current line of sight.

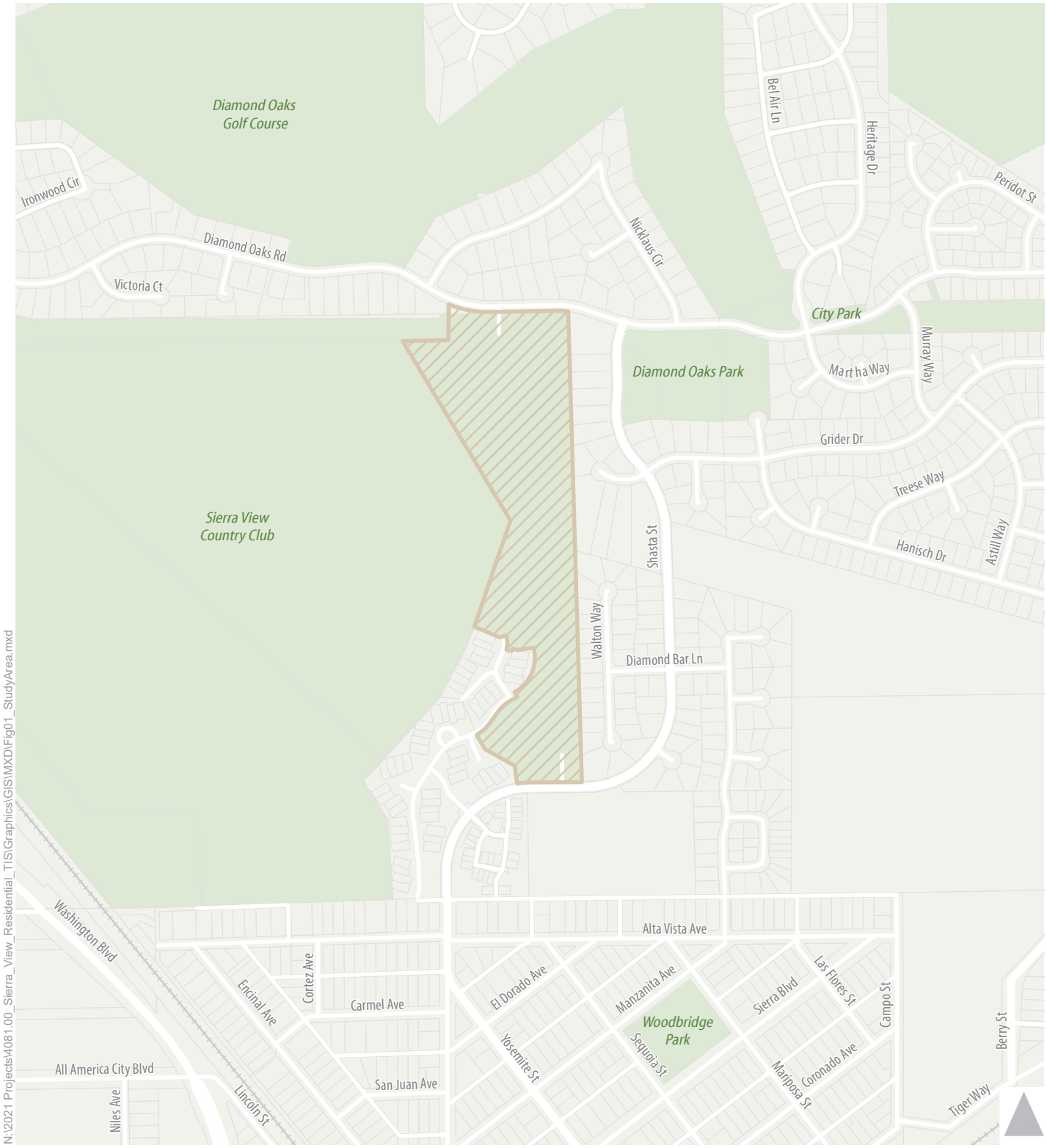
Image 3: View of southbound Shasta Street from approximate location of southerly project access.

Part 2 – Evaluation of Four Access Scenarios

Table: Study Recommendations

Scenario	Recommendation
Scenario 1: Full Access on Diamond Oaks Road and Shasta Street	Remove from further consideration because it would introduce substantially increased vehicular conflicts with Ferris Spanger Elementary School.
Scenario 2: Full access on Shasta Street and emergency vehicle access (EVA) on Diamond Oaks Road	Remove from further consideration because it would introduce substantially increased conflicts with access to Ferris Spanger Elementary School and cause unnecessary traffic volume increases on Shasta Street
Scenario 3: Full access on Diamond Oaks Road and partial access on Shasta Street, allowing for exiting movements only	Less desirable than Scenario 4 because the two issues raised in Part 1 would be difficult to address[1].
Scenario 4: Full access on Diamond Oaks Road and emergency vehicle access (EVA) on Shasta Street	. Proposed Project

Note:
[1] Allowing outbound (exiting) movements would have less interference with school-related trips (versus full access). However, conflicts would nevertheless increase due to the frequency of activity along the street (turning vehicles, queued vehicles, parked vehicles, pedestrian crossings, etc.) in the immediate driveway vicinity.



Project Site

Park/Open Space

Figure 1

Study Area

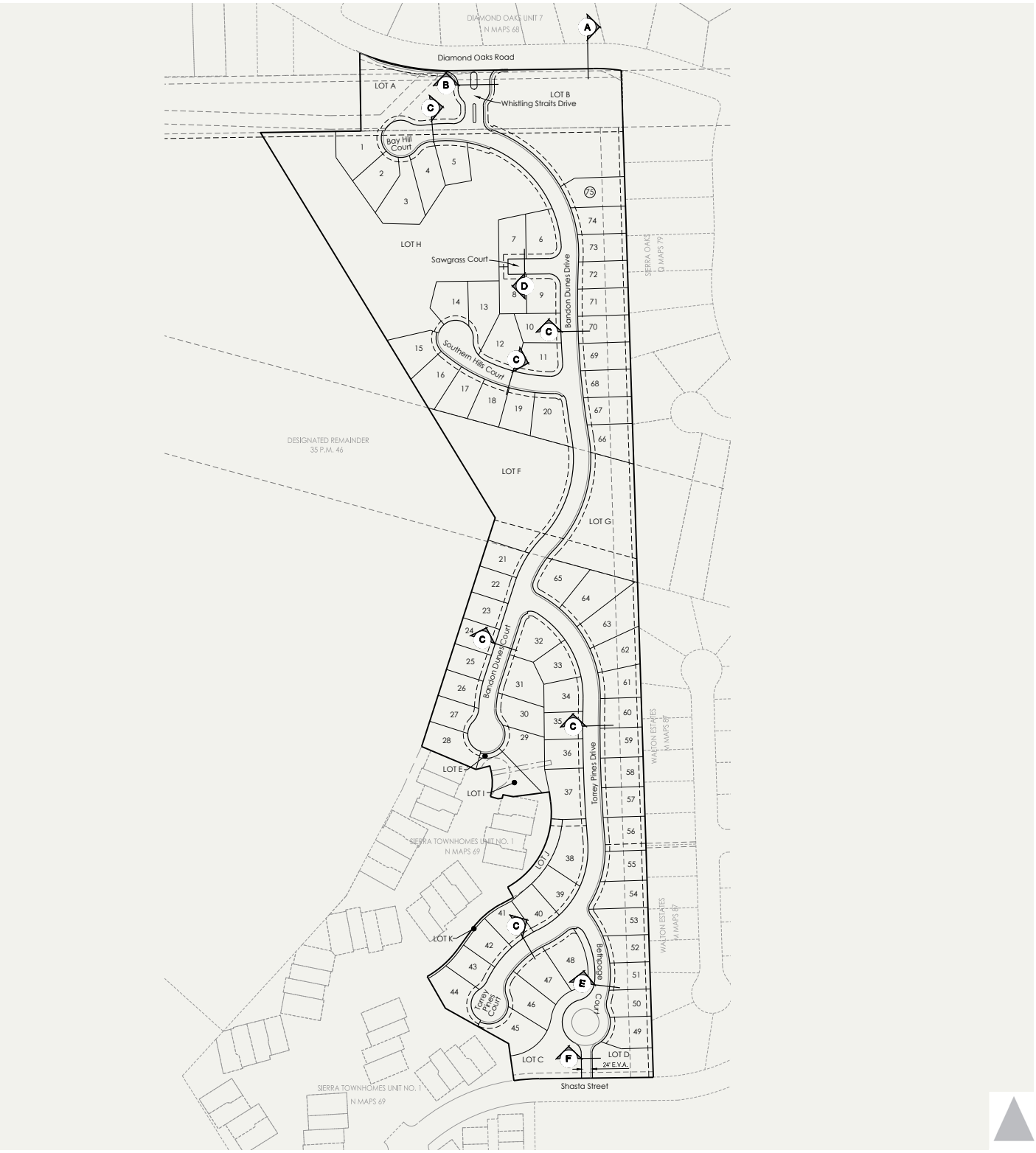


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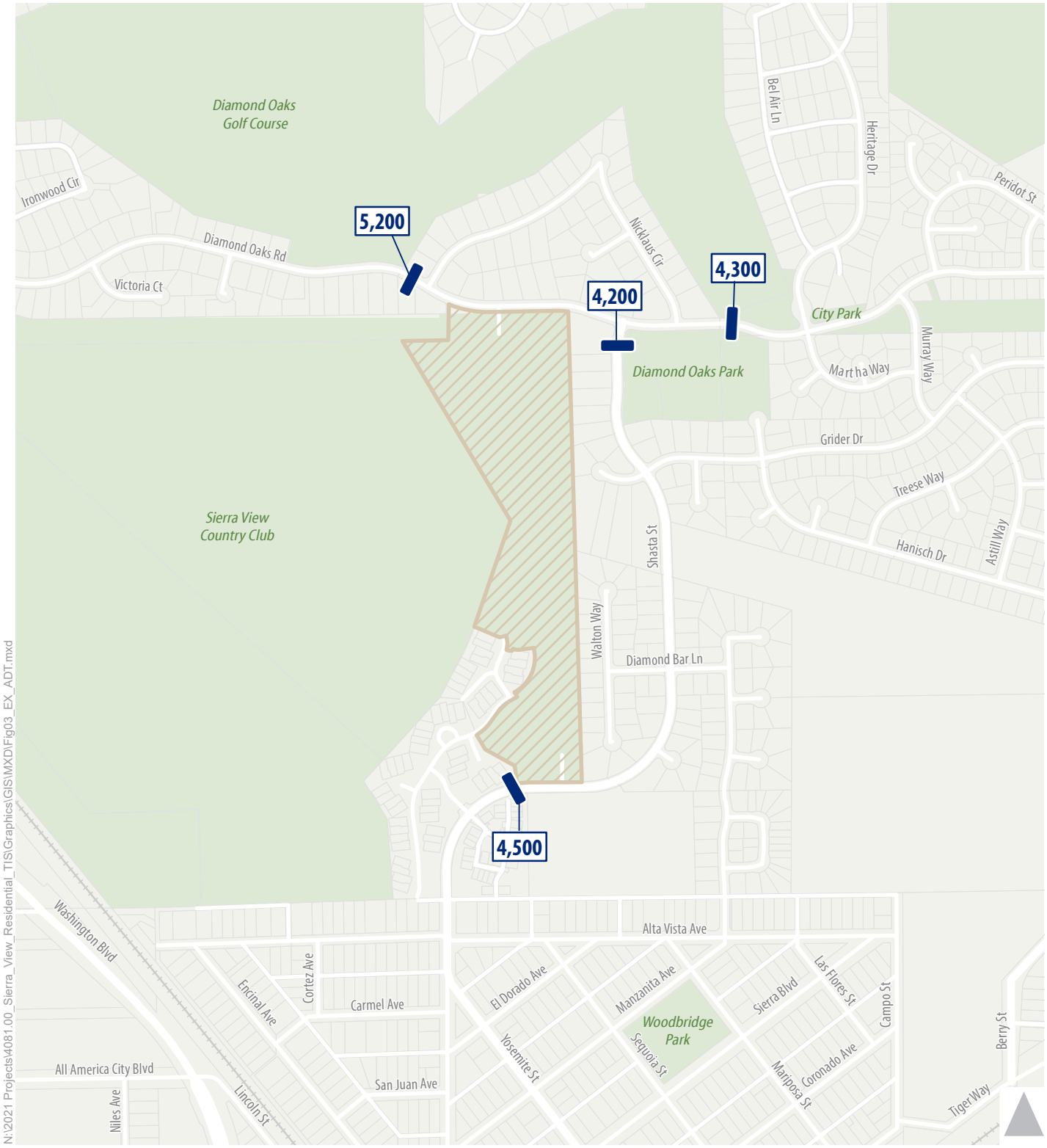
Figure 2

Project Site Plan



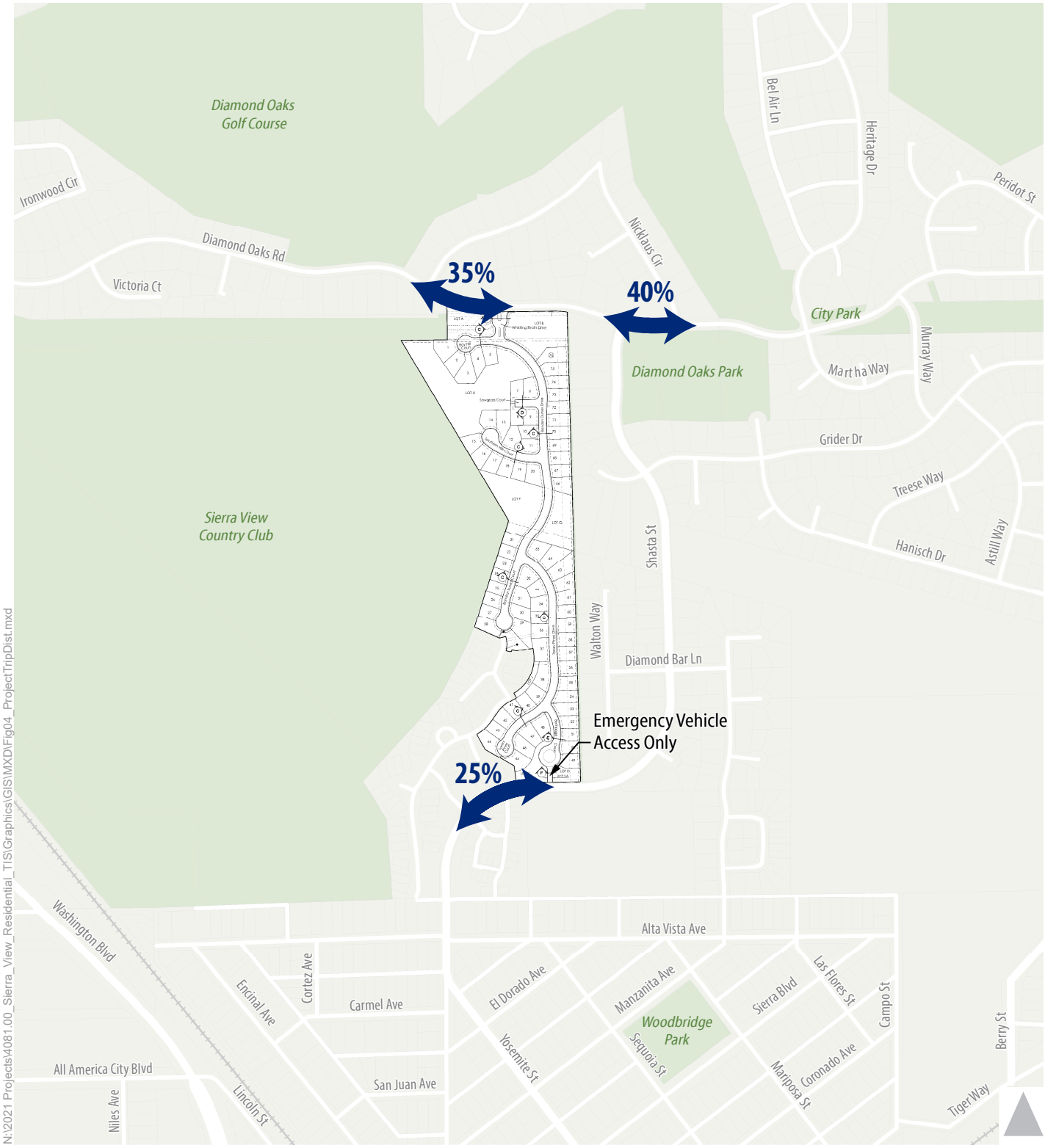
Average Daily Traffic Volume

Park/Open Space

Project Site

Figure 3

Average Daily Traffic Volumes - Existing Conditions



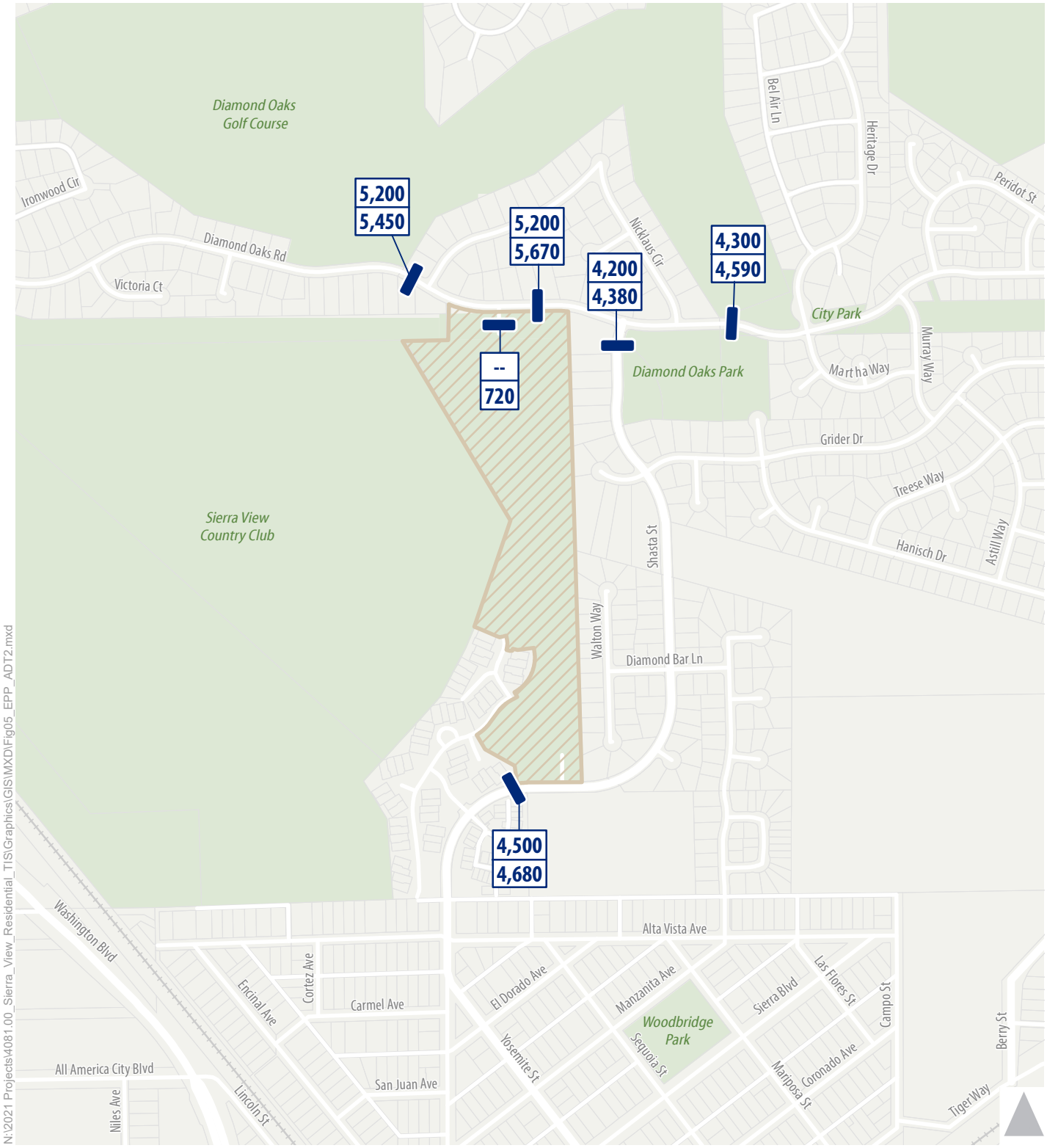
xx% Project Trip Distribution Percentage

Project Site

Park/Open Space

Figure 4

Project Trip Distribution



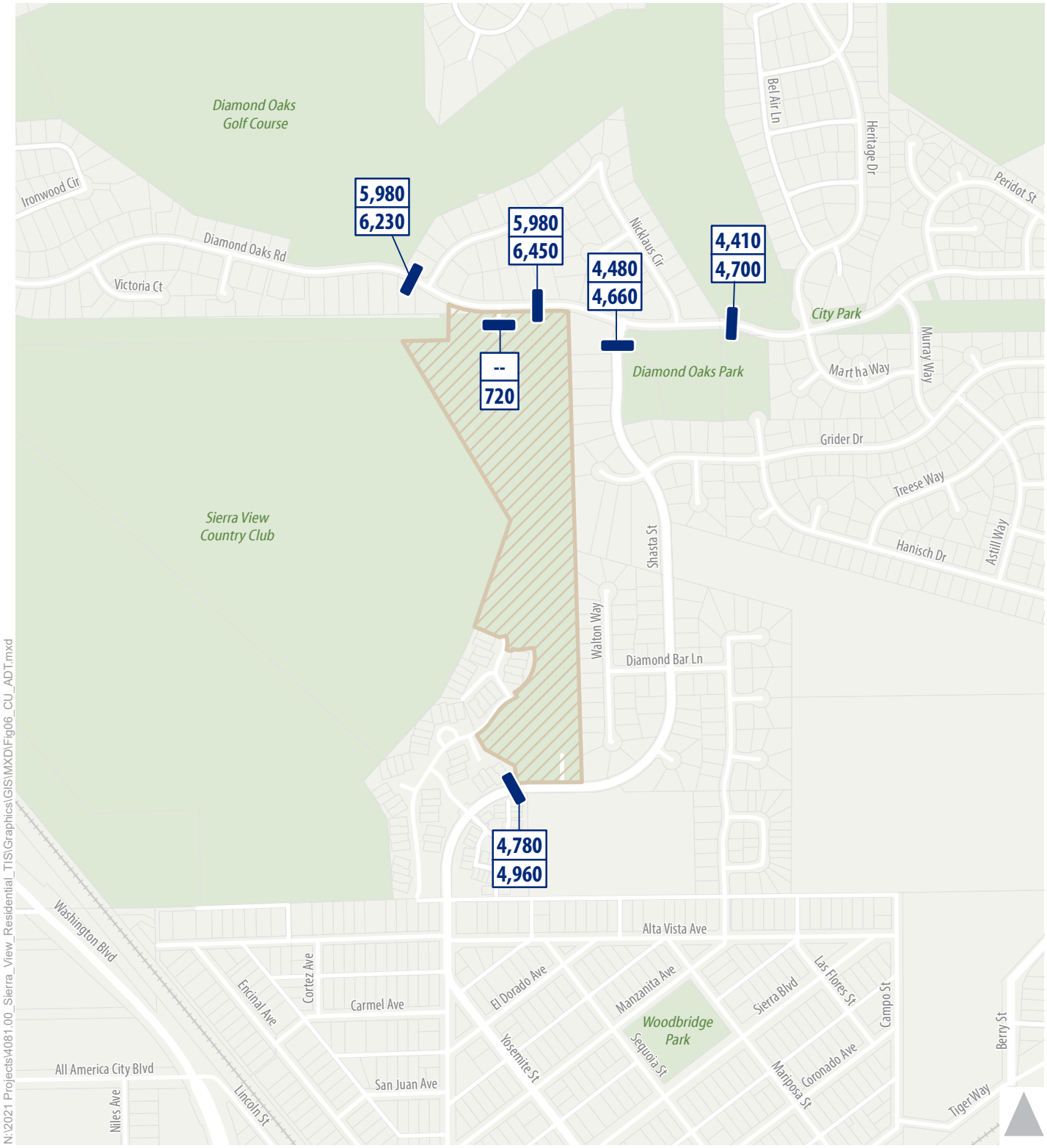
x,xxx Exisitng ADT
x,xxx Existing Plus Project ADT

Project Site

Park/Open Space

Figure 5

Average Daily Traffic Volumes (ADT) - Existing Plus Project Conditions



x,xxx
x,xxx
Cumulative No Project ADT
Cumulative Plus Project ADT

Project Site

Park/Open Space

Figure 6

Average Daily Traffic Volumes (ADT) - Cumulative Conditions

CEQA AB52
Tribal Consultation Notice

Date: August 4, 2021

To: Anna Starkey, Cultural Regulatory Specialist
United Auburn Indian Community
10720 Indian Hill Road
Auburn, CA 95603

Don Ryberg, Chairperson
Tsi Akim Maidu
PO Box 510
Browns Valley, CA 95918

Sara D. Setshwaelo, Cultural Committee Chair
Ione Band of Miwok Indians
P.O. Box 699
Plymouth, CA 95669

Nicholas Fonseca, Chairperson
Shingle Springs Band of Miwok Indians
P.O. Box 1340
Shingle Springs, CA 95682

RE: Notice of Opportunity to Consult Under AB52 for the INFILL PCL 3 & 100 – Sierra View Subdivision Project (File #PL21-0162) in the City of Roseville

---

The City of Roseville will soon be initiating environmental review under the California Environmental Quality Act (CEQA) for the above referenced project. A project location map and preliminary project description are enclosed for your information.

In accordance with Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC), we are responding to your Tribe's request to be notified of projects in our jurisdiction that will be reviewed under CEQA. The above names were provided to the City of Roseville as the point of contact for your tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

Mackenzie Harrison is the City's Lead Agency Contact to receive replies in response to this notice. In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this notice to either request or decline AB52 consultation in writing for this project from the City's Lead Agency Contact. Please send your written response by letter or by email to:

Mackenzie Harrison
311 Vernon Street
Roseville, CA 95678
msharrison@roseville.ca.us

Cc: Jason Camp, Tribal Historic Preservation Officer

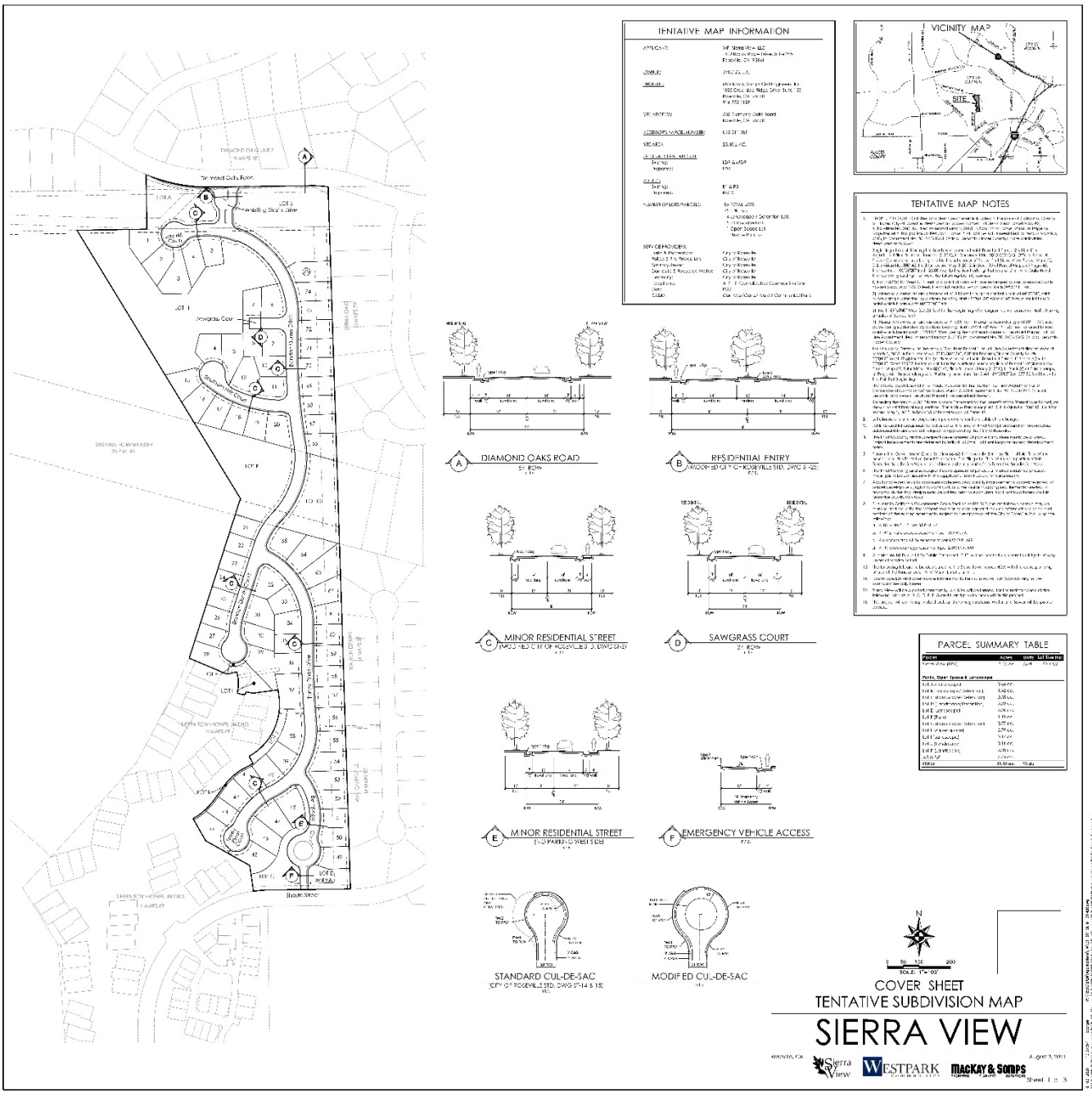
Project Description:

The project site is located at 360 Diamond Oaks Road, within the City's infill area. The site is approximately 23 acres and has a land use designation of Medium Density Residential (MDR) and a zoning designation of Multi-Family Residential (R3). The parcel has frontage on Diamond Oaks to the north and Shasta Street to the south and is adjacent to existing Low Density Residential (LDR) uses to the east and the Sierra View Country Club golf course and Medium Density Residential uses to the west.

The project includes a General Plan Amendment to change the land use designation from MDR to LDR, a Rezone to change the zoning designation from R3 to Small Lot Residential with modified Development Standards (RS/DS), and a Tentative Subdivision Map to subdivide the 23 acres into 75 MDR lots. A Tree Permit is also requested to remove 158 native oak trees. As part of the project, 95 units will be transferred from Infill Parcels 3 and 100 to Sierra Vista Specific Plan Parcels WB-31 (+32 units) and WB-41 (+63 units).

Aerial View of Project Site

Proposed Tentative Subdivision Map



SB18
Tribal Consultation Notice

August 4, 2021

To:

Anna Starkey, Cultural Regulatory Specialist
United Auburn Indian Community
10720 Indian Hill Road
Auburn, CA 95603

Grayson Coney, Cultural Director
Tsi Akim Maidu
P.O. Box 510
Browns Valley, CA 95918

Pamela Cubbler, Treasurer
Colfax-Todds Valley Consolidated Tribe
P.O. Box 4884
Auburn, CA 95604

Darrel Cruz, Cultural Resources Department, THPO
Washoe Tribe of Nevada & California
919 Hwy 395 South
Gardnerville, NV 89410

Don Ryberg, Chairperson
Tsi Akim Maidu
P.O. Box 510
Browns Valley, CA 95918

Regina Cuellar, Chairperson
Shingle Springs Band of Miwok Indians
P.O. Box 1340
Shingle Springs, CA 95682

Clyde Prout, Chairman
Colfax-Todds Valley Consolidated Tribe
P.O. Box 4884
Auburn, CA 95604

Subject: Tribal Consultation Pursuant to SB 18 for Project #PL21-0162: INFILL PCL 3 & 100 – Sierra View Subdivision in the City of Roseville

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The City of Roseville is processing an application for the above-referenced project, located in the northwestern portion of the City of Roseville. Recognizing the importance of tribal participation in the local planning process, the City is requesting your review of the project to determine if formal consultation is appropriate pursuant to Government Code Section 65352.3 (SB 18). Pursuant to Government Code Section 65352.3(a)(2) you have 90 days from receipt of this letter to respond.

The project description is attached to this letter.

The City looks forward to hearing from you. Should you have any questions, please send your written response by letter or by email to:

Mackenzie Harrison
311 Vernon Street
Roseville, CA 95678
msharrison@roseville.ca.us

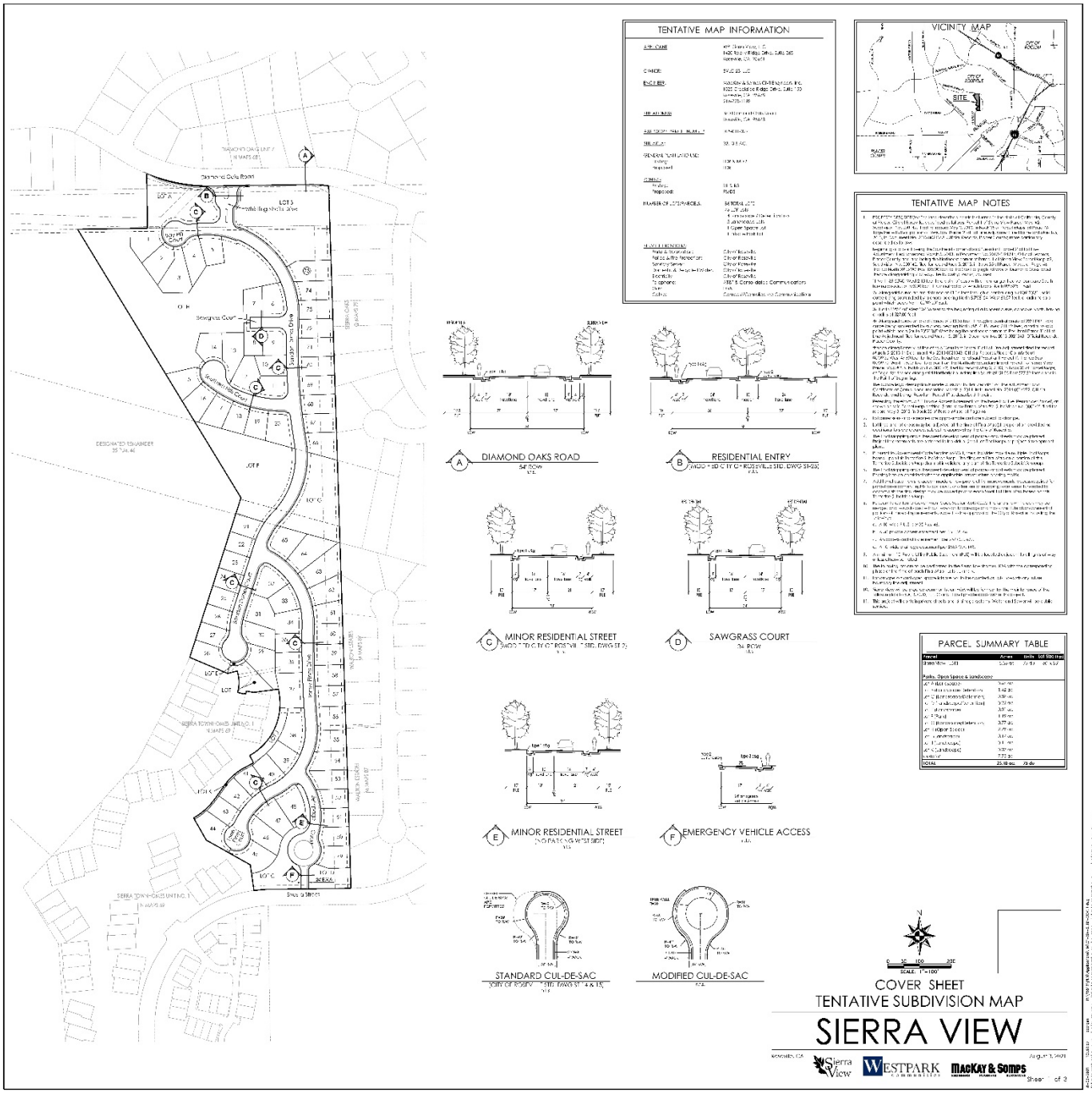
Project Description:

The project site is located at 360 Diamond Oaks Road, within the City's infill area. The site is approximately 23 acres and has a land use designation of Medium Density Residential (MDR) and a zoning designation of Multi-Family Residential (R3). The parcel has frontage on Diamond Oaks to the north and Shasta Street to the south and is adjacent to existing Low Density Residential (LDR) uses to the east and the Sierra View Country Club golf course and Medium Density Residential uses to the west.

The project includes a General Plan Amendment to change the land use designation from MDR to LDR, a Rezone to change the zoning designation from R3 to Small Lot Residential with modified Development Standards (RS/DS), and a Tentative Subdivision Map to subdivide the 23 acres into 75 MDR lots. A Tree Permit is also requested to remove 158 native oak trees. As part of the project, 95 units will be transferred from Infill Parcels 3 and 100 to Sierra Vista Specific Plan Parcels WB-31 (+32 units) and WB-41 (+63 units).

Aerial View of Project Site

Proposed Tentative Subdivision Map



SB18
Tribal Consultation Notice

August 17, 2021

To:

Anna Starkey, Cultural Regulatory Specialist
United Auburn Indian Community
10720 Indian Hill Road
Auburn, CA 95603

Grayson Coney, Cultural Director
Tsi Akim Maidu
P.O. Box 510
Browns Valley, CA 95918

Pamela Cubbler, Treasurer
Colfax-Todds Valley Consolidated Tribe
P.O. Box 4884
Auburn, CA 95604

Jesus Tarango, Chairperson
Wilton Rancheria
9728 Ken Street
Elk Grove, CA 95624

Darrel Cruz, Cultural Resources Department, THPO
Washoe Tribe of Nevada & California
919 Hwy 395 South
Gardnerville, NV 89410

Don Ryberg, Chairperson
Tsi Akim Maidu
P.O. Box 510
Browns Valley, CA 95918

Regina Cuellar, Chairperson
Shingle Springs Band of Miwok Indians
P.O. Box 1340
Shingle Springs, CA 95682

Clyde Prout, Chairman
Colfax-Todds Valley Consolidated Tribe
P.O. Box 4884
Auburn, CA 95604

Steven Hutchason, THPO
Wilton Rancheria
9728 Kent Street
Elk Grove, CA 95624

Dahlton Brown, Director of Admin.
9728 Kent Street
Elk Grove, CA 95624

Subject: Tribal Consultation Pursuant to SB 18 for Project #PL21-0162: INFILL PCL 3 & 100 – Sierra View Subdivision in the City of Roseville

---

The City of Roseville is processing an application for the above-referenced project, located in the northwestern portion of the City of Roseville. Recognizing the importance of tribal participation in the local planning process, the City is requesting your review of the project to determine if formal consultation is appropriate pursuant to Government Code Section 65352.3 (SB 18). Pursuant to Government Code Section 65352.3(a)(2) you have 90 days from receipt of this letter to respond.

The project description is attached to this letter.

The City looks forward to hearing from you. Should you have any questions, please send your written response by letter or by email to:

Mackenzie Harrison
311 Vernon Street
Roseville, CA 95678
msharrison@roseville.ca.us

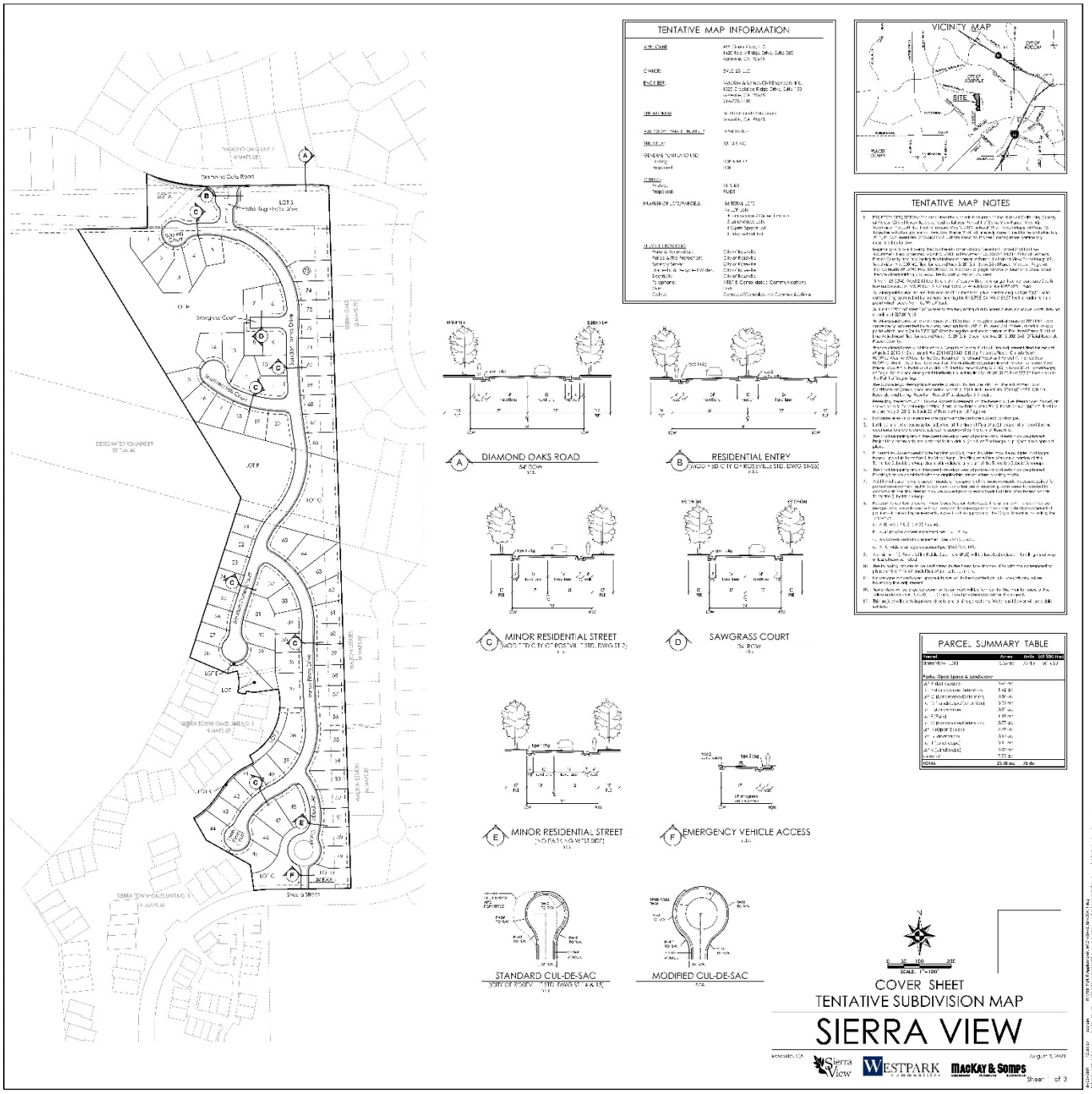
Project Description:

The project site is located at 360 Diamond Oaks Road, within the City's infill area. The site is approximately 23 acres and has a land use designation of Medium Density Residential (MDR) and a zoning designation of Multi-Family Residential (R3). The parcel has frontage on Diamond Oaks to the north and Shasta Street to the south and is adjacent to existing Low Density Residential (LDR) uses to the east and the Sierra View Country Club golf course and Medium Density Residential uses to the west.

The project includes a General Plan Amendment to change the land use designation from MDR to LDR, a Rezone to change the zoning designation from R3 to Small Lot Residential with modified Development Standards (RS/DS), and a Tentative Subdivision Map to subdivide the 23 acres into 75 MDR lots. A Tree Permit is also requested to remove 158 native oak trees. As part of the project, 95 units will be transferred from Infill Parcels 3 and 100 to Sierra Vista Specific Plan Parcels WB-31 (+32 units) and WB-41 (+63 units).

Aerial View of Project Site

Proposed Tentative Subdivision Map



TECHNICAL MEMORANDUM

TO: Allison Wathen, Mackay & Somps Civil Engineers, Inc.

PREPARED BY: Laney Nelson, Woodard & Curran

REVIEWED BY: Chris van Lienden, PE, Woodard & Curran

DATE: April 21, 2021

RE: Sierra View Country Club Sewer Capacity Evaluation

1. BACKGROUND

Woodard & Curran was asked to analyze the impacts of the proposed Sierra View Country Club proposed development on the City of Roseville's sewer system. The location of the proposed site is shown in Figure 1. The proposed development includes 77 single family units on parcel 015-011-029 (21.2 acres) in Roseville on previously undeveloped land. The development would discharge sewer flows into City-owned sewers to the north on Diamond Oaks Road and to the south on Shasta Street. A conceptual site plan is included in Appendix A.

Woodard & Curran recently updated the City of Roseville's sewer system model as part of the City's June 2017 Sewer Model Update [1](2017 Model Update). For the model update, the model was converted to the InfoWorks ICM software, which provides a fully-dynamic solution for modeling sanitary sewer systems. Pipeline information for all trunk sewers (pipes > 10-inches) was validated through review of record drawings while smaller diameter sewers were modeled based on pipe diameter and slope information in the City's GIS database. Recalibration was performed based on flow meter data collected during the 2015/2016 wet weather season, and future flows were estimated for 2050 and buildout land use conditions. Future flows did not include any flows from the location of the proposed development. Capacity improvements were not identified in the model update, though capacity limitations under the 10-year 24-hour design storm scenario were identified in the Church Street and Cedar Street areas as well as downstream of the SMD-2 meter on Old Auburn Road.

Subsequently, flows in the South Placer Wastewater Authority (SPWA) sewers were updated as part of the 2020 SPWA Systems Evaluation Update.

The purpose of this TM is to document whether the updated sewer model predicts that City and SPWA sewers will have capacity for the proposed development.

2. MODEL RESULTS & CONCLUSIONS

Wastewater flow projections for the proposed development were estimated based on the Average Dry Weather Flow (ADWF) unit flow factor of 190 gallons per day per dwelling unit (gpd/DU), resulting in an ADWF of 14,630 gpd. The flows were split into two subcatchments for the north development and the south development. The north development loads to the 12-inch sewer on Diamond Oaks Road and the south development loads to the 8-inch sewer on Shasta Street (Figure 1). For this analysis, a diurnal pattern was applied to the ADWF, as well as projected rainfall-dependent

[1] June 2017, City of Roseville Sewer Model Update Final Report, Woodard & Curran

infiltration and inflow (RDI/I) based on the City's standard 10-year 24-hour design event. Modeled flows from the proposed development are summarized in Table 1.

Table 1: Modeled Sierra View Country Club Sewer Loads

Development Site	Loading Manhole (Roseville Model/ SPWA Model)	Equivalent Dwelling Units (EDUs)	Average Dry Weather Flow (gpd)	Peak Wet Weather Flow (mgd)
North Development	SMH D05-013	72	13,680	0.0258
South Development	SMH D05-082/ SMH C05-055	5	950	0.0018
Total	**-**	**77**	**14,630**	**0.0276**

For this evaluation, simulations for four model scenarios have been run. A profile indicating model results under buildout conditions with the development are indicated in Figures 2 through 5. The hydraulic profile for the sewers downstream of the portion of the development loading to the north are shown in Figures 2 and 3. Figure 2 includes the City sewers from the development loading point at SMH D05-013 to the SPWA trunk connection at SMH F02-055, and Figure 3 shows the SPWA trunk sewers from SMH F02-055 to the Pleasant Grove Wastewater Treatment Plant. Figures 4 and 5 show the hydraulic profile for the sewers downstream of the portion of the development loading to the south. Figure 4 includes the City sewers from the development loading point at SMH D05-082 to the SPWA trunk connection at SMH B04-131 and Figure 5 shows the SPWA trunk sewers from SMH B04-131 to the Dry Creek Wastewater Treatment Plant. Model results indicating d/D performance for each pipe segment for all scenarios is included in Appendix B.

City of Roseville design standards specify that pipes 10-inch diameter or less should have maximum depth of flow under design conditions of 0.7 times the diameter (d/D < 0.7). Pipes larger than 10-inches should have a d/D < 1.0. As indicated in Figure 4 and Appendix B, there are some City pipe segments in the sewers south of the development that the model predicts will be flowing full under buildout conditions (d/D = 1). This is due to 4 pipe segments where the full pipe capacity is less than the predicted peak wet weather flow (d/D indicated as "2" in the table, and are highlighted yellow). The model predicts no surcharge in the sewers north of the proposed development.

City design standards are typically applied to the design of new sewers. For existing sewers, it may be appropriate to use a less strict criteria, such as a minimum depth of freeboard, particularly when using a relatively conservative 10-year design event. However, the sewers projected to be surcharging are relatively shallow, resulting in freeboard of less than 2 feet in some locations. This surcharge occurs only under the buildout scenarios; under existing scenarios, no surcharge is predicted with or without the proposed development. To relieve the surcharge, pipe upsizes of approximately 2,300 feet may be needed (including about 500 feet of 12-inch upsized to 15-inch, and 1,800 feet of 10-inch upsized to 12-inch). Surcharge is not predicted under the existing scenario even with the proposed development; therefore, upsizing sewers is not needed at this time.

SPWA design standards from the Systems Evaluation indicate that surcharging up to within 5 feet of the manhole rims (ground surface) is considered acceptable under 10-year design storm PWWF, as long as the surcharge (flow height in the manhole) does not exceed 4 feet from the top of the pipe up the manhole. Based on this criteria, the modeled results of buildout conditions indicates no capacity issues from the proposed development in downstream SPWA sewers.

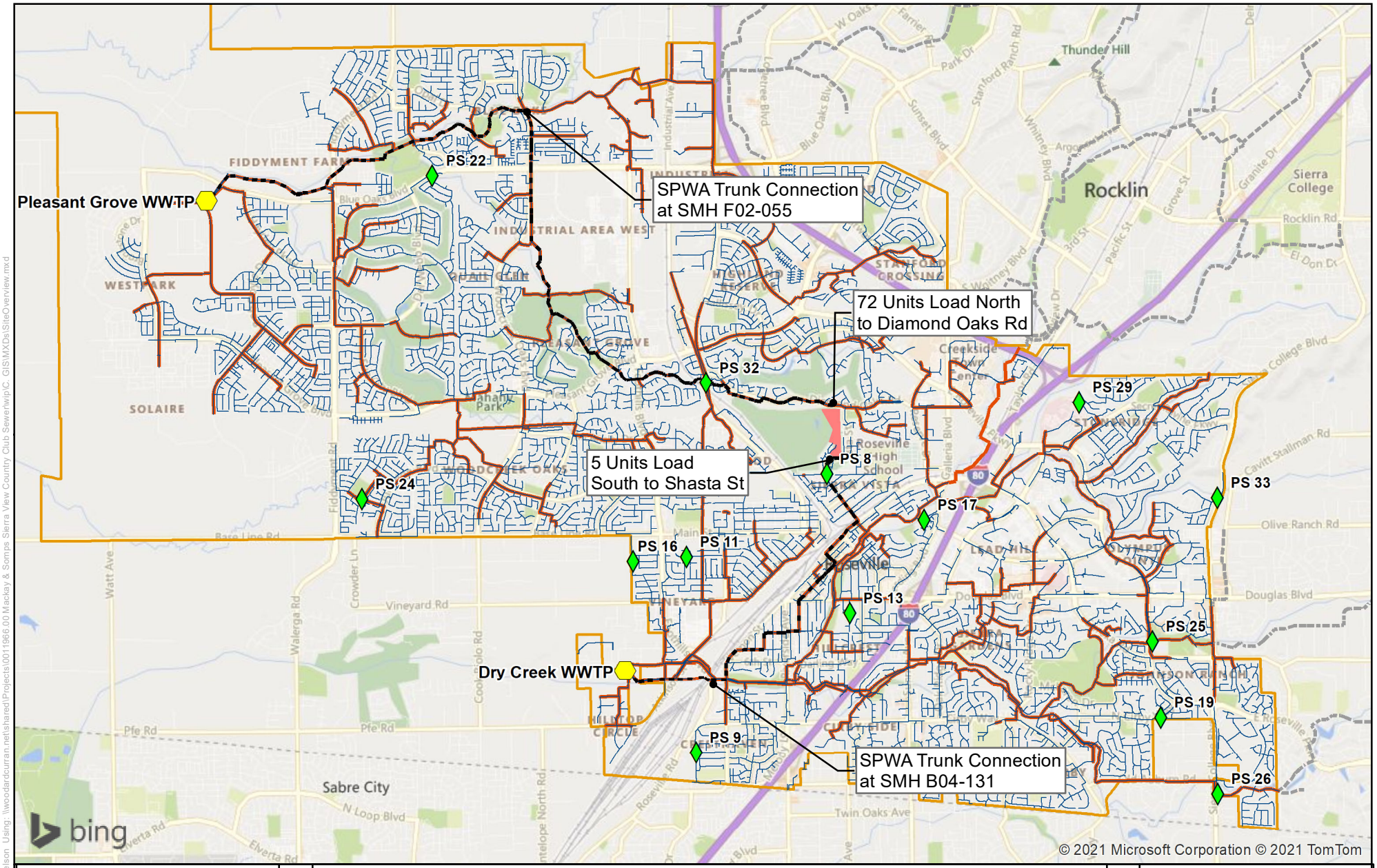

Pleasant Grove WWTP
Dry Creek WWTP
PS 22
PS 32
PS 8
PS 24
PS 16
PS 11
PS 17
PS 13
PS 9
PS 29
PS 33
PS 25
PS 19
PS 26
SPWA Trunk Connection at SMH F02-055
72 Units Load North to Diamond Oaks Rd
5 Units Load South to Shasta St
SPWA Trunk Connection at SMH B04-131
Rocklin
Roseville
Sabre City
Thunder Hill
Sierra College
FIDDYMENT FARM
INDUSTRIAL AREA WEST
WESTPARK
SOLAIRE
Roseville High School
Creekside Town Center
Olive Ranch Rd
Douglas Blvd
Vineyard Rd
Pfe Rd
Twin Oaks Ave
Cavitt Stallman Rd
Rocklin Rd
Blue Oaks Blvd
Sunset Blvd
Stanford Ranch Rd
Whitney Blvd
Pacific St
Grove St
Granite Dr
Galleria Blvd
Watt Ave
Walerga Rd
Crowder Ln
Cooperstown Rd
Antelope North Rd
Roseville Rd
Elverta Rd
N Loop Blvd
Bass Lake Rd
Industrial Ave
Farrier Ln
Park Dr
Stanford Ranch Rd
Blue Oaks Blvd
Sunset Blvd
Whitney Blvd
Argonne Dr
Granite Dr
Grove St
Pacific St
3rd St
El Don Dr
College Blvd
Cavitt Stallman Rd
Olive Ranch Rd
Douglas Blvd
Vineyard Rd
Pfe Rd
Twin Oaks Ave
Roseville Rd
Antelope North Rd
Cooperstown Rd
Crowder Ln
Walerga Rd
Watt Ave

Figure 2 –Hydraulic Profile (North City Sewers from SMH D05-013 to SMH F02-055)

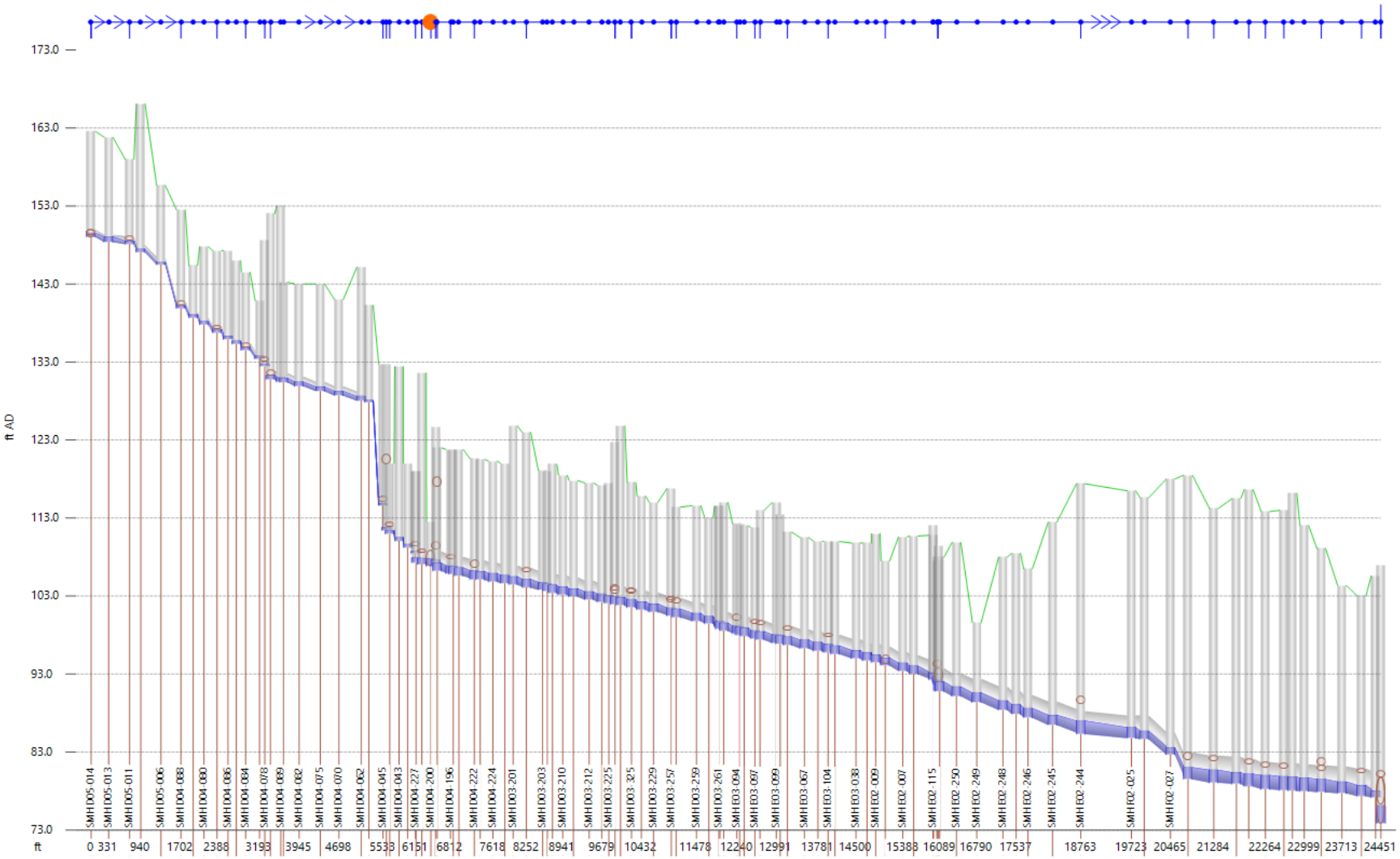


Figure 3 –Hydraulic Profile (North SPWA Sewers from SMH F02-055 to Pleasant Grove WWTP)

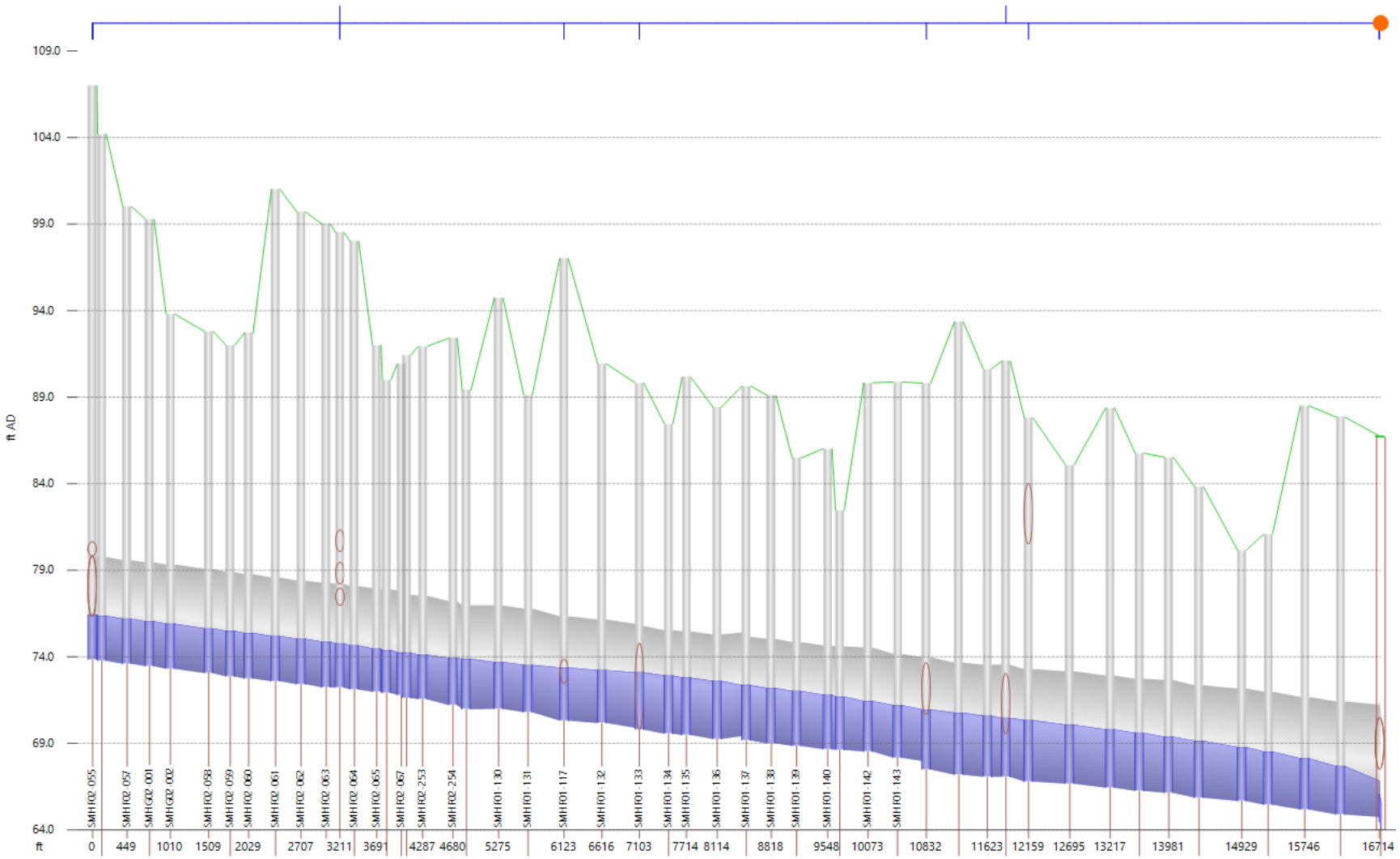


Figure 4 –Hydraulic Profile (South City Sewers from SMH D05-090 to SMH B04-131)

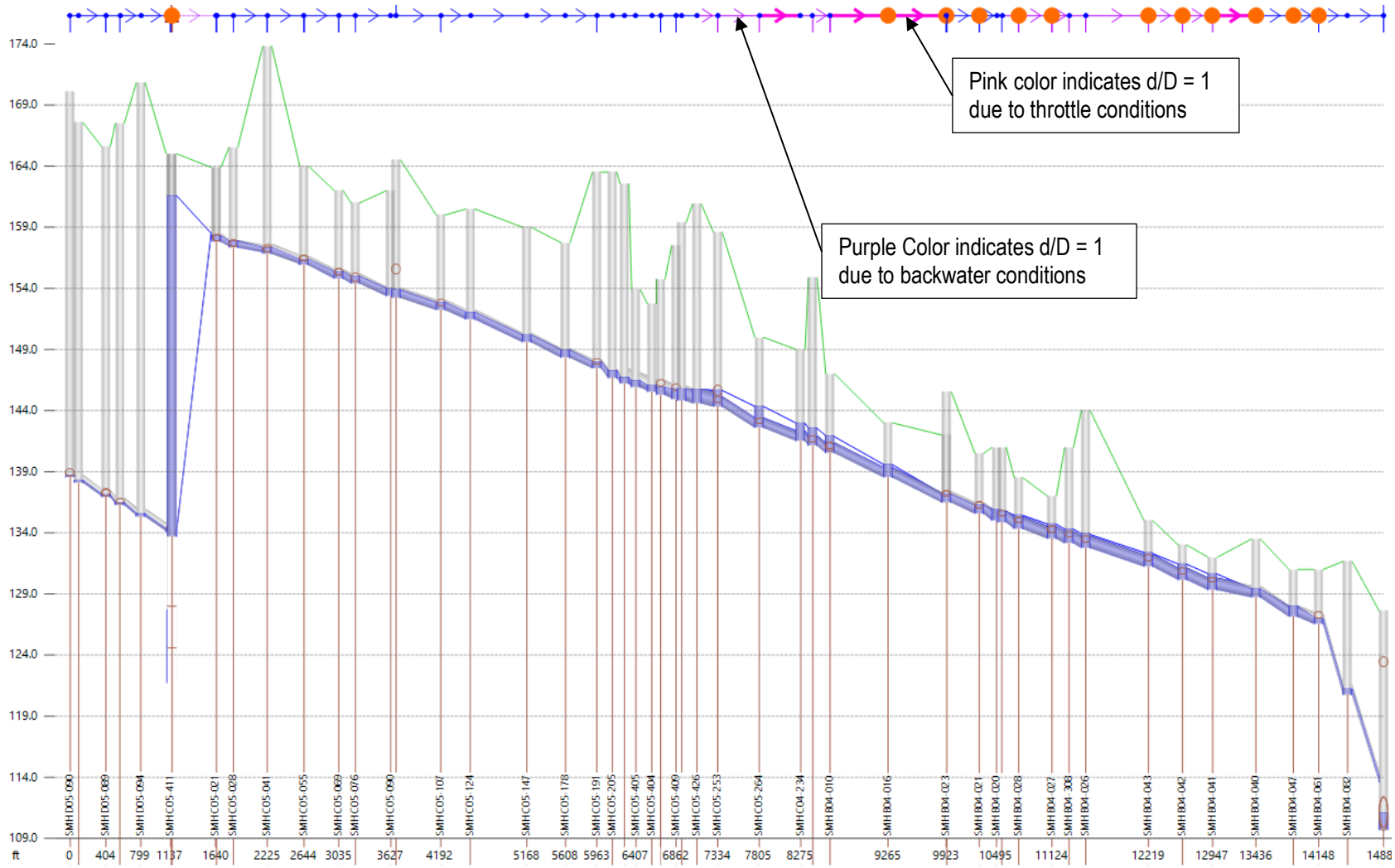
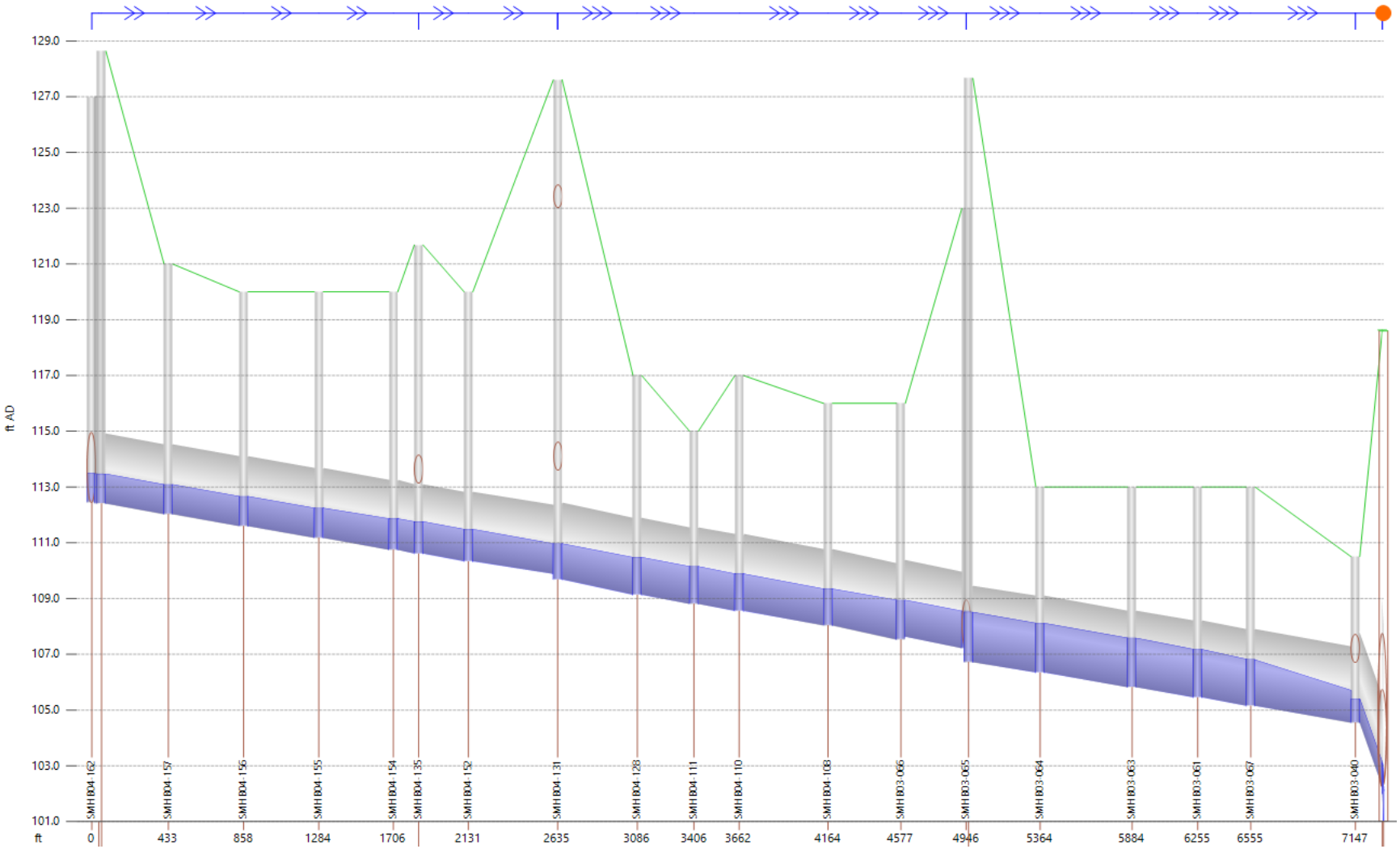
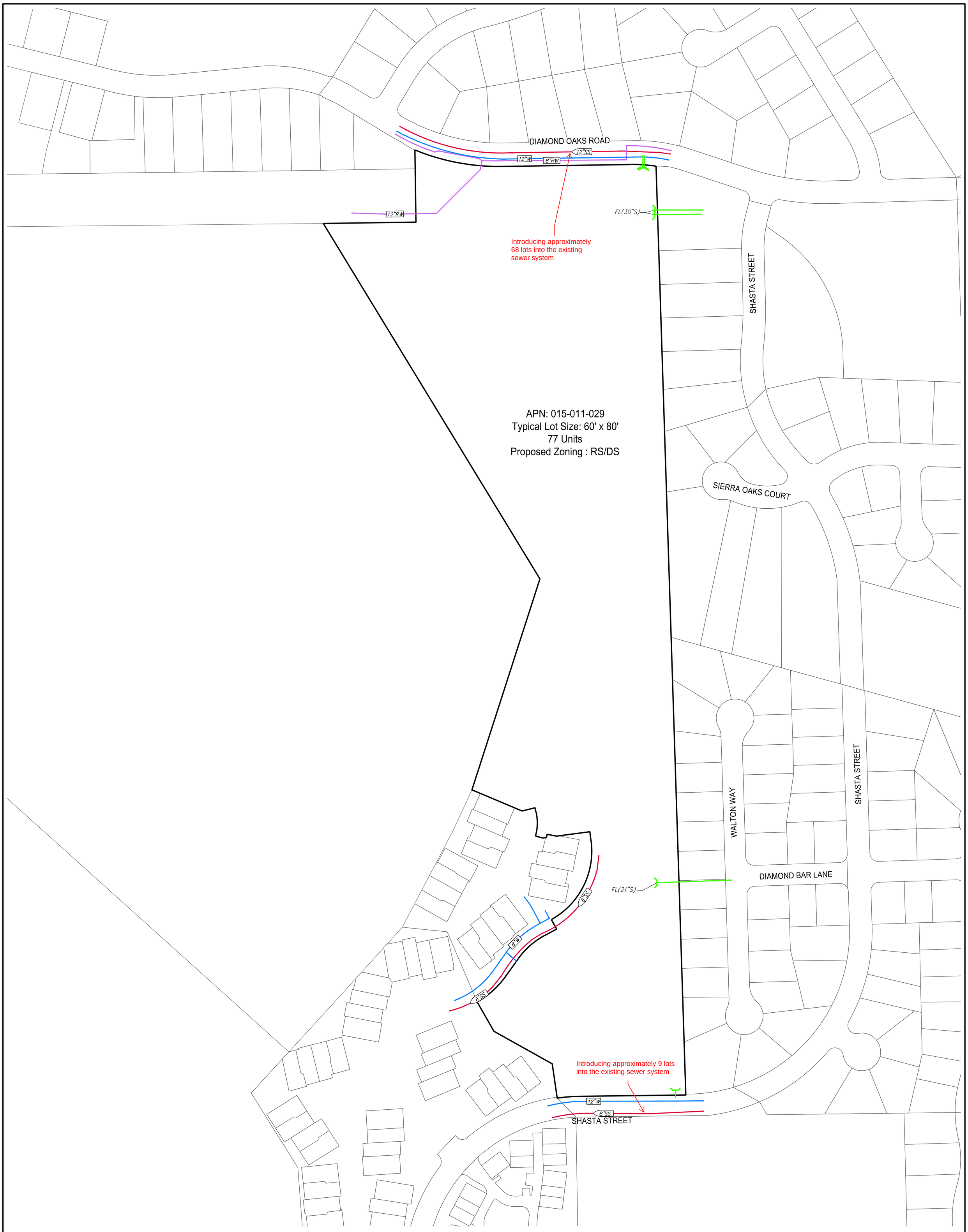


Figure 5 –Hydraulic Profile (South SPWA Sewers from SMH B04-131 to Dry Creek WWTP)



APPENDIX A – SEWER FACILITY MAP



N

0 50 100 200

SCALE: 1"=100'

EXISTING UTILITIES MAP

SIERRA VIEW

Roseville, CA

March 23, 2021

WESTPARK communities

MACKAY & SOMPS ENGINEERS PLANNERS SURVEYORS

J-23-2021 08:31:54 bborgen P:\18512\PLN\Exh-P\SierraView_ExistingUtilities.dwg
[1] P:\18512\SRV\Topo\Aerial\D-TP-FLD-SV-OC.dwg [2] P:\18512\SRV\Topo\Wetlands\SV_Wetlands.dwg [3] P:\18512\PLN\Exh-P\TreeData\SV_Trees.dwg [4] P:\18512\SRV\Stake\Topo-Rd\SierraView Sup Tp1.dwg [5] P:\18512\SRV\CS\Received\Brady\BNDY 2020-07-21.dwg

Constraints Map 18512

APPENDIX B – MODEL RESULTS

Model Results (Pipes with insufficient capacity highlighted yellow)

From MH ID	To MH ID	Pipe Dia. (in)	Pipe Length (ft)	Pipe Slope (%)	Pipe Load: d/D (1 indicates backwater surcharge, 2 indicates insufficient pipe capacity)			
					1. Existing	2. Existing + Proposed Development	3. Buildout	4. Buildout + Proposed Development
City Sewers								
SMH D05-014	SMH D05-013	12	331	0.2	0.55	0.57	0.62	0.64
SMH D05-013	SMH D05-011	12	398	0.1	0.55	0.57	0.62	0.64
SMH D05-011	SMH D05-007	12	211	0.4	0.35	0.36	0.39	0.4
SMH D05-007	SMH D05-006	12	384	0.4	0.35	0.36	0.39	0.4
SMH D05-006	SMH D04-088	12	378	1.5	0.34	0.35	0.37	0.38
SMH D04-088	SMH D04-081	12	233	0.5	0.36	0.37	0.4	0.41
SMH D04-081	SMH D04-080	12	204	0.4	0.36	0.37	0.4	0.41
SMH D04-080	SMH D04-087	12	249	0.4	0.36	0.37	0.41	0.42
SMH D04-087	SMH D04-086	12	206	0.4	0.37	0.38	0.42	0.42
SMH D04-086	SMH D04-085	12	159	0.4	0.37	0.38	0.42	0.42
SMH D04-085	SMH D04-084	12	177	0.5	0.39	0.4	0.43	0.44
SMH D04-084	SMH D04-083	12	263	0.4	0.39	0.4	0.43	0.44
SMH D04-083	SMH D04-078	12	100	1.0	0.32	0.32	0.35	0.35
SMH D04-078	SMH D04-077	15	106	1.6	0.38	0.39	0.43	0.43
SMH D04-077	SMH D04-089	15	198	0.2	0.38	0.39	0.43	0.43
SMH D04-089	SMH D04-426	15	50	0.2	0.38	0.39	0.43	0.43
SMH D04-426	SMH D04-082	15	298	0.2	0.38	0.39	0.43	0.44
SMH D04-082	SMH D04-075	15	400	0.2	0.38	0.39	0.43	0.44
SMH D04-075	SMH D04-070	15	353	0.2	0.39	0.4	0.44	0.44
SMH D04-070	SMH D04-062	15	421	0.2	0.39	0.4	0.44	0.44
SMH D04-062	SMH D04-052	15	146	0.2	0.37	0.38	0.42	0.42
SMH D04-052	SMH D04-045	15	268	4.9	0.2	0.2	0.21	0.21
SMH D04-045	SMH D04-036	15	64	4.9	0.29	0.29	0.32	0.32
SMH D04-036	SMH D04-044	18	64	0.7	0.26	0.27	0.29	0.29
SMH D04-044	SMH D04-043	18	176	0.5	0.26	0.27	0.29	0.29
SMH D04-043	SMH D04-042	18	164	0.5	0.26	0.27	0.29	0.29
SMH D04-042	SMH D04-227	18	150	0.5	0.26	0.27	0.29	0.29
SMH D04-227	SMH D04-226	18	10	6.9	0.17	0.17	0.18	0.18
SMH D04-226	SMH D04-199	24	110	0.1	0.29	0.3	0.34	0.34
SMH D04-199	SMH D04-200	24	170	0.1	0.42	0.42	0.47	0.47
SMH D04-200	SMH D04-201	24	87	0.1	0.42	0.42	0.47	0.47
SMH D04-201	SMH D04-408	24	33	0.1	0.38	0.38	0.43	0.43

From MH ID	To MH ID	Pipe Dia. (in)	Pipe Length (ft)	Pipe Slope (%)	Pipe Load: d/D (1 indicates backwater surcharge, 2 indicates insufficient pipe capacity)			
					1. Existing	2. Existing + Proposed Development	3. Buildout	4. Buildout + Proposed Development
SMH D04-408	SMH D04-196	30	251	0.1	0.36	0.36	0.4	0.4
SMH D04-196	SMH D04-241	30	53	0.1	0.36	0.36	0.4	0.4
SMH D04-241	SMH D04-197	30	108	0.1	0.35	0.35	0.39	0.39
SMH D04-197	SMH D04-222	30	292	0.1	0.36	0.37	0.41	0.41
SMH D04-222	SMH D04-223	30	112	0.0	0.41	0.41	0.45	0.46
SMH D04-223	SMH D04-224	30	241	0.1	0.37	0.37	0.42	0.42
SMH D04-224	SMH D03-200	30	225	0.1	0.37	0.37	0.42	0.42
SMH D03-200	SMH D03-201	30	158	0.1	0.37	0.37	0.42	0.42
SMH D03-201	SMH D03-202	30	251	0.1	0.36	0.36	0.41	0.41
SMH D03-202	SMH D03-203	30	308	0.1	0.37	0.37	0.41	0.41
SMH D03-203	SMH D03-204	30	89	0.1	0.34	0.34	0.37	0.38
SMH D03-204	SMH D03-205	30	99	0.1	0.34	0.34	0.38	0.38
SMH D03-205	SMH D03-210	30	193	0.1	0.36	0.36	0.4	0.41
SMH D03-210	SMH D03-211	30	203	0.1	0.36	0.36	0.4	0.4
SMH D03-211	SMH D03-212	30	297	0.1	0.36	0.36	0.4	0.4
SMH D03-212	SMH D03-213	30	238	0.1	0.36	0.36	0.41	0.41
SMH D03-213	SMH D03-225	30	136	0.1	0.36	0.36	0.41	0.41
SMH D03-225	SMH D03-226	30	119	0.1	0.36	0.36	0.41	0.41
SMH D03-226	SMH D03-227	30	103	0.1	0.36	0.36	0.41	0.41
SMH D03-227	SMH D03-325	30	207	0.1	0.36	0.36	0.41	0.41
SMH D03-325	SMH D03-228	30	188	0.1	0.36	0.36	0.4	0.41
SMH D03-228	SMH D03-229	30	231	0.1	0.37	0.37	0.42	0.42
SMH D03-229	SMH D03-257	30	335	0.1	0.37	0.37	0.41	0.41
SMH D03-257	SMH D03-258	30	94	0.1	0.36	0.36	0.4	0.4
SMH D03-258	SMH D03-259	30	386	0.1	0.37	0.37	0.42	0.42
SMH D03-259	SMH D03-260	30	234	0.2	0.35	0.35	0.39	0.39
SMH D03-260	SMH D03-261	30	189	0.1	0.34	0.34	0.37	0.37
SMH D03-261	SMH D03-262	30	21	1.0	0.3	0.3	0.33	0.33
SMH D03-262	SMH D03-263	30	71	0.1	0.34	0.34	0.37	0.37
SMH D03-263	SMH E03-094	30	247	0.2	0.35	0.35	0.39	0.39
SMH E03-094	SMH E03-093	30	55	0.1	0.34	0.34	0.38	0.38
SMH E03-093	SMH E03-096	30	88	0.1	0.36	0.37	0.41	0.41
SMH E03-096	SMH E03-097	30	201	0.1	0.36	0.37	0.41	0.41
SMH E03-097	SMH E03-098	30	96	0.1	0.38	0.38	0.42	0.42

From MH ID	To MH ID	Pipe Dia. (in)	Pipe Length (ft)	Pipe Slope (%)	Pipe Load: d/D (1 indicates backwater surcharge, 2 indicates insufficient pipe capacity)			
					1. Existing	2. Existing + Proposed Development	3. Buildout	4. Buildout + Proposed Development
SMH E03-098	SMH E03-099	30	311	0.1	0.38	0.38	0.42	0.43
SMH E03-099	SMH E03-079	30	72	0.1	0.38	0.38	0.42	0.43
SMH E03-079	SMH E03-101	30	136	0.1	0.38	0.38	0.43	0.43
SMH E03-101	SMH E03-067	30	325	0.1	0.39	0.39	0.43	0.43
SMH E03-067	SMH E03-058	30	257	0.1	0.39	0.39	0.43	0.43
SMH E03-058	SMH E03-104	30	191	0.1	0.4	0.4	0.44	0.44
SMH E03-104	SMH E03-050	30	130	0.1	0.37	0.38	0.42	0.42
SMH E03-050	SMH E03-038	30	398	0.1	0.37	0.37	0.42	0.42
SMH E03-038	SMH E03-107	30	209	0.1	0.37	0.37	0.42	0.42
SMH E03-107	SMH E02-009	30	166	0.1	0.36	0.36	0.41	0.41
SMH E02-009	SMH E02-008	30	182	0.1	0.35	0.36	0.39	0.39
SMH E02-008	SMH E02-007	30	331	0.2	0.37	0.37	0.41	0.41
SMH E02-007	SMH E02-006	30	207	0.1	0.37	0.37	0.41	0.41
SMH E02-006	SMH E02-115	30	366	0.1	0.37	0.37	0.41	0.41
SMH E02-115	SMH E02-114	30	10	0.1	0.3	0.3	0.33	0.33
SMH E02-114	SMH E02-011	30	63	0.2	0.31	0.31	0.35	0.35
SMH E02-011	SMH E02-252	36	15	1.4	0.19	0.19	0.21	0.21
SMH E02-252	SMH E02-329	36	9	9.3	0.31	0.32	0.4	0.4
SMH E02-329	SMH E02-251	36	31	0.2	0.31	0.31	0.4	0.4
SMH E02-251	SMH E02-250	36	317	0.2	0.31	0.31	0.4	0.4
SMH E02-250	SMH E02-249	36	384	0.2	0.31	0.31	0.4	0.4
SMH E02-249	SMH E02-248	36	497	0.2	0.31	0.31	0.4	0.4
SMH E02-248	SMH E02-247	36	250	0.2	0.31	0.31	0.4	0.4
SMH E02-247	SMH E02-246	36	225	0.2	0.31	0.31	0.4	0.4
SMH E02-246	SMH E02-245	36	466	0.2	0.32	0.32	0.41	0.41
SMH E02-245	SMH E02-244	36	535	0.2	0.37	0.37	0.49	0.49
SMH E02-244	SMH F02-025	36	960	0.1	0.44	0.44	0.56	0.56
SMH F02-025	SMH F02-026	36	243	0.0	0.37	0.37	0.46	0.46
SMH F02-026	SMH F02-027	36	499	0.4	0.27	0.27	0.34	0.34
SMH F02-027	SMH F02-028	36	332	0.8	0.22	0.22	0.33	0.33
SMH F02-028	SMH F02-029	42	487	0.1	0.37	0.37	0.46	0.46
SMH F02-029	SMH F02-030	42	430	0.0	0.37	0.37	0.46	0.46
SMH F02-030	SMH F02-031	42	232	0.1	0.34	0.34	0.44	0.44
SMH F02-031	SMH F02-069	42	318	0.1	0.41	0.41	0.51	0.51

From MH ID	To MH ID	Pipe Dia. (in)	Pipe Length (ft)	Pipe Slope (%)	Pipe Load: d/D (1 indicates backwater surcharge, 2 indicates insufficient pipe capacity)			
					1. Existing	2. Existing + Proposed Development	3. Buildout	4. Buildout + Proposed Development
SMH F02-069	SMH F02-070	42	349	0.0	0.41	0.41	0.51	0.51
SMH F02-070	SMH F02-071	42	163	0.0	0.4	0.4	0.5	0.5
SMH F02-071	SMH F02-072	42	223	0.0	0.39	0.39	0.49	0.49
SMH F02-072	SMH F02-073	42	323	0.0	0.39	0.39	0.48	0.48
SMH F02-073	SMH F02-074	42	391	0.0	0.38	0.38	0.46	0.46
SMH F02-074	SMH F02-075	42	372	0.1	0.33	0.33	0.41	0.41
SMH F02-075	SMH F02-077	42	267	0.1	0.31	0.31	0.38	0.38
SMH F02-077	SMH F02-055	42	99	0.9	0.2	0.2	0.24	0.24
City Sewers (South)								
SMH D05-090	SMH D05-082	8	95	0.4	0.29	0.29	0.3	0.3
SMH D05-082	SMH D05-089	8	309	0.4	0.29	0.3	0.3	0.3
SMH D05-089	SMH D05-256	8	159	0.4	0.3	0.31	0.33	0.33
SMH D05-256	SMH D05-094	8	236	0.4	0.3	0.31	0.33	0.34
SMH D05-094	SMH C05-411	8	338	0.4	0.31	0.31	0.34	0.34
SMH C05-411	SMH C05-287	10	10	0.3	0.29	0.29	0.31	0.31
TEE C05-428	SMH C05-021	6	493	-4.9	1	1	1	1
SMH C05-021	SMH C05-020	8	10	0.5	0.64	0.65	0.65	0.56
SMH C05-020	SMH C05-028	8	192	0.2	0.78	0.79	0.8	0.7
SMH C05-028	SMH C05-041	8	383	0.1	0.84	0.88	0.89	0.84
SMH C05-041	SMH C05-055	10	419	0.2	0.57	0.6	0.61	0.6
SMH C05-055	SMH C05-069	10	391	0.3	0.66	0.68	0.72	0.72
SMH C05-069	SMH C05-076	10	191	0.2	0.65	0.68	0.71	0.71
SMH C05-076	SMH C05-090	10	401	0.3	0.72	0.74	0.79	0.79
SMH C05-090	SMH C05-089	10	60	0.2	0.7	0.72	0.76	0.76
SMH C05-089	SMH C05-107	10	505	0.2	0.7	0.71	0.75	0.75
SMH C05-107	SMH C05-124	10	336	0.2	0.68	0.7	0.73	0.74
SMH C05-124	SMH C05-147	10	640	0.3	0.65	0.65	0.71	0.71
SMH C05-147	SMH C05-178	10	440	0.3	0.71	0.73	0.78	0.78
SMH C05-178	SMH C05-191	10	355	0.2	0.69	0.7	0.74	0.75
SMH C05-191	SMH C05-205	10	177	0.4	0.65	0.66	0.73	0.73
SMH C05-205	SMH C05-206	10	135	0.3	0.64	0.65	0.72	0.72
SMH C05-206	SMH C05-405	16	132	0.2	0.36	0.37	0.39	0.39
SMH C05-405	SMH C05-404	15	179	0.2	0.41	0.41	0.44	0.44
SMH C05-404	SMH C05-403	15	101	0.1	0.39	0.4	0.43	0.43

From MH ID	To MH ID	Pipe Dia. (in)	Pipe Length (ft)	Pipe Slope (%)	Pipe Load: d/D (1 indicates backwater surcharge, 2 indicates insufficient pipe capacity)			
					1. Existing	2. Existing + Proposed Development	3. Buildout	4. Buildout + Proposed Development
SMH C05-403	SMH C05-409	15	175	0.2	0.41	0.41	0.61	0.62
SMH C05-409	SMH C05-385	15	63	0.2	0.44	0.45	0.75	0.77
SMH C05-385	SMH C05-426	15	173	0.1	0.44	0.45	0.88	0.9
SMH C05-426	SMH C05-253	15	236	0.1	0.44	0.44	1	1
SMH C05-253	SMH C05-264	10	471	0.4	0.78	0.79	1	1
SMH C05-264	SMH C04-234	10	470	0.2	0.77	0.78	2	2
SMH C04-234	SMH B04-303	10	137	0.3	0.71	0.71	1	1
SMH B04-303	SMH B04-010	10	197	0.3	0.74	0.75	1	1
SMH B04-010	SMH B04-016	10	656	0.3	0.73	0.73	2	2
SMH B04-016	SMH B04-023	10	658	0.3	0.75	0.75	2	2
SMH B04-023	SMH B04-022	12	8	0.0	0.61	0.61	0.68	0.69
SMH B04-022	SMH B04-021	12	370	0.3	0.58	0.58	0.73	0.73
SMH B04-021	SMH B04-020	12	194	0.3	0.64	0.64	0.95	0.96
SMH B04-020	SMH B04-029	12	61	0.2	0.62	0.63	0.95	0.96
SMH B04-029	SMH B04-028	12	190	0.3	0.67	0.68	1	1
SMH B04-028	SMH B04-027	12	378	0.2	0.7	0.7	1	1
SMH B04-027	SMH B04-308	12	193	0.2	0.7	0.7	1	1
SMH B04-308	SMH B04-026	12	190	0.2	0.72	0.73	1	1
SMH B04-026	SMH B04-043	12	712	0.2	0.7	0.7	1	1
SMH B04-043	SMH B04-042	12	386	0.3	0.74	0.76	1	1
SMH B04-042	SMH B04-041	12	342	0.2	0.98	0.99	1	1
SMH B04-041	SMH B04-040	12	489	0.1	0.98	0.99	2	2
SMH B04-040	SMH B04-047	12	426	0.4	0.73	0.73	0.85	0.85
SMH B04-047	SMH B04-061	12	286	0.2	0.72	0.72	0.84	0.84
SMH B04-061	SMH B04-082	12	328	1.8	0.42	0.42	0.45	0.45
SMH B04-082	SMH B04-131	12	408	1.8	0.42	0.42	0.45	0.45
SPWA Sewers (North)								
SMH F02-055	SMH F02-056	72	120	0.1	0.360	0.36	0.43	0.43
SMH F02-056	SMH F02-057	72	329	0.1	0.360	0.36	0.43	0.43
SMH F02-057	SMH G02-001	72	292	0.0	0.360	0.36	0.43	0.43
SMH G02-001	SMH G02-002	72	269	0.1	0.360	0.36	0.43	0.43
SMH G02-002	SMH F02-058	72	499	0.1	0.350	0.35	0.43	0.43
SMH F02-058	SMH F02-059	72	280	0.1	0.360	0.36	0.43	0.43
SMH F02-059	SMH F02-060	72	240	0.1	0.360	0.36	0.43	0.43

From MH ID	To MH ID	Pipe Dia. (in)	Pipe Length (ft)	Pipe Slope (%)	Pipe Load: d/D (1 indicates backwater surcharge, 2 indicates insufficient pipe capacity)			
					1. Existing	2. Existing + Proposed Development	3. Buildout	4. Buildout + Proposed Development
SMH F02-060	SMH F02-061	72	349	0.0	0.360	0.36	0.43	0.43
SMH F02-061	SMH F02-062	72	329	0.1	0.360	0.36	0.43	0.43
SMH F02-062	SMH F02-063	72	329	0.1	0.360	0.36	0.43	0.43
SMH F02-063	SMH F02-049	72	175	0.0	0.360	0.36	0.43	0.43
SMH F02-049	SMH F02-064	72	190	0.1	0.350	0.35	0.42	0.42
SMH F02-064	SMH F02-065	72	290	0.0	0.340	0.35	0.42	0.42
SMH F02-065	SMH F02-066	72	129	0.1	0.340	0.34	0.41	0.41
SMH F02-066	SMH F02-067	72	189	0.0	0.330	0.33	0.41	0.41
SMH F02-067	SMH F02-068	72	70	0.2	0.350	0.35	0.43	0.43
SMH F02-068	SMH F02-253	72	208	0.0	0.350	0.35	0.43	0.43
SMH F02-253	SMH F02-254	72	393	0.1	0.360	0.36	0.45	0.45
SMH F02-254	SMH F02-255	72	177	0.1	0.380	0.38	0.48	0.48
SMH F02-255	SMH F01-130	72	418	0.0	0.380	0.38	0.48	0.48
SMH F01-130	SMH F01-131	72	381	0.1	0.350	0.35	0.45	0.45
SMH F01-131	SMH F01-117	72	467	0.1	0.380	0.38	0.51	0.51
SMH F01-117	SMH F01-132	72	493	0.0	0.380	0.38	0.51	0.51
SMH F01-132	SMH F01-133	72	487	0.1	0.360	0.36	0.53	0.53
SMH F01-133	SMH F01-134	72	379	0.1	0.390	0.39	0.56	0.56
SMH F01-134	SMH F01-135	72	232	0.0	0.390	0.39	0.56	0.56
SMH F01-135	SMH F01-136	72	400	0.1	0.390	0.39	0.55	0.55
SMH F01-136	SMH F01-137	72	378	0.0	0.390	0.39	0.55	0.55
SMH F01-137	SMH F01-138	72	326	0.0	0.370	0.37	0.53	0.53
SMH F01-138	SMH F01-139	72	326	0.0	0.370	0.37	0.53	0.53
SMH F01-139	SMH F01-140	72	404	0.0	0.370	0.37	0.52	0.52
SMH F01-140	SMH F01-141	72	158	0.0	0.370	0.37	0.52	0.52
SMH F01-141	SMH F01-142	72	367	0.0	0.360	0.36	0.51	0.51
SMH F01-142	SMH F01-143	72	384	0.1	0.360	0.36	0.5	0.5
SMH F01-143	SMH F01-144	72	375	0.1	0.360	0.36	0.5	0.5
SMH F01-144	SMH F01-145	78	421	0.1	0.410	0.41	0.55	0.55
SMH F01-145	SMH F99-001	78	370	0.0	0.410	0.41	0.55	0.55
SMH F99-001	SMH F99-002	78	242	0.0	0.410	0.41	0.54	0.54
SMH F99-002	SMH F99-004	78	294	0.1	0.410	0.41	0.54	0.54
SMH F99-004	SMH F99-006	78	536	0.0	0.410	0.41	0.54	0.54
SMH F99-006	SMH F99-007	78	522	0.0	0.390	0.39	0.52	0.52

From MH ID	To MH ID	Pipe Dia. (in)	Pipe Length (ft)	Pipe Slope (%)	Pipe Load: d/D (1 indicates backwater surcharge, 2 indicates insufficient pipe capacity)			
					1. Existing	2. Existing + Proposed Development	3. Buildout	4. Buildout + Proposed Development
SMH F99-007	SMH F99-008	78	382	0.0	0.390	0.39	0.51	0.51
SMH F99-008	SMH F99-009	78	382	0.0	0.390	0.39	0.51	0.51
SMH F99-009	SMH F99-010	78	392	0.1	0.380	0.38	0.5	0.5
SMH F99-010	SMH F99-011	78	556	0.0	0.380	0.38	0.5	0.5
SMH F99-011	SMH F99-012	78	342	0.1	0.360	0.36	0.48	0.48
SMH F99-012	SMH F99-079	78	475	0.1	0.360	0.36	0.47	0.47
SMH F99-079	SMH F99-013	78	464	0.1	0.350	0.35	0.45	0.45
SMH F99-013	SMH F99-016	78	504	0.0	0.330	0.33	0.42	0.42
SMH F99-016	F99-016D1	84	20	2.4	0.160	0.16	0.22	0.22
SPWA Sewers (South)								
SMH B04-162	SMH B04-161	30	40	0.1	0.36	0.36	0.42	0.42
SMH B04-161	SMH B04-160	30	15	0.1	0.36	0.36	0.42	0.42
SMH B04-160	SMH B04-157	30	378	0.1	0.36	0.36	0.42	0.42
SMH B04-157	SMH B04-156	30	425	0.1	0.36	0.36	0.42	0.42
SMH B04-156	SMH B04-155	30	426	0.1	0.37	0.37	0.42	0.42
SMH B04-155	SMH B04-154	30	422	0.1	0.4	0.4	0.44	0.44
SMH B04-154	SMH B04-135	30	143	0.1	0.42	0.42	0.46	0.46
SMH B04-135	SMH B04-152	30	282	0.1	0.43	0.43	0.46	0.46
SMH B04-152	SMH B04-131	30	504	0.1	0.43	0.43	0.46	0.46
SMH B04-131	SMH B04-128	33	451	0.1	0.47	0.47	0.49	0.49
SMH B04-128	SMH B04-111	33	320	0.1	0.47	0.47	0.49	0.49
SMH B04-111	SMH B04-110	33	256	0.1	0.47	0.47	0.48	0.48
SMH B04-110	SMH B04-108	33	502	0.1	0.46	0.46	0.48	0.48
SMH B04-108	SMH B03-066	33	413	0.1	0.49	0.49	0.51	0.51
SMH B03-066	SMH B03-065	33	369	0.1	0.47	0.47	0.48	0.48
SMH B03-065	SMH B03-053	33	13	3.8	0.64	0.64	0.65	0.65
SMH B03-053	SMH B03-064	33	405	0.1	0.63	0.63	0.65	0.65
SMH B03-064	SMH B03-063	33	520	0.1	0.62	0.62	0.64	0.64
SMH B03-063	SMH B03-061	33	371	0.1	0.62	0.62	0.64	0.64
SMH B03-061	SMH B03-067	33	300	0.1	0.6	0.6	0.62	0.62
SMH B03-067	SMH B03-040	33	592	0.1	0.58	0.58	0.6	0.6
SMH B03-040	CAP B03-DCWWTP	39	152	1.5	0.25	0.25	0.26	0.26
CAP B03-DCWWTP	B03-DCWWTPD1	84	7	14.3	0.14	0.14	0.16	0.16

CITY OF ROSEVILLE CALIFORNIA

DEVELOPMENT SERVICES DEPARTMENT–PLANNING DIVISION

311 Vernon St, Roseville, CA 95678 (916) 774-5276

MITIGATION MONITORING AND REPORTING PROGRAM

Project Title/File Number:	Sierra View (SV) Redesignation and Rezoning Project / File No. PL21-0162
Project Location:	360 Diamond Oaks Road, Roseville, CA 95678 (APN 015-011-029-000)
Project Description:	The SV project consists of amending the General Plan designation and modifying the zoning for a portion of Infill Planning Parcel 100 (northern part) from Medium Density Residential to Low Density Residential and from R3 to RS/DS and modifying the zoning for a portion of Infill Planning Parcel 3 (southern part) from R1 to RS/DS. Other approvals and entitlements from the City include a Tentative Subdivision Map for 75 residential units that reduces the number of residential units approved for the project site from 223 to 130 and a tree permit.
Environmental Document:	Mitigated Negative Declaration
Project Applicant:	WP Sierra View, LLC Contact: John Tallman
Property Owner:	SVLC 23, LLC
Lead Agency Contact:	Kinarik Shallow, Associate Planner, (916) 746-1309

Section 21081.6 of the California Public Resources Code requires public agencies to "adopt a reporting and monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." This Mitigation Monitoring and Reporting Program has been adopted for the purpose of avoiding environmental impacts.

MONITORING PROCESS: Existing monitoring mechanisms are in place that assist the City of Roseville in meeting the intent of the California Environmental Quality Act (CEQA). These existing monitoring mechanisms eliminate the need to develop new monitoring processes for each mitigation measure. These mechanisms include grading plan review and approval, improvement/building plan review and approval and on-site inspections by City Departments. Given that these monitoring processes are requirements of the project, they are not included in the mitigation monitoring program.

It shall be the responsibility of the project applicant/owner to provide written notification to the City using the Mitigation Verification Cover Sheet and Forms, in a timely manner, of the completion of each Mitigation Measure as identified on the following pages. The City will verify that the project is in compliance with the adopted Mitigation Monitoring and Reporting Program. Any non-compliance will be reported by the City to the applicant/owner, and it shall be the project applicant's/owner's responsibility to rectify the situation by bringing the project into compliance. The purpose of this program is to ensure diligent and good faith compliance with the Mitigation Measures which have been adopted as part of the project.

MITIGATION MONITORING AND REPORTING PROGRAM for Sierra View Redesignation and Rezoning Project / File No. PL21-0162					
Mitigation Measure	**Implementation**	**Timing**	**Reviewing Party**	**Documents to be Submitted to the City**	**Staff Use Only**
MM BIO 1: Conduct Pond Turtle Pre-Construction Survey: A western pond turtle survey shall be conducted in all areas within 150 feet of the intermittent drainage in within 48 hours prior to construction in that area. If no western pond turtles or nests are found, no further mitigation is necessary. If a western pond turtle is observed within the proposed impact area, a qualified biologist shall relocate the individual to suitable habitat outside of the proposed impact area prior to construction. If a western pond turtle nest is observed within the proposed impact area, the nest shall be fenced off and avoided until the eggs hatch. The exclusion fencing shall be placed no less than 25 feet from the nest. A qualified biologist shall monitor the nest daily during construction to ensure that hatchlings do not disperse into the construction area. Relocation of hatchlings will occur as stipulated above, if necessary.	Results of the preconstruction survey and other mitigation implementation (if needed) shall be submitted prior to the issuance of a grading permit. The applicant or developer shall coordinate with USFWS and/or CDFG to modify as necessary any mitigation plans in an effort to attain mitigation success.	Pre-Construction and Construction: Survey required prior to construction. If survey is positive for the specie, then remainder of mitigation steps are required prior to construction.	Engineering	Copy of pre-construction survey	
MM BIO-2: Protect Special Status Birds, Including Migratory Birds. For all construction-related activities that take place within the nesting season, between February 15 through August 31st, a preconstruction nesting-bird survey for special-status specie birds and migratory birds shall be conducted by a qualified biologist no more than two weeks prior to project initiation within the area of construction and a 300-foot buffer. If active nests are found, a no-disturbance buffer zone shall be established, the size of which will be determined in consultation with the City. Within this buffer zone, no construction shall take place until August 31st or the biologist determines that the nest is no longer active.	Results of the preconstruction survey and other mitigation implementation (if needed) shall be submitted prior to the issuance of a grading permit. The applicant or developer shall coordinate with USFWS and/or CDFG to modify as necessary any mitigation plans in an effort to attain mitigation success.	Pre-Construction and Construction: Survey required prior to construction. If the survey is positive for the species, then remainder of mitigation steps are required prior to construction.	Engineering	Copy of pre-construction survey	
MM BIO-3: Obtain a Lake and Streambed Alteration Agreement. For any construction that will occur on the bed and bank of a stream or other water body, including drainage canals, a Lake and Streambed	Results of implementation of conditions of approval and/or mitigation (if required) included as part of the agreement shall	Pre-Construction and Construction: Executed	Engineering	Copy of executed Lake and Streambed	

MITIGATION MONITORING AND REPORTING PROGRAM for Sierra View Redesignation and Rezoning Project / File No. PL21-0162					
Mitigation Measure	**Implementation**	**Timing**	**Reviewing Party**	**Documents to be Submitted to the City**	**Staff Use Only**
Alteration Agreement shall be obtained that complies with Section 1602 of the California Fish and Game Code. The Lake and Streambed Alteration Agreement will contain conditions of approval and/or mitigation measures to avoid, minimize, or compensate for adverse effects to riparian habitat within the bed and bank of a stream or other water body that must be implemented as a condition of the agreement that ensures no net loss of riparian acreage. Obtaining this Agreement and adhering to its requirements ensures that performance standards sufficient to meet CEQA mitigation standards are satisfied.	be submitted prior to the issuance of a grading permit.	agreement required prior to construction and any agreement conditions of approval and/or mitigation measures are required prior to construction.		Alteration Agreement	
MM BIO-4: No Net Loss of Wetlands by Obtaining Requisite Federal and State Permits. For all wetlands and other Waters of the U.S. or State that are removed or disturbed by project construction, all requisite federal and State permits shall be obtained, including, at least, a discharge permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act, and possibly State-issued Waste Discharge Requirements pursuant to Division 7, Chapter 4, Article 4 of the Water Code established by the Porter-Cologne Water Quality Control Act. These federal and State permits will contain conditions of approval and/or mitigation measures that will ensure a net zero loss of wetlands and other waters. Obtaining these permits and adhering to their requirements ensures that performance standards sufficient to meet CEQA mitigation standards are satisfied.	Results of implementation of conditions of approval and/or mitigation (if required) included as part of the permits shall be submitted prior to the issuance of a grading permit.	Pre-Construction and Construction: Permits must be obtained prior to construction and any permit conditions of approval and/or mitigation measures are required prior to construction.	Engineering	Copy of issued permits	
MM BIO-5: Obtain Tree Permit and Adhere to Permit Conditions. For all native oaks trees protected by the City Code that shall be removed or encroached upon as a result of the project, a Tree Permit shall be obtained that includes payment of in-lieu mitigation fees to compensate for oak tree encroachment and removal and/or onsite replacement plantings consisting of both native and nonnative tree species as well as protection measures for the trees that will	Results of implementation of conditions of mitigation (if needed) included as part of the permit shall be submitted prior to the issuance of a grading permit.	Pre-Construction and Construction: Permit must be obtained prior to construction and any permit mitigation is	Engineering	Copy of issued permit	

MITIGATION MONITORING AND REPORTING PROGRAM for Sierra View Redesignation and Rezoning Project / File No. PL21-0162					
Mitigation Measure	**Implementation**	**Timing**	**Reviewing Party**	**Documents to be Submitted to the City**	**Staff Use Only**
remain onsite. Obtaining a Tree Permit and adhering to its requirements ensures that CEQA performance standards are satisfied.		required prior to construction.			
MM CUL-1: Inadvertent Discovery. If subsurface deposits believed to be cultural (historical, archeological, paleontological, or tribal) or human in origin are discovered during construction, all work must halt within a 50-foot radius of the discovery. A qualified professional archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for pre-contact and historic archaeologist shall be retained to evaluate the significance of the find (i.e., whether the subsurface deposits could qualify as an historical resource, a unique archaeological resource, or a tribal cultural resource) and shall have the authority to modify the no-work radius as appropriate, using professional judgment. The following notifications and mitigation requirements shall apply, depending on the nature of the find: 1. If the professional archaeologist determines that the find does not represent an historical resource, a unique archaeological resources, or a tribal cultural resource, work may resume immediately, and no agency notifications are required. 2. If the professional archaeologist determines that the find represents a potential historical resource, unique archaeological resource, or tribal cultural resource, the archaeologist shall immediately notify the City and the applicable landowner and/or Applicant. The City shall work with the archaeologist and, if necessary, with other experts or expert agencies (e.g., the State Historic Preservation Officeror, in the case of a potential tribal cultural resource, the relevant Native American organization) to determine whether, based on statutory criteria, the find qualifies as an historical resource, a unique archaeological	This measure shall be reflected in all construction and building plans, and construction site workers shall be advised by the site manager of this measure.	Construction: Measure applies if resources are discovered during construction.	Engineering and Building	Copies of construction and building plans containing this measure	

Mitigation Measure	Implementation	Timing	Reviewing Party	Documents to be Submitted to the City	Staff Use Only
resource, or a tribal cultural resource. If a determination is made in the affirmative, appropriate mitigation or treatment measures shall be taken, consistent with those set forth in Public Resources Code Section 21083.2, subdivisions (b) through (e), and CEQA Guidelines Sections 15126.4, subdivision (b)(3). Preservation in place is the preferred manner of mitigating impacts to archaeological sites, but data recovery may be permitted where preservation would be inconsistent with project design, logistics, and cost considerations. Work may not resume within the no-work radius until the City determines that the site either: 1) is not an historical resources, a unique archaeological resources, or a tribal cultural; or 2) that the mitigation or treatment measures have been completed to the City's satisfaction. 3. If the find includes human remains, or remains that are potentially human, the City and/or the landowner or Applicant shall ensure that reasonable protection measures are taken to protect the discovery from disturbance (A.B. 2641 [Stats. 2006, ch. 863]). The archaeologist shall notify the Placer County Coroner (per Section 7050.5 of the Health and Safety Code). The provisions of Section 7050.5 of the California Health and Safety Code, Section 5097.98 of the Public Resources Code, and A.B. 2641 will be implemented. If the Coroner determines the remains are Native American and not the result of a crime scene, the Coroner is required by statute to notify the California Native American Heritage Commission (NAHC), which then will designate a Native American Most Likely Descendant (MLD) for the Project (Public Resources Code Section 5097.98). The designated MLD will have 48 hours from the time access to the property is granted to					

MITIGATION MONITORING AND REPORTING PROGRAM for Sierra View Redesignation and Rezoning Project / File No. PL21-0162					
Mitigation Measure	**Implementation**	**Timing**	**Reviewing Party**	**Documents to be Submitted to the City**	**Staff Use Only**
make recommendations concerning treatment of the remains. If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Public Resources Code Section 5097.94). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Public Resources Code Section 5097.98). This reburial will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a reinternment document with the county in which the property is located (A.B. 2641). Work may not resume within the no-work radius until the City, through consultation as appropriate, determines that the treatment measures have been completed to its satisfaction.					
MM GEO-1: If paleontological resources are discovered during the course of construction, work shall be halted immediately within 50 meters (165 feet) of the discovery, the City of Roseville shall be notified, and a qualified paleontologist shall be retained to determine the significance of the discovery. If the paleontological resource is considered significant, it should be excavated by a qualified paleontologist and given to a local agency, State University, or other institution with expertise in paleontology, where the resource could be curated and displayed for public education purposes.	This measure shall be reflected in all construction and building plans, and construction site workers shall be advised by the site manager of this measure.	Construction: Measure applies if resources are discovered during construction.	Engineering and Building	Copies of construction and building plans containing this measure	
MM NOISE-1: Limits Hours of Construction and Muffle/Maintain Construction Equipment. Project construction shall occur only between the hours of 7 a.m. and 7 p.m. on weekdays and 8 a.m. and 8 p.m. on weekends to limit construction noise. All construction equipment shall be fitted with factory installed muffling devices and maintained in good	This measure shall be reflected in all construction and building plans, and construction site workers shall be advised by the site manager of this measure.	Construction: Measure applies during construction.	Engineering and Building	Copies of construction and building plans containing this measure	

MITIGATION MONITORING AND REPORTING PROGRAM for Sierra View Redesignation and Rezoning Project / File No. PL21-0162					
Mitigation Measure	**Implementation**	**Timing**	**Reviewing Party**	**Documents to be Submitted to the City**	**Staff Use Only**
working order, pursuant to City Noise Ordinance Section 9.24.150(G).					
MM TCR-1: Unpaid Tribal Observation. A minimum of seven days prior to beginning earthwork or other soil disturbance activities, the Construction Manager shall notify the City of the proposed earthwork start-date, in order to provide the City representative sufficient time to contact the consulting tribe(s). A single tribal representative shall be invited to, at its discretion, voluntarily observe any or all ground-disturbing activities during construction. The tribe shall be provided 72 hours to accept or decline observation. The single tribal observer shall be required to comply with all job site safety requirements and shall sign a waiver of liability prior to entering the job site. Should the tribe choose not to observe any or all of the activity, the City shall deem the mitigation measure completed in good faith without tribal observation as long as the notification was made and documented.	This measure shall be reflected in all construction and building plans, and construction site managers shall be advised by the applicant or developer of this measure.	Pre-Construction and Construction: Measure applies just prior to and during construction.	Engineering and Building	Documentation of tribal notification	
MM TCR-2: Contractor Awareness Training. The Construction Manager shall ensure that a Contractor Awareness Training Program is delivered to train equipment operators about cultural resources and tribal cultural resources. The program shall be designed to inform construction personnel about: federal and state regulations pertaining to cultural resources and tribal cultural resources; the subsurface indicators of resources that shall require a work stoppage; procedures for notifying the City of any occurrences; and project-specific requirements; and enforcement of penalties and repercussions for non-compliance with the program. The training shall be prepared by a qualified professional archaeologist and reviewed by City for approval, and may be provided in an audio-visual format, such as a DVD. The Construction Manager shall provide culturally affiliated tribes that consulted on the	This measure shall be reflected in all construction and building plans, and construction site managers shall be advised by the applicant or developer of this measure.	Pre-Construction and Construction: Measure applies just prior to and during construction.	Engineering and Building	Copy of signed training roster	

MITIGATION MONITORING AND REPORTING PROGRAM for Sierra View Redesignation and Rezoning Project / File No. PL21-0162					
Mitigation Measure	**Implementation**	**Timing**	**Reviewing Party**	**Documents to be Submitted to the City**	**Staff Use Only**
project the option of attending the initial training in person and/or providing additional materials germane to the unanticipated discovery of tribal cultural resources for incorporation into the training. The training program shall be required for all construction supervisors, forepersons, and operators of ground-disturbing equipment and all personnel shall be required to sign a training roster and display a hardhat sticker that is visible to City inspectors. The construction manager is responsible for ensuring that all required personnel receive the training. The Construction Manager shall provide a copy of the signed training roster to the City as proof of compliance.					
MM TCR-3: Post-Review Discovery Procedures. If subsurface deposits believed to be cultural or human in origin, or tribal cultural resources, are discovered during construction, all work shall halt within a 100-foot radius of the discovery, and the Construction Manager shall immediately notify the City of Roseville Development Services Director by phone. The Construction Manager shall also immediately coordinate with the monitoring archeologist or project archaeologist and (if present) tribal monitor, or, in the absence of either, contact the consulting tribe(s) and a qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for archaeology and subject to approval by the City, to evaluate the significance of the find and develop appropriate management recommendations in coordination with the consulting tribe(s) if the find is a tribal cultural resource. All management recommendations shall be provided to the City in writing for the City's review and approval. If recommended by the qualified professional and consulting tribes and approved by the City, this may include modification of the no-work radius.	This measure shall be reflected in all construction and building plans, and construction site workers shall be advised by the site manager of this measure.	Construction: Measure applies if resources are discovered during construction.	Engineering and Building	Copies of construction and building plans containing this measure	

Mitigation Measure	Implementation	Timing	Reviewing Party	Documents to be Submitted to the City	Staff Use Only
The professional archaeologist must make a determination, based on professional judgement and supported by substantial evidence, within one business day of being notified, as to whether or not the find represents a cultural or tribal resource or has the potential to be a cultural or tribal cultural resource. The consulting tribe shall also be given the opportunity to provide, within one business day of being notified, a determination as to whether or not the find represents a tribal cultural resource or has the potential to be a tribal cultural resource. The type of discovery, as described below will determine the subsequent actions. These include: 1) a work pause that, upon further investigation, is not actually a discovery and the work pause was simply needed in order to allow for closer examination of soil (a "false alarm"); 2) a work pause and subsequent action for discoveries that are clearly not related to tribal resources, such as can and bottle dumps, artifacts of European origin, and remnants of built environment features; and 3) a work pause and subsequent action for discoveries that are likely related to tribal resources, such as midden soil, bedrock mortars, groundstone, or other similar expressions. Whenever there is question as to whether or not the discovery represents a tribal resource, culturally affiliated tribes shall be consulted in making the determination. Whenever a tribal monitor is present, the monitor shall be consulted. The following processes shall apply, depending on the nature of the find, subject to the review and approval of the City: • Response to False Alarms: If the professional archaeologist determines that the find is negative for any cultural indicators, and tribal representatives have					

Mitigation Measure	Implementation	Timing	Reviewing Party	Documents to be Submitted to the City	Staff Use Only
not indicated the find is a tribal cultural resource, then work may resume immediately upon notice to proceed from the City's representative. No further notifications or archaeological consultation is necessary if it is determined that the discovery is not a cultural or tribal cultural resource of any kind. The professional archaeologist shall provide written documentation of this finding to the City, which shall include as an attachment any written documentation provided by tribal representatives or monitors. • Response to Non-Tribal Discoveries: If a tribal monitor is not present at the time of discovery and a professional archaeologist determines that the find represents a non-tribal cultural resource from any time period or cultural affiliation, the City shall be notified immediately, to consult on a finding of eligibility and implementation of appropriate treatment measures, if the find is determined to be a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines. The professional archaeologist shall provide a photograph of the find and a written description to the City of Roseville. The City of Roseville will notify any [tribe(s)] who, in writing, requested notice of unanticipated discovery of non-tribal resources. Notice shall include the photograph and description of the find, and					

Mitigation Measure	Implementation	Timing	Reviewing Party	Documents to be Submitted to the City	Staff Use Only
a tribal representative shall have the opportunity to determine whether the find represents a tribal cultural resource. If a response is not received within 24 hours of notification (none of which time period may fall on weekends or City holidays), the City will deem this portion of the measure completed in good faith as long as the notification was made and documented. If requested by a [tribe(s)], the City may extend this timeframe, which shall be documented in writing (electronic communication may be used to satisfy this measure). If a notified tribe responds within 24 hours to indicate that the find represents a tribal cultural resource, then the Response to Tribal Discoveries portion of this measure applies. If the tribe does not respond or concurs that the discovery is non-tribal, work shall not resume within the no-work radius until the City, through consultation as appropriate, determines that the site either: 1) is not a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines; or 2) that the treatment measures have been completed to its satisfaction. • Response to Tribal Discoveries: If the find represents a tribal or potentially tribal cultural resource that does not include human remains, the consulting tribe(s) and City shall be notified. The City will consult					

Mitigation Measure	Implementation	Timing	Reviewing Party	Documents to be Submitted to the City	Staff Use Only
with the tribe(s) on a finding of eligibility and implement appropriate treatment measures, if the find is determined to be either a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines, or a Tribal Cultural Resource, as defined in Section 21074 of the Public Resources Code. Preservation in place is the preferred treatment, if feasible. Work shall not resume within the no-work radius until the City, through consultation as appropriate, determines that the site either: 1) is not a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines; or 2) not a Tribal Cultural Resource, as defined in Section 21074 of the Public Resources Code; or 3) that the treatment measures have been completed to its satisfaction. • Response to Human Remains: If the find includes human remains, or remains that are potentially human, the construction supervisor or on-site archaeologist and (if present) tribal monitor shall ensure reasonable protection measures are taken to protect the discovery from disturbance (AB 2641) and shall notify the City and Placer County Coroner (per § 7050.5 of the Health and Safety Code). The provisions of § 7050.5 of the California Health and Safety Code, § 5097.98 of the California Public Resources Code, and Assembly Bill					

Mitigation Measure	Implementation	Timing	Reviewing Party	Documents to be Submitted to the City	Staff Use Only
2641 shall be implemented. If the Coroner determines the remains are Native American and not the result of a crime scene, the Coroner will notify the Native American Heritage Commission (NAHC), which then will designate a Native American Most Likely Descendant (MLD) for the project (§ 5097.98 of the Public Resources Code). The designated MLD will have 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. Public Resources Code § 5097.94 provides structure for mediation through the NAHC if necessary. If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (§ 5097.94 of the Public Resources Code). If no agreement is reached, the landowner must rebury the remains in a respectful manner where they will not be further disturbed (§ 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a reinternment document with the county in which the property is located (AB 2641). Work shall not resume within the no-work radius until the City, through consultation as appropriate, determines that the treatment measures have been completed to its satisfaction.					