Appendix H

Placer Ranch Specific Plan
Sanitary Sewer Master Plan

PR PLACER RANCH
SPECIFIC PLAN

Sanitary Sewer Master Plan

July 18, 2017

Revised: September 1, 2017

FINAL REPORT

DATUM NGVD29

Prepared for

Placer County
Community Development Resource Agency
3091 County Center Drive
Auburn, California 95603

Prepared by

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road
Roseville, California 95661

PLACER RANCH SPECIFIC PLAN
PLACER COUNTY, CALIFORNIA

SANITARY SEWER MASTER PLAN

July 18, 2017

FINAL REPORT

Prepared for:

Placer County
Community Development Resource Agency
3091 County Center Drive
Auburn, California 95603

Prepared by:

MacKay & Somps
1552 Eureka Road, Suite 100
Roseville, California 95661-3040

TABLE OF CONTENTS

I. INTRODUCTION....1
Location....1
Purpose....2

II. PROJECT DESCRIPTION....3
Plan Area Description....3
Treatment Plant Description....15

III. SEWER MASTER PLAN METHODOLOGY....16
Analysis Procedure....16
Pipeline Design....17

IV. WASTEWATER FLOWS....18
Average Dry Weather Flow....18
Factored Flow....24
Peak Wet Weather Flow....24

V. WASTEWATER INFRASTRUCTURE IMPROVEMENTS....32
Collection and Transmission....32
Fiddyment Road/Angus Road Offsite Connection....32
Duluth Avenue Offsite Connection....34
Flow Meter....37
Effluent / Disposal....37
Permanent Lift Station and Force Main....39
Alternative Lift Station and Force Main....40
Interim Improvements / Subshed Boundary Modifications....41
Conclusion....42

VI. REFERENCES....43

VII. TABLES

Table 1 – Placer Ranch Specific Plan Land Use Summary

Table 2 – Land Use Summary, Western Wastewater Shed for Scenarios 1 & 2

Table 3 – Land Use Summary, Central Wastewater Shed for Scenario 1

Table 4 – Land Use Summary, Eastern Wastewater Shed for Scenario 1

Table 5 – Land Use Summary, Eastern Wastewater Shed for Scenario 2

Table 6 – Average Dry Weather Flow Summary

Table 7 – PRSP ADWF Summary, Western Wastewater Shed for Scenarios 1 & 2

Table 8 – PRSP + Future SA Offsite ADWF Summary, Central Shed for Scenario 1

Table 9 – PRSP ADWF Summary, Eastern Wastewater Shed for Scenario 1

Table 10 – PRSP + Future SA Offsite ADWF Summary, Eastern Shed for Scenario 2

Table 11 – Western Wastewater Shed Flows by Node for Scenario 1 & Scenario 2

Table 12 – Central Wastewater Shed Flows by Node for Scenario 1 (PRSP Only)

Table 13 – Central Wastewater Shed Flows by Node for Scenario 1 (PRSP + Future SA Offsite)

Table 14 – Eastern Wastewater Shed Flows by Node for Scenario 1

Table 15 – Eastern Wastewater Shed Flows by Node for Scenario 2 (PRSP Only)

Table 16 – Eastern Wastewater Shed Flows by Node for Scenario 2 (PRSP + Future SA Offsite)

VIII. FIGURES

Figure 1 – Vicinity Map

Figure 1B – 2005 Regional & Ultimate Service Area Boundary

Figure 2A – Land Use Map

Figure 2B – Phasing Plan

Figure 3 – Scenario 1 Western, Central & Eastern Shed Boundaries

VIII. FIGURES

Figure 4 – Scenario 2 Western & Eastern Shed Boundaries

Figure 5 – Future SA Offsite Wastewater Flow Data

Figure 6 – Duluth Avenue Existing Pipe Capacity Assessment

Figure 7 – PGWWTP Wastewater Disposal Location

IX. ATTACHMENTS

Attachment 1: Placer Ranch Wastewater Collection System Modeling Technical Memorandum prepared by HydroScience Engineers, Inc.

Attachment 2: Placer Ranch Specific Plan, Conceptual Lift Station Design Technical Memorandum prepared by HydroScience Engineers, Inc

Attachment 3: Appendix D TM 2b – Dry Weather Flow Projections for Ultimate Service Area (w/ UGAs)

Attachment 4: (1) Placer Ranch Specific Plan, Preliminary University Sewer Demands Estimate Memo dated March 3, 2015
(2) Placer Ranch CSUS University Sewer Flow Data Research

Attachment 5: Placer County, Sunset County Service Area Maps – Zone 2A3

X. EXHIBITS

Exhibit A – Sanitary Sewer Master Plan, Western Shed (Scenarios 1 & 2)

Exhibit B, Scenario 1 – Sanitary Sewer Master Plan, PRSP Only (Base Condition), Central & Eastern Sheds

Exhibit C, Scenario 1 – Sanitary Sewer Master Plan, PRSP + Future SA Offsite, Central & Eastern Sheds

Exhibit D, Scenario 2 – Sanitary Sewer Master Plan, PRSP Only (Base Condition), Eastern Shed

Exhibit E, Scenario 2 – Sanitary Sewer Master Plan, PRSP + Future SA Offsite, Eastern Shed

Exhibit F, Scenario 1-LS – Sanitary Sewer Master Plan, PRSP Only (Base Condition), Central & Eastern Sheds

Exhibit G, Scenario 1-LS – Sanitary Sewer Master Plan, PRSP + Future SA Offsite, Central & Eastern Sheds

Exhibit H, Scenario 2-LS – Sanitary Sewer Master Plan, PRSP Only (Base Condition), Eastern Shed

Exhibit I, Scenario 2-LS – Sanitary Sewer Master Plan, PRSP + Future SA Offsite, Eastern Shed

ABBREVIATIONS

ADWF	Average Dry Weather Flow
BP	Business Park
CC	Community Commercial
CMU	Commercial Mixed Use
CP	Commerce Park
DU	Dwelling Unit
EDUs	Equivalent Dwelling Units
GPD	Gallons per Day
HDR	High Density Residential
LDR	Low Density Residential
LI	Light Industrial
M&S	MacKay & Somps
MDR	Medium Density Residential
MGD	Million Gallons per Day
NC	Neighborhood Commercial
NPDES	National Pollution Discharge Elimination System
PGWWTP	Pleasant Grove Wastewater Treatment Plant
PQP	Public Quasi Public
PQPS	Public Quasi Public Schools
PR	Park Reserve
PRSP	Placer Ranch Specific Plan
PWWF	Peak Wet Weather Flow
RC	Regional Commercial
R&D	Research & Development
SA	Sunset Area
SPMUD	South Placer Municipal Utility District
SPWA	South Placer Wastewater Authority
UR	Urban Reserve
UGA	Urban Growth Area

I. INTRODUCTION

LOCATION

The Placer Ranch Specific Plan (PRSP) is approximately 2,213 acres in size and is a subset of the 8,900-acre Sunset Area (SA) Plan. The PRSP site is located in south Placer County, immediately north of the City of Roseville, south of the City of Lincoln, and west of the City of Rocklin. The location of the project site is shown below on **Figure 1 – Vicinity Map**. Relative to major roadways, the PRSP is approximately one mile west of Highway 65, one mile north of Blue Oaks Boulevard, and one mile south of Athens Avenue. The site is generally rectangular and measures approximately three miles (east-west) and one mile (north-south).

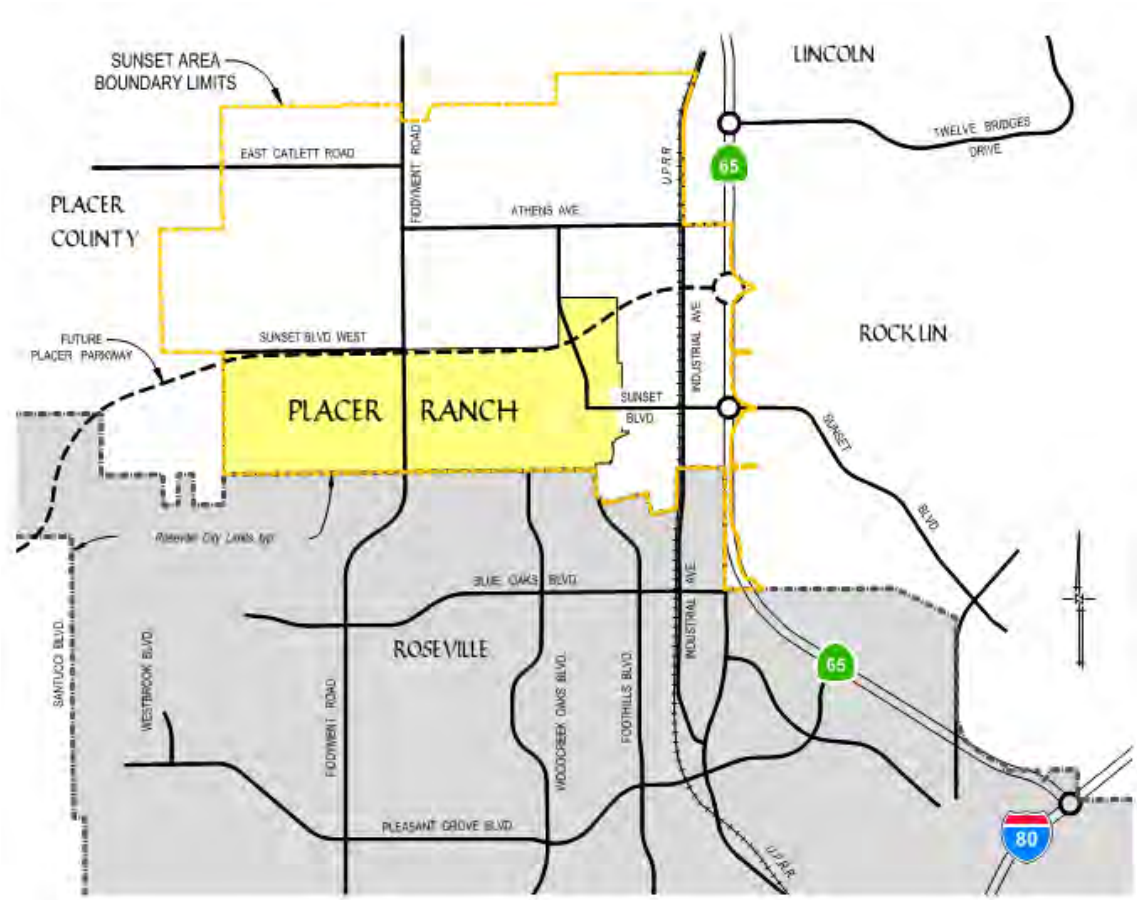


Figure 1. Vicinity Map

The southern boundary of the PRSP is the existing Roseville City limits and the northern boundary is defined, in part, by the existing alignment of West Sunset Boulevard west of

LOCATION *(CONTINUED)*

Fiddyment Road. Fiddyment Road extends through the site in a north-south alignment near the center of the site and extends south into the City of Roseville. On the east side of the PRSP, West Sunset Boulevard extends into the site for approximately 1,600 feet and terminates at Foothills Boulevard.

The PRSP area is a master-planned community anchored by Sacramento State University's Placer campus and an adjacent mixed-use University Town Center. The area comprises sections 7, 8 and 12 and portions of 4, 5 and 9 of the USGS Roseville quadrangle and consists of thirteen assessor parcels (017-063-012, -039, -040, -042, -043, -045, -046; 017-101-010; and 017-020-018). The entire property is privately owned except for 1.8 acres of City owned parcel (017-063-005), which contains the City of Roseville's existing Power Plant 2 (Peaking Plant Electric Facility).

PURPOSE

The purpose of this master plan study is to provide preliminary design and analysis for the sanitary sewer infrastructure to serve the entire PRSP area and portions of the adjacent SA Plan Area which flows into the project site at three locations. Refer to **Figure 5 – Future SA Offsite Wastewater Flow Data**. Both the PRSP and the SA sewer sheds will be tributary to the Pleasant Grove Wastewater Treatment Plant (PGWWTP). The PGWWTP is owned and operated by the City of Roseville for the benefit of the South Placer Wastewater Authority (SPWA). The PGWWTP is located three miles southwest of the PRSP. Refer to **Figure 7 – PGWWTP Wastewater Disposal Location**. Background information including wastewater generation rates, peaking factors, proposed plan area land uses, and tributary sewer shed areas will be used to plan the location and sizes of proposed sanitary sewer facilities within the PRSP area. Additionally, a PRSP preliminary grading plan was utilized to determine areas within the PRSP that could either flow via gravity transmission pipes or which will require sewer conveyance via a lift station and force main system.

II. PROJECT DESCRIPTION

PLAN AREA DESCRIPTION

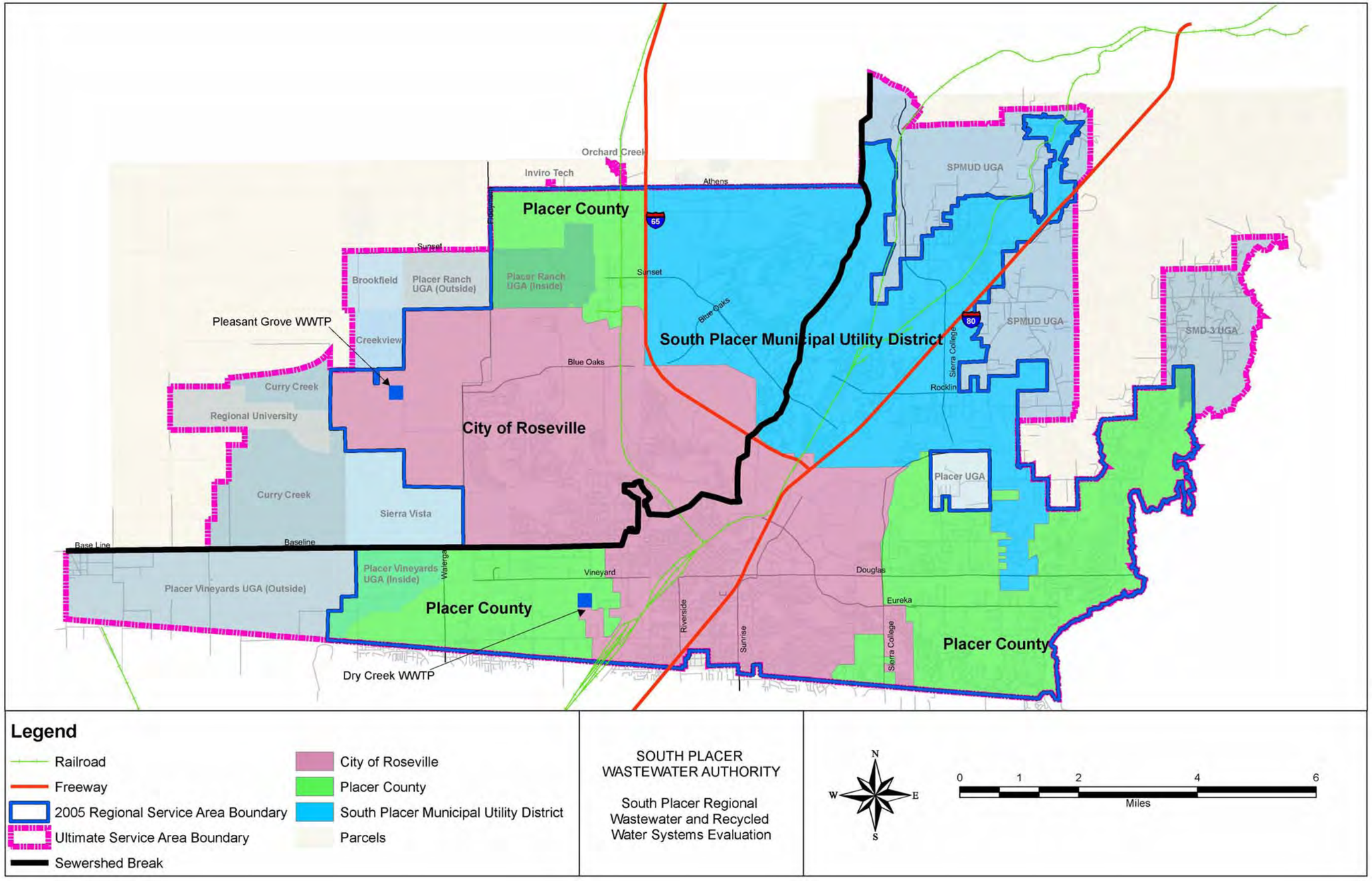
The project site is presently undeveloped, except for the existing City of Roseville Peaking Plant Electric Facility, and primarily consists of non-native grasslands, areas previously used for agriculture (cultivated wheat and rice fields), riparian areas associated with Pleasant Grove Creek tributaries, and other areas of natural vegetation.

The existing site topography can generally be characterized by areas of flat and gently rolling terrain crossed by natural drainage courses. Ground elevations of 145± feet occur in the northeastern portion of the PRSP area and decline to elevations of 86± feet in the southwest.

The PRSP area is identified as an Urban Growth Area in the South Placer Regional Wastewater and Recycled Water Systems Evaluation Report dated December 2009, prepared by RMC Water and Environment (RMC) for the South Placer Wastewater Authority (SPWA), an entity comprised of the City of Roseville, Placer County, and the South Placer Municipal Utility District (SPMUD). Per the Systems Evaluation Report, approximately 1,027 acres are located within the SPWA 2005 Regional Service Area Boundary, 807 acres are located outside of the SPWA 2005 Regional Service Area Boundary and 379 acres are designated as right-of-way. The region outside the SPWA 2005 Regional Service Area Boundary is defined as the area west of Fiddyment Road. Although this 807 acre portion of the PRSP is outside of the SPWA 2005 Service Area Boundary, this region is located within the Ultimate SPWA Service Area and was included in the Systems Evaluation Report to be tributary to the PGWWTP. The projected ADWF within the SPWA 2005 Regional Service Area is 0.90 MGD and the projected ADWF located outside of the SPWA 2005 Regional Service Area is 1.27 MGD. A total projected ADWF of 2.17 MGD to be tributary to the PGWWTP for the entire PRSP area. Refer to **Figure 1B – 2005 Regional & Ultimate Service Area Boundary**, and **Attachment 3 – TM2b-Dry Weather Flow Projections for Ultimate Service Area.**

FIGURE 1B - 2005 Regional & Ultimate Service Area Boundary

Figure ES - 4: SPWA Partner Agencies, 2005 Regional Service Area Boundary, Ultimate Service Area Boundary, and UGAs



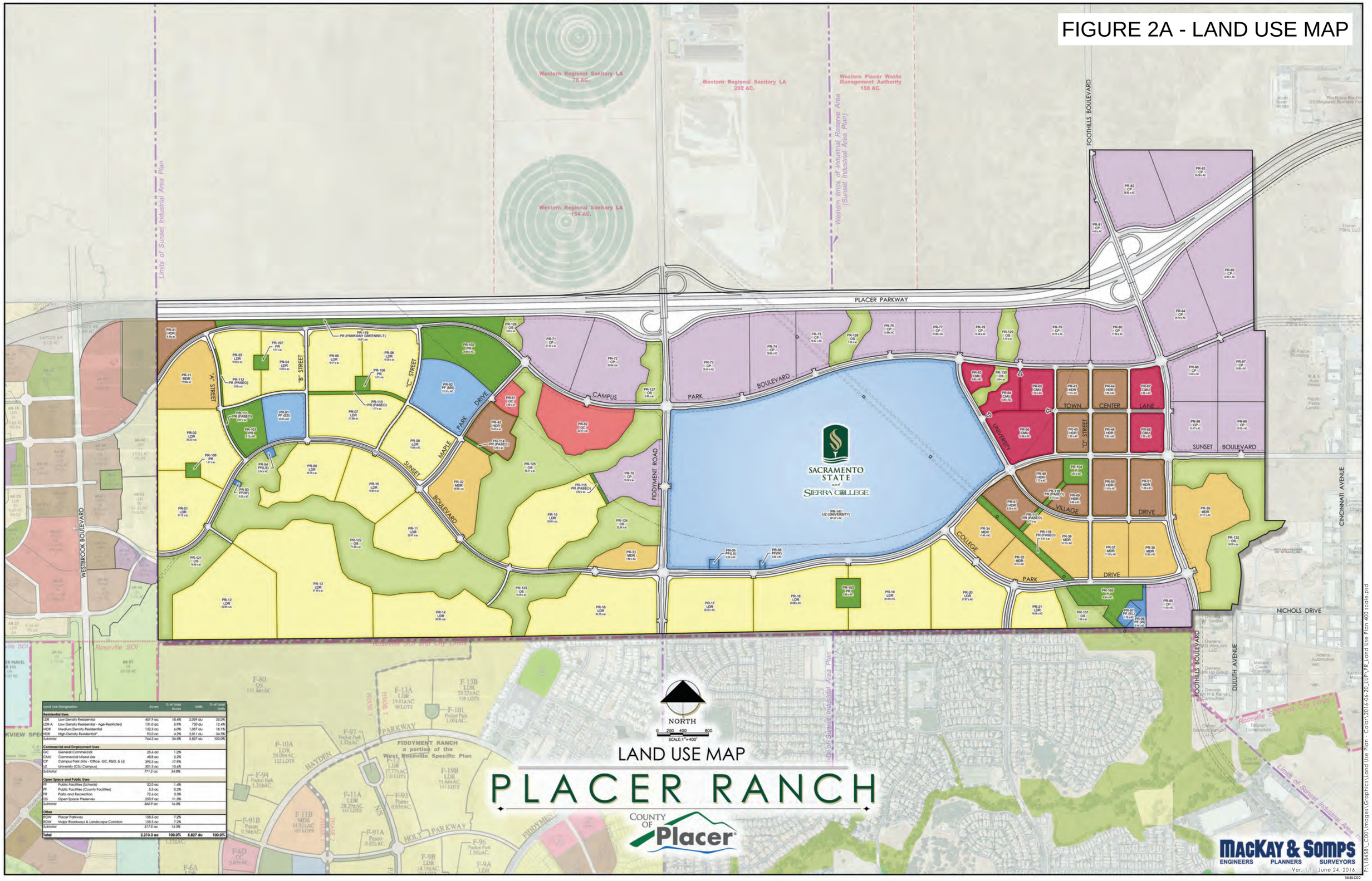
PLAN AREA DESCRIPTION *(CONTINUED)*

The PRSP area is proposed to be developed with a variety of land uses including a University Campus, low/medium/ high density residential, commercial, industrial, office uses, schools, parks and open space. The proposed project land use plan dated June 24, 2016, and the phasing plan dated May 31, 2017, are depicted on **Figure 2A - Land Use Map** and **Figure 2B - Phasing Plan**. A summary of the proposed land use acreages and equivalent dwelling units (EDUs) are shown in **Table 1 - Placer Ranch Specific Plan Land Use Summary.**

Table 1 – Placer Ranch Specific Plan Land Use Summary

LAND USE	AREA SIZE (Acres)	EDUs
LDR – Low Density Residential	538.9	2,759
MDR – Medium Density Residential	132.3	1,057
HDR – High Density Residential	93.0	2,011
GC – General Commercial	25.6	
CMU – Community Commercial Mixed Use	48.8	
CP – Campus Park (Mix of Office, GC, R&D & LI)	395.5	
UZ – University (CSU Campus)	301.3	
PF – Public Facilities (County Facilities)	5.5	
PF – Public Facilities (Schools)	32.0	
PR – Parks & Recreation	72.6	
OS – Open Space	250.9	
TOTAL	**1,896.4**	**5,827**

FIGURE 2A - LAND USE MAP



Land Use Designation		Acres	% of Total Acres	Units	% of Total Units
Residential Uses					
LDR	Low Density Residential	407.9 ac	18.4%	2,039 du	35.0%
LDR-A	Low Density Residential - Age-Restricted	131.0 ac	5.9%	720 du	12.4%
MDR	Medium Density Residential	132.3 ac	6.0%	1,057 du	18.1%
HDR	High Density Residential*	93.0 ac	4.2%	2,011 du	34.5%
Subtotal		764.2 ac	34.5%	5,827 du	100.0%
Commercial and Employment Uses					
GC	General Commercial	25.6 ac	1.2%		
CMU	Commercial Mixed Use	48.8 ac	2.2%		
CP	Campus Park (Mix - Office, GC, R&D, & UI)	395.5 ac	17.9%		
UZ	University (CSU Campus)	301.3 ac	13.6%		
Subtotal		771.2 ac	34.8%		
Open Space and Public Uses					
PF	Public Facilities (Schools)	32.0 ac	1.4%		
PF	Public Facilities (County Facilities)	5.5 ac	0.2%		
PR	Parks and Recreation	72.6 ac	3.3%		
OS	Open Space Preserves	250.9 ac	11.3%		
Subtotal		360.9 ac	16.3%		
Other					
ROW	Placer Parkway	158.5 ac	7.2%		
ROW	Major Roadways & Landscape Corridors	158.5 ac	7.2%		
Subtotal		317.0 ac	14.3%		
Total		**2,213.3 ac**	**100.0%**	**5,827 du**	**100.0%**

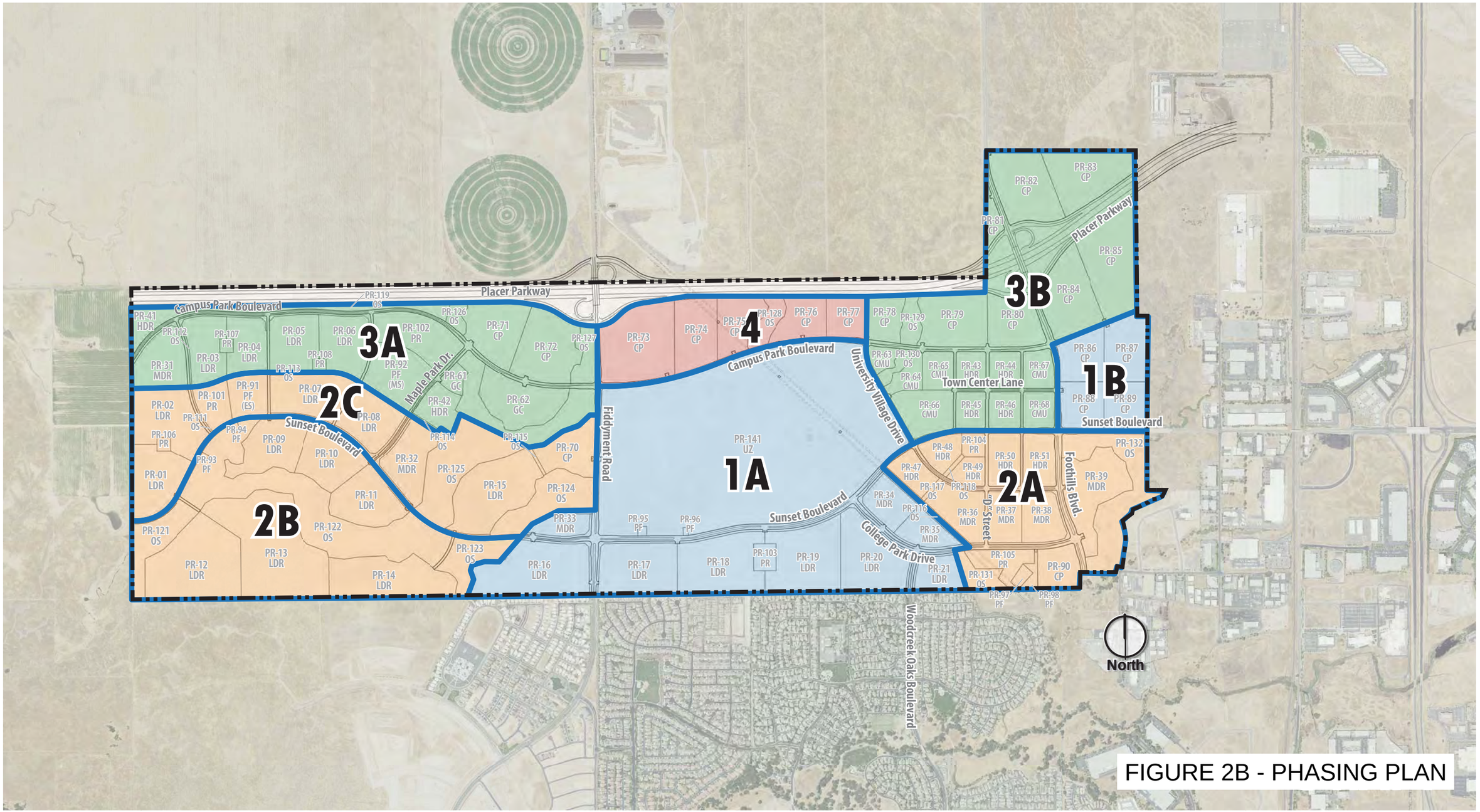


FIGURE 2B - PHASING PLAN

PLAN AREA DESCRIPTION *(CONTINUED)*

The PRSP wastewater flow will be analyzed using two scenarios which differ in how the project areas are split to convey wastewater flow.

Scenario 1

The first scenario, Scenario 1, divides the PRSP area into three major wastewater sheds. A western shed area located west of Fiddyment Road consist of approximately 576 acres, a central shed area located east of Fiddyment Road consist of approximately 866 acres, and an eastern shed area located in the southeast portion of PRSP consist of approximately 135 acres. Refer to **Figure 3 - Scenario 1 Western, Central & Eastern Shed Boundaries** illustrating the three major wastewater sheds. This scenario allows for project phasing flexibility in that the three sheds can all be developed independently and allows for development near existing infrastructure and facilities.

The western shed area will gravity flow towards a permanent lift station on lot PR-94 located east of "B" Street on the south side of Sunset Boulevard. This lift station will then pump flows into a force main reception manhole located within the central shed area boundary on Sunset Boulevard just west of Fiddyment Road.

The central shed area will gravity flow towards the intersection of Fiddyment Road and Sunset Boulevard. The wastewater flow will then converge with the western shed flows and convey the combined flows south offsite along Fiddyment Road to Angus Road and into the existing 30-inch sewer pipe stub located in Angus Road just north of Pleasant Grove Creek. Two design options were analyzed that would transport flows south offsite along the Fiddyment Road/ Angus Road corridor: (1) a gravity main design and (2) a lift station/forcemain design.

The eastern shed area will gravity flow to the south along Foothills Boulevard, east on Nichols Drive, and then south into the existing 20-inch sewer main in Duluth Avenue. These flows will then be conveyed south through Duluth Avenue, east along the City of

PLAN AREA DESCRIPTION *(CONTINUED)*

Roseville limits where it then discharges into the trunk 21-inch and 42-inch sewer mains maintained by the City of Roseville. This connection point from County to City is known as the Cincinnati Avenue connection where an existing flow meter gauges flows leaving Placer County and entering into the City of Roseville limits.

Scenario 2

Scenario 2 divides the PRSP area into two major wastewater sheds. The western shed is the area west of Fiddyment Road and is identical to the western shed for Scenario 1 described previously. The eastern shed is the area east of Fiddyment Road and consist of approximately 1,001 acres. Refer to **Figure 4 – Scenario 2 Western & Eastern Shed Boundaries** illustrating the two major wastewater sheds.

The eastern shed area for this scenario combines Scenario 1's central and eastern shed areas. This scenario will not utilize the existing Nichols Drive and Duluth Avenue sewer infrastructure as described in Scenario 1. The shed area and corresponding flows will be redirected to flow back west along College Park Drive to converge with Scenario 1's central shed flows and then continue towards Fiddyment Road. These flows will then combine with the western shed flows and head south to the existing tie-in in Angus Road.

Similar to Scenario 1, Scenario 2 will analyze two design options to transport flows offsite along the Fiddyment Road/ Angus Road corridor: (1) a gravity main design and (2) a lift station/forcemain design.

LEGEND

- Western Shed
- Central Shed
- Eastern Shed

Figure 3. Scenario 1 - Western, Central & Eastern Shed Boundaries

Placer Ranch Specific Plan

Not to Scale

April 25, 2017
18458.C00

MacKay & Somps
Civil Engineers Planners Surveyors
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1159

4-25-2017 09:51:12 eterrys P:\18458_C00\Misc\Phi\SS1\Figures\Figure 3 Scenario 1.dwg
[1] P:\18458_C00\PLN\P-LU-Placer Ranch.dwg [2] P:\18458_C00\Misc\Phi\Bases\M-ADJ-PR.dwg

NORTH
PARCEL 2
29 P.M. 45
PARCEL 3
29 P.M. 45
PARCEL 4
29 P.M. 45
PARCEL 1
25 P.M. 48
PARCEL 2
34 P.M. 40
FOOTHILL BOULEVARD
FOOTHILL ROAD
PLACER PARKWAY
PARK BOULEVARD
UNIVERSITY
TOWN CENTER LANE
VILLAGE DRIVE
COLLEGE PARK
SUNSET
PR-141
UZ (UNIVERSITY)
PR-112
OPR (PASEO)
PR-114
PR (PASEO)
PR-119
PR (PASEO)
PR-117
PR (PASEO)
PR-118
PR (PASEO)
PR-95
PR (LS)
PR-96
PR (W)
PR-97
PR (EL)
PR-98
PR (W)
PR-108
PR
PR-103
PR
PR-104
P
PR-105
P
PR-106
PR
PR-107
PR
PR-113
PR (PASEO)
PR-116
PR (PASEO)
PR-122
OS
PR-124
OS
PR-132
OS
PR-131
OS
PR-130
OS
PR-129
OS
PR-128
OS
PR-127
OS
PR-126
OS
PR-125
OS
PR-123
OS
PR-121
OS
PR-120
OS
PR-118
OS
PR-115
OS
PR-110
OS
PR-109
OS
PR-107
OS
PR-105
OS
PR-104
OS
PR-102
OS
PR-101
OS
PR-100
OS
PR-99
OS
PR-98
OS
PR-97
OS
PR-96
OS
PR-95
OS
PR-94
OS
PR-93
OS
PR-92
OS
PR-91
OS
PR-90
OS
PR-89
OS
PR-88
OS
PR-87
OS
PR-86
OS
PR-85
OS
PR-84
OS
PR-83
OS

PLAN AREA DESCRIPTION *(CONTINUED)*

The sanitary sewer infrastructure will be sized to carry the wastewater flow to the PGWWTP per the Systems Evaluation Report dated December 2009. The land use acreages and EDU counts for the residential parcels are shown in the following tables:

- **Table 2 - Land Use Summary, Western Wastewater Shed for Scenarios 1 & 2**
- **Table 3 - Land Use Summary, Central Wastewater Shed for Scenario 1**
- **Table 4 - Land Use Summary, Eastern Wastewater Shed for Scenario 1**
- **Table 5 - Land Use Summary, Eastern Wastewater Shed for Scenario 2**

Table 2 - Land Use Summary, Western Wastewater Shed for Scenarios 1 & 2

LAND USE	AREA SIZE (Acres)	EDUs
LDR – Low Density Residential	377.46	1952
MDR – Medium Density Residential	36.58	292
HDR – High Density Residential	18.39	397
GC – General Commercial	25.63	
CMU – Community Commercial Mixed Use	0	
CP – Commerce Park (Mix of Office, GC, R&D & LI)	47.60	
PF – Public Facilities (City Facilities)	0.77	
PF – Public Facilities (Schools)	31.96	
UZ – University (CSU Campus)	0	
PR – Parks & Recreation	37.79	
TOTAL	**576.18**	**2,641**

Table 3 - Land Use Summary, Central Wastewater Shed for Scenario 1

LAND USE	AREA SIZE (Acres)	EDUs
LDR – Low Density Residential	161.42	809
MDR – Medium Density Residential	55.61	445
HDR – High Density Residential	36.16	781
GC – General Commercial	0	
CMU – Community Commercial Mixed Use	33.75	
CP – Commerce Park (Mix of Office, GC, R&D & LI)	309.92	
PF – Public Facilities (City Facilities)	0.81	
PF – Public Facilities (Schools)	0	
UZ – University (CSU Campus)	251.2[(a)]	
PR – Parks & Recreation	17.11	
TOTAL	**865.98**	**2,035**

Footnote:

(a) Area size excludes open space area within the University property.

Table 4 - Land Use Summary, Eastern Wastewater Shed for Scenario 1

LAND USE	AREA SIZE (Acres)	EDUs
LDR – Low Density Residential	0	
MDR – Medium Density Residential	40.09	320
HDR – High Density Residential	38.47	831
GC – General Commercial	0	
CMU – Community Commercial Mixed Use	15.05	
CP – Commerce Park (Mix of Office, GC, R&D & LI)	38.01	
PF – Public Facilities (City Facilities)	3.9	
PF – Public Facilities (Schools)	0	
UZ – University (CSU Campus)	0	
PR – Parks & Recreation	0	
TOTAL	**135.52**	**1,151**

Table 5 - Land Use Summary, Eastern Wastewater Shed for Scenario 2

LAND USE	AREA SIZE (Acres)	EDUs
LDR – Low Density Residential	161.42	809
MDR – Medium Density Residential	95.7	765
HDR – High Density Residential	74.63	1,612
GC – General Commercial	0	
CMU – Community Commercial Mixed Use	48.8	
CP – Commerce Park (Mix of Office, GC, R&D & LI)	347.93	
PF – Public Facilities (City Facilities)	4.71	
PF – Public Facilities (Schools)	0	
UZ – University (CSU Campus)	251.2[(a)]	
PR – Parks & Recreation	17.1	
TOTAL	**1,001.49**	**3,186**

Footnote:

(a) Area size excludes open space area within the University property.

TREATMENT PLANT DESCRIPTION

The PGWWTP is owned and operated by the City of Roseville for the benefit of the SPWA. Wastewater flows from the PRSP and future SA offsite will be tributary to the PGWWTP. The flows will be conveyed by the proposed onsite transmission facilities and the proposed offsite facilities along Fiddyment Road that connects to the existing 30-inch sewer pipe stub constructed in Angus Road just north of Pleasant Grove Creek.

The SPWA uses ADWF volumes when analyzing wastewater treatment plant capacity. Per the Amoruso Ranch Specific Plan Final EIR dated May 2016, the PGWWTP currently treats approximately 7.4 MGD ADWF and 16.9 MGD PWWF (Buchanan, 2015). The PGWWTP is presently authorized to discharge treated effluent into Pleasant Grove Creek under the NPDES Permit No. CA0084573/WDR No. R5-2014-0051 adopted on March 28, 2014. Under the permit, the PGWWTP can discharge an ADWF of 12 MGD.

Today, the treatment plant has an existing capacity to treat up to 9.5 MGD of average dry weather flows, but is presently in the design phase to expand the plant's treatment capacity to 12 MGD. The Pleasant Grove Wastewater Treatment Plant Expansion project will likely begin construction late this year or by early 2018 (George Hansen, May 18, 2017).

III. SEWER MASTER PLAN METHODOLOGY

ANALYSIS PROCEDURE

The following procedure was used for the preliminary design and analysis of the sanitary sewer system proposed in the PRSP Sewer Master Plan:

- The primary wastewater sheds within the plan area were delineated.
- A sewer trunk system alignment was defined to collect wastewater flow within the PRSP area. The gravity sewer system was placed within the proposed road system shown on the Specific Plan Land Use Map.
- Node points were inserted into the sewer system alignment to define flow collection points within the sewer system.
- The primary wastewater sheds were subdivided into secondary sheds to determine tributary areas into the trunk system node points.
- Proposed land use acreages and EDUs within each secondary wastewater shed were tabulated.
- Wastewater flow, including average dry weather flow, factored flow, and peak wet weather flow were calculated at each node point using the design methodology defined in Appendix L Placer Ranch TM of the Systems Evaluation Report.
- Average dry weather flow was calculated using the Average Dry Weather Unit Flow Factors for the land use types within each secondary wastewater shed.
- Factored flows were calculated by multiplying average dry weather flow by a factor of safety of 2.0.
- Peak wet weather flow within the trunk system was calculated by summing factored flows at the nodes along the trunk system alignment and applying appropriate peaking factors from the Peaking Factor Curve shown in Figure 1 from Appendix L Placer Ranch TM of the Systems Evaluation Report.
- Trunk system pipe sizes were initially sized based on peak wet weather flow and pipe capacities based on minimum pipe slopes.

ANALYSIS PROCEDURE *(CONTINUED)*

- Trunk sewer pipes initially calculated to be 18-inches or larger were restudied and resized as appropriate using hydraulic modeling.
- Preliminary pipe inverts were calculated and compared to existing ground grades and conceptual finished grades to check the ability to serve the secondary sheds with gravity sewer pipe systems.

PIPELINE DESIGN

The proposed pipe size diameters were selected using the following pipe criteria:

- A Manning's "n" value of 0.013 was used for all pipe-sizing calculations per Placer County Land Development Manual, Section 6.
- Pipes 10-inches and less in diameter and pipes with lateral connections are designed to have a maximum depth of flow 70% of the pipe diameter.
- Pipes 12-inches and larger with no lateral connections are designed to flow full.
- Pipe sizes have been selected assuming pipes will be installed at minimum slopes. The minimum slope for a pipe is a slope that yields a minimum 2 feet per second velocity when flowing at design capacity.
- Pipe sizes determined from Placer County Land Development Manual, Section 6 Sewerage, Section 6.01 (5) – Minimum Sewer Slopes, and SPWA Report TM3a. The two criteria are consistent with one another.
- Pipes proposed to be placed deeper than 20 feet shall conform to the pipe manufacturer's construction recommendations and comply with the Placer County improvement standards.
- Pipes larger than 18" in diameter were modeled using hydraulic modeling software H2OMAP Sewer Suite 10.5, SP 1, Update #11; an Innovyze software.

IV. WASTEWATER FLOWS

AVERAGE DRY WEATHER FLOW

ADWF has been calculated using the average dry weather unit flow factors shown below in Table 1 of the Appendix L Placer Ranch Hydraulic Modeling TM of the System Evaluation Report dated December 2006.

Table 1 – Average Dry Weather Unit Flow Factors

Land Use Designation	Units	Flow Factor (gpd/unit)[1]
Commercial	gpd per acre	850
Heavy Industrial	gpd per acre	850
Light Industrial	gpd per acre	850
Mixed Use	gpd per acre	2,300
Public/Quasi-Public	gpd per acre	660
Schools	gpd per acre	170
Residential 1 DU	gpd per DU	190
Residential 2 DU	gpd per DU	190
Residential 3 DU	gpd per DU	190
Residential Multiple DU[2]	gpd per acre or gpd per DU	2,040 or 130
Open Space	gpd per acre	0
Parks > 10 Acres	gpd per acre	10
Vacant	gpd per acre	0

[1] Includes allowance for dry season GWI.
[2] Future development projects should use the factor that results in the highest flow .

As determined from the Technical Memorandum No. 2b from Appendix D of the Systems Evaluation Report dated September 2009 (refer to ***Attachment 3***), the Average Dry Weather Unit Flow Rate Factor for the university campus was derived by dividing the total flow projection for the university in the Placer Ranch UGA (0.68 MGD) by its corresponding acreage (295 acres), yielding 2,304 GPD/acre. Validation of the 2,304 GPD/acre flow rate factor has been confirmed to be logical and appropriate (refer to ***Attachment 4***).

AVERAGE DRY WEATHER FLOW *(CONTINUED)*

The Placer Ranch development will generate a total ADWF of 2.045 MGD. An additional ADWF of 3.23 MGD from future SA offsite flows will be conveyed through the PRSP area at three entry locations. **Figure 5 – Future SA Offsite Wastewater Flow Data** shows these three points of connection and the shed area boundaries included in the future SA offsite flow information provided by PSOMAS. A total ADWF of 5.28 MGD (2.045 MGD from Placer Ranch and 3.23 MGD from future SA offsite) is projected to be tributary to the Pleasant Grove Treatment Plant. A breakdown of the average dry weather flow for each land use of the PRSP is shown in **Table 6 - Average Dry Weather Flow Summary**.

Table 6 - Average Dry Weather Flow Summary

LAND USE	FLOW RATE	AREA SIZE (Acres)	EDUs	ADWF (MGD)
LDR – Low Density Residential	190 GPD/DU	538.9	2,759	0.524
MDR – Medium Density Residential	190 GPD/DU	132.3	1,057	0.201
HDR – High Density Residential	130 GPD/DU or 2040 GPD/AC	93.1	2,011	0.262
GC – General Commercial	850 GPD/AC	25.6		0.021
CMU – Community Commercial Mixed Use	2,300 GPD/AC	48.8		0.113
CP – Commerce Park (Mix of Office, GC, R&D & LI)	850 GPD/AC	395.5		0.336
PF – Public Facilities (City Facilities)	660 GPD/AC	5.5		0.004
PF – Public Facilities (Schools)	170 GPD/AC	31.96		0.005
UZ – University (CSU Campus)	2,304 GPD/AC [(a)]	251.2[(b)]		0.579
PR – Parks & Recreation	10 GPD/AC	50.7		0.0005
	PRSP TOTAL	**1,573.56**	**5,827**	**2.047**
	SA Offsite			**3.23** [(c)]
	PRSP + SA Offsite TOTAL			**5.275**

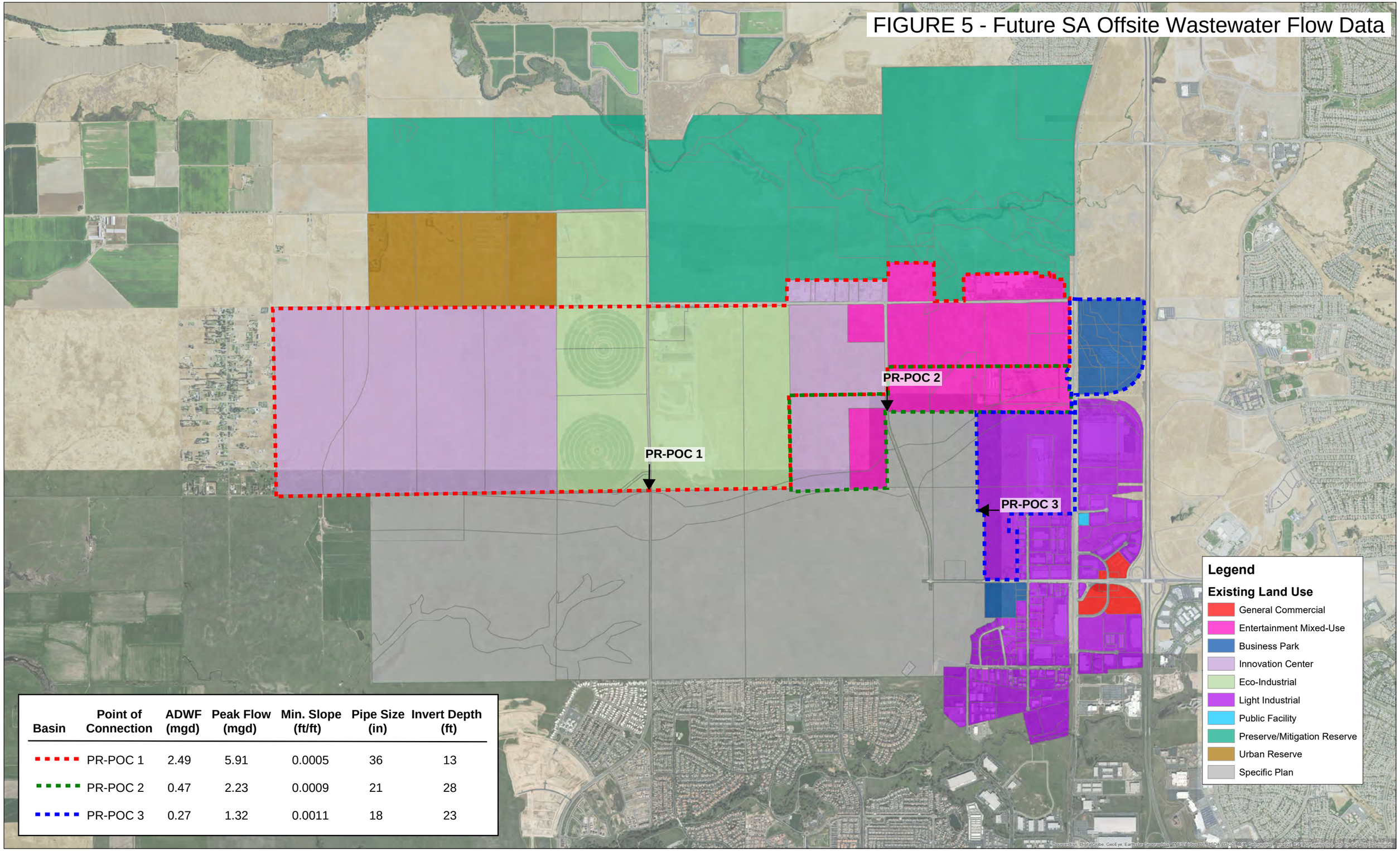
Footnotes:

(a) The unit flow rate factor for the university was derived by dividing the total flow projection for the university in the Placer Ranch UGA (0.68 mgd) by its corresponding acreage (295 acres), yielding 2,304 GPD/acre, as determined from the Technical Memorandum No. 2b from Appendix D of the South Placer Regional Wastewater and Recycled Water Systems Evaluation. For supporting documents that verify the flow rate factor, refer to documents in **Attachment 4**.

(b) Area size excludes open space area within the University property.

(c) Future SA offsite wastewater flow provided by PSOMAS. Refer to **Figure 5**.

FIGURE 5 - Future SA Offsite Wastewater Flow Data



Basin	Point of Connection	ADWF (mgd)	Peak Flow (mgd)	Min. Slope (ft/ft)	Pipe Size (in)	Invert Depth (ft)
	PR-POC 1	2.49	5.91	0.0005	36	13
	PR-POC 2	0.47	2.23	0.0009	21	28
	PR-POC 3	0.27	1.32	0.0011	18	23

PSOMAS

Sunset Area Sewer System

AVERAGE DRY WEATHER FLOW *(CONTINUED)*

A breakdown of the average dry weather flows for each scenario and wastewater shed is shown in the following tables:

- **Table 7 - PRSP ADWF Summary Western Wastewater Shed for Scenarios 1 & 2**
- **Table 8 - PRSP + Future SA Offsite ADWF Summary Central Shed for Scenario 1**
- **Table 9 - PRSP ADWF Summary Eastern Wastewater Shed for Scenario 1**
- **Table 10 – PRSP + Future SA Offsite ADWF Summary Eastern Shed for Scenario 2**

Table 7 – PRSP ADWF Summary, Western Wastewater Shed for Scenarios 1 & 2

LAND USE	FLOW RATE	AREA SIZE (Acres)	EDUs	ADWF (MGD)
LDR – Low Density Residential	190 GPD/DU	377.5	1,952	0.371
MDR – Medium Density Residential	190 GPD/DU	36.6	292	0.055
HDR – High Density Residential	130 GPD/DU or 2040 GPD/AC	18.4	397	0.052
GC – General Commercial	850 GPD/AC	25.6		0.022
CMU – Community Commercial Mixed Use	2,300 GPD/AC			
CP – Commerce Park (Mix of Office, GC, R&D & LI)	850 GPD/AC	47.6		0.04
PF – Public Facilities (City Facilities)	660 GPD/AC	0.77		0.001
PF – Public Facilities (Schools)	170 GPD/AC	32.0		0.005
UZ – University (CSU Campus)	2,304 GPD/AC [(a)]			
PR – Parks & Recreation	10 GPD/AC	37.8		0.0004
	TOTAL	**576.18**	**2,641**	**0.546**

Footnotes:

(a) The unit flow rate factor for the university was derived by dividing the total flow projection for the university in the Placer Ranch UGA (0.68 mgd) by its corresponding acreage (295 acres), yielding 2,304 GPD/acre, as determined from the Technical Memorandum No. 2b from Appendix D of the South Placer Regional Wastewater and Recycled Water Systems Evaluation. For supporting documents that verify the flow rate factor, refer to documents in **Attachment 4**.

Table 8 – PRSP + Future SA Offsite ADWF Summary, Central Shed for Scenario 1

LAND USE	FLOW RATE	AREA SIZE (Acres)	EDUs	ADWF (MGD)
LDR – Low Density Residential	190 GPD/DU	161.42	809	0.154
MDR – Medium Density Residential	190 GPD/DU	55.61	445	0.085
HDR – High Density Residential	130 GPD/DU or 2040 GPD/AC	36.16	782	0.102
GC – General Commercial	850 GPD/AC			
CMU – Community Commercial Mixed Use	2,300 GPD/AC	33.75		0.078
CP – Commerce Park (Mix of Office, GC, R&D & LI)	850 GPD/AC	309.92		0.263
PF – Public Facilities (City Facilities)	660 GPD/AC	0.81		0.0005
PF – Public Facilities (Schools)	170 GPD/AC			
UZ – University (CSU Campus)	2,304 GPD/AC [(a)]	251.2[(b)]		0.579
PR – Parks & Recreation	10 GPD/AC	17.11		0.0002
	PRSP TOTAL	**865.98**	**2,034**	**1.262**
	Offsite SA			**3.23** [(c)]
	PRSP + SA Offsite TOTAL			**4.492**

Footnotes:

(a) The unit flow rate factor for the university was derived by dividing the total flow projection for the university in the Placer Ranch UGA (0.68 mgd) by its corresponding acreage (295 acres), yielding 2,304 GPD/acre, as determined from the Technical Memorandum No. 2b from Appendix D of the South Placer Regional Wastewater and Recycled Water Systems Evaluation. For supporting documents that verify the flow rate factor, refer to documents in **Attachment 4**.

(b) Area size excludes open space area within the University property.

(c) Future SA offsite wastewater flow provided by PSOMAS. Refer to **Figure 5**.

Table 9 – PRSP ADWF Summary, Eastern Wastewater Shed for Scenario 1

LAND USE	FLOW RATE	AREA SIZE (Acres)	EDUs	ADWF (MGD)
LDR – Low Density Residential	190 GPD/DU			
MDR – Medium Density Residential	190 GPD/DU	40.09	320	0.061
HDR – High Density Residential	130 GPD/DU or 2040 GPD/AC	38.47	831	0.108
GC – General Commercial	850 GPD/AC			
CMU – Community Commercial Mixed Use	2,300 GPD/AC	15.05		0.035
CP – Commerce Park (Mix of Office, GC, R&D & LI)	850 GPD/AC	38.01		0.032
PF – Public Facilities (City Facilities)	660 GPD/AC	3.9		0.003
PF – Public Facilities (Schools)	170 GPD/AC			
UZ – University (CSU Campus)	2,304 GPD/AC			
PR – Parks & Recreation	10 GPD/AC			
	TOTAL	**135.52**	**1,152**	**0.239**

Table 10 – PRSP + Future SA Offsite ADWF Summary, Eastern Shed for Scenario 2

LAND USE	FLOW RATE	AREA SIZE (Acres)	EDUs	ADWF (MGD)
LDR – Low Density Residential	190 GPD/DU	161.42	809	0.154
MDR – Medium Density Residential	190 GPD/DU	95.7	765	0.146
HDR – High Density Residential	130 GPD/DU or 2040 GPD/AC	74.63	1,612	0.210
GC – General Commercial	850 GPD/AC			
CMU – Community Commercial Mixed Use	2,300 GPD/AC	48.8		0.112
CP – Commerce Park (Mix of Office, GC, R&D & LI)	850 GPD/AC	347.93		0.296
PF – Public Facilities (City Facilities)	660 GPD/AC	4.71		0.003
PF – Public Facilities (Schools)	170 GPD/AC			
UZ – University (CSU Campus)	2,304 GPD/AC [(a)]	251.2[(b)]		0.579
PR – Parks & Recreation	10 GPD/AC	17.11		0.0002
	PRSP TOTAL	**1,001.49**	**3,186**	**1.50**
	SA Offsite			**3.23** [(c)]
	PRSP + SA Offsite TOTAL			**4.73**

Footnotes:

(a) The unit flow rate factor for the university was derived by dividing the total flow projection for the university in the Placer Ranch UGA (0.68 mgd) by its corresponding acreage (295 acres), yielding 2,304 GPD/acre, as determined from the Technical Memorandum No. 2b from Appendix D of the South Placer Regional Wastewater and Recycled Water Systems Evaluation. For supporting documents that verify the flow rate factor, refer to documents in **Attachment 4**.

(b) Area size excludes open space area within the University property.

(c) Future SA offsite wastewater flow provided by PSOMAS. Refer to **Figure 5**.

AVERAGE DRY WEATHER FLOW *(CONTINUED)*

FACTORED FLOW

Factored wastewater flows were used in the design process to calculate the PWWF. Factored flows are determined by multiplying ADWF by a factor of 2.0. To obtain the PWWF, the factored flows are then multiplied by peaking factors extrapolated from Figure 1 within TM No. 3a of the Systems Evaluation Report dated October 2006.

PEAK WET WEATHER FLOW

For sanitary sewer pipes up to 15-inches in diameter, the PWWF was determined using ADWF, factored flows, and peaking factors described above. For sanitary sewer pipes calculated with diameters 18-inches and larger, the PWWF and pipe sizes have been calculated using hydraulic modeling prepared by HydroScience Engineers, Inc. The results of the hydraulic modeling are presented in **Attachment 1 – Placer Ranch Wastewater Collection System Modeling dated July 17, 2017**.

The peak wet weather flows by node are shown in the following tables:

- **Table 11 – Western Wastewater Shed Flows by Node for Scenario 1 & Scenario 2**
- **Table 12 – Central Wastewater Shed Flows by Node for Scenario 1 (PRSP Only)**
- **Table 13 – Central Wastewater Shed Flows by Node for Scenario 1 (PRSP + Future SA Offsite)**
- **Table 14 – Eastern Wastewater Shed Flows by Node for Scenario 1**
- **Table 15 – Eastern Wastewater Shed Flows by Node for Scenario 2 (PRSP Only)**
- **Table 16 – Eastern Wastewater Shed Flows by Node for Scenario 2 (PRSP + Future SA Offsite)**

AVERAGE DRY WEATHER FLOW *(CONTINUED)*

Wastewater flow data for each node are depicted graphically on the following exhibits:

- **Exhibit A - Sanitary Sewer Master Plan Western Shed (Scenarios 1 & 2)**
- **Exhibit B – Scenario 1 Sanitary Sewer Master Plan, PRSP Only (Base Condition) Central & Eastern Sheds**
- **Exhibit C - Scenario 1 Sanitary Sewer Master Plan PRSP + Future SA Offsite Central & Eastern Sheds**
- **Exhibit D - Scenario 2 Sanitary Sewer Master Plan PRSP Only (Base Condition) Eastern Shed**
- **Exhibit E - Scenario 2 Sanitary Sewer Master Plan PRSP + Future SA Offsite Eastern Shed**
- **Exhibit F - Scenario 1-LS Sanitary Sewer Master Plan PRSP Only (Base Condition) Central & Eastern Sheds**
- **Exhibit G - Scenario 1-LS Sanitary Sewer Master Plan PRSP + Future SA Offsite Central & Eastern Sheds**
- **Exhibit H - Scenario 2-LS Sanitary Sewer Master Plan PRSP Only (Base Condition) Eastern Shed**
- **Exhibit I - Scenario 2-LS Sanitary Sewer Master Plan PRSP + Future SA Offsite Eastern Shed**

Table 11 - Western Wastewater Shed Flows by Node for Scenario 1 & Scenario 2
Placer Ranch Specific Plan

Reference	Contributing	LDR (190 GPD / DU)				MDR (190 GPD / DU)				HDR (130 GPD / DU or 2040 GPD / AC)				CMU (2300 GPD / ACRE)			GC, CP (850 GPD / AC)			PF (School) (170 GPD / AC)			PF (County Facilities) (660 GPD / AC)			PR (Parks & Recreation) (10 GPD / ACRE)			Total	Factored	Peaking	Total	Pipe	Pipe	% Full
Node	Node	Area	DU	Cum. DU	Q-ADWF	Area	DU	CUM. DU	Q-ADWF	Area	DU	CUM. DU	Q-ADWF	Area	Cum. Area	Q-ADWF	Area	Cum. Area	Q-ADWF	Area	Cum. Area	Q-ADWF	Area	Cum. Area	Q-ADWF	Area	Cum. Area	Q-ADWF	Q-ADWF	Flow	Factor	Q-PWWF	Size	Slope	Q-PWWF
		(Acre)			(MGD)	(Acre)			(MGD)	(Acre)			(MGD)	(Acre)	(Acre)	(MGD)	(Acre)	(Acre)	(MGD)	(Acre)	(Acre)	(MGD)	(Acre)	(Acre)	(MGD)	(Acre)	(Acre)	(MGD)	(MGD)	(MGD)		(MGD)	(inch)	(Ft/Ft)	(d/D)
115																	21.5	21.5	0.018										0.018	0.036	3.48	0.125	6	0.0070	41.8
116																	48.2	48.2	0.041										0.041	0.082	3.29	0.270	8	0.0070	49.7
115	116																	48.2	0.041										0.041	0.082	3.29	0.270	8	0.0035	49.7
113	115																	69.7	0.059							20.9	20.9	0.000	0.059	0.118	3.17	0.374	8	0.0035	68.9
112	113																3.6	73.2	0.062								20.9	0.000	0.062	0.124	3.15	0.391	10	0.0025	46.3
111	112																	73.2	0.062	21.3	21.3	0.004					20.9	0.000	0.066	0.132	3.12	0.412	10	0.0025	48.9
110	111									10.2	221	221	0.029					73.2	0.062		21.3	0.004				0.6	21.4	0.000	0.095	0.190	2.96	0.562	12	0.0020	55.1
109	110					8.3	66	66	0.013			221	0.029					73.2	0.062		21.3	0.004					21.4	0.000	0.108	0.216	2.89	0.624	12	0.0020	61.2
119		31.0	170	170	0.032																								0.032	0.064	3.37	0.216	8	0.0070	39.7
118	119			170	0.032																								0.032	0.064	3.37	0.216	8	0.0035	39.7
118		32.7	163	163	0.031																					0.6	0.6	0.000	0.031	0.062	3.37	0.209	6	0.0070	69.6
117	118			333	0.063																						0.6	0.000	0.063	0.126	3.14	0.396	10	0.0025	46.9
109	117	10.3	51	384	0.073	10.4	83	83	0.016																		0.6	0.000	0.089	0.178	2.99	0.532	12	0.0020	52.2
108	109	47.6	238	622	0.118			149	0.028			221	0.029					73.2	0.062		21.3	0.004					22.1	0.000	0.241	0.482	2.47	1.191	15	0.0015	73.9
107	108			622	0.118			149	0.028			221	0.029					73.2	0.062		21.3	0.004					22.1	0.000	0.241	0.482	2.47	1.191	15	0.0015	73.9
102	107			821	0.156			149	0.028			221	0.029					73.2	0.062		21.3	0.004					22.1	0.000	0.279	0.558	2.43	1.356	15	0.0015	84.2
104		13.9	70	70	0.013																								0.013	0.026	3.52	0.092	6	0.0070	30.5
105		18.0	90	90	0.017																								0.017	0.034	3.49	0.119	6	0.0070	39.6
105	104			70	0.013																								0.013	0.026	3.52	0.092	8	0.0035	16.9
103	105			160	0.030															10.7	10.7	0.002				3.0	0.0	0.000	0.032	0.064	3.37	0.216	8	0.0035	39.7
102	103			160	0.030																10.7	0.002					0.0	0.000	0.032	0.064	3.37	0.216	8	0.0035	39.7
114		18.4	92	92	0.017																								0.017	0.034	3.49	0.119	6	0.0070	39.6
106	114	21.4	107	199	0.038																								0.038	0.076	3.32	0.252	8	0.0035	46.5
107	106			199	0.038																								0.038	0.076	3.32	0.252	8	0.0035	46.5
101	102	20.7	103	1084	0.206			149	0.028			221	0.029					73.2	0.062		32.0	0.005					22.1	0.000	0.330	0.660	2.39	1.577	18	0.0012	67.1
120										8.2	176	176	0.023																0.023	0.046	3.45	0.159	6	0.0070	52.9
121	120	16.0	80	80	0.015							176	0.023													1.2	1.2	0.000	0.038	0.076	3.32	0.252	8	0.0035	46.5
122	121			80	0.015	17.9	143	143	0.027			176	0.023													0.6	1.8	0.000	0.065	0.130	3.13	0.407	10	0.0025	48.3
123	122			80	0.015			143	0.027			176	0.023														1.8	0.000	0.065	0.130	3.13	0.407	10	0.0025	48.3
124	123			80	0.015			143	0.027			176	0.023													9.7	11.5	0.000	0.065	0.130	3.13	0.407	10	0.0025	48.3
125	124	26.3	132	212	0.040			143	0.027			176	0.023														11.5	0.000	0.090	0.180	2.98	0.536	10	0.0025	63.6
127		100.1	550	550	0.105																								0.105	0.210	2.96	0.622	12	0.0060	60.9
126	127			550	0.105																								0.105	0.210	2.96	0.622	12	0.0020	60.9
125	126	21.1	106	656	0.125																		0.2	0.2	0.0002	1.2	1.2	0.000	0.125	0.250	2.85	0.714	12	0.0020	70.0
101	125			868	0.165			143	0.027			176	0.023											0.2	0.0002		12.8	0.000	0.215	0.430	2.53	1.089	18	0.0012	46.3
100	101			1952	0.371			292	0.055			397	0.052					73.2	0.062		32.0	0.005	0.5	0.8	0.0005		34.8	0.00035	0.546	NA	NA	1.330	18	0.0012	57.0

Table 12 - Central Wastewater Shed Flows by Node for Scenario 1 (PRSP Only)
Placer Ranch Specific Plan

REFERENCE NODE	CONTRI-BUTING NODE	LDR (190 GPD / DU)				MDR (190 GPD / DU)				HDR (130 GPD / DU or 2040 GPD / AC)				CMU (2300 GPD / ACRE)			GC, CP (850 GPD / AC)			UZ (University) (2,304 GPD / AC)			PF (Public Facilities) (660 GPD / AC)			PR (Parks & Recreation) (10 GPD / ACRE)			TOTAL Q-ADWF (MGD)	FACTORED FLOW (MGD)	PEAKING FACTOR	TOTAL Q-PWWF (MGD)	PIPE SIZE (IN.)	PIPE SLOPE (FT/FT)	% FULL Q-PWWF (d/D)
		AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)							
236																	26.4	26.4	0.022										0.022	0.044	3.45	0.152	6	0.0050	28.0
234	236																26.9	53.3	0.045										0.045	0.090	3.27	0.294	8	0.0035	54.2
235																	33.9	33.9	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
234	235																	33.9	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
233	234																57.8	145.1	0.123										0.123	0.246	2.81	0.691	12	0.0020	67.8
232	233																	145.1	0.123										0.123	0.246	2.81	0.691	12	0.0020	67.8
230																	4.5	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
231	230																	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
232	231																17.6	22.1	0.019										0.019	0.038	3.48	0.132	8	0.0035	24.4
228	232									7.2	155	155	0.020					167.2	0.142										0.162	0.324	2.64	0.855	12	0.0020	83.9
229																	23.8	23.8	0.020										0.020	0.040	3.47	0.139	6	0.0050	46.3
228	229													7.9	7.9	0.018		23.8	0.020										0.038	0.076	3.32	0.252	8	0.0035	46.5
227	228											155	0.020		7.9	0.018		190.9	0.162										0.200	0.400	2.54	1.016	12	0.0020	99.6
226	227									7.2	156	311	0.040		7.9	0.018		190.9	0.162										0.220	0.440	2.50	1.100	15	0.0015	68.3
225																										3.6	3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
226	225																										3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
216	226											311	0.040		7.9	0.018		190.9	0.162								3.6	0.000	0.220	0.440	2.50	1.100	15	0.0015	68.3
223																				28.1	28.1	0.065							0.065	0.130	3.13	0.407	10	0.0025	48.3
222	223																12.9	12.9	0.011		28.1	0.065							0.076	0.152	3.06	0.465	10	0.0025	55.2
221	222																11.0	23.8	0.020		28.1	0.065							0.085	0.170	3.01	0.512	10	0.0025	60.7
224																	10.4	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
221	224																	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
220	221																	34.2	0.029		28.1	0.065							0.094	0.188	2.96	0.556	10	0.0025	66.0
219	220													4.1	4.1	0.009		34.2	0.029		28.1	0.065							0.103	0.206	2.91	0.599	12	0.0020	58.8
216	219													21.8	25.8	0.059		34.2	0.029	27.2	55.3	0.127							0.215	0.430	2.51	1.079	15	0.0015	67.0
218										5.7	122	122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
217	218											122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
216	217									16.1	348	470	0.061																0.061	0.122	3.15	0.384	8	0.0035	70.8
210	216											781	0.102		33.8	0.078		225.1	0.191		55.3	0.127					3.6	0.000	0.498	NA	NA	1.000	18	0.0012	59.0
215						11.3	91	91	0.017																	9.5	9.5	0.000	0.017	0.034	3.49	0.119	6	0.0050	39.6
214	215							91	0.017																		9.5	0.000	0.017	0.034	3.49	0.119	6	0.0050	39.6
213	214					15.2	121	212	0.040																		9.5	0.000	0.040	0.080	3.30	0.264	8	0.0035	48.6
212	213	10.0	50	50	0.010			212	0.040																		9.5	0.000	0.050	0.100	3.22	0.322	8	0.0035	59.3
211	212			50	0.010	9.7	78	290	0.055																		9.5	0.000	0.065	0.130	3.13	0.407	10	0.0025	48.3
210	211	27.9	140	190	0.036	11.5	92	382	0.073																		9.5	0.000	0.109	0.218	2.88	0.628	12	0.0020	61.6
209	210			190	0.036			382	0.073			781	0.102		33.8	0.078		225.1	0.191	32.0	87.3	0.201					13.1	0.000	0.681	NA	NA	1.320	18	0.0012	60.0
208	209	30.5	153	343	0.065			382	0.073			781	0.102		33.8	0.078		225.1	0.191	69.5	156.8	0.361	0.3	0.3	0.0002	4.0	17.1	0.000	0.870	NA	NA	1.760	21	0.0010	55.0
207	208	56.3	282	625	0.119			382	0.073			781	0.102		33.8	0.078		225.1	0.191		156.8	0.361		0.3	0.0002		17.1	0.000	0.924	NA	NA	1.840	21	0.0010	57.0
202	207			625	0.119			382	0.073			781	0.102		33.8	0.078		225.1	0.191		156.8	0.361	0.6	0.8	0.0005		17.1	0.000	0.925	NA	NA	1.840	21	0.0010	57.0
206																	14.4	14.4	0.012										0.012	0.024	3.52	0.084	6	0.0050	28.2
205	206																19.6	34.0	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
204	205																35.2	69.3	0.059	41.7	41.7	0.096							0.155	0.310	2.67	0.828	12	0.0020	81.1
203	204																	69.3	0.059		41.7	0.096							0.155	0.310	2.67	0.828	12	0.0020	81.1
202	203																15.5	84.8	0.072	52.7	94.4	0.217							0.289	0.578	2.42	1.399	15	0.0015	86.9
201		36.8	184	184	0.035																								0.035	0.070	3.35	0.235	8	0.0050	43.2
202	201			184	0.035	7.9	63	63	0.012																				0.047	NA	NA	1.430	18	0.0012	53.0
200	202			809	0.154			445	0.085			781	0.102		33.8	0.078		309.9	0.263		251.2	0.579		0.8	0.0005		17.1	0.000	1.262	NA	NA	3.510	27	0.0007	59.0
400	200			809	0.154			445	0.085			781	0.102		33.8	0.078		309.9	0.263		251.2	0.579		0.8	0.0005		17.1	0.000	1.262	NA	NA	3.440	27	0.0007	59.0

Table 13 - Central Wastewater Shed Flows by Node for Scenario 1 (PRSP + Future SIA Offsite)
Placer Ranch Specific Plan

REFERENCE NODE	CONTRI-BUTING NODE	LDR (190 GPD / DU)				MDR (190 GPD / DU)				HDR (130 GPD / DU or 2040 GPD / AC)				CMU (2300 GPD / ACRE)			GC, CP (850 GPD / AC)			UZ (University) (2,304 GPD / AC)			PF (Public Facilities) (660 GPD / AC)			PR (Parks & Recreation) (10 GPD / ACRE)			TOTAL Q-ADWF (MGD)	FACTORED FLOW (MGD)	PEAKING FACTOR	TOTAL Q-PWWF (MGD)	PIPE SIZE (IN.)	PIPE SLOPE (FT/FT)	% FULL Q-PWWF (d/D)
		AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)							
500																													2.490	N/A	N/A	5.910	36	0.00045	58.5
600																													0.470	N/A	N/A	2.230	21	0.0010	60.9
700																													0.270	N/A	N/A	1.320	18	0.0012	53.5
236																	26.4	26.4	0.022										0.022	0.044	3.45	0.152	6	0.0050	28.0
234	236																26.9	53.3	0.045										0.045	0.090	3.27	0.294	8	0.0035	54.2
234	700																33.9	33.9	0.029										0.299	0.058	3.39	1.517	18	0.0012	64.5
233	600																												0.470	N/A	N/A	2.230	21	0.0010	60.9
233	234																57.8	145.1	0.123										0.393	0.246	2.81	2.011	18	0.0012	85.6
232	233																	145.1	0.123										0.863	NA	NA	1.930	21	0.0010	56.0
230																	4.5	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
231	230																	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
232	231																17.6	22.1	0.019										0.019	0.038	3.48	0.132	8	0.0035	24.4
228	232									7.2	155	155	0.020					167.2	0.142										0.902	NA	NA	1.990	21	0.0010	58.0
229																	23.8	23.8	0.020										0.020	0.040	3.47	0.139	6	0.0050	46.3
228	229													7.9	7.9	0.018		23.8	0.020										0.038	0.076	3.32	0.252	8	0.0035	46.5
227	228											155	0.020		7.9	0.018		190.9	0.162										0.940	NA	NA	2.070	21	0.0010	59.0
226	227									7.2	156	311	0.040		7.9	0.018		190.9	0.162										0.960	NA	NA	2.100	21	0.0010	60.0
225																										3.6	3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
226	225																										3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
216	226											311	0.040		7.9	0.018		190.9	0.162								3.6	0.000	0.960	NA	NA	2.100	21	0.0010	58.0
223																				28.1	28.1	0.065							0.065	0.130	3.13	0.407	10	0.0025	48.3
222	223																12.9	12.9	0.011		28.1	0.065							0.076	0.152	3.06	0.465	10	0.0025	55.2
221	222																11.0	23.8	0.020		28.1	0.065							0.085	0.170	3.01	0.512	10	0.0025	60.7
224																	10.4	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
221	224																	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
220	221																	34.2	0.029		28.1	0.065							0.094	0.188	2.96	0.556	10	0.0025	66.0
219	220													4.1	4.1	0.009		34.2	0.029		28.1	0.065							0.103	0.206	2.91	0.599	12	0.0020	58.8
216	219													21.8	25.8	0.059		34.2	0.029	27.2	55.3	0.127							0.215	0.430	2.51	1.079	15	0.0015	67.0
218										5.7	122	122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
217	218											122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
216	217									16.1	348	470	0.061																0.061	0.122	3.15	0.384	8	0.0035	70.8
210	216											781	0.102		33.8	0.078		225.1	0.191		55.3	0.127					3.6	0.000	1.238	NA	NA	2.630	24	0.0008	68.0
215						11.3	91	91	0.017																	9.5	9.5	0.000	0.017	0.034	3.49	0.119	6	0.0050	39.6
214	215							91	0.017																		9.5	0.000	0.017	0.034	3.49	0.119	6	0.0050	39.6
213	214					15.2	121	212	0.040																		9.5	0.000	0.040	0.080	3.30	0.264	8	0.0035	48.6
212	213	10.0	50	50	0.010			212	0.040																		9.5	0.000	0.050	0.100	3.22	0.322	8	0.0035	59.3
211	212			50	0.010	9.7	78	290	0.055																		9.5	0.000	0.065	0.130	3.13	0.407	10	0.0025	48.3
210	211	27.9	140	190	0.036	11.5	92	382	0.073																		9.5	0.000	0.109	0.218	2.88	0.628	12	0.0020	61.6
209	210			190	0.036			382	0.073			781	0.102		33.8	0.078		225.1	0.191	32.0	87.3	0.201					13.1	0.000	1.421	NA	NA	2.940	24	0.0008	61.0
208	209	30.5	153	343	0.065			382	0.073			781	0.102		33.8	0.078		225.1	0.191	69.5	156.8	0.361	0.3	0.3	0.000	4.0	17.1	0.000	1.610	NA	NA	3.380	24	0.0008	67.0
207	208	56.3	282	625	0.119			382	0.073			781	0.102		33.8	0.078		225.1	0.191		156.8	0.361		0.3	0.000		17.1	0.000	1.664	NA	NA	3.440	24	0.0008	68.0
202	207			625	0.119			382	0.073			781	0.102		33.8	0.078		225.1	0.191		156.8	0.361	0.6	0.8	0.001		17.1	0.000	1.665	NA	NA	3.390	24	0.0008	67.0
206																	14.4	14.4	0.012										0.012	0.024	3.52	0.084	6	0.0050	28.2
205	206																19.6	34.0	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
204	205																35.2	69.3	0.059	41.7	41.7	0.096							0.155	0.310	2.67	0.828	12	0.0020	81.1
204	500																												2.490	N/A	N/A	5.910	36	0.00045	58.5
203	204																	69.3	0.059		41.7	0.096							2.645	0.310	2.67	6.738	36	0.00045	73.7
202	203																15.5	84.8	0.072	52.7	94.4	0.217							2.779	0.578	2.42	7.309	36	0.00045	80.0
201		36.8	184	184	0.035																								0.035	0.070	3.35	0.235	8	0.0050	43.2
202	201			184	0.035	7.9	63	63	0.012																				0.047	NA	NA	1.430	18	0.0012	60.0
200	202			809	0.154			445	0.085			781	0.102		33.8	0.078		309.9	0.263		251.2	0.579		0.8	0.001		17.1	0.000	4.492	NA	NA	9.830	42	0.00045	54.0
400	200			809	0.154			445	0.085			781	0.102		33.8	0.078		309.9	0.263		251.2	0.579		0.8	0.001		17.1	0.000	4.492	NA	NA	9.880	42	0.00045	54.0

Table 14 - Eastern Wastewater Shed Flows by Node for Scenario 1
Placer Ranch Specific Plan

REFERENCE NODE	CONTRI-BUTING NODE	LDR (190 GPD / DU)				MDR (190 GPD / DU)				HDR (130 GPD / DU or 2040 GPD / AC)				CMU (2300 GPD / ACRE)			GC, CP (850 GPD / AC)			PF (School) (170 GPD / AC)			PF (County Facilities) (660 GPD / AC)			PR (Parks & Recreation) (10 GPD / ACRE)			TOTAL Q-ADWF (MGD)	FACTORED FLOW (MGD)	PEAKING FACTOR	TOTAL Q-PWWF (MGD)	PIPE SIZE (IN.)	PIPE SLOPE (FT/FT)	% FULL Q-PWWF (d/D)
		AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM AREA (ACRE)	Q-ADWF (MGD)							
310										15.8	341	341	0.044																0.044	0.088	3.28	0.289	8	0.0035	53.2
309	310											341	0.044																0.044	0.088	3.28	0.289	8	0.0035	53.2
308	309											341	0.044	7.6	7.6	0.017													0.061	0.122	3.15	0.384	10	0.0025	45.6
306	308											341	0.044	7.5	15.1	0.035													0.079	0.158	3.05	0.482	10	0.0128	57.2
307																	13.4	13.4	0.011										0.011	0.022	3.53	0.078	6	0.0050	25.9
306	307																13.2	26.6	0.023										0.023	0.046	3.45	0.159	6	0.0050	52.9
303	306											341	0.044		15.1	0.035		26.6	0.023										0.102	0.204	2.92	0.596	12	0.0020	58.4
305										11.4	247	247	0.032																0.032	0.064	3.37	0.216	8	0.0035	39.7
304	305											247	0.032																0.032	0.064	3.37	0.216	8	0.0035	39.7
303	304									11.2	243	490	0.064																0.064	0.128	3.14	0.402	10	0.0025	47.7
301	303					29.8	238	238	0.045			831	0.108		15.1	0.035		26.6	0.023										0.211	0.422	2.52	1.063	18	0.0012	45.3
302																							3.9	3.9	0.003				0.003	0.006	3.61	0.022	6	0.0050	7.2
301	302																11.4	11.4	0.010					3.9	0.003				0.013	0.026	3.52	0.092	6	0.0050	30.5
300	301					10.3	82	320	0.061			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003				0.239	0.478	2.47	1.181	18	0.0012	50.2

Table 15 - Eastern Wastewater Shed Flows by Node for Scenario 2 (PRSP Only)
Placer Ranch Specific Plan

REFERENCE NODE	CONTRI-BUTING NODE	LDR (190 GPD / DU)				MDR (190 GPD / DU)				HDR (130 GPD / DU or 2040 GPD / AC)				CMU (2300 GPD / ACRE)			GC, CP (850 GPD / AC)			UZ (University) (2,304 GPD / AC)			PF (Public Facilities) (660 GPD / AC)			PR (Parks & Recreation) (10 GPD / ACRE)			TOTAL Q-ADWF (MGD)	FACTORED FLOW (MGD)	PEAKING FACTOR	TOTAL Q-PWWF (MGD)	PIPE SIZE (IN.)	PIPE SLOPE (FT/FT)	% FULL Q-PWWF (d/D)
		AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)							
236																	26.4	26.4	0.022										0.022	0.044	3.45	0.152	6	0.0050	28.0
234	236																26.9	53.3	0.045										0.045	0.090	3.27	0.294	8	0.0035	54.2
235																	33.9	33.9	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
234	235																	33.9	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
233	234																57.8	145.1	0.123										0.123	0.246	2.81	0.691	12	0.0020	67.8
232	233																	145.1	0.123										0.123	0.246	2.81	0.691	12	0.0020	67.8
230																	4.5	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
231	230																	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
232	231																17.6	22.1	0.019										0.019	0.038	3.48	0.132	8	0.0035	24.4
228	232									7.2	155	155	0.020					167.2	0.142										0.162	0.324	2.64	0.855	12	0.0020	83.9
229																	23.8	23.8	0.020										0.020	0.040	3.47	0.139	6	0.0050	46.3
228	229													7.9	7.9	0.018		23.8	0.020										0.038	0.076	3.32	0.252	8	0.0035	46.5
227	228											155	0.020		7.9	0.018		190.9	0.162										0.200	0.400	2.54	1.016	12	0.0020	99.6
226	227									7.2	156	311	0.040		7.9	0.018		190.9	0.162										0.220	0.440	2.50	1.100	15	0.0015	68.3
225																										3.6	3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
226	225																										3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
216	226											311	0.040		7.9	0.018		190.9	0.162								3.6	0.000	0.220	0.440	2.50	1.100	15	0.0015	68.3
223																				28.1	28.1	0.065							0.065	0.130	3.13	0.407	10	0.0025	48.3
222	223																12.9	12.9	0.011		28.1	0.065							0.076	0.152	3.06	0.465	10	0.0025	55.2
221	222																11.0	23.8	0.020		28.1	0.065							0.085	0.170	3.01	0.512	10	0.0025	60.7
224																	10.4	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
221	224																	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
220	221																	34.2	0.029		28.1	0.065							0.094	0.188	2.96	0.556	10	0.0025	66.0
219	220													4.1	4.1	0.009		34.2	0.029		28.1	0.065							0.103	0.206	2.91	0.599	12	0.0020	58.8
216	219													21.8	25.8	0.059		34.2	0.029	27.2	55.3	0.127							0.215	0.430	2.51	1.079	15	0.0015	67.0
218										5.7	122	122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
217	218											122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
216	217									16.1	348	470	0.061																0.061	0.122	3.15	0.384	8	0.0035	70.8
210	216											781	0.102		33.8	0.078		225.1	0.191		55.3	0.127					3.6	0.000	0.498	NA	NA	0.990	18	0.0012	59.0
310										15.8	341	341	0.044																0.044	0.088	3.28	0.289	8	0.0035	53.2
309	310											341	0.044																0.044	0.088	3.28	0.289	8	0.0035	53.2
308	309											341	0.044	7.6	7.6	0.017													0.061	0.122	3.15	0.384	10	0.0025	45.6
306	308											341	0.044	7.5	15.1	0.035													0.079	0.158	3.05	0.482	10	0.0025	57.2
307																	13.4	13.4	0.011										0.011	0.022	3.53	0.078	6	0.0050	25.9
306	307																13.2	26.6	0.023										0.023	0.046	3.45	0.159	6	0.0050	52.9
303	306											341	0.044		15.1	0.035		26.6	0.023										0.102	0.204	2.92	0.596	12	0.0020	58.4
305										11.4	247	247	0.032																0.032	0.064	3.37	0.216	8	0.0035	39.7
304	305											247	0.032																0.032	0.064	3.37	0.216	8	0.0035	39.7
303	304									11.2	243	490	0.064																0.064	0.128	3.14	0.402	10	0.0025	47.7
301	303					29.8	238	238	0.045			831	0.108		15.1	0.035		26.6	0.023										0.211	0.422	2.52	1.063	18	0.0012	45.3
215	301					10.3	82	320	0.061			831	0.108		15.1	0.035	11.4	38.0	0.032				3.9	3.9	0.003				0.239	0.478	2.47	1.181	18	0.0012	50.2
214	215					11.3	91	411	0.078			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003	9.5	9.5	0.000	0.256	0.512	2.45	1.254	18	0.0012	53.4
213	214					15.2	121	532	0.101			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.279	0.558	2.43	1.356	18	0.0012	57.7
212	213	10.0	50	50	0.010			532	0.101			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.289	0.578	2.42	1.399	18	0.0012	59.5
211	212			50	0.010	9.7	78	610	0.116			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.304	0.608	2.41	1.465	18	0.0012	62.4
210	211	27.9	140	190	0.036	11.5	92	702	0.134			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.348	0.696	2.38	1.656	18	0.0012	70.5
209	210			190	0.036			702	0.134			1612	0.210		48.8	0.112		263.1	0.224	32.0	87.3	0.201		3.9	0.003		13.1	0.000	0.920	NA	NA	1.670	18	0.0012	70.0
208	209	30.5	153	343	0.065			702	0.134			1612	0.210		48.8	0.112		263.1	0.224	69.5	156.8	0.361	0.3	4.2	0.003	4.0	17.1	0.000	1.109	NA	NA	2.100	21	0.0010	62.0
207	208	56.3	282	625	0.119			702	0.134			1612	0.210		48.8	0.112		263.1	0.224		156.8	0.361		4.2	0.003		17.1	0.000	1.163	NA	NA	2.180	21	0.0010	63.0
202	207			625	0.119			702	0.134			1612	0.210		48.8	0.112		263.1	0.224		156.8	0.361	0.6	4.7	0.003		17.1	0.000	1.163	NA	NA	2.180	21	0.0010	63.0
206																	14.4	14.4	0.012										0.012	0.024	3.52	0.084	6	0.0050	28.2
205	206																19.6	34.0	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
204	205																35.2	69.3	0.059	41.7	41.7	0.096							0.155	0.310	2.67	0.828	12	0.0020	81.1
203	204																	69.3	0.059		41.7	0.096							0.155	0.310	2.67	0.828	12	0.0020	81.1
202	203																15.5	84.8	0.072	52.7	94.4	0.217							0.289	0.578	2.42	1.399	15	0.0015	86.9
201		36.8	184	184	0.035																								0.035	0.070	3.35	0.235	8	0.0050	43.2
202	201			184	0.035	7.9	63	63	0.012																				0.047	NA	NA	1.440	18	0.0012	53.0
200	202			809	0.154			765	0.146			1612	0.210		48.8	0.112		347.9	0.296		251.2	0.579		4.7	0.003		17.1	0.000	1.500	NA	NA	3.780	27	0.0007	62.0
400	200			809	0.154			765	0.146			1612	0.210		48.8	0.112		347.9	0.296		251.2	0.579		4.7	0.003		17.1	0.000	1.500	NA	NA	3.800	27	0.0007	63.0

Table 16 - Eastern Wastewater Shed Flows by Node for Scenario 2 (PRSP + Future SIA Offsite)
Placer Ranch Specific Plan

REFERENCE NODE	CONTRIBUTING NODE	LDR (190 GPD / DU)				MDR (190 GPD / DU)				HDR (130 GPD / DU or 2040 GPD / AC)				CMU (2300 GPD / ACRE)			GC, CP (850 GPD / AC)			UZ (University) (2,304 GPD / AC)			PF (Public Facilities) (660 GPD / AC)			PR (Parks & Recreation) (10 GPD / ACRE)			TOTAL Q-ADWF (MGD)	FACTORED FLOW (MGD)	PEAKING FACTOR	TOTAL Q-PWWF (MGD)	PIPE SIZE (IN.)	PIPE SLOPE (FT/FT)	% FULL Q-PWWF (d/D)
		AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	DU	CUM. DU	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)	AREA (ACRE)	CUM. AREA (ACRE)	Q-ADWF (MGD)							
500																													2.490	N/A	N/A	5.910	36	0.00045	64.7
204	500																												2.490	N/A	N/A	5.910	36	0.00045	64.7
600																													0.470	N/A	N/A	2.230	21	0.0010	69.0
233	600																												0.470	N/A	N/A	2.230	21	0.0010	69.0
700																													0.270	N/A	N/A	1.320	18	0.0012	56.2
236																	26.4	26.4	0.022										0.022	0.044	3.45	0.152	6	0.0050	28.0
234	236																26.9	53.3	0.045										0.045	0.090	3.27	0.294	8	0.0035	54.2
234	700																33.9	33.9	0.029										0.299	0.058	3.39	1.517	18	0.0012	64.5
233	234																57.8	145.1	0.123										0.393	0.246	2.81	2.011	18	0.0012	85.6
232	233																	145.1	0.123										0.863	NA	NA	1.930	21	0.0010	56.0
230																	4.5	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
231	230																	4.5	0.004										0.004	0.008	3.59	0.029	8	0.0035	5.3
232	231																17.6	22.1	0.019										0.019	0.038	3.48	0.132	8	0.0035	24.4
228	232									7.2	155	155	0.020					167.2	0.142										0.902	NA	NA	1.990	21	0.0010	58.0
229																	23.8	23.8	0.020										0.020	0.040	3.47	0.139	6	0.0050	25.6
228	229													7.9	7.9	0.018		23.8	0.020										0.038	0.076	3.32	0.252	8	0.0035	46.5
227	228											155	0.020		7.9	0.018		190.9	0.162										0.940	NA	NA	2.070	21	0.0010	59.0
226	227									7.2	156	311	0.040		7.9	0.018		190.9	0.162										0.960	NA	NA	2.100	21	0.0010	60.0
225																										3.6	3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
226	225																										3.6	0.000	0.000	0.000	3.65	0.000	6	0.0050	0.0
216	226											311	0.040		7.9	0.018		190.9	0.162								3.6	0.000	0.960	NA	NA	2.100	21	0.0010	58.0
223																				28.1	28.1	0.065							0.065	0.130	3.13	0.407	10	0.0025	48.3
222	223																12.9	12.9	0.011		28.1	0.065							0.076	0.152	3.06	0.465	10	0.0025	55.2
221	222																11.0	23.8	0.020		28.1	0.065							0.085	0.170	3.01	0.512	10	0.0025	60.7
224																	10.4	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
221	224																	10.4	0.009										0.009	0.018	3.55	0.064	6	0.0050	21.3
220	221																	34.2	0.029		28.1	0.065							0.094	0.188	2.96	0.556	10	0.0025	66.0
219	220													4.1	4.1	0.009		34.2	0.029		28.1	0.065							0.103	0.206	2.91	0.599	12	0.0020	58.8
216	219													21.8	25.8	0.059		34.2	0.029	27.2	55.3	0.127							0.215	0.430	2.51	1.079	15	0.0015	67.0
218										5.7	122	122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
217	218											122	0.016																0.016	0.032	3.49	0.112	6	0.0050	37.2
216	217									16.1	348	470	0.061																0.061	0.122	3.15	0.384	8	0.0035	70.8
210	216											781	0.102		33.8	0.078		225.1	0.191		55.3	0.127					3.6	0.000	1.238	NA	NA	2.630	24	0.0008	68.0
310										15.8	341	341	0.044																0.044	0.088	3.28	0.289	8	0.0035	53.2
309	310											341	0.044																0.044	0.088	3.28	0.289	8	0.0035	53.2
308	309											341	0.044	7.6	7.6	0.017													0.061	0.122	3.15	0.384	10	0.0025	45.6
306	308											341	0.044	7.5	15.1	0.035													0.079	0.158	3.05	0.482	10	0.0025	57.2
307																	13.4	13.4	0.011										0.011	0.022	3.53	0.078	6	0.0050	25.9
306	307																13.2	26.6	0.023										0.023	0.046	3.45	0.159	6	0.0050	52.9
303	306											341	0.044		15.1	0.035		26.6	0.023										0.102	0.204	2.92	0.596	12	0.0020	58.4
305										11.4	247	247	0.032																0.032	0.064	3.37	0.216	8	0.0035	39.7
304	305											247	0.032																0.032	0.064	3.37	0.216	8	0.0035	39.7
303	304									11.2	243	490	0.064																0.064	0.128	3.14	0.402	10	0.0025	47.7
301	303					29.8	238	238	0.045			831	0.108		15.1	0.035		26.6	0.023										0.211	0.422	2.52	1.063	18	0.0012	45.3
215	301					10.3	82	320	0.061			831	0.108		15.1	0.035	11.4	38.0	0.032				3.9	3.9	0.003				0.239	0.478	2.47	1.181	18	0.0012	50.2
214	215					11.3	91	411	0.078			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003	9.5	9.5	0.000	0.256	0.512	2.45	1.254	18	0.0012	53.4
213	214					15.2	121	532	0.101			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.279	0.558	2.43	1.356	18	0.0012	57.7
212	213	10.0	50	50	0.010			532	0.101			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.289	0.578	2.42	1.399	18	0.0012	59.5
211	212			50	0.010	9.7	78	610	0.116			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.304	0.608	2.41	1.465	18	0.0012	62.4
210	211	27.9	140	190	0.036	11.5	92	702	0.134			831	0.108		15.1	0.035		38.0	0.032					3.9	0.003		9.5	0.000	0.348	0.696	2.38	1.656	18	0.0012	70.5
209	210			190	0.036			702	0.134			1612	0.210		48.8	0.112		263.1	0.224	32.0	87.3	0.201		3.9	0.003		13.1	0.000	1.660	NA	NA	3.280	24	0.0008	66.0
208	209	30.5	153	343	0.065			702	0.134			1612	0.210		48.8	0.112		263.1	0.224	69.5	156.8	0.361	0.3	4.2	0.003	4.0	17.1	0.000	1.849	NA	NA	3.720	27	0.0007	58.0
207	208	56.3	282	625	0.119			702	0.134			1612	0.210		48.8	0.112		263.1	0.224		156.8	0.361		4.2	0.003		17.1	0.000	1.903	NA	NA	3.780	27	0.0007	58.0
202	207			625	0.119			702	0.134			1612	0.210		48.8	0.112		263.1	0.224		156.8	0.361	0.6	4.7	0.003		17.1	0.000	1.903	NA	NA	3.730	27	0.0007	58.0
206																	14.4	14.4	0.012										0.012	0.024	3.52	0.084	6	0.0050	28.2
205	206																19.6	34.0	0.029										0.029	0.058	3.39	0.197	6	0.0050	65.5
204	205																35.2	69.3	0.059	41.7	41.7	0.096							0.155	0.310	2.67	0.828	12	0.0020	81.1
203	204																	69.3	0.059		41.7	0.096							2.645	0.310	2.67	6.738	36	0.00045	73.7
202	203																15.5	84.8	0.072	52.7	94.4	0.217							2.779	0.578	2.42	7.309	36	0.00045	80.0
201		36.8	184	184	0.035																								0.035	0.070	3.35	0.235	8	0.0050	43.2
202	201			184	0.035	7.9	63	63	0.012																				0.047	NA	NA	1.430	18	0.0012	53.0
200	202			809	0.154			765	0.146			1612	0.210		48.8	0.112		347.9	0.296		251.2	0.579		4.7	0.003		17.1	0.000	4.730	NA	NA	10.170	42	0.00045	55.0
400	200			809	0.154			765	0.146			1612	0.210		48.8	0.112		347.9	0.296		251.2	0.579		4.7	0.003		17.1	0.000	4.730	NA	NA	10.220	42	0.00045	55.0

V. WASTEWATER INFRASTUCTURE IMPROVEMENTS

COLLECTION AND TRANSMISSION

The sanitary sewer system is comprised of gravity trunk pipelines, lift stations, and force mains to collect and convey wastewater flows within the PRSP Area. The gravity pipelines and force mains were placed within the proposed road system serving the PRSP area. Preliminary pipe inverts and manhole rim grades are shown on the exhibits.

Reimbursement

The PRSP Developer shall be entitled to infrastructure construction cost reimbursement from the SA Plan Area due to the additional wastewater flow passing through the PRSP from the future SA offsite. **Exhibit B** and **Exhibit D** represents the infrastructure required to develop the PRSP only, while **Exhibit C** and **Exhibit E** represents the infrastructure to develop both the PRSP and the future SA offsite flows.

There are three locations where the future SA offsite flows enter the PRSP area. The locations are shown at Nodes 500, 600 and 700 on the **Exhibit C** and **Exhibit E**. Pipes within the PRSP area conveying the offsite SA wastewater flows through the PRSP area are subject to cost sharing. Reimbursement shall be based on a proportionate share of contributing flows within the pipelines from PRSP and from SA.

FIDDYMENT ROAD/ANGUS ROAD OFFSITE CONNECTION

The existing 30-inch pipe stub on Angus Road was constructed in 2007 as a part of the Fiddyment Ranch – Phase 2, Pleasant Grove Creek Sewer Crossing improvements, on behalf of and funded by Placer County. From the 30-inch sewer pipe, the wastewater flow will be conveyed to the PGWWTP via an existing 72-inch trunk sewer pipeline within the Pleasant Grove Creek corridor. This offsite connection point is identified as Node 400 within the attached exhibits.

FIDDYMENT ROAD/ANGUS ROAD OFFSITE CONNECTION

(CONTINUED)

Gravity Main Design

The wastewater flows from the associated contributing shed areas (Scenario 1 Western & Central Sheds and Scenario 2 Western & Eastern Sheds) will be conveyed south via an offsite gravity main approximately 20-feet to 30-feet deep along the Fiddyment Road/ Angus Road corridor. The offsite gravity pipe diameter will be as follows:

- Scenario 1 & Scenario 2 PRSP only base condition sewer mains shall both be ***27-inches***. Refer to **Exhibit B – Scenario 1 Sanitary Sewer Master Plan, PRSP Only (Base Condition) Central & Eastern Sheds** and **Exhibit D - Scenario 2 Sanitary Sewer Master Plan PRSP Only (Base Condition) Eastern Shed**, respectively.
- Scenario 1 & Scenario 2 PRSP and future SA offsite sewer mains shall both be ***42-inches***. Refer to **Exhibit C - Scenario 1 Sanitary Sewer Master Plan PRSP + Future SA Offsite Central & Eastern Sheds** and **Exhibit E - Scenario 2 Sanitary Sewer Master Plan PRSP + Future SA Offsite Eastern Shed**, respectively.

Lift Station / Forcemain Design

The wastewater flows from the associated contributing shed areas (Scenario 1 - Western & Central Sheds and Scenario 2 - Western & Eastern Sheds) will converge into an alternative lift station located on lot PR-95 east of Fiddyment Road on the north side of Sunset Boulevard. A preliminary conceptual design for the alternative lift station has been prepared by HydroScience Engineers, Inc. and is presented in **Attachment 2 – Placer Ranch Specific Plan, Conceptual Lift Station Design dated July 17, 2017**. This lift station will then pump flows south via an offsite forcemain approximately 6-feet deep along the Fiddyment Road/ Angus Road corridor. The offsite forcemain diameter will be as follows:

FIDDYMENT ROAD/ANGUS ROAD OFFSITE CONNECTION

(CONTINUED)

- Scenario 1 & Scenario 2 PRSP only base condition forcemains shall both be ***12-inches***. Refer to **Exhibit F - Scenario 1-LS Sanitary Sewer Master Plan PRSP Only (Base Condition) Central & Eastern Sheds** and **Exhibit H - Scenario 2-LS Sanitary Sewer Master Plan PRSP Only (Base Condition) Eastern Shed**, respectively.
- Scenario 1 & Scenario 2 PRSP and future SA offsite forcemains shall both be ***20-inches***. Refer **to Exhibit G - Scenario 1-LS Sanitary Sewer Master Plan PRSP + Future SA Offsite Central & Eastern Sheds** and **Exhibit I - Scenario 2-LS Sanitary Sewer Master Plan PRSP + Future SA Offsite Eastern Shed**, respectively.

DULUTH AVENUE OFFSITE CONNECTION

An existing 10-inch sewer pipe servicing the Peaker Plant on Nichols Drive will be removed and replaced with an 18-inch sewer pipe. Flow continues into an existing 20-inch sewer pipe running south along Duluth Avenue, east along the City of Roseville limits where it then discharges into a trunk 21-inch and 42-inch sewer main, which is maintained by the City of Roseville. Flows will then be conveyed to the PGWWTP via an existing 42-inch and 72-inch sewer trunk pipeline within the Pleasant Grove Creek corridor, known as the Pleasant Grove Trunk Sewer. This offsite connection point is identified as Node 300 within the attached exhibits.

To determine the capacity available in the existing 20-inch sewer pipe, a wastewater shed area boundary was established using the Placer County Sunset County Service Area maps for Zone 2A3, map pages CA3, CA4 and CB4 (Refer to **Attachment 5**). Once the wastewater shed area was defined, flows were calculated assuming an industrial land use flow rate of 850 gallons per day per acre. Pipe slopes for the existing 20-inch sewer pipe is determined using the Northern California Power Agency Peaking Combustion Turbine Project as-built plans dated April 15, 1986 and the Trunk Three-A as-built plans, sheet number 24 of 58, for the North Roseville/Rocklin Sewer Assessment District.

DULUTH AVENUE OFFSITE CONNECTION *(CONTINUED)*

The pipe slope was calculated to be approximately 0.002 ft/ft. At this slope, the capacity of a 20-inch pipe flowing 70% full is approximately 3.37 MGD and flowing full is approximately 4.02 MGD.

The wastewater shed area that enters into the existing 20-inch sewer pipe is estimated to be approximately 107.3± acres. Refer to **Figure 6 – Duluth Avenue Existing Pipe Capacity Assessment**. Hence, the ADWF is calculated to be 0.091 MGD and the PWWF is calculated to be 0.542± MGD. With the addition of the eastern wastewater shed from the Placer Ranch development, the PWWF contributing to the 20-inch sewer pipe on Duluth Avenue will approximately be a total of 1.723± MGD (0.542± MGD from existing SA and 1.181± MGD from Placer Ranch). Based on the 20-inch pipe flowing 70% full, the pipe will have sufficient capacity to allow the eastern shed flow from the Placer Ranch development, and would flow at approximately 43% full.

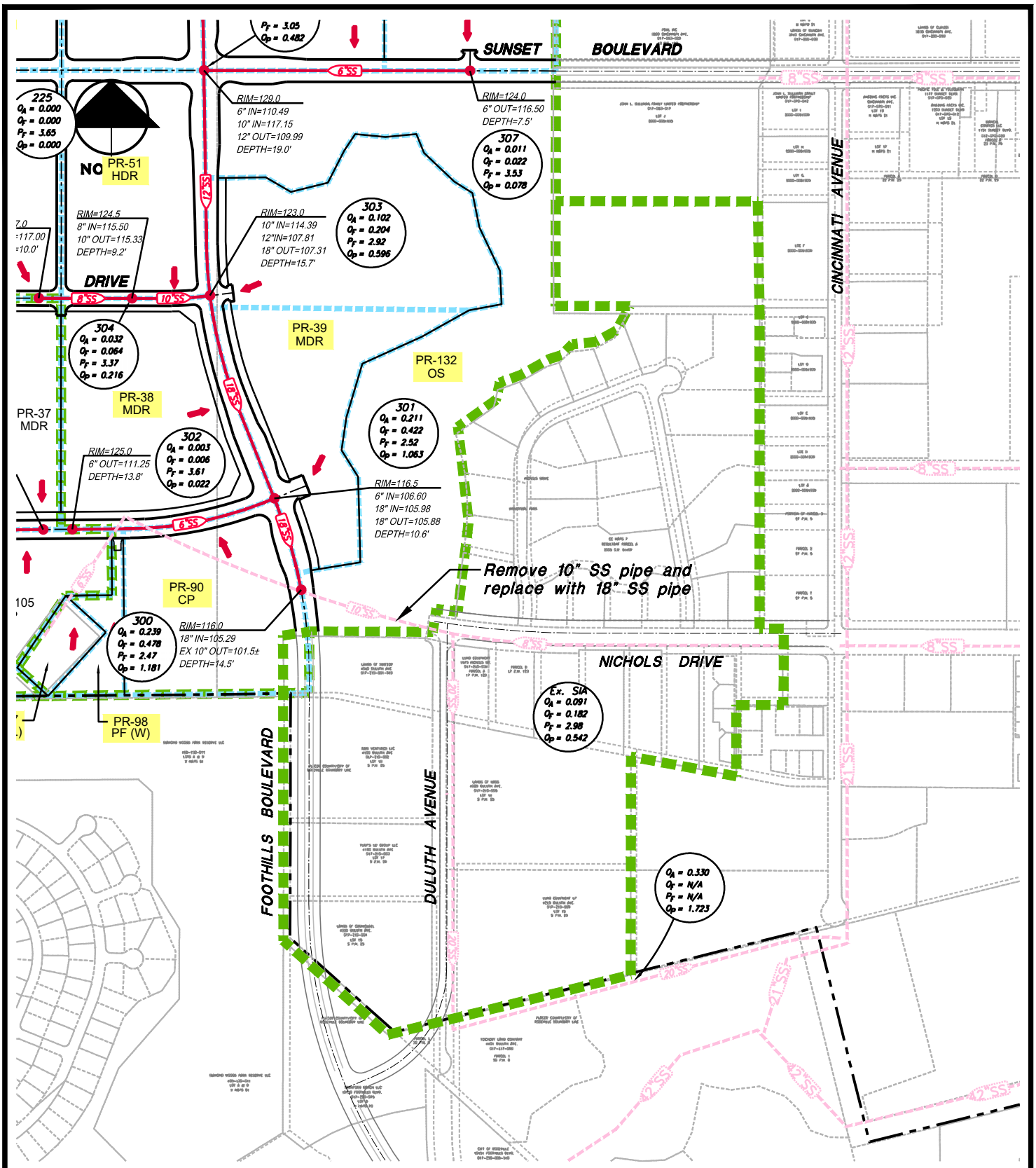


Figure 6. Duluth Avenue Existing Pipe Capacity Assessment

Placer Ranch Specific Plan

Not to Scale

July 18, 2017
18458.C00

MacKay & Somps
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

7-13-2017 16:59:47 eterryp P:\18458_C00\MstrPln\SS\Figures\Figure 6 Duluth Ave SS Assessment.dwg
[1] P:\18458_C00\SRV\Topo\Aerial\D-TP-PR-E.dwg [2] P:\18458_C00\SRV\Topo\Aerial\D-TP-PR-W.dwg [3] P:\18458_C00\MstrPln\SS\bases\W-SSMP-SHEDS-PR.dwg [4] P:\18458_C00\PLN\P-LU-Placer Ranch.dwg [5] P:\18458_C00\MstrPln\Bases\M-ADJ-PR.dwg

FLOW METER

In order for the City to account for contributing flows to the treatment plant, flow meters shall be installed at the Placer County/City of Roseville boundary line where the sewer pipe crosses from County to City jurisdiction. There is currently an existing flow meter, known as the Cincinnati meter, located at the southern limit of Cincinnati Avenue. A proposed flow meter shall be located on the Fiddyment Road sewer main to measure flows from PRSP and the SA which are from the County. The City of Roseville will assist with locating the proposed flow meter, along the pipeline alignment.

EFFLUENT / DISPOSAL

Effluent from the PGWWTP is released through an existing outfall structure into Pleasant Grove Creek. The current NPDES permit allows the treatment plant to discharge an average dry weather flow of 12 MGD, increasing to a permitted ADWF discharge of 15 MGD upon completion of additional treatment facilities. The outfall location is shown on **Figure 7 – PGWWTP Wastewater Disposal Location**.

The total ADWF to the PGWWTP after construction of the Placer Ranch development will be 9.45± MGD, completely within the plant's treatment capacity of 12.0 MGD after the Pleasant Grove Wastewater Treatment Plant Expansion project. The total ADWF after construction of the future SA offsite will be 12.68± MGD, which will exceed the plant's treatment capacity. Therefore, any additional flows beyond the plants' capacity being conveyed to it will require additional treatment facilities to be constructed within the PGWWTP before accepting any additional flows.

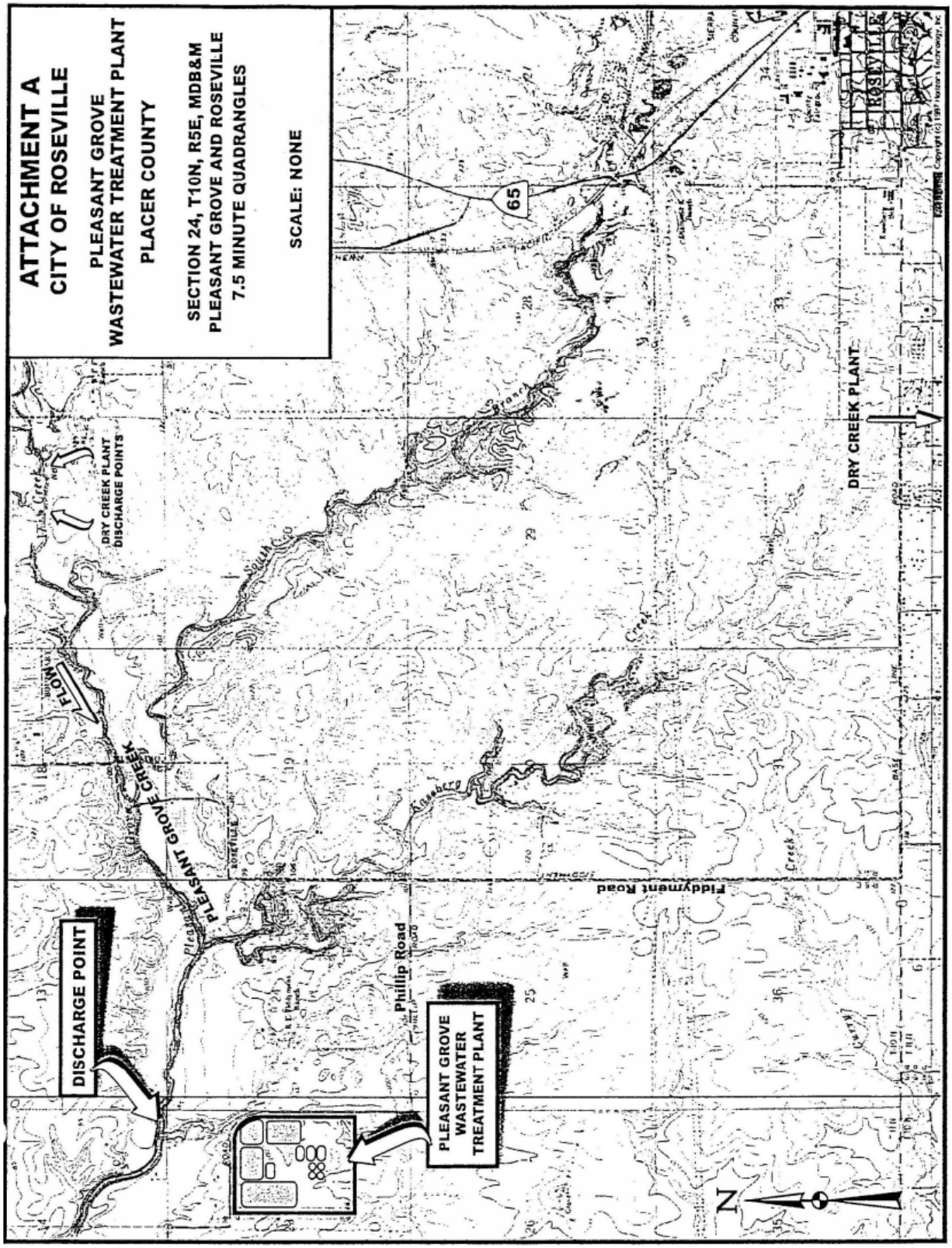


FIGURE 7
PGWWTP WASTEWATER DISPOSAL LOCATION

PERMANENT LIFT STATION AND FORCE MAIN

The western wastewater shed will gravity flow into a permanent lift station located east of "A" Street on the south side of Sunset Boulevard on lot PR-94. This lift station will then pump flows into a force main reception manhole located on Sunset Boulevard, approximately 1,050-feet west of the intersection of Fiddyment Road and Sunset Boulevard. The permanent lift station will be constructed above and outside the 100-year flood plain, as shown on the sanitary sewer master plan depicted on **Exhibit A**. The lift station will be accessible from Sunset Boulevard.

A 10-inch force main will pump flows approximately one mile east along Sunset Boulevard to the proposed force main reception manhole (described above), identified as Node 201 on **Exhibit A**. The wastewater flows will discharge into the proposed 18-inch gravity sewer main and ultimately convey wastewater flows into the existing 30-inch sewer stub near Angus Road just north of the Pleasant Grove Creek. Based on preliminary invert and rim grades, the force main reception sewer manhole (described above) will be approximately 15 feet deep. At this depth, the force main reception manhole will have adequate capacity to accept the active volume pumped from the lift station while maintaining over 4.5 feet of freeboard.

A preliminary conceptual design for this permanent lift station and force main has been prepared by HydroScience Engineers and is presented in **Attachment 2 – Placer Ranch Specific Plan, Conceptual Lift Station Design dated July 17, 2017**. The conceptual design for this lift station and force main is based on the PWWF at the lift station as calculated by HydroScience Engineers using hydraulic modeling.

ALTERNATIVE LIFT STATION AND FORCEMAIN

An alternative lift station will be located approximately 800-feet east of Fiddyment Road on the north side of Sunset Boulevard on lot PR-95. The entire wastewater flow generated from PRSP and the future SA offsite would converge at this alternative lift station and would then convey the flows via a force main and discharge flows into the existing 30-inch sewer stub near Angus Road just north of Pleasant Grove Creek. A preliminary conceptual design for this alternative lift station and force main has been prepared by HydroScience Engineers and is presented in **Attachment 2 – Placer Ranch Specific Plan, Conceptual Lift Station Design** dated July 17, 2017.

Construction of a 6-feet deep dual force main versus a 20-feet to 30-feet deep gravity sewer pipe along the Fiddyment Road/ Angus Road corridor would yield a shallower construction of trenching, but there are significant draw backs to the alternative lift station option as discussed with County staff, in the technical memo prepared by HydroScience Engineers (See **Attachment 2**), and has been summarized below.

1. To accommodate PRSP and SA wastewater flows of 10.28 MGD PWWF, a large lift station system and site area would be required
    a) Wet well diameter = 16-feet
    b) Dual forcemains (per Placer County design standards) = 20-inches
    c) Quad 100-hp pump configuration (3 duty, 1 stand-by)

2. To provide a minimum 4-hours of PWWF emergency storage facilities as required per Placer County Pump Station Design Manual for a 10.28 MGD PWWF lift station system
    a) Emergency storage volume required would be up to 1.7 million gallons
    b) Emergency storage facility dimensions would be 10-feet deep by 1,800-feet long by1,440-feet wide.

ALTERNATIVE LIFT STATION AND FORCEMAIN *(CONTINUED)*

3. Lift Station Probable Cost of Construction total to be $5.88 million
    a) 10.28 MGD PWWF Lift Station system = $4.59 million
    b) 20-inch dual forcemain = 2 ($110/foot x 5,870-feet) = $1.29 million

4. Annual Operations & Maintenance Cost would be approximately $300,000 per year (approximately 5% of initial construction cost)

The initial costs of $5.88 million plus on-going operation and maintenance cost of $300,000 per year render this alternative as not feasible for the project.

INTERIM IMPROVEMENTS/ SUBSHED BOUNDARY MODIFICATIONS

Interim sanitary sewer improvements will be allowed on a temporary basis to provide sewer service for parcel development within the PRSP area. Interim improvements may include pipe alignments or points of connection that differ from those shown in the master plan for individual land use parcels, temporary sewer lift stations for individual land use parcels to provide sewer service until permanent infrastructure is constructed, as well as other types of interim improvements. All interim improvements shall be designed and constructed per the latest Placer County standards.

During the final grading and utility design process for individual development projects within the PRSP area, it may become apparent that there is a more efficient method of delivering wastewater flow to the sanitary sewer trunk system than at a node defined within this sewer master plan. Minor wastewater shed boundary adjustments would be allowed during the final design/improvement plan process.

All interim sanitary sewer improvements and wastewater shed adjustments will be subject to the review and approval of Placer County.

CONCLUSION

Two scenarios were presented with each having two conditions modeled: (1) the base condition with PRSP flows only and (2) the condition adding the future SA offsite flows. Scenario 1 is the preferred design as it allows for flexibility in construction phasing. The PRSP will generate an ADWF of approximately 2.045± MGD, and with the future SA offsite adding an ADWF of approximately 3.23± MGD. Total ADWF of approximately 5.28± MGD will be tributary to the Pleasant Grove Wastewater Treatment Plant. Sewer mains within the PRSP area conveying the SA wastewater flows through the PRSP area are subject to cost sharing. Reimbursement shall be based on a proportionate share of contributing flows in the pipelines from PRSP and from SA.

To convey the wastewater flow offsite to the point of connection at Pleasant Grove Creek, each condition examined a gravity main system design and a lift station/forcemain system design. Although construction of the forcemain would require less excavation than a deep gravity main, the construction cost of the gravity main is estimated at a cost of $2.45 million [($400 x 5870-feet)+($10,000 x 10 manholes)]. This is less than half the estimated construction cost of the lift station/forcemain system of $5.88 million. In addition to construction cost savings, re-occurring operation and maintenance costs would be significantly smaller for the gravity system versus the lift station system. Therefore, a sanitary sewer gravity system is the preferred design.

This Sanitary Sewer Master Plan demonstrates that the Pleasant Grove Wastewater Treatment Plant has sufficient capacity to accept the additional flows from the PRSP. Based on today's figures, the total ADWF after construction of the Placer Ranch development will be 9.45± MGD.

VI. REFERENCES

Central Valley RWQCB – Waste Discharge Requirements for the City of Roseville Pleasant Grove Wastewater Treatment Plant, Placer County Order No. R5-2008-0079, NPDES No. CA0084573

South Placer Regional Wastewater and Recycled Water Systems Evaluation Final Report – June 2007 (Including Updated Technical Documents as of 03/05/2009. Updated documents include Appendices A (TM 1b), C (TM 2a), D (TM 2b), F (TM 2c), G (TM 3a), H (TM 3b), N (TM 4a), O (TM 4b), P (TM 5a), Q (TM 5b), and TM 4c.

City of Roseville, Design and Constructions Standards dated January 2013

Record Improvement Plan Set for Fiddyment Ranch – Phase 2, Pleasant Grove Creek Sewer Crossing, dated May 1, 2007

Record Improvement Plan Set for Northern California Power Agency Peaking Combustion Turbine Project, dated April 15, 1985

Record Improvement Plan Set for North Roseville/Rocklin Sewer Assessment District, Trunk Three-A, sheet number 24 of 58

Placer County Sunset County Service Area – Zone 2A3, Map Pages CA4, CA3 & CB4

Final Environmental Impact Report, Amoruso Ranch Specific Plan, dated May 2016 Available online at: http://www.roseville.ca.us/gov/development_services/_planning/specific_plans_n_planning_areas/amoruso_ranch_specific_plan.asp. Accessed August 2016.

Placer Ranch Specific Plan, Preliminary University Sewer Demands Estimate, Mackay & Somps Memo, dated March 3, 2015

Placer Ranch CSUS University Sewer Flow Data Research, Mackay & Somps