Appendix D

Sewer Master Plan

Sutter Pointe Specific Plan

Sewer Master Plan

Prepared by

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November 14, 2008

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Appendices

ABBREVIATIONS

ADWF	**Average dry weather flow (same as BWF)**
cfs	**cubic feet per second**
CSD-1	**Sacramento County Sanitation District 1**
d/D	**Depth of flow divided by diameter of pipe**
DCWWTP	**Dry Creek Wastewater Treatment Plant**
ESD	**Equivalent single family dwelling unit**
fps	**feet per second**
gpd	**Gallons per day**
I/I	**Inflow and infiltration**
mgd	**million gallons per day**
NEMDC	**Natomas East Main Drainage Canal**
NNPS	**New Natomas Pump Station**
OPPC	**Opinion of Probable Construction Cost**
PF	**Peaking factor**
PDWF	**Peak dry weather flow**
PGWWTP	**Pleasant Grove Wastewater Treatment Plant**
PVSP	**Placer Vineyards Specific Plan**
PWWF	**Peak wet weather flow**
RD 1000	**Reclamation District 1000**
SMP	**Sewer Master Plan**
SPSP	**Sutter Pointe Specific Plan**
SPWA	**South Placer Wastewater Authority**
SRCSD	**Sacramento Regional County Sanitation District**
UGA	**Urban Growth Area**
UNWI	**Upper Northwest Interceptor**
WWTP	**Wastewater Treatment Plant**

Executive Summary

This Sewer Master Plan (SMP) is prepared for the Sutter Pointe Specific Plan (SPSP) or the "Project", a 7527.6 acre mixed use Master Planned Community located in south Sutter County. Project land uses include: low, medium and high-density residential parcels, schools, parks and open space, drainage detention basins, commercial sites, and employment centers. Reference the following Exhibits for a Project overview:

- Exhibit ES-1: Conceptual Land Use Plan and Vicinity Map
- Exhibit ES-2: Wastewater Treatment Plant Alternates:

  Alternate 1: SRCSD Regional Wastewater Treatment Plant

  Alternate 2: On-site WWTP and Sacramento River Discharge

  Alternate 3: City of Roseville Pleasant Grove or Dry Creek WWTP
- Exhibit ES-3: Alternate 1: Off-site Sewer Force Main Alignment
- Exhibit ES-4: Phasing Plan with Sewer Layout

ES.1 Purpose of Sewer Master Plan

The purpose of the Sewer Master Plan includes, but is not limited to:

- Evaluate SPSP wastewater disposal options and select the preferred alternative
- Identify design criteria for sizing on-site pipelines and sewer pump stations
- Pre-design on-site sewer systems and location of sewer pump stations
- Identify phasing and timing, of trunk and collector sewers and pumping stations
- Identify the off-site sewer force main and/or gravity sewer options
- Confirm capacity of the Sacramento Regional County Sanitation District (SRCSD) Upper Northwest Interceptor Sewer (UNWI) and other affected facilities

- Identify the proposed point of connection to the SRCSD interceptor sewer
- Prepare a preliminary Opinion of Probable Construction Cost (Appendix B)
- Provide sufficient sewer study detail to support EIR documentation
- Identify exceptions to design criteria and/or policy needed for approval

ES.2 Alternative Treatment and Disposal Facilities to Serve the Project

- **Wastewater Treatment**: Three WWTP alternatives were evaluated including:

  Alternative 1) Preferred Alternative: construct an off-site sewer force main and connect to the SRCSD UNWI at Elkhorn Boulevard and West 6th Street in Rio Linda. From the point of connection, SRCSD interceptor lines will convey wastewater 20 miles south to the SCRSD WWTP near Freeport for treatment and disposal.

  Alternative 2) Obtain permits for and construct an on-site tertiary WWTP with discharge to the Sacramento River

  Alternative 3) Conveyance to the City of Roseville Dry Creek or Pleasant Grove WWTP

ES.3 Design Standards

Although the Project is located in south Sutter County, the Preferred Alternate will convey Project wastewater to the SRCSD WWTP via the SRCSD UNWI and the New Natomas Pump Station (NNPS).

Sizing of SPSP on-site collector / trunk sewers, pump stations, and storage facilities will be based on Sutter County Standards, and will be subject to the review and approval of

the Public Works Director of Sutter County. A summary of design standards is as follows:

Average Dry Weather Flow (ADWF)	# of ESDs x 310 gpd/ESD
Peaking Factor (PF)	$3.5 – 1.8 \times ADWF^{0.05}$
Peak Dry Weather Flow (PDWF)	ADWF x PF
Inflow and Infiltration (I/I)	Area x 1400gpd/acre
Peak Wet Weather Flow (PWWF)	PDWF + I/I

ES.4 Calculated Wastewater Flows

Using the Sutter County design standards, this SMP calculated the ADWF and PWWF rate to be 11.22 and 27.03 mgd, respectively, for 36,180 ESDs.

ES.5 Project Constraints and Other Considerations

- **Capacity in SRCSD UNWI and New Natomas Pump Station**:
  SPSP has identified the SRCSD Northwest Interceptor at Elkhorn Boulevard and West 6th Street in Rio Linda as the proposed point of connection to discharge Project wastewater flows. The SPSP, however, is not within the service area boundary of this interceptor sewer. To evaluate possible available capacity for the SPSP, Montgomery Watson Harza (MWH) prepared preliminary modeling (July 7, 2007) of the UNWI system "with and without" SPSP. This modeling effort was finalized in early 2008 wherein it was determined that a 3.9 million gallon storage reservoir would be needed within the SPSP area to store peak wet weather flows during peak flow periods when the UNWI system couldn't accept flows from SPSP.[1]

[1] The storage volume of 3.9 million gallons is based on Sutter County design criteria. The storage requirement using Sacramento County design criteria is 3.6 million gallons.

- **Industrial Waste Discharge Permitting**: Because commercial and industrial users, and water treatment facilities will be located within the SPSP, this Sewer Master Plan proposes that Sutter County adopt an industrial waste discharge permitting process, similar to one adopted by Sacramento County, to monitor and control the discharge of industrial wastes into the public sewer system. This permitting process will be developed by the developers of SPSP for consideration and adoption by the County Board of Supervisors.

ES.6 Phasing

The SPSP area will be developed in several phases. The proposed phases are divided into two categories, residential villages (Phases 1-4) and employment villages (Phases A-D). While it may be that the employment villages (Phases A-D) will develop concurrently with the residential villages (Phases 1-4), it is more reasonable to believe that this development rate will be much lower. From an engineering perspective, however, it is difficult to predict the sewer demands of a new development where there are numerous variables as to the construction timing of the various phases. Therefore, for the purposes of this SMP, a simplifying yet conservative approach was implemented, which assumes the development of the residential villages and employment villages achieve ultimate build-out in the same time frame. With this assumption in place and for simplicity of this analysis, the following build-out durations for each phase have been established:

- Phase 1+A (build-out over approximately 7 years)
- Phase 2+B (build-out over approximately 5 years)
- Phase 3+C (build-out over approximately 3 years)
- Phase 4+D (build-out over approximately 5 years)

The Sutter Pointe Specific Plan Conceptual Phasing Plan is shown in Exhibit D. Sanitary sewer infrastructure to serve each phase is described in detail in the Sewer Master Plan.

ES.7 Conclusion and Recommended Wastewater Alternative

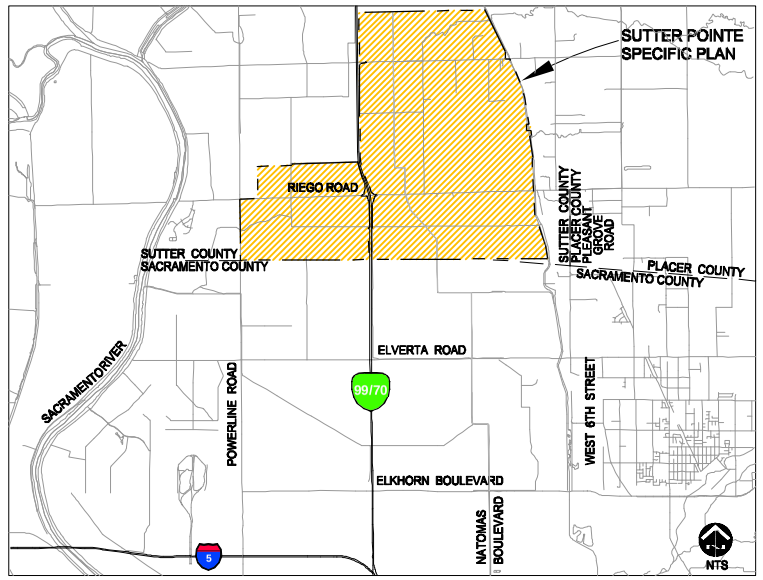
- To provide wastewater service for the SPSP, this Sewer Master Plan evaluated on-site collection, off-site conveyance and wastewater treatment options. Three sanitary treatment and disposal alternatives were identified.

From review of available information, and consideration of issues including but not limited to permitting, downstream SRCSD interceptor capacity, and an initial favorable response from SRCSD to provide wastewater treatment, this SMP concludes that the recommended SPSP wastewater solution is:

Alternative 1: Connect to SRSCD interceptor facilities that convey flows for treatment to the Sacramento Regional Wastewater Treatment Plant at Freeport.

ES.8 Future Studies and Requirements

The 2008 Sewer Master Plan for the Sutter Pointe Specific Plan (SPSP) area was prepared on a conceptual level and intended for planning and entitlement purposes only. Additional and more detailed Master Plans will need to be developed as the project moves closer and into the design stages of the development. It is the intent of this master plan to provide sewer facilities that meet generally accepted industry standards and that are comparable in features and quality to those provided in neighboring agencies with similar developments. For clarification, all future analysis and final design master plans will be completed to comply with Sutter County Standards and will be subject to the review and approval of the Public Works Director of Sutter County.



VICINITY MAP

LEGEND

LAND USE		ACRES
RESIDENTIAL		
Low Density Residential	LDR	512.4 Acres
Medium Density Residential	MDR	1,950.2 Acres
High Density Residential	HDR	187.6 Acres
Residential Roads		249.1 Acres
		Subtotal 2,899.3 Acres
		Measure M 2,900 Acres
EMPLOYMENT		
Employment 1	E1	172.6 Acres
E1 Interim Flood Zone	E1F	108.3 Acres
Employment 2	E2	1,990.0 Acres
Commercial Retail	CR	178.1 Acres
Industrial Drainage Basins	IDB	411.9 Acres
Mixed Use	MU	164.0 Acres
Employment Roads		299.4 Acres
		Subtotal 3,627.3 Acres
		Measure M 3,600 Acres
COMMUNITY FACILITIES		
Park	P	431.8 Acres
Open Space	OS	391.5 Acres
Schools		
K-8 School		121.8 Acres
High School		52.9 Acres
Transit Center		
Civic Center		
Fire Station		
Pedestrian Enhanced Intersections		
		Subtotal 1,001.0 Acres
		Measure M 1,000 Acres
Grand Total		**7,527.6 Acres**
Measure M Grand Total		**7,500 Acres**

Activity Center Boundary

Interchange Planning Area

EXHIBIT ES-1

SUTTER POINTE

MEASURE "M" GROUP

Conceptual Land Use Exhibit

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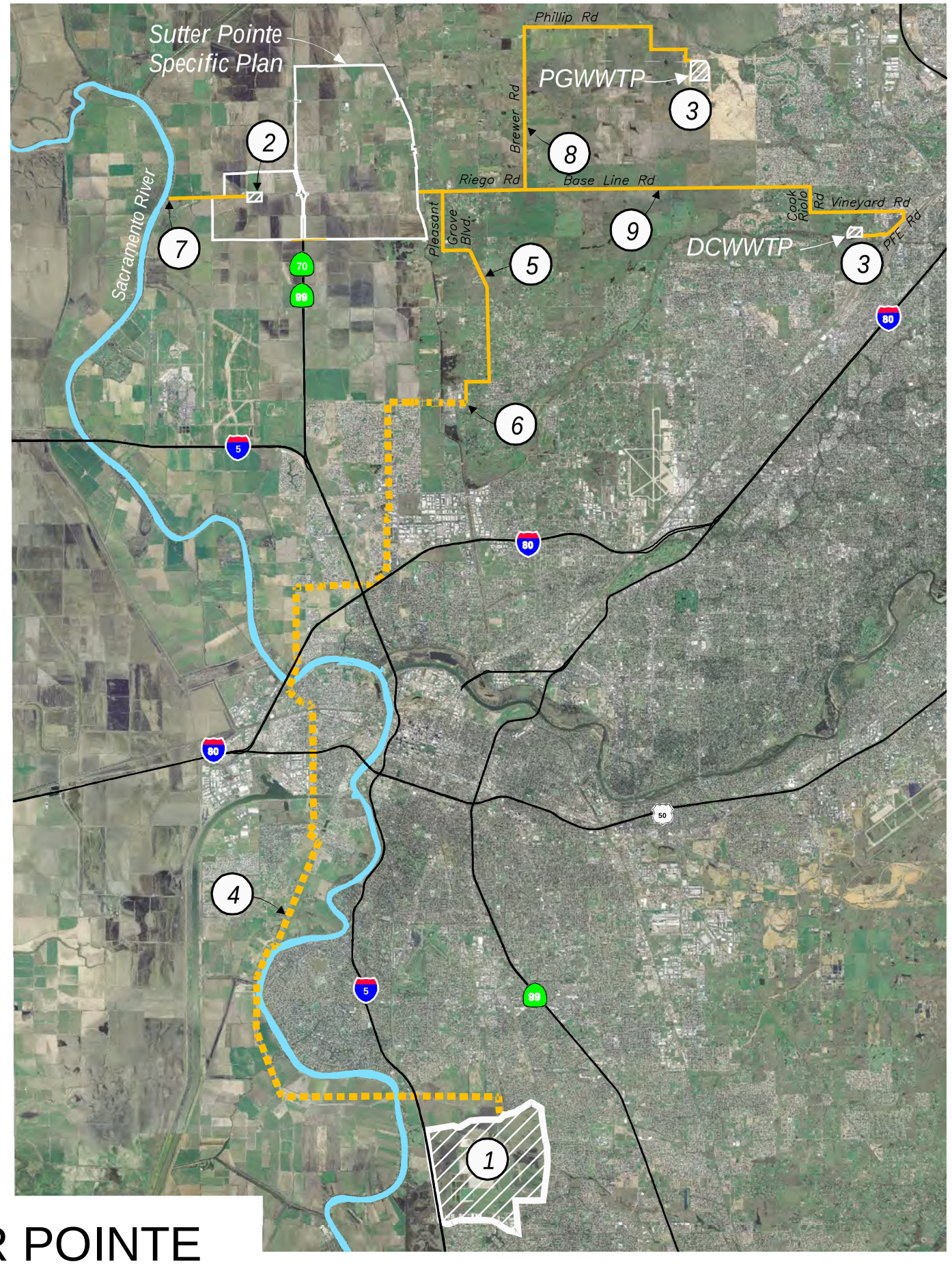
June 20, 2008



KEY NOTES:

1. *Alternate 1 - SRCSD regional WWTP*
2. *Alternate 2 - On-site WWTP and discharge to river*
3. *Alternate 3 - PGWWTP or DCWWTP*
4. *Interceptor sewer to SRCSD WWTP (existing) D = 20+ (Highway 99/I-5) miles from Sutter Pointe to WWTP.*
5. *Alternate 1: Line A Sewer force main from Sutter Pointe to SRCSD point of connection. D = 6.4± miles.*
6. *Alternate 1: Line A Point of connection to SRCSD UNWI at Elkhorn Blvd. and West 6th St.*
7. *Alternate 2: Discharge pipeline to the Sacramento River following the Riego Road right of way. D = 1.0 mile from west SPSP limit.*
8. *Alternate 3: Off-site force main to PGWWTP.*
9. *Alternate 3: Off-site force main to DCWWTP.*

ABBREVIATIONS:

DCWWTP	Dry Creek Wastewater Treatment Plant
PGWWTP	Pleasant Grove Wastewater Treatment Plant
SPSP	Sutter Pointe Specific Plan
SRCSD	Sacramento Regional County Sanitation District
UNWI	Upper Northwest Interceptor
WWTP	Wastewater Treatment Plant

SUTTER POINTE
MEASURE "M" GROUP

Exhibit ES-2
Wastewater Treatment Plant Alternates

0 15,000 30,000

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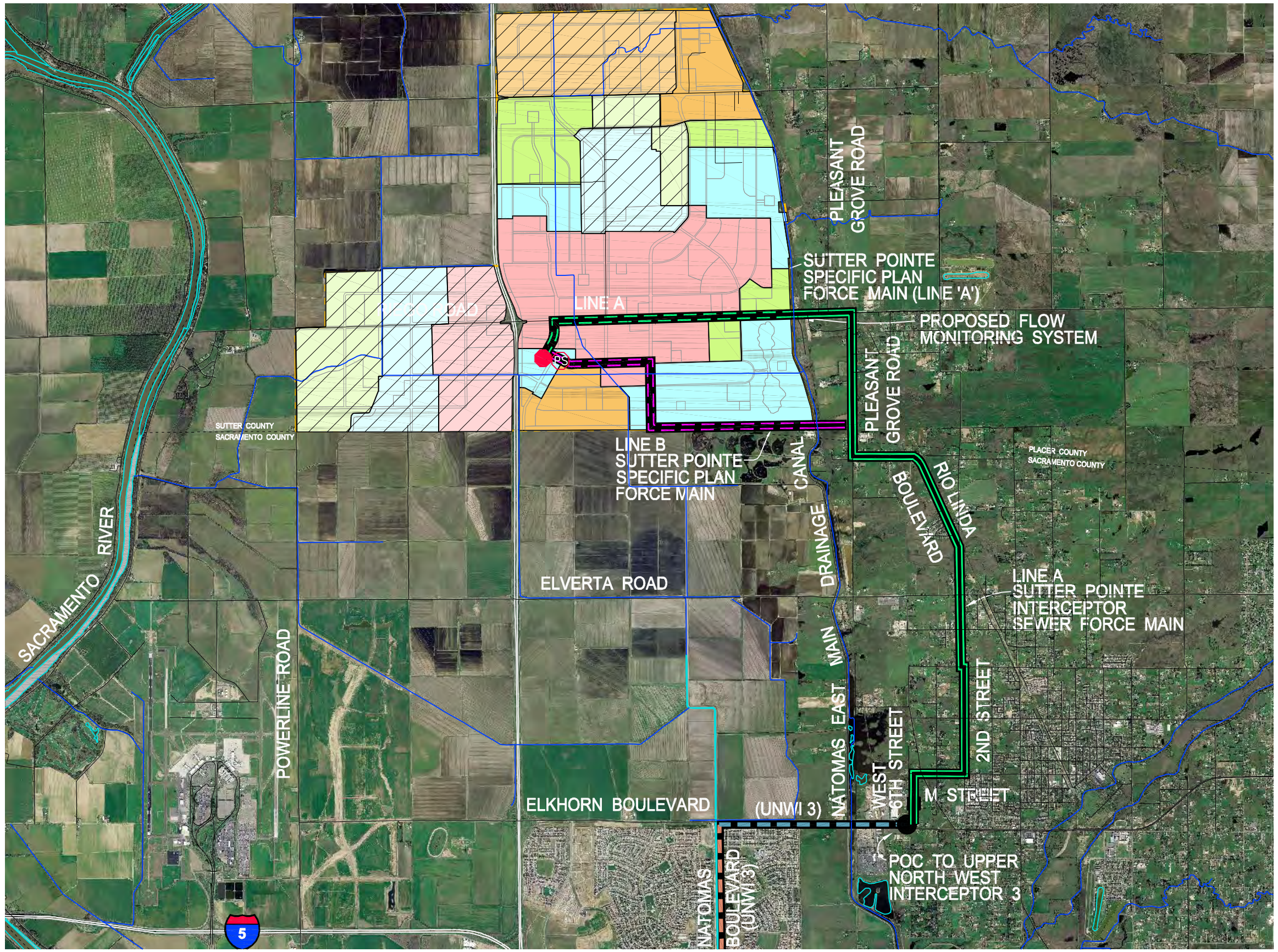

L E G E N D

- Sutter Pointe Central Pump Station
- Proposed Flow Monitoring Station
- Sutter Pointe Offsite Sewer Force Main (LINE 'B')
- Sutter Pointe Onsite Sewer Force Main (LINE 'B')
- Sutter Pointe Offsite Sewer Force Main (LINE 'A')
- Sutter Pointe Onsite Sewer Force Main (LINE 'A')
- Upper Northwest Interceptor 2 (UNWI-2)
- Upper Northwest Interceptor 3 (UNWI-3)
- Flow Control Valve Station
- Sutter Point Specific Plan Boundary

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase A
- Phase B
- Phase C
- Phase D

EXHIBIT ES-3

SUTTER POINTE

MEASURE "M" GROUP

Alternate 1: Offsite Sewer Force Main Alignment

0 2,500 5,000 10,000

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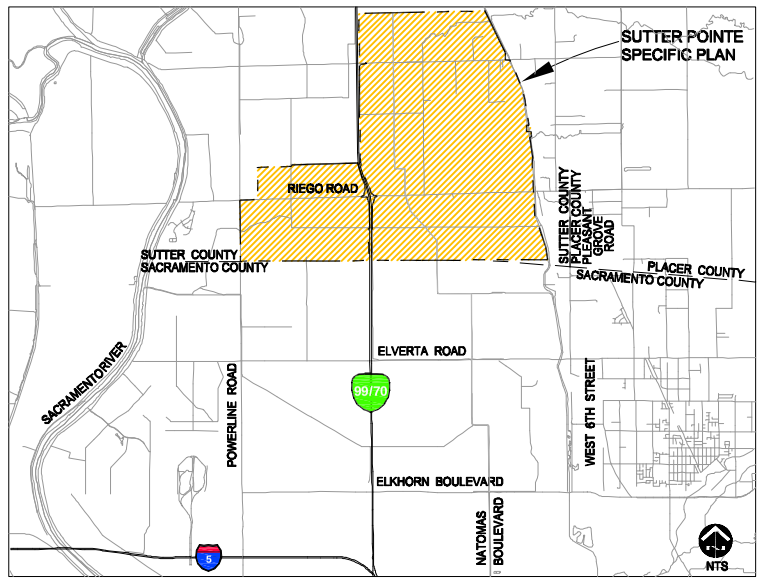
June 20, 2008



VICINITY MAP

Legend

RESIDENTIAL

LDR	Low Density Residential
MDR	Medium Density Residential
HDR	High Density Residential

EMPLOYMENT

E1	Employment 1
E1F	E1 Interim Flood Zone
E2	Employment 2
CR	Commercial Retail
IDB	Industrial Drainage Basin
MU	Mixed Use

COMMUNITY FACILITIES

POS	Parks & Open Space
NP	Neighborhood Parks
K-8	K-8 School
HS	High School
(T)	Transit Center
(C)	Civic Center
(F)	Fire Station
⊠	Pedestrain Enhanced Intersections

Phase 1	Phase A
Phase 2	Phase B
Phase 3	Phase C
Phase 4	Phase D

EXHIBIT ES-4

SUTTER POINTE

MEASURE "M" GROUP

Conceptual Phasing Plan with Sewer Layout

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June 20, 2008

Sutter Point Specific Plan

Sewer Master Plan

Section 1: Introduction and Background

1.1 Purpose of the Sewer Master Plan

This Sewer Master Plan (SMP) is prepared for the Sutter Pointe Specific Plan (SPSP) or the "Project", a 7527.6 acre mixed-use Master Planned Community in south Sutter County. Land uses for the Project include: low, medium and high-density residential parcels, schools, parks and open space, drainage detention basins, commercial sites, and employment centers. Reference the following Exhibits for a Project overview:

- Exhibit A: Conceptual Land Use Plan and Vicinity Map
- Exhibit B: Wastewater Treatment Plant Alternatives:
  - Alternate 1: Sacramento Regional County Sanitation District
  - Alternate 2: On-site WWTP with Sacramento River Discharge
  - Alternate 3: City of Roseville Pleasant Grove or Dry Creek WWTP
- Exhibit C: Alternate 1: Off-site Sewer Force Main Alignment

- Exhibit D: Phasing Plan with Sewer Layout

The purpose of this Sewer Master Plan is to provide sufficient detail to demonstrate that the proposed sewer collection and trunk systems are adequately sized and to identify wastewater treatment options. A summary of SMP topics include, but is not limited to:

Wastewater Treatment Options

- Identify and evaluate wastewater treatment options for the SPSP
- Select the preferred wastewater treatment alternative

On-site Technical

- Identify design criteria for sizing sewer pipelines and pump stations
- Identify the on-site sewer sub-sheds
- Calculate wastewater flows and size the backbone and internal collector and trunk sewer systems
- Pre-design sewer systems to estimate depth of pipes and flow line elevations
- Locate and size the on-site sewer pump stations
- Identify phasing and timing of trunk and collector sewers and pumping stations

Off-site Trunk Sewer and Preferred Wastewater Treatment Alternative

- Identify SRCSD constraints to provide sewer service to the SPSP
- Identify the proposed point of connection to the SRCSD interceptor sewer
- Identify the off-site sewer force main and/or gravity sewer options
- Confirm capacity of the downstream SRCSD trunk sewer pipeline and other affected facilities (required supplemental studies by SRSCD and/or its consultant)

Financial (Appendix B ~ Preliminary Opinion of Probable Construction Cost)

- Prepare a preliminary Opinion of Probable Construction Cost (OPCC) for the Preferred Wastewater Treatment Alternative.
- The OPCC will be used to establish a finance plan to provide sewer infrastructure to the SPSP.

Environmental and Policy Issues

- Provide sufficient sewer study detail to support EIR documentation
- Identify exceptions to design criteria and/or policy needed for approval

In addition to topics addressed by this SMP, supplemental studies to the SMP are summarized as follows:

Supplemental Technical Studies to this SMP

- MWH study of the available capacity of the UNWI and NNPS.
- MWH study of the need for emergency wastewater storage facilities upstream of the NNPS
- MWH study of the required on-site emergency storage upstream of the SPSP central pump station.

1.2 Background

Base line information and design criteria used to develop this Sewer Master Plan (SMP), is summarized as follows:

- Sutter Pointe Land Use Plan prepared by EDAW, February 2008

- Sutter County design criteria for the design of sanitary sewer systems.
- Off-site Sewer Force Main: Sacramento County Public Works improvement Standards, adopted 1999 (within Sacramento County).
- Sutter County design criteria.
- Topographic Mapping: digital aerial topography for the SPSP. The aerial survey is to National Standards for two-foot contour intervals flown in October 2003.
- SRCSD Construction Documents for the Upper Northwest Interceptor Reach 3
- Pipe materials as approved by the Director and conforming to the requirements of the Sutter County Standard Specifications.

1.3 Location

The SPSP is located along the east and west sides of State Highway 99. Physical boundaries are generally described as follows:

- West of Highway 99, the site boundary is the highway to the east, the Sutter/Sacramento County line to the south, and Powerline Road to the west. The north limit is one-half mile north of Riego Road.
- East of Highway 99, the site boundary is the highway on the west, the Sutter/Sacramento, County line to the south, and the Natomas East Main Drainage Canal (NEMDC) to the east. The north Project limit is approximately 4000 feet north of Sankey Road.

1.4 Topography and Site Design Considerations

On-site Topography

The SPSP site is bisected by State Highway 99, which divides the Project total land area into approximately 23% west and 77% east of the highway.

West of the Highway, all the land area has been leveled for rice and/or row crop production. Elevation of the fields ranges from approximately 22 (NGVD 29) at the northwest corner to elevation 15 at the southeast corner. Reclamation District 1000 (RD 1000) owns and operates the North and East Drainage Canals that divide the area into four irregularly shaped areas west of the highway.

East of the Highway, more than 90% of the land area has been leveled for agricultural row crops and/or rice production. Numerous RD 1000 canals and Natomas Central Mutual Water Company irrigation ditches traverse this portion of the SPSP. Elevations in the leveled fields east of the Highway range from approximately 14 (NGVD 29) at the southwest corner of the area to elevation 38 along the Union Pacific Railroad south of Sankey Road. The majority of the non-leveled fields lie east of Pacific Avenue and north of Riego Road.

With the average site gradient well below 0.1 percent (1 foot fall over 1000 feet), both east and west of the highway, it is not possible to provide gravity sewer service to all areas of the SPSP without pumping. Multiple sewer pump stations and force mains to service local sub-basins, and a central pumping station east of Highway 99 to pump all Project wastewater flows are required to serve the Sutter Point Specific Plan.

Site Specific Design Considerations and Phasing

The SPSP is a self-contained regional sewer basin. All wastewater generated within the project limits will be collected and sent by gravity sewers and local pump stations to the central pumping station to be constructed in phases starting with the first phase of development.

The SPSP area will be developed in several phases. The proposed phases are divided into two categories, residential villages (Phases 1-4) and employment villages (Phases A-D). The phasing sequences were determined by analyzing the proposed infrastructure needs of the Sutter Pointe community, the potential impacts of the economy, surrounding regional growth, and proposed future changes in the surrounding

infrastructure/public facilities. It is estimated that the residential villages (Phases 1-4) will be developed at an average rate of 1000 units per year, with ultimate build-out in approximately 20 years, however this could fluctuate depending on the economic strength of the housing industry.

While it may be that the employment villages (Phases A-D) will develop concurrently with the residential villages (Phases 1-4), it is more reasonable to believe that this development rate will be much lower, with full build-out in approximately 40 years. Due to the development rate of the employment villages being affected by a multitude of social and economic factors, it is difficult to determine the total amount of the employment lands developing in any given year.

From an engineering perspective, it is difficult to predict the sewer demands of a new development where there are numerous variables as to the construction timing of the various phases. Therefore, for the purposes of this SMP, a simplifying yet conservative approach was implemented, which assumes the development of the residential villages and employment villages achieve ultimate build-out in the same time frame. With this assumption in place and for simplicity of this analysis, the following build-out durations for each phase have been established:

- Phase 1+A (build-out over approximately 7± years)
- Phase 2+B (build-out over approximately 5± years)
- Phase 3+C (build-out over approximately 3± years)
- Phase 4+D (build-out over approximately 5± years)

Given this breakdown of development phases, and for the purposes of this SMP analysis, it is assumed that the ultimate build-out is achieved in approximately 20 years. The Sutter Pointe Specific Plan Conceptual Phasing Plan is shown in Exhibit D. Sanitary sewer infrastructure to serve each phase is described in detail in this Sewer Master Plan.

1.5 Land Use and Zoning

On-site

The current land use for the Project site is agriculture and some limited industrial development. The proposed land uses for the Project include: low, medium and high density residential parcels, schools, parks and open space, drainage detention basins, commercial sites, employment centers (industrial), and roadways. Lands within the SPSP will be rezoned to be consistent with the proposed land use plan.

Off-site

To the east, west and north, the Sutter Pointe Specific Plan is bordered by lands in Sutter County that are zoned agricultural, 80-acre minimum parcel size. To the south lies Sacramento County and lands zoned agricultural, 80-acre minimum parcel size.

Section 2: Wastewater Treatment Alternates

2.1 Identify Wastewater Treatment Alternatives

Identification and evaluation of wastewater treatment alternatives is an important initial step in the SMP process. Development phasing, sizing of collection and trunk line facilities, sewer pump station location, and availability of wastewater treatment are considered as part of alternative ranking and selection. As part of the alternatives study, the following Exhibits were prepared:

Exhibit A: Conceptual Land Use Plan

Exhibit B: Wastewater Treatment Plant Alternates

Exhibit C: Off-site Sewer Force Main Alignments

Exhibit D: Phasing Plan with Sewer Layout

Exhibit E: Off-site Sewer Force Main Routes

The proposed land use plan for SPSP has been designed to include sufficient areas for location of the wastewater facilities (including pump stations). Appropriate buffers for all permanent and temporary wastewater facilities have been anticipated with the treatment alternatives and included in the 2008 Land Use Plan.

From research of existing regional infrastructure and considerations of other options, three (3) wastewater treatment alternatives were identified as follows:

Alternate 1: Connect to SRCSD Upper Northwest Interceptor sewer at Elkhorn Boulevard and West 6th Street. Exhibit E depicts the various possible off-site sewer force main routes from the SPSP to the UNWI.

Alternate 2: Construction of an on-site WWTP with discharge of tertiary treated wastewater effluent to the Sacramento River.

Alternate 3: Construct an off-site sewer force main easterly, and discharge to the City of Roseville Pleasant Grove or Dry Creek WWTP. The length of the force main system is 10.5 miles to Pleasant Grove and 12 miles to the Dry Creek WWTP.

2.2 Discussion of the Three Wastewater Treatment Alternatives

Each of the three SPSP wastewater treatment alternatives has distinct advantages, disadvantages, challenges and opportunities. The phasing of development and the resulting wastewater demands are important considerations in evaluating these alternatives, as permit processing and construction of off-site facilities for a particular alternative may affect providing timely sewer service to the Project.

For purposes of estimating the first level of SPSP development, Phases 1 and A are estimated to include 1700.7 acres in the Phase 1 Residential / Community Facilities, and 588.3 acres of Phase A Employment / Industrial. It is acknowledged that the Phase 1 and Phase A developed acres may vary from the estimated acres.

Table 1 summarizes the calculated acreage, equivalent sewer dwelling units (ESDs) and ADWF by Phase for the SPSP. Total estimated average dry weather flow (ADWF) generation for Phase 1 is 3.81 mgd, or nearly one-third of the total Project build out flow.

Table 1

Summary of Acres, ESDs, and ADWF by Phase

Phase	Acres			ESDs			ADWF (mgd)
Phase / ESD Cum. %	Res. Community % of Total	Industrial % of Total	Cum. Total	Res. Commun	Industrial	Cum. Total	310 gpd / ESD / 10^6 = mgd
1+A / 34.0%	1700.7 / 39%	588.3 / 19%	2289.0	11,076	1,220	12,296	3.81
2+B / 61.2%	1338.7/ 31%	978.6/ 31%	4606.3	8,892	956	22,144	6.86
3+C / 81.7%	674.5 / 15%	822.9 / 26%	6103.7	6,709	697	29,550	9.16
4+D / 100%	652.7 / 15%	771.2 / 24%	7527.6	5,859	771	36,180	11.22
Total	**4366.6**	**3161.0**	**7527.6**	**32,536**	**3,644**	36,180	**11.22**

An overview and discussion of each WWTP alternative is as follows:

Alternate 1: Convey Wastewater to the SRCSD Regional WWTP

Reference: Exhibit B: Wastewater Treatment Plant Alternates

Exhibit C: Off-site Sewer Force Main Alignments

Exhibit D: Phasing Plan with Sewer Layout

Exhibit E: Off-site Sewer Force Main Routes

Description: The Sacramento Regional County Sanitation District (SRCSD) owns and operates a regional WWTP located near Freeport, approximately 20 miles south of the SPSP. With assistance from SRCSD, a point of connection (POC) to the SRCSD Upper Northwest Interceptor sewer at the intersection of Elkhorn Blvd. and West 6th Street in Rio /Linda was identified.

SRCSD studied the downstream capacity of the UNWI and NNPS, and advised the SPSP developer of the allowable PWWF discharge rate from SPSP, and the required wastewater volume and time duration to be stored by SPSP during the peak wet weather event. The resulting storage volume is 3.9 million gallons.[2]

Discussion: Discharge of wastewater to SRCSD interceptor sewers and treatment at the regional WWTP is dependent on several factors:

- **Treatment capacity at SRCSD WWTP:** During preliminary discussions with SRCSD, the District has been receptive to the SPSP proposal to discharge project wastewater to the Upper Northwest Interceptor with a POC at Elkhorn Boulevard and West 6th Street in Rio Linda. From this POC, wastewater would be conveyed in SRCSD interceptor facilities to the SRCSD WWTP. This regional facility has a permitted capacity of 181 mgd per NPDES Permit Order No. 5-00-188 and a reported ADWF of 131mgd in year 2006. Additionally, SRCSD submitted a Capacity Rating Study to the California Central Valley Regional Water Quality Control Board in February 2005 which determined the current ADWF capacity of the STCSD WWTP is approximately 207 mgd. Finally, SRCSD has plans to expand the WWTP to 218 mgd over time. Clearly, the SRCSD WWTP has capacity to handle the SPSP wastewater flows.

  The SPSP is not currently within the service area boundary of the SRCSD. Acceptance and treatment of wastewater by SRCSD from the SPSP is subject to:

  - Annexation of the SPSP into the SRCSD service area or,
  - Agreement by contract between SPSP and SRCSD to accept and treat wastewater from SPSP

[2] The storage volume of 3.9 million gallons is based on Sutter County design criteria. The storage requirement using Sacramento County design criteria is 3.6 million gallons.

- o Conditions and/or requirements identified by SRCSD and its consultant, MWH, that mitigate impacts of addition of SPSP wastewater flows to SRCSD interceptor conveyance, wastewater pumping, emergency storage, and treatment facilities.

SRCSD staff has stated in discussions with the SPSP developer that its Regional WWTP and NPDES permit provide sufficient capacity and flexibility to accept and treat projected wastewater flows from the SPSP.

- **Conveyance to SRCSD Interceptor / Off-site sewer force main route**:

  The SRCSD UNWI Reach 3 is currently under construction and will extend this interceptor east along Elkhorn Boulevard to West 6th Street in Rio Linda.

  To deliver SPSP wastewater to the POC, a sewer force main system, owned, operated, and maintained by Sutter County will be constructed from the central pump station in Phase 1, thence east in Riego Road to east of the NEMDC Canal, and south within existing roadway alignments in Rio Linda to the POC at Elkhorn Boulevard and West 6th Streets.

  Reference Exhibit E for the multiple off-site force main routes considered. Based on a preliminary field survey of potential options, the preferred route is Line A, which follows existing road rights of way northerly from Elkhorn Boulevard to the east SPSP boundary at Riego Road. A second rated choice, the combined Line A / Line B route would connect to the on-site SPSP sewer force main at the southeast corner of the SPSP. Exhibit E depicts the preferred off-site sewer force main route, Line A.

- **Capacity of the Upper Northwest Interceptor and NNPS**

  Based on conversations with SRCSD and dynamic modeling by MWH, the UNWI and NNPS have capacity to handle the ADWF from SPSP without impact to the interceptor system. PWWFs from SPSP, however, cannot be handled by SRCSD facilities, and the SPSP PWWF must be “throttled” down to a lower rate.

SRCSD's consultant, MWH, studied the interceptor system and calculated the following:

- o the maximum discharge rate from SPSP
- o the on-site storage volume required for SPSP upstream of its central pump station to respond to an emergency or service interruption at the NNPS

Alternate 1: Advantages Summary

- Connect to the SRCSD UNWI, which has identified dry weather flow capacity (MWH).
- SRCSD will accept and treat SPSP wastewater at its regional WWTP.
- No SPSP land encumbrance with an on-site WWTP
- No WWTP and river discharge permits to acquire by the SPSP developer
- Avoids the need for Sutter County to own and operate a WWTP

Alternate 1: Disadvantages Summary

- SPSP is not within the SRCSD service area. SPSP must negotiate an agreement with SRCSD to provide wastewater treatment. Sutter County and SRCSD staff's have been working on the details of an agreement in principle outlining the terms and conditions under which SRCSD would extend service to the SPSPS area.
- Line A is 6.4± miles of off-site sewer force main system within existing roads. The combined Line A and B route is 4.9 miles with approximately 95% of the route within existing road rights of way. Pre-design of the force main indicates:
  - o Phase 1+A, which provides for 12,296 ESDs (34% of total ESDs), and generates 3.81 mgd ADWF and 6.02 mgd PWWF, requires parallel 12 and 18-inch pipelines in a single trench that will occupy an estimated 6- foot wide horizontal zone. At natural terrain drainage crossings, existing rights of way may be constrained in some areas of the Line A, off-site route. For

example, bore pits may be needed outside of pavement areas to work around large culverts and/or to tunnel under wetlands. Temporary construction and permanent easements outside of rights of way may be required.

- Phases 2+B through 4+D accommodate the SPSP growth from 12,296 to 36,180 ESDs. With Phase 2 of the SPSP, a 24-inch force main must be added to the 12 and 18-inch Phase 1 system to provide a total PWWF capacity of 27.03 mgd. Due to horizontal constraints, the route of the 24-inch Phase 2 force main may deviate slightly from the preferred Phase 1, Line A/B route.

Alternate 1: Other Considerations

SRCSD is studying alternatives to provide sanitary sewer service to the Rio Linda West Trunk Shed that include:

- A proposed SRCSD interceptor system known as the Rio Linda Interceptor (RLI) could extend north in West 6th Street from Elkhorn Boulevard to a point approximately 2000 feet south of Rio Linda Boulevard. This may be a phased sewer to be determined by SRCSD
- CSD-1 would construct relief trunk sewers as needed and upgrade existing pump stations.

Since Phase 1 of the SPSP is expected to precede the RLI, the SPSP will not rely or speculate on any possible RLI capacity or POC closer than the UNWI at Elkhorn and West 6th Street. To avoid conflict with a future RLI, the SPSP off-site sewer force main will stay clear of any route that is currently known to be a possible RLI alignment.

Alternate 1: Conclusion

Alternate 1, Connect to SRCSD facilities appears to be a viable alternate. Components of service by SRCSD include:

- The SRCSD Upper Northwest Interceptor (UNWI) trunk sewer system accept wastewater generated within the SPSP and transport flows to the SCRSD wastewater treatment plant (WWTP) near Freeport
- The SRCSD provide treatment and disposal of SPSP wastewater

The form of acceptance of wastewater by SCRSD shall be a contract for service between Sutter County and SCRSD.

Alternate 2: On-site Wastewater Treatment and Sacramento River Discharge

Discussion: Alternate 2 consists of an on-site tertiary WWTP and discharge of treated effluent to the Sacramento River. An enhanced tertiary treatment plant (e.g., a membrane bioreactor (MBR) facility) would discharge treated effluent to the river. A summary of Alternate 2 issues is as follows:

- **Regional Water Quality Control Board:** The adopted Basin Plan of the Central Valley Regional Water Quality Control Board prohibits discharge of wastewater flows upstream of the Sacramento metropolitan area. A successful application for a NPDES waste discharge permit for the disposal of tertiary treatment wastewater, even though technically achievable from a water quality perspective, is anticipated to take considerable effort in the face of significant regulatory opposition.
- **Downstream Metropolitan Water Purveyors**: Three existing and two proposed surface water diversions from the Sacramento River for municipal drinking water purposes occur and/or are proposed to occur immediately downstream of the SPSP planning area. The City of Sacramento and the City of West Sacramento both have major intake facilities only a short distance downstream of the most likely location of discharge from a tertiary treatment plant to serve the SPSP

area. Farther downstream, near the town of Freeport, and immediately upstream of the discharge from the SRCSD Regional wastewater treatment plant, Freeport Regional Water Authority (FRWA) is constructing a major intake facility that will serve new development in southeastern Sacramento county and municipal customers of East Bay Municipal Utilities District (EBMUD) in the San Francisco Bay Area. Additionally, both Placer County Water Agency (PCWA), and the City's of Davis and Woodland, are proposing two major municipal intake facilities to serve growth in western Placer County[3] and Yolo County[4], respectively. Further, the City of Sacramento, the City of Roseville, and the Sacramento Suburban Water District partners with PCWA in their proposed intake facility. It is anticipated that these agencies would oppose a river discharge. Further more, it is anticipated that other downstream water purveyors might oppose such a discharge in this locale.

- **Environmental Groups**: While no specific environmental groups have been identified to date, it is anticipated that numerous environmental groups would oppose an application to discharge treated wastewater effluent to the Sacramento River.
- **SRCSD**: Discussions with SRCSD staff and the SRCSD Board of Directors indicate that SRCSD is open to the concept of regionalization of wastewater facilities. Significant work effort has been expended to date by the staffs of Sutter County, SRCSD and Measure M to develop a set of principles that will guide the development of a definitive contract for service between Sutter County and SRCSD. This Principles of Agreement is currently being evaluated by the respective agencies.

Alternate 2: Advantages Summary

- Avoids the need to rely on an existing wastewater authority to provide confirmed capacity for the SPSP

[3] Sacramento River Water Reliability Project
[4] Davis-Woodland Water Supply Project

- Provides for river discharge with tertiary treated effluent meeting the requirements of Title 22.

Alternate 2: Disadvantages Summary

- Sutter County must own and operate the WWTP
- The complex and lengthy entitlement and permitting process to obtain a NPDES waste discharge permit from the California Central Valley Regional Water Quality Control Board in direct conflict with its adopted Basin Plan is anticipated to be very difficult at best. Opposition from downstream metropolitan municipal water purveyors, who draw surface water from the Sacramento River, as well as from various environmental groups opposed to river discharges, is anticipated to be extremely significant.
- Buffer areas may be required for compatibility with adjacent land uses. This could effectively downzone some SPSP land adjacent to the WWTP.

Alternate 2: Conclusion

While it may be technically feasible to design and construct a tertiary treatment plant to meet the technical requirements for river discharge, significant permitting, environmental and political issues would need to be overcome. Accordingly, on-site wastewater treatment and river discharge are not considered a viable alternative for the SPSP.

Alternate 3: Discharge to City of Roseville WWTP Facilities

Description: Key components of the City of Roseville treatment alternative are:

- Wastewater treatment would be provided by the City of Roseville at the Pleasant Grove or Dry Creek WWTP (PGWWTP and DCWWTP).

- A force main system would convey raw wastewater to the Pleasant Grove or Dry Creek WWTP located 6 and 9 miles east of the SPSP, respectively. Actual force main routes would follow existing road rights of way with lengths of 10.5 miles to the PGWWTP and 12 miles to the DCWWTP.
- Sutter County would own and operate the pump station and off-site force main system to the point of discharge to the selected WWTP

Discussion: The City of Roseville operates the Pleasant Grove and Dry Creek WWTPs for the South Placer Wastewater Authority (SPWA), which includes the city of Roseville, Placer County, and the South Placer Municipal Utility District. This alternate, while geographically possible, has multiple problems to overcome to be considered a realistic option. A summary of Alternate 3 issues is as follows:

- **SPWA Service Area Boundary**: Sutter County is not a member of the SPWA and annexation to the service area and existing Joint Powers Authority would likely be required.
- **Point of Connection**: The nearest urban growth area (UGA) is the Placer Vineyard Specific Plan (PVSP) area with its west boundary approximately one-half mile east of the SPSP. No provision is made as part of the PVSP to accept tributary wastewater flow from Sutter County. A 10.5 to 12 mile long force main system will be required to convey raw wastewater to the PGWWTP or DCWWTP respectively.
- **Treatment Capacity at the Pleasant Grove or Dry Creek WWTP**: The city of Roseville has recently completed a 2005 service area boundary update to incorporate areas annexed since 1995 to the SPWA. As part of the update. UGAs were identified by the city to plan for the ultimate build out of the PGWWTP and DCWWTP. The total build out flow for PGWWTP and DCWWTP is projected to be 24.6 and 21.3 mgd respectively. The SPSP build out flow is projected to be 11.09 mgd based on SRCSD flow rate factors.

Recently updated flow rate factors (gal/day/ESD) for the SPWA service area are significantly lower at 190 gpd compared to 310 gpd for SRCSD. Addition of SPSP to the DCWWTP for example, would require estimated total treatment capacity to increase from 21.3 mgd to 28.3 mgd or 32.8 mgd dependent on the particular flow rate (city of Roseville or SRCSD) applied per ESD. A significant expansion at either WWTP would be required to accommodate the SPSP. Discussion with the Roseville Environmental Utilities Department indicates that there is limited expansion capability at the PGWWTP. Further study of the viability of expansion of the DCWWTP to serve SPSP is required and is beyond the scope of this Sewer Master Plan.

- **Discharge from the PGWWTP or DCWWTP and NPDES Permitting**

  Both the PGWWTP and DCWWTP discharge tertiary treated effluent to small ephemeral streams that eventually flow to the Sacramento River. Under low flow conditions, these streams, if not now, will ultimately be effluent dominated. Dischargers seeking new permits, or renewing existing NPDES permits to discharge into effluent dominated streams are facing increasingly onerous discharge standards that require advanced treatment and/or elaborate operating procedures to comply with permit standards.

  If the SPWA was to consider annexing SPSP to its service area boundary, an EIR will be required to study the environmental impact. This will include conducting the appropriate anti-degradation analysis and identifying the associated impacts to receiving waters as a result of additional discharge from either the Pleasant Grove or Dry Creek WWTP.

Alternate 3 Advantages Summary

- Avoids the need to rely solely on an existing wastewater authority (SRCSD) to provide confirmed capacity for the SPSP
- Sutter County avoids owning and operating a WWTP

Alternate 3 Disadvantages Summary

- Off-site sewer force main system is 10.5 to 12 miles long in existing roads
- Not within the SPWA service area boundary
- No treatment capacity at the DCWWTP or PGWWTP
- NPDES discharge permit issues at Dry Creek and Pleasant Grove Creek

Alternate 3 Conclusions

Whereas a solution to expand treatment capacity at the PGWWTP or DCWWTP could be engineered and constructed, significant jurisdictional and environmental issues remain to overcome. Treatment of wastewater by the SPWA is therefore not considered a viable alternate for the SPSP.

2.3 Other Wastewater Treatment Considerations

Industrial Waste…Special Permitting

Because commercial and industrial users will be located within the SPSP, this SMP proposes that Sutter County adopt an industrial waste discharge permitting process to monitor and control the discharge of industrial wastes into the public sewer system. This SMP recommends that this permitting process be modeled after Sacramento County's existing industrial waste discharge permitting process. Sutter County will require the developers of SPSP to develop the industrial waste discharge permitting process, including any necessary enabling ordinances, for consideration and adoption by the County Board of Supervisors.

In addition, the SPSP will construct surface and groundwater treatment plants to supply potable water to the Project. These water treatment facilities will discharge wastewater to the public sewer system. The industrial waste discharge permitting process should be comprehensive to include discharge of water treatment wastes and by-products from the water treatment facilities.

2.4 Wastewater Treatment Preferred Alternative Summary

Three wastewater alternatives were studied, but only one was found to be viable:

- **Alternative 1…Viable**: connect to the SRCSD UNWI that conveys flows to the Sacramento Regional WWTP
- **Alternative 2…Not Viable**: construct an on-site WWTP with discharge to the Sacramento River.
- **Alternative 3…Not Viable**: conveyance to the City of Roseville Dry Creek or Pleasant Grove WWTP

Based on the initially positive discussions with SRCSD to accept wastewater flows, this SMP concludes that Alternative 1, connect to the SRCSD facilities is the Preferred Wastewater Treatment Alternative.

Section 3: Design Criteria for On-site Pipelines

3.1 Design – General

Design Standards: Although the Project is located in south Sutter County, the Preferred Alternate will convey Project wastewater to the SRCSD regional WWTP via the SRCSD Upper Northwest Interceptor, the North Natomas Pumping Station, and the Lower Northwest Interceptor.

The Sutter County design standards for sanitary sewers shall be used to calculate Project Wastewater Flows to size on-site systems and to determine impact on the downstream interceptor system. These design standards are summarized as follows:

Table 2
Design Standards

Land Use	ESD equivalent (ESD/acre)	Density (DU/acre)	Flow Factor
Low Density Residential	3	3	310 gpd/DU
Medium Density Residential	6.4	6.4	310 gpd/DU
High Density Residential	18.5 * 0.75	18.5	232 gpd/DU
Commercial/Retail	6		1860 gpad
Employment 1	6		1860 gpad
Interim Floodzone (E1F)	6		1860 gpad
Employment 2	6		1860 gpad
Mixed Use	9.75		3020 gpad
Industrial Detention Basin	0		0
Parks	0.5		150 gpad
Open Space	0.5		150 gpad
Schools	6		1860 gpad
Roads	0		0

(1) Groundwater general comments: Historical data for spring and fall groundwater levels, published by the California Department of Water Resources, shows the usual groundwater table within the SPSP area to be from 10 feet to 20 feet

below existing ground. The groundwater table within the area appears to be affected by seasonal irrigation practices. During the summer when irrigation of the rice fields is heavy, groundwater levels go higher.

Design Flow Calculations: The above listed design criteria were used to generate the design flow calculations shown in Table 3 below:

Table 3

Design Calculations by Land Use

(Land Uses per 2008 Conceptual Land Use Plan)

Land Use	ESD equivalent (ESD/acre)	Density (DU/acre)	Flow Factor	Area (acres)	ESD[(1)]	ADWF (mgd)	PF	PDWF (mgd)	$Q_{I/I}$ (mgd)	Q_d PWWF (mgd)
Low Density Residential	3	3	310 gpd/DU	512.4	1537	0.48	1.77	0.84	0.72	1.56
Medium Density Residential	6.4	6.4	310 gpd/DU	1950.2	12481	3.87	1.57	6.09	2.73	8.82
High Density Residential	18.5	18.5	232 gpd/DU	187.6	2603	0.81	1.72	1.39	0.26	1.65
Commercial/Retail	6		1860 gpad	178.1	1069	0.33	1.80	0.60	0.25	0.84
Employment 1	6		1860 gpad	172.6	1036	0.32	1.80	0.58	0.24	0.82
Interim Floodzone (E1F)	6		1860 gpad	408.3	2450	0.76	1.72	1.31	0.57	1.88
Employment 2	6		1860 gpad	1990.0	11940	3.70	1.58	5.84	2.79	8.63
Mixed Use	9.75		3020 gpad	164.0	1599	0.50	1.76	0.87	0.23	1.10
Industrial Detention Basin	0		0	414.9	0	0.00	3.50	0.00	0.58	0.58
Parks	0.5		150 gpad	431.8	216	0.07	1.93	0.13	0.60	0.73
Open Space	0.5		150 gpad	394.5	197	0.06	1.93	0.12	0.55	0.67
Schools	6		1860 gpad	174.7	1048	0.32	1.80	0.58	0.24	0.83
Roads	0		0	548.5	0	0.00	3.50	0.00	0.77	0.77
TOTAL				**7527.6**	**36176**	**11.21**	**1.47**	**16.47**	**10.54**	**27.01**

(1) ESD calculation for HDR: (Area)*(18.5 ESD/acre)*(0.75)

Summary of Formulas

ESD = ESD equivalent*Area
ADWF = Density*Flow Factor*Area (residential only)
ADWF = Flow Factor*Area
PF = $3.5-1.8*(ADWF)^{0.05}$
PDWF = (ADWF)*(PF)
$Q_{I/I}$ = (Area)*(1400 gpd/acre)
PWWF = PDWF+$Q_{I/I}$

Upstream tributary sewer basin: The Sewer Master Plan must look beyond its project boundary to plan for future tributary wastewater flow. Land uses surrounding the Sutter Pointe Specific Plan to the west, north and east are zoned agricultural, A-80, with 80-acre minimum parcel size in the Sutter County General Plan. There is no planned development in these adjacent lands and no provision for future tributary flow is provided in this SMP.

The south boundary of the SPSP is the Sacramento/Sutter County line. Lands south of the SPSP are also zoned agricultural, A-80, with 80-acre minimum parcel size. These adjacent lands known as "Natomas Vision" comprise approximately 10,000 acres and are part of an urban growth area study in Sacramento County. That project will provide its own separate and distinct sewer system and connection to the SRCSD UNWI in Elkhorn Boulevard. No provision for future Natomas Vision wastewater tributary flow is made within the SPSP, except in the sizing of the required storage facility upstream of the Sutter Pointe Central Pump Station. For purposes of this sizing analysis, it was assumed that the Natomas Vision area, when developed, would be required to provide a similar storage facility to attenuate its peak wet weather flows and store its non wet weather flows in the event of an emergency operation condition in the downstream SRCSD system.

3.2 Design Approach

Design Task One: Compile record and design support data

The design approach for the Sewer Master Plan began with compilation of known data and resources, previously prepared studies, and the layout and land use summary with densities for the proposed Sutter Pointe Specific Plan including the following:

- Preliminary construction documents for the SRCSD UNWI system
- The best available topography information for the SPSP
- Land Use Map and acreage summary by EDAW, February 2008

Design Task Two: Identify point of connection and capacity

From the alternative wastewater treatment alternatives analysis, the point of connection has previously been identified to be the SRCSD Upper Northwest Interceptor sewer at Elkhorn Boulevard and West 6th Street in Rio Linda.

Design Task Three: **Layout Backbone Sewer, Calculate ESDs & Flows**

- Evaluate existing topographic contours over the entire SPSP site. In general, finished contours are assumed to not vary significantly from existing ground.
- Using the “lay of the land” and gravity when possible, lay out a backbone trunk sewer system in the Project roadways and a schematic sewer system to the farthest point in each adjacent land use parcel.
- Confirm the proposed phasing of the Project. Phasing may be a consideration in the location of sewer pipeline routes and/or the location of a sewer pump station.
- Determine reasonable sewer sub-sheds within land use parcels, calculate areas, ESDs and resultant PWWF, and size pipelines.
- Begin conceptual sewer profile design within respective land use parcels using a minimum sewer depth of 8.0 feet, existing ground to invert, and a slope of 0.005 until the schematic sewer reaches a roadway shown on the Conceptual Land Use Plan.
- This SMP assumes a worse case pipe layout scenario to reach the “back corner” of each parcel and recommends a reduced slope of 0.005 to the upper end of each sub-shed.
- Once large parcel schematic sewers reach a Project roadway, continue the conceptual sewer system downstream design, and optimize pump station locations at 25± foot maximum depth for trunk sewers.
- Size the SPSP central pump station and off-site sewer force main system.
- The SPSP will also provide on-site emergency storage within the Project limits to either store six hours of wastewater flow at the average dry weather flow rate, or store a sufficient volume to reduce the SPSP PWWF discharge

to the capacity of the downstream UNWI or the North Natomas Pump Station flow allocation for the SPSP.

Design Task Four: **Determine the Off-site Sewer Force Main Route**

- Scope and evaluate alternative routes for the off-site sewer force main from the Project east boundary to the Point of Connection at Elkhorn Boulevard and West 6th Street in Rio Linda.
- Locate record information for a preliminary reconnaissance of buried utilities. This is a general overview and not a detailed study and discovery effort.
- Field walk the alternative force main routes to observe the obvious constraints. This does not include biological evaluation and/or delineation of jurisdictional wetlands, etc.
- Based on preliminary record and field information, and input from the SPSP project team biological and wetlands consultant, select the preferred alternative for the off-site sewer force main

Section 4: Design Results and Summary

4.1 Recap of Sewer Master Plan Purpose

At the beginning of this SMP, Section 1.1 provided a description of desired work product. A recap of the SMP purpose is to identify and evaluate:

Wastewater Treatment Options

- Identify and evaluate wastewater treatment options for the SPSP
- Select the preferred wastewater treatment alternative

On-site Technical

- Identify design criteria for sizing sewer pipelines and pump stations
- Identify the on-site sewer sub-sheds
- Calculate wastewater flows and size the backbone and internal collector and trunk sewer systems
- Pre-design sewer systems to estimate depth of pipes and flow line elevations
- Locate and size the on-site sewer pump stations
- Identify phasing and timing of trunk and collector sewers and pumping stations

Off-site Trunk Sewer and Preferred Wastewater Treatment Alternative

- Identify SRCSD constraints to provide sewer service to the SPSP
- Identify the proposed point of connection to the SRCSD interceptor sewer
- Identify the off-site sewer force main and/or gravity sewer options
- Confirm capacity of the downstream SRCSD trunk sewer pipeline and other affected facilities

Financial (Appendix B ~ Preliminary Opinion of Probable Construction Cost)

- Prepare a preliminary Opinion of Probable Construction Cost (OPCC) for the Preferred Wastewater Treatment Alternative.
- The OPCC will be used to establish a finance plan to provide sewer infrastructure to the SPSP.

Environmental and Policy Issues

- Provide sufficient sewer study detail to support EIR documentation
- Identify exceptions to design criteria and/or policy needed for approval

In addition to topics addressed by this SMP, supplemental studies to the SMP are summarized as follows:

Supplemental Technical Studies to this SMP

- MWH study of the available capacity of the UNWI and NNPS.
- MWH study of the emergency wastewater storage facilities upstream of the NNPS.
- MWH study of the required on-site emergency storage upstream of the SPSP Central Pump Station.

4.2 Results and Recommendations of the Sewer Master Plan

4.2.1: Wastewater Treatment

Three WWTP alternatives were identified and evaluated as follows:

- **Alternate 1:** Construct an off-site sewer force main, and connect to the SRCSD UNWI at Elkhorn Boulevard and West 6th Street.

Alternate 2: Construct an on-site tertiary WWTP with river discharge.

Alternate 3: Construct an off-site sewer force main and discharge to the City of Roseville Pleasant Grove or Dry Creek WWTP.

The Recommended Alternative is:

Alternative 1: Connect to SRCSD at the UNWI

4.2.2: Wastewater Generation: SPSP Sanitary Sewer Calculations

- **General**

  Appendix A summarizes areas, ESDs, pipeline sizes, and flows at each node. Reference Exhibit D for the proposed SPSP collector and trunk sewer systems.

  Using the Sutter County design criteria, this SMP calculated the ADWF and PWWF rate to be 11.22 and 27.03 mgd respectively for 36,180 ESDs.

4.2.3: Other Considerations

- **On-site Collection system**

  Sewer systems within the SPSP limits will be gravity pipelines that flow to localized sewer pump stations. Due to the very flat topography on the site, and the general limitation of gravity sewers to maximum 25± feet depth, multiple sewer pump stations are required. Flows from pump stations may be either a lift station only, or lift and force main to a downstream manhole. All pump stations, force mains and gravity lines will ultimately flow to a central pumping station in Phase 1, east of Highway 99 and south of Riego Road.

- **Off-site Sewer Force Main System to SRCSD Point of Connection**

  From the SPSP central pumping station, a sewer force main system will transport all project wastewater east along Riego Road to Sorento Road, thence south in existing road rights of way to the POC at the intersection of Elkhorn Boulevard and West 6th Street. This POC is the SRCSD Upper Northwest Interceptor. From the SRCSD point of connection, wastewater will flow south through gravity and force mains to the SRCSD WWTP in south Sacramento County.

Based on estimates of Project build out, a multiple sewer force main pipeline system is proposed. The initial installation will be a parallel 12 and 18-inch system. In consideration of lower initial flows, a single 12-inch force main will be used to convey up to the initial 2.0 mgd. As the Project wastewater flow increases, the 18-inch force main will share flows. As build out continues, a 24-inch force main will be constructed. Combined with the 12 and 18-inch system, the three force mains will provide service at PWWF and a measure of redundancy during ADWF to accommodate full Project build out.

- **On-site and Off-site Sewer Systems – Operations and Maintenance**

  Sutter County will own, operate and maintain the on-site sanitary sewer collection and force main systems, sewer pump stations, and the off-site sewer force main to its point of connection at the SRCSD UNWI.

- **Industrial Waste Discharges and Special Permitting**

  The SPSP provides for development of approximately 3,200 acres of industrial uses. Unlike domestic flows generated by residential and commercial users, industrial development often generates sewer flows of high pollutant concentrations and unusual characteristics. Therefore, this SMP proposes that Sutter County adopt an industrial waste discharge permitting process to monitor and control the discharge of industrial wastes into the public sewer system.

  In addition, the SPSP will construct surface and groundwater treatment plants to supply potable water to the Plan Area. Byproducts from treating ground and surface water include but may not be limited to: filtration backwash waster, polymers, and/or alum coagulated precipitates, iron, manganese, boron, dissolved solids and arsenic.

  It is proposed that with the exception of arsenic, a suspected groundwater constituent, water treatment by-products be discharged directly into the public sewer system. Arsenic tainted by-products from the water treatment process will be collected, stored and disposed in accordance with the requirements of law,

and not discharged to the public sewer system. The industrial waste discharge permit should be comprehensive to include the water treatment facilities in the overall permitting process.

- **Wastewater Reclamation**

  It may be possible that recycled water could be available to serve the large-scale irrigation demands in the SPSP area some time in the future. While not likely to occur for many years, it is proposed that Sutter County adopt a "purple pipe" ordinance that would require all major irrigated landscaping and open space areas within the SPSP area to install a purple pipe irrigation system that could be easily converted from potable to recycled water distribution at some future date. If recycled wastewater ever becomes available within the SPSP area, then a system of recycled water pipes could be installed to provide these areas with recycled wastewater with minimal difficulty.

Section 5: Project Phasing

Phasing of the Sutter Pointe Specific Plan is projected to be in four major phases. See Exhibit D. A summary of the estimated residential, industrial and other land uses together with estimated wastewater generation by phase is shown in Table 4:

Table 4
Design Calculations by Phase
(Land Uses per 2008 Conceptual Land Use Plan)

Phase	LDR	MDR	HDR	CR	E1	E1F	E2	MU	IDB	P	OS	Schools	Roads	Cum. Area[1]	Cum. ESD[2]	ADWF	PF	PDWF	Gross Area[3]	$Q_{I/I}$	Q_d PWWF
	(3 ESD/AC)	(6.4 ESD/AC)	(18.5 ESD/AC)	(6 ESD/AC)	(6 ESD/AC)	(6 ESD/AC)	(6 ESD/AC)	(9.75 ESD/AC)	(0 ESD/AC)	(0.5 ESD/AC)	(0.5 ESD/AC)	(6 ESD/AC)	(0 ESD/AC)	(acres)		(mgd)		(mgd)	(acres)	(mgd)	(mgd)
Phase 1+A	121.0	874.8	91.4	129.9	38.4	0.0	380.3	100.8	25.3	99.4	115.8	114.0	197.9	2263.7	12296	3.81	1.58	6.02	2289.0	3.20	9.22
Phase 2+B	316.3	491.9	14.5	0	21	138.3	611.4	63.3	148.5	181.8	183.5	20.9	125.9	2168.8	22144	6.86	1.52	10.43	4606.3	6.45	16.88
Phase 3+C	0	331.3	57.8	21.8	91.2	97.3	506.2	0	145	67	51.4	21	107.4	1352.4	29550	9.16	1.49	13.65	6103.7	8.55	22.19
Phase 4+D	75.5	252.3	24	26.5	22	172.2	492.6	0	95.5	83.7	44.1	18.7	116.8	1328.4	36180	11.22	1.47	16.49	7527.6	10.54	27.03
	512.8	**1950.3**	**187.7**	**178.2**	**172.6**	**407.8**	**1990.5**	**164.1**	**414.3**	**431.9**	**394.8**	**174.6**	**548.0**	**7113.3**	**36180**	**11.22**	**1.47**	**16.49**	**7527.6**	**10.54**	**27.03**

(1) "Cum. Area" does not include "IDB"
(2) ESD calculation for HDR: (Area)*(18.5 ESD/acre)*(0.75)
(3) "Gross Area" is the sum of all land uses
(4) Acreages in table may vary from those in the text due to rounding

Summary of Formulas

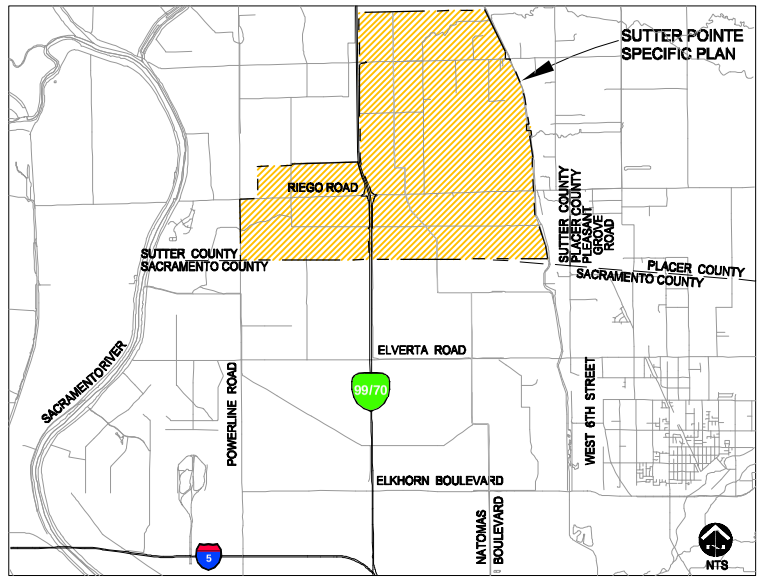
ADWF = (Cum. ESD)*(310 gpd/ESD)
PF = $3.5-1.8*(ADWF)^{0.05}$
PDWF = (ADWF)*(PF)
$Q_{I/I}$ = (Gross Area)*(1400 gpd/acre)
PWWF = PDWF+$Q_{I/I}$

Section 6: Conclusions of the Sewer Master Plan

Three wastewater treatment plant options were studied by the SMP. Alternate 1, connect to the SRCSD regional WWTP is the Preferred Alternate. A summary of results of this SMP is as follows:

- Gravity sewers, multiple local sewer pump stations, and one central pump station will be constructed to provide sewer service to the SPSP.
- For the preferred wastewater treatment Alternate 1, an off-site sewer force main Line A on Exhibit E, will be constructed to convey wastewater from the SPSP to the SRCSD Upper Northwest Interceptor Sewer at Elkhorn Boulevard / 6th Street.
- ADWF is calculated to be 11.22 mgd and PWWF is 27.03 mgd at build out
- On-site storage upstream of the SPSP central pump station is required to limit the maximum pumping and discharge rate. The volume of this storage is estimated to be 3.9 million gallons.
- No downstream improvements to the SRCSD trunk sewer system are required.

Based on evaluation of available data, wastewater calculations, and discussions with SRCSD, this SMP concludes that the proposed SPSP sewer systems with connection to the SRCSD UNWI can be constructed subject to approval of plans by Sutter County and Sacramento County.



VICINITY MAP

LEGEND

LAND USE		ACRES
RESIDENTIAL		
Low Density Residential	LDR	512.4 Acres
Medium Density Residential	MDR	1,950.2 Acres
High Density Residential	HDR	187.6 Acres
Residential Roads		249.1 Acres
		Subtotal 2,899.3 Acres
		Measure M 2,900 Acres
EMPLOYMENT		
Employment 1	E1	172.6 Acres
E1 Interim Flood Zone	E1F	108.3 Acres
Employment 2	E2	1,990.0 Acres
Commercial Retail	CR	178.1 Acres
Industrial Drainage Basins	IDB	411.9 Acres
Mixed Use	MU	164.0 Acres
Employment Roads		299.4 Acres
		Subtotal 3,627.3 Acres
		Measure M 3,600 Acres
COMMUNITY FACILITIES		
Park	P	431.8 Acres
Open Space	OS	391.5 Acres
Schools		
K-8 School		121.8 Acres
HS High School		52.9 Acres
T Transit Center		
C Civic Center		
F Fire Station		
Pedestrian Enhanced Intersections		
		Subtotal 1,001.0 Acres
		Measure M 1,000 Acres
		Grand Total 7,527.6 Acres
		Measure M Grand Total 7,500 Acres
Activity Center Boundary		
Interchange Planning Area		

EXHIBIT A

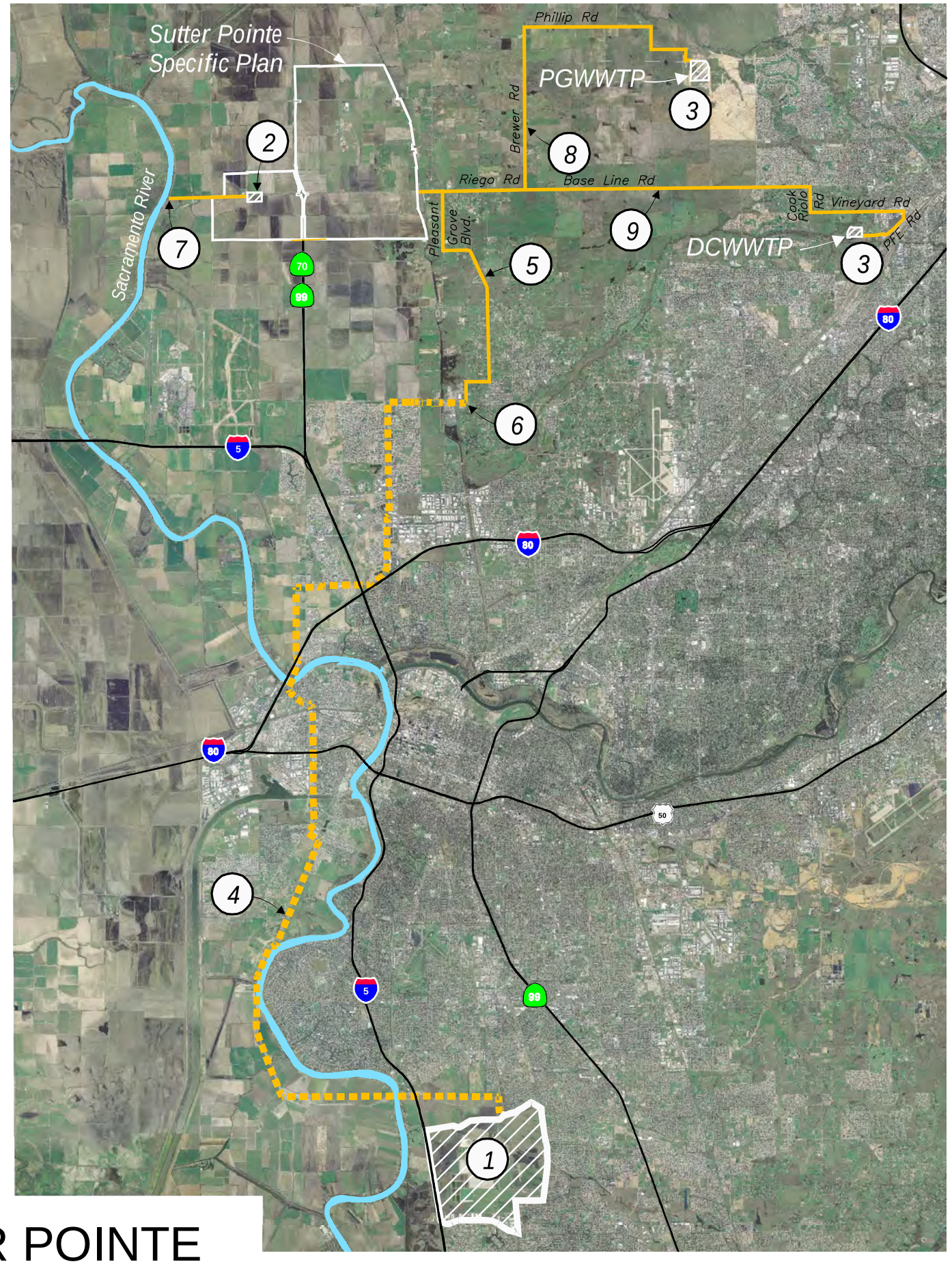
SUTTER POINTE

MEASURE "M" GROUP

Conceptual Land Use Exhibit

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 929-6092

June 20, 2008



KEY NOTES:

1. *Alternate 1 - SRCSD regional WWTP*
2. *Alternate 2 - On-site WWTP and discharge to river*
3. *Alternate 3 - PGWWTP or DCWWTP*
4. *Interceptor sewer to SRCSD WWTP (existing) D = 20+ (Highway 99/I-5) miles from Sutter Pointe to WWTP.*
5. *Alternate 1: Line A Sewer force main from Sutter Pointe to SRCSD point of connection. D = 6.4± miles.*
6. *Alternate 1: Line A Point of connection to SRCSD UNWI at Elkhorn Blvd. and West 6th St.*
7. *Alternate 2: Discharge pipeline to the Sacramento River following the Riego Road right of way. D = 1.0 mile from west SPSP limit.*
8. *Alternate 3: Off-site force main to PGWWTP.*
9. *Alternate 3: Off-site force main to DCWWTP.*

ABBREVIATIONS:

DCWWTP	Dry Creek Wastewater Treatment Plant
PGWWTP	Pleasant Grove Wastewater Treatment Plant
SPSP	Sutter Pointe Specific Plan
SRCSD	Sacramento Regional County Sanitation District
UNWI	Upper Northwest Interceptor
WWTP	Wastewater Treatment Plant

SUTTER POINTE
MEASURE "M" GROUP

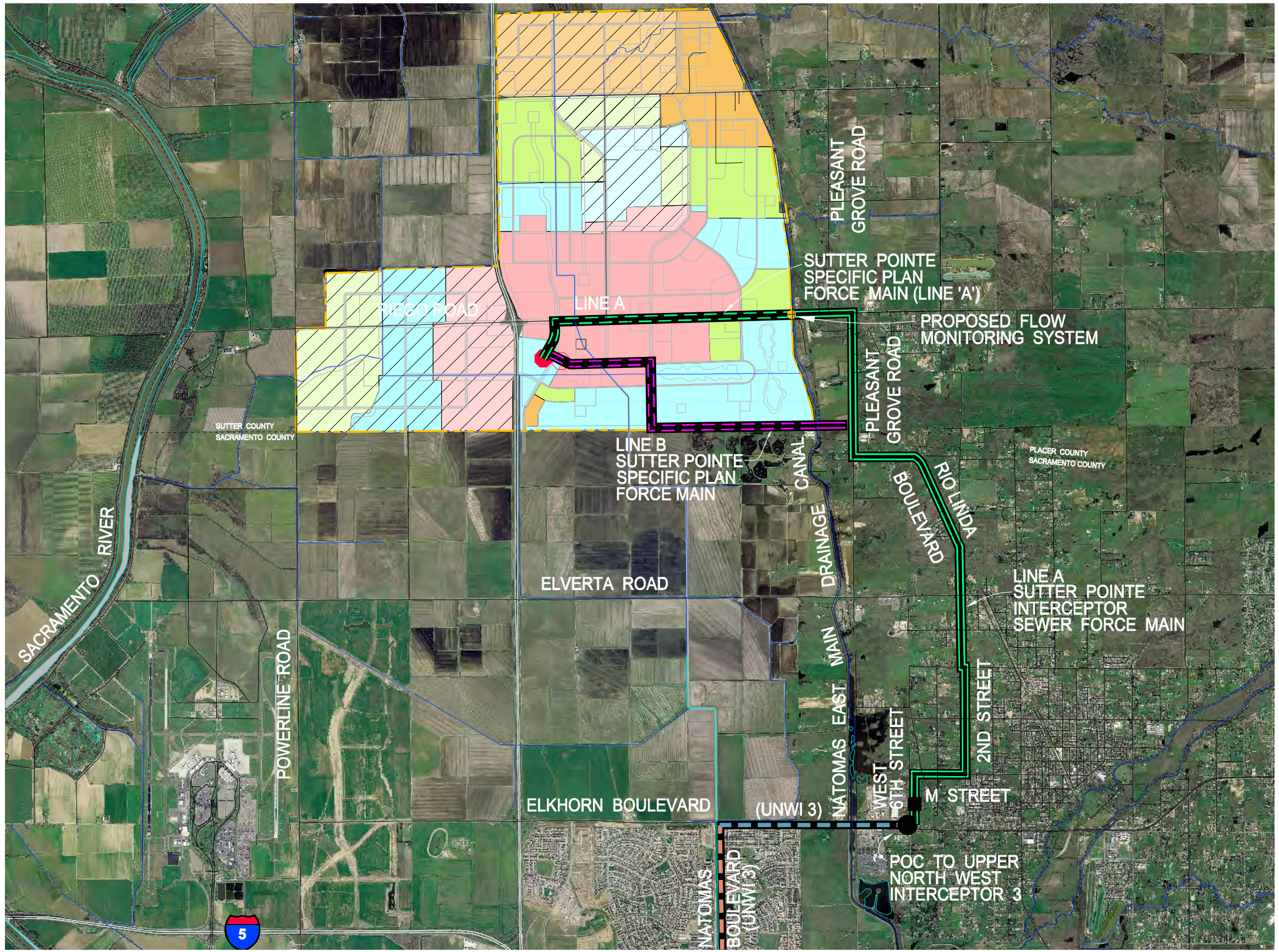
Exhibit B

Wastewater Treatment Plant Alternates

0 15,000 30,000

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 929-6092

June 20, 2008



L E G E N D

- PS — Sutter Pointe Central Pump Station
- Proposed Flow Monitoring Station
- Sutter Pointe Offsite Sewer Force Main (LINE 'B')
- Sutter Pointe Onsite Sewer Force Main (LINE 'B')
- Sutter Pointe Offsite Sewer Force Main (LINE 'A')
- Sutter Pointe Onsite Sewer Force Main (LINE 'A')
- Upper Northwest Interceptor 2 (UNWI–2)
- Upper Northwest Interceptor 3 (UNWI–3)
- Flow Control Valve Station
- Sutter Point Specific Plan Boundary

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase A
- Phase B
- Phase C
- Phase D

EXHIBIT C

SUTTER POINTE

MEASURE "M" GROUP

Alternate 1:
Offsite Sewer Force Main Alignment

0 2,500 5,000 10,000

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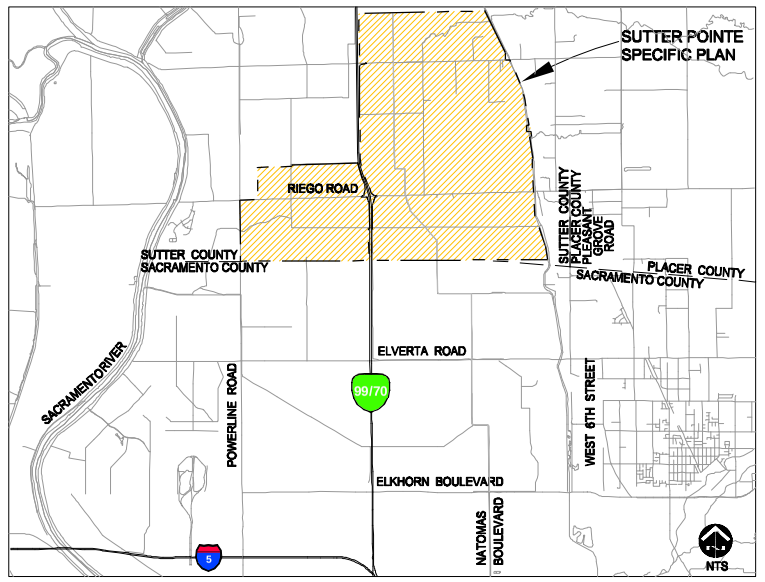
June 20, 2008



VICINITY MAP

Legend

RESIDENTIAL

LDR	Low Density Residential
MDR	Medium Density Residential
HDR	High Density Residential

EMPLOYMENT

E1	Employment 1
E1F	E1 Interim Flood Zone
E2	Employment 2
CR	Commercial Retail
IDB	Industrial Drainage Basin
MU	Mixed Use

COMMUNITY FACILITIES

POS	Parks & Open Space
NP	Neighborhood Parks
K-8	K-8 School
HS	High School
(T)	Transit Center
(C)	Civic Center
(F)	Fire Station
	Pedestrian Enhanced Intersections

Phase 1	Phase A
Phase 2	Phase B
Phase 3	Phase C
Phase 4	Phase D

EXHIBIT D

NOTE: FLOW CALCULATIONS ARE BASED ON THE APRIL 23, 2007 LAND USE PLAN, PREPARED BY EDAW.

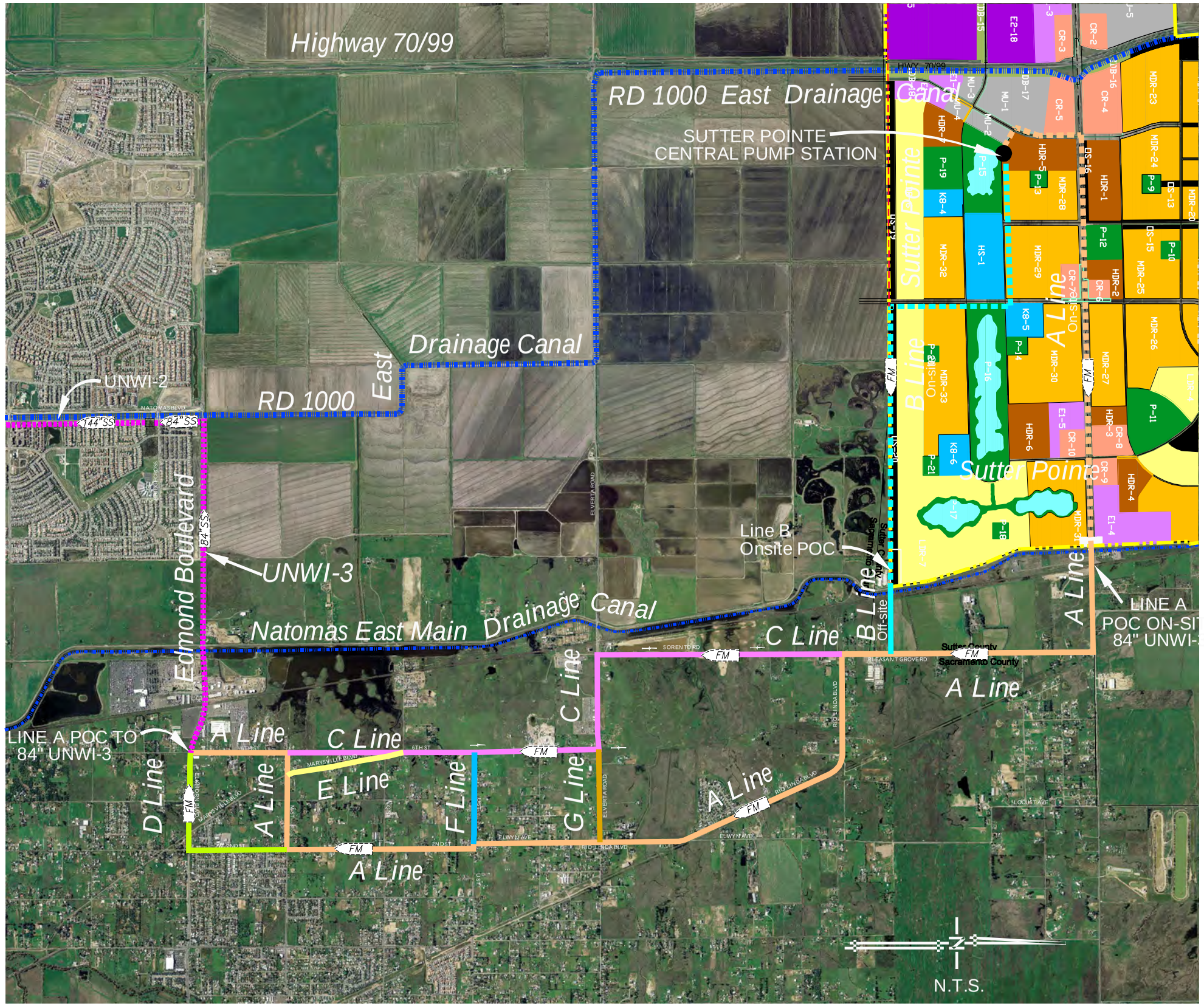
SUTTER POINTE

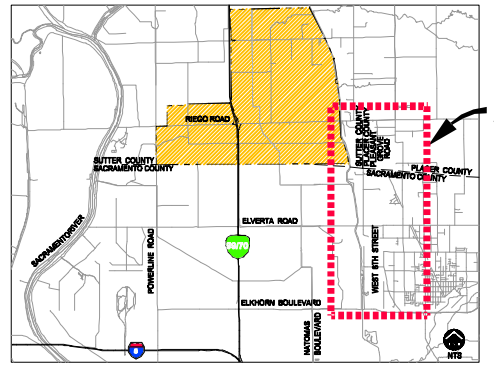
MEASURE "M" GROUP

Conceptual Phasing Plan with Sewer Layout

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING
SACRAMENTO, CALIFORNIA (916) 929-6092

June 20, 2008





Legend

OFFSITE		ON SITE	
FM	A LINE	FM	A LINE
FM	B LINE	FM	B LINE
FM	C LINE		
FM	D LINE		
FM	E LINE		
FM	F LINE		
FM	G LINE		
144" SS	UPPER NORTHWEST INTERCEPTOR–2 (UNWI–2)		
84" SS	UPPER NORTHWEST INTERCEPTOR–3 (UNWI–3)		
	RD 1000 DRAINAGE CANAL		
	SUTTER POINTE BOUNDARY		
	NATOMAS EAST MAIN DRAINAGE CANAL(NEMDC)		

SUTTER POINTE

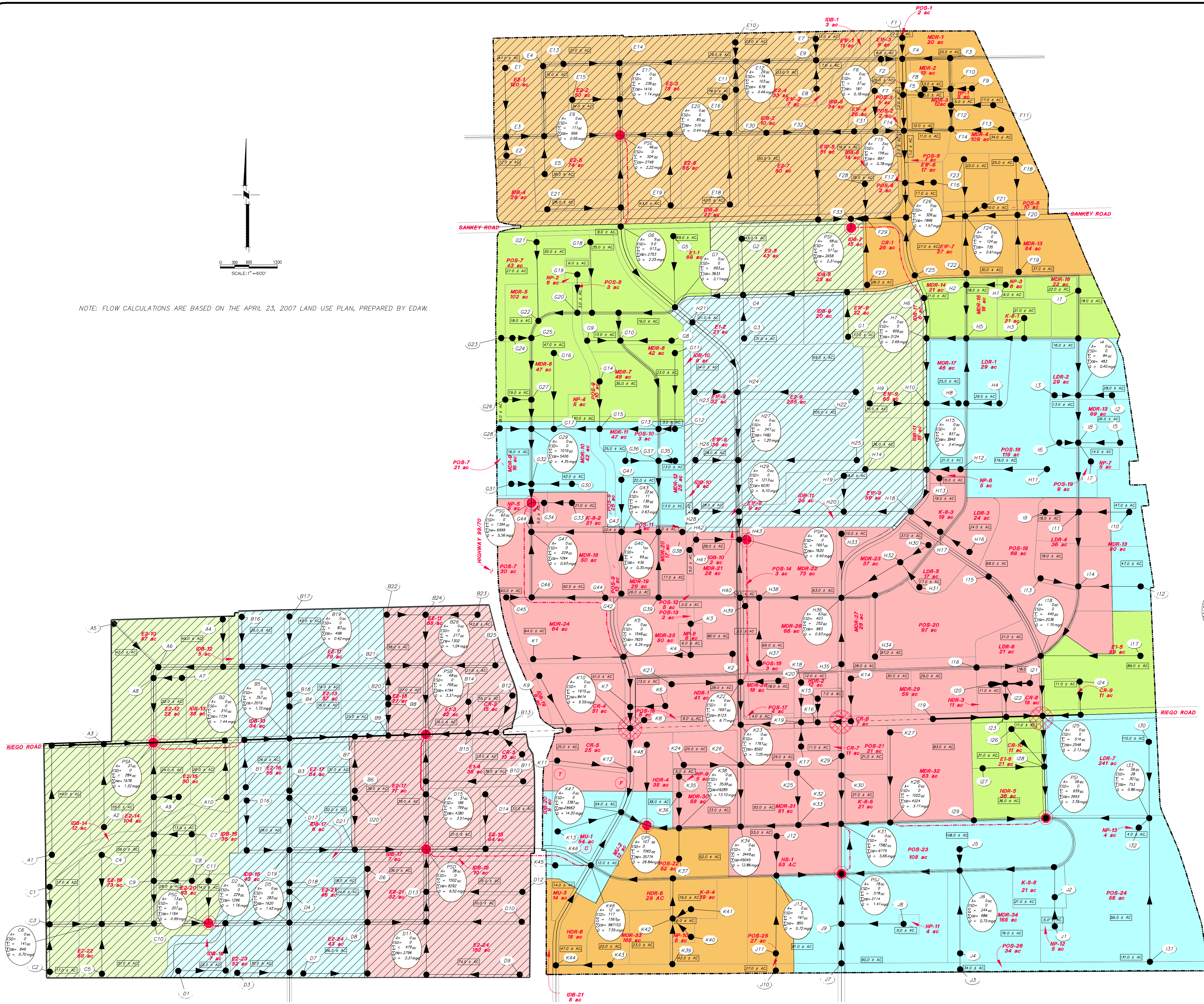
MEASURE "M" GROUP

EXHIBIT E
Offsite Sewer Force Main Routes

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 929-6092

Job Number: 7900.00 Date: 06/20/08

NOTE: FLOW CALCULATIONS ARE BASED ON THE APRIL 23, 2007 LAND USE PLAN, PREPARED BY EDAW.



LEGEND

- PROJECT BOUNDARY
- PROPOSED SEWER
- PUMP STATION SHED
- NODE SHEDS
- SSMH
- FLOW DIRECTION
- PUMP STATION

PHASE 1	PHASE A
PHASE 2	PHASE B
PHASE 3	PHASE C
PHASE 4	PHASE D

NODE#: A= Xac; ESD= X; Σ A= Xac; Σ ESD= X; Q_p= Xmgd

- MANHOLE/ NODE NUMBER
- CONTRIBUTING AREA (ACRES)
- CONTRIBUTING EQUIVALENT SINGLE FAMILY DWELLINGS
- CUMULATIVE AREA (ACRES)
- CUMULATIVE EQUIVALENT SINGLE FAMILY DWELLINGS
- PEAK WET WEATHER FLOW (MILLION GALLONS PER DAY)

PUMP STATION SUMMARY

PS ID	TOTAL SHED AREA (AC)	ADWF (MED)	PWWF (MED)
PSA	284	0.49	1.32
PSB	768	1.30	3.37
PSC	207	0.36	0.99
PSD	1502	2.57	6.52
PSE	504	0.85	2.22
PSF	511	0.82	2.31
PSG	1,394	2.17	5.56
PSH	1,651	2.36	6.40
PSI	939	1.24	3.39
PSJ	518	0.66	1.87
CPS	7,065	11.09	26.84

EXHIBIT F-1

SANITARY SEWER MASTER PLAN

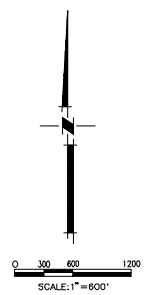
FLOW INFORMATION

SUTTER POINTE SPECIFIC PLAN

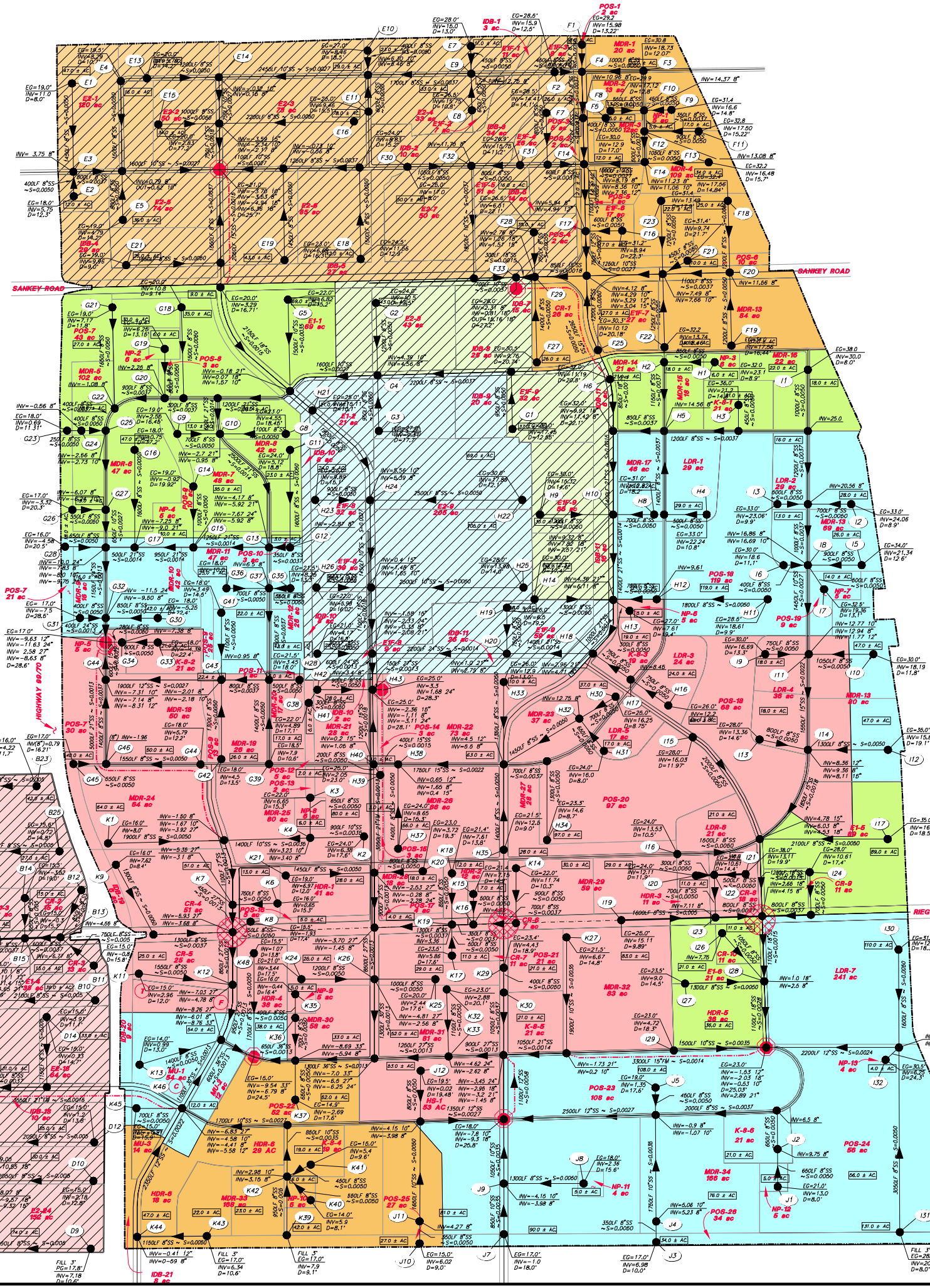
SUTTER COUNTY CALIFORNIA
Scale: 1" = 600' JUNE 20, 2008

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 929-6092

7900-00



NOTE: FLOW CALCULATIONS ARE BASED ON THE APRIL 23, 2007 LAND USE PLAN, PREPARED BY EDAW.



LEGEND

- PROJECT BOUNDARY
- PROPOSED SEWER
- PUMP STATION SHED
- NODE SHEDS
- SSMH
- FLOW DIRECTION
- PUMP STATION

- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE A
- PHASE B
- PHASE C
- PHASE D

EXHIBIT F-2

SANITARY SEWER MASTER PLAN

PIPE INFORMATION

SOUTH SUTTER POINTE SPECIFIC PLAN

SUTTER COUNTY — CALIFORNIA

Scale: 1" = 600' — June 20, 2008

MacKAY & SOMPS
CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 922-9092

7800.00

Appendix A

Design Calculations

APPENDIX A

Node ID	Down-stream Node	Area by Land Use												Area			ESD		ADWF	PF	PDWF	Gross Area		$Q_{i/i}$	Qd PWWF	Pipe Size	Slope	PWWF velocity	d/D	Flowline Elevation	Rim Elevation	Depth
		LDR (3ESD/AC)	MDR (6.4ESD/AC)	HDR (18.5ESD/AC)	E1 (6ESD/AC)	E1F (6ESD/AC)	E2 (6ESD/AC)	CR (6ESD/AC)	MU (9.7ESD/AC)	Parks (0.5ESD/AC)	K-8 School (6ESD/school)	H. School (6 ESD/AC)	Roads (0ESD/AC)	Per Node (AC)	Cum. (AC)	Cum. Park (AC)	Dir.	Cum.	(mgd)		(mgd)	Per Node (AC)	Cum. (AC)	(mgd)	(mgd)	(in)	(ft/ft)	(fps)	(in/in)			(ft)
A1	A3						49.0							49	49	0	294	294	0.09	1.90	0.17	52	52	0.07	0.25	8	0.005	2.33	0.44	14.5	22.5	8.0
A2	A3						55.0							55	55	0	330	330	0.10	1.89	0.19	59	59	0.08	0.28	8	0.005	2.47	0.5	7.7	18.4	10.7
A3	PSA													0	104	0	0	624	0.19	1.84	0.36	0	111	0.15	0.51	10	0.0027	2.23	0.58	-1.2	21.5	22.7
A4	A6						45.0							45	45	0	270	270	0.08	1.91	0.16	47	47	0.07	0.23	8	0.0050	2.33	0.44	10.9	20.0	9.1
A5	A6						42.0							42	42	0	252	252	0.08	1.92	0.15	45	45	0.06	0.21	8	0.0050	2.23	0.41	7.2	22.5	15.3
A6	A8													0	87	0	0	522	0.16	1.86	0.30	0	91	0.13	0.43	10	0.0027	2.15	0.53	0.5	18.0	17.5
A7	A8						22.0							22	22	0	132	132	0.04	1.97	0.08	25	25	0.03	0.12	8	0.0050	1.92	0.3	2.9	17.0	14.1
A8	PSA													0	109	0	0	654	0.20	1.84	0.37	0	116	0.16	0.54	10	0.0027	2.26	0.62	-0.3	18.0	18.3
A9	PSA						24.0							24	24	0	144	144	0.04	1.96	0.09	27	27	0.04	0.12	8	0.0050	1.92	0.3	3.1	18.5	15.4
A10	PSA						26.0							26	26	0	156	156	0.05	1.95	0.09	34	34	0.05	0.14	8	0.0050	2.04	0.34	7.7	18.0	10.3
PSA	B2												21	21	284	0	0	1578	0.49	1.76	0.86	39	327	0.46	1.32	10		4.68	1.0			
B1	B2						26.0							26	26	0	156	156	0.05	1.95	0.09	29	29	0.04	0.13	8	0.0050	1.92	0.3	6.1	16.5	10.4
B2	B5													0	310	0	0	1734	0.54	1.76	0.94	0	355	0.50	1.44	12	0.0063	3.94	0.65	0.1	19.0	18.9
B3	B5						31.0							31	31	0	186	186	0.06	1.94	0.11	36	36	0.05	0.16	8	0.0050	2.04	0.34	0.6	15.5	14.9
B4	B5						16.0							16	16	0	96	96	0.03	1.99	0.06	57	57	0.08	0.14	8	0.0050	2.04	0.34	-1.4	16.0	17.4
B5	B7													0	357	0	0	2016	0.62	1.74	1.09	0	449	0.63	1.72	15	0.0018	2.52	0.78	-6.2	18.2	24.4
B6	B7						39.0							39	39	0	234	234	0.07	1.92	0.14	45	45	0.06	0.20	8	0.0050	2.23	0.41	-1.7	15.0	16.7
B7	B9													0	396	0	0	2250	0.70	1.73	1.21	0	493	0.69	1.90	18	0.0018	2.70	0.58	-8.7	17.7	26.4
B8	B9						25.0							25	25	0	150	150	0.05	1.96	0.09	30	30	0.04	0.13	8	0.0050	1.92	0.3	-5.5	15.0	20.5
B9	PSB													0	421	0	0	2400	0.74	1.73	1.28	0	524	0.73	2.02	18	0.0015	2.52	0.65	-10.0	18.0	28.0
B10	PSB				39.0									39	39	0	234	234	0.07	1.92	0.14	42	42	0.06	0.20	8	0.0050	2.23	0.41	3.9	15.0	11.1
B11	B13							13.0						13	13	0	78	78	0.02	2.01	0.05	16	16	0.02	0.07	8	0.0050	1.54	0.21	-0.8	15.0	15.8
B12	B13							15.0						15	15	0	90	90	0.03	1.99	0.06	17	17	0.02	0.08	8	0.0050	1.54	0.21	-0.3	15.0	15.3
B13	B15													0	28	0	0	168	0.05	1.95	0.10	0	33	0.05	0.15	8	0.0037	1.84	0.38	-4.6	17.7	22.3
B14	B15				15.0									15	15	0	90	90	0.03	1.99	0.06	19	19	0.03	0.08	8	0.0050	1.54	0.21	-3.5	15.5	19.0
B15	PSB													0	43	0	0	258	0.08	1.91	0.15	0	51	0.07	0.23	8	0.0037	2.06	0.47	-6.8	17.7	24.5
B16	B19						25.0							25	25	0	150	150	0.05	1.96	0.09	31	31	0.04	0.13	8	0.0050	1.92	0.3	10.0	18.0	8.0
B17	B19						42.0							42	42	0	252	252	0.08	1.92	0.15	43	43	0.06	0.21	8	0.0050	2.23	0.41	6.3	18.9	12.6
B18	B19						16.0							16	16	0	96	96	0.03	1.99	0.06	18	18	0.03	0.08	8	0.0050	1.76	0.26	4.1	16.0	12.0
B19	B21													0	83	0	0	498	0.15	1.86	0.29	0	93	0.13	0.42	10	0.0027	2.15	0.53	0.9	16.0	15.1
B20	B21						27.0							27	27	0	162	162	0.05	1.95	0.10	30	30	0.04	0.14	8	0.0050	2.04	0.34	-1.1	15.0	16.1
B21	B26													0	110	0	0	660	0.20	1.84	0.38	0	123	0.17	0.55	10	0.0027	2.26	0.62	-4.8	15.8	20.6
B22	B24						38.0							38	38	0	228	228	0.07	1.92	0.14	40	40	0.06	0.19	8	0.0050	2.14	0.38	3.0	18.0	15.0
B23	B24						42.0							42	42	0	252	252	0.08	1.92	0.15	42	42	0.06	0.21	8	0.0050	2.23	0.41	4.2	16.0	11.8
B24	B26													0	80	0	0	480	0.15	1.86	0.28	0	81	0.11	0.39	8	0.0050	2.66	0.62	-1.3	15.7	17.0
B25	B26				27.0									27	27	0	162	162	0.05	1.95	0.10	27	27	0.04	0.14	8	0.0050	1.92	0.3	0.7	15.6	14.9
B26	PSB													0	217	0	0	1302	0.40	1.78	0.72	0	231	0.32	1.04	15	0.0022	2.49	0.5	-8.0	15.8	23.8
PSB	D15												48	48	768	0	0	4194	1.30	1.68	2.18	0	849	1.19	3.37	15		5.31	1.0			
C1	C3						17.0							17	17	0	102	102	0.03	1.99	0.06	22	22	0.03	0.09	8	0.0050	1.76	0.26	9.6	23.7	14.1
C2	C3						17.0							17	17	0	102	102	0.03	1.99	0.06	18	18	0.03	0.09	8	0.0050	1.76	0.26	10.6	23.7	13.1
C3	C6													0	34	0	0	204	0.06	1.93	0.12	0	40	0.06	0.18	8	0.0037	1.92	0.41	5.6	23.7	18.1
C4	C6						56.0							56	56	0	336	336	0.10	1.89	0.20	68	68	0.10	0.29	8	0.0050	2.47	0.5	8.8	20.4	11.7
C5	C6						51.0							51	51	0	306	306	0.09	1.90	0.18	52	52	0.07	0.25	8	0.0050	2.40	0.47	6.8	23.0	16.3
C6	C10													0	141	0	0	846	0.26	1.82	0.48	0	160	0.22	0.70	12	0.0022	2.24	0.56	0.5	21.3	20.8
C7	C9						13.0							13	13	0	78	78	0.02	2.01	0.05	18	18	0.03	0.07	8	0.0050	1.54	0.21	10.0	18.0	8.0
C8	C9						26.0							26	26	0	156	156	0.05	1.95	0.09	29	29	0.04	0.14	8	0.0050	1.92	0.3	6.3	20.0	13.7
C9	C10													0	39	0	0	234	0.07	1.92	0.14	0	48	0.07	0.21	8	0.0037	2.00	0.44	2.3	23.0	20.7
C10	PSC													0	180	0	0	1080	0.33	1.80	0.60	0	208	0.29	0.89	12	0.0022	2.36	0.67	-2.0	20.3	22.3
C11	PSC						14.0							14	14	0	84	84	0.03	2.00	0.05	36	36	0.05	0.10	8	0.0050	1.76	0.26	0.9	19.0	18.1
PSC	D2												13	13	207	0	0	1164	0.36	1.79	0.65	0	244	0.34	0.99	8		5.47	1.0			
D1	D2						22.0							22	22	0	132	132	0.04	1.97	0.08	31	31	0.04	0.12	8	0.0050	1.92	0.3	12.6	19.0	6.5
D2	D5													0	229	0	0	1296	0.40	1.78	0.72	46	321	0.45	1.16	15	0.0040	3.16	0.44	1.3	18.0	16.7
D3	D5						30.0							30	30	0	180	180	0.06	1.94	0.11	33	33	0.05	0.15	8	0.0050	2.04	0.34	6.5	22.0	15.5
D4	D5						24.0							24	24	0	144	144	0.04	1.96	0.09	27	27	0.04	0.12	8	0.0050	1.92	0.3	0.4	17.0	16.6
D5	D8													0	283	0	0	1620	0.50	1.76	0.88	0	381	0.53	1.42	15	0.0018	2.48	0.67	-4.1	18.0	22.1
D6	D8						36.0							36	36	0	216	216	0.07	1.93	0.13	46	46	0.06	0.19	8	0.0050	2.23	0.41	-0.6	14.4	15.0
D7	D8						56.0							56	56	0	336	336	0.10	1.89	0.20	59	59	0.08	0.28	8	0.0050	2.47	0.5	6.4	20.0	13.6
D8	D11													0	375	0	0	2172	0.67	1.74	1.17	0	486	0.68	1.85	18	0.0018	2.66	0.56	-7.1	14.0	21.1
D9	D11						74.0							74	74	0	444	444	0.14	1.87	0.26	75	75	0.10	0.36	8	0.0050	2.62	0.58	7.2	17.8	10.6
D10	D11						30.0							30	30	0	180	180	0.06	1.94	0.11	31	31	0.04	0.15	8	0.0050	2.04	0.34	2.2	15.0	12.8
D11	D13													0	479	0	0	2796	0.87	1.71	1.48	0	592	0.83	2.31	18	0.0015	2.57	0.71	-9.6	14.5	24.1
D12	D13						35.0							35	35	0	210	210	0.07	1.93	0.13	49	49	0.07	0.19	8	0.0050	2.23	0.41	1.2	15.0	13.8
D13	PSD													0	514	0	0	3006	0.93	1.71	1.59	0	641	0.90	2.49	18	0.0015	2.59	0.74	-10.6	14.5	25.1
D14	PSD						33.0							33	33	0	198	198	0.06	1.93	0.12	35	35	0.05	0.17	8	0.0050	2.14	0.38	0.3	15.0	14.7
D15	PSD						31.0							31	799	0	186	4380	1.36	1.67	2.27	34	882	1.23	3.51	21	0.0050	4.56	0.47	-6.4	14.7	21.1
D16	D19						29.0							29	29	0	174	174	0.05	1.94	0.10	34	34	0.05	0.15	8	0.0050	2.04	0.34	8.5	16.5	8.0
D17	D19						32.0							32	32	0	192	192	0.06	1.94	0.12	35	35	0.05	0.16	8	0.0050	2.04	0.34	4.5	15.5	11.0
D18	D19						18.0							18	18	0	108	108	0.03	1.98	0.07	28	28	0.04	0.11	8	0.0050	1.76	0.26	2.5	17.0	14.5
D19	D21													0	79	0	0	474	0.15	1.86	0.27	0	98	0.14	0.41	10	0.0037	2.39	0.47	-1.0	15.0	16.0
D20	D21						39.0							39	39	0	234	234	0.07	1.92	0.14	42	42	0.06	0.20	8	0.0050	2.23	0.41	-0.7	15.0	15.7
D21	PSD													0	118	0	0	708	0.22	1.83	0.40	0	139	0.20	0.60	10	0.0027	2.32	0.67	-6.4	14.0	20.4
PSD	K46												38	38	1502	0	0	8292	2.57	1.61	4.15	0	1697	2.38	6.52	21		5.24	1.0			

Node ID	Down-stream Node	Area by Land Use												Area			ESD		ADWF	PF	PDWF	Gross Area		$Q_{i/i}$	Qd PWWF	Pipe Size	Slope	PWWF velocity	d/D	Flowline Elevation	Rim Elevation	Depth
		LDR (3ESD/AC)	MDR (6.4ESD/AC)	HDR (18.5ESD/AC)	E1 (6ESD/AC)	E1F (6ESD/AC)	E2 (6ESD/AC)	CR (6ESD/AC)	MU (9.7ESD/AC)	Parks (0.5ESD/AC)	K-8 School (6ESD/school)	H. School (6 ESD/AC)	Roads (0ESD/AC)	Per Node (AC)	Cum. (AC)	Cum. Park (AC)	Dir.	Cum.	(mgd)		(mgd)	Per Node (AC)	Cum. (AC)	(mgd)	(mgd)	(in)	(ft/ft)	(fps)	(in/in)			
E1	E3						47.0							47	47	0	282	282	0.09	1.91	0.17	50	50	0.07	0.24	8	0.0050	2.33	0.44	11.0	19.0	8.0
E2	E3						12.0							12	12	0	72	72	0.02	2.01	0.04	12	12	0.02	0.06	8	0.0050	1.54	0.21	5.8	18.0	12.3
E3	E6													0	59	0	0	354	0.11	1.89	0.21	0	62	0.09	0.29	8	0.0037	2.22	0.56	3.8	18.0	14.3
E4	E6						16.0							16	16	0	96	96	0.03	1.99	0.06	18	18	0.03	0.08	8	0.0050	1.76	0.26	8.3	19.5	11.2
E5	E6						36.0							36	36	0	216	216	0.07	1.93	0.13	39	39	0.05	0.18	8	0.0050	2.14	0.38	4.8	19.0	14.2
E6	PSE													0	111	0	0	666	0.21	1.84	0.38	0	119	0.17	0.55	10	0.0027	2.26	0.62	0.6	19.0	18.4
E7	E9					11.0								11	11	0	66	66	0.02	2.02	0.04	12	12	0.02	0.06	8	0.0050	1.54	0.21	15.0	28.0	13.0
E8	E9					7.0								7	7	0	42	42	0.01	2.05	0.03	8	8	0.01	0.04	8	0.0050	1.30	0.15	15.8	26.5	10.8
E9	E12													0	18	0	0	108	0.03	1.98	0.07	0	20	0.03	0.09	8	0.0037	1.51	0.26	12.8	28.0	15.3
E10	E12						23.0							23	23	0	138	138	0.04	1.96	0.08	24	24	0.03	0.12	8	0.0050	1.92	0.3	8.5	27.0	18.5
E11	E12						33.0							33	33	0	198	198	0.06	1.93	0.12	36	36	0.05	0.17	8	0.0050	2.14	0.38	9.5	25.0	15.5
E12	E14						29.0							29	103	0	174	618	0.19	1.84	0.35	0	80	0.11	0.46	10	0.0027	2.20	0.56	6.3	25.0	18.7
E13	E14						21.0							21	21	0	126	126	0.04	1.97	0.08	22	22	0.03	0.11	8	0.0050	1.76	0.26	5.9	20.0	14.2
E14	E17													0	124	0	0	744	0.23	1.83	0.42	31	133	0.19	0.61	10	0.0027	2.32	0.67	-0.3	21.0	21.3
E15	E17						34.0							34	34	0	204	204	0.06	1.93	0.12	38	38	0.05	0.17	8	0.0050	2.14	0.38	2.8	20.0	17.2
E16	E17						78.00							78	78	0	468	468	0.15	1.87	0.27	85	85	0.12	0.39	8	0.0050	2.66	0.62	8.8	24.5	15.7
E17	PSE													0	236	0	0	1416	0.44	1.77	0.78	0	256	0.36	1.14	15	0.0018	2.36	0.56	-3.6	21.2	24.8
E18	E20						42.0							42	42	0	252	252	0.08	1.92	0.15	52	52	0.07	0.22	8	0.0050	2.33	0.44	11.6	24.5	12.9
E19	E20						43.0							43	43	0	258	258	0.08	1.91	0.15	55	55	0.08	0.23	8	0.0050	2.33	0.44	6.7	23.0	16.3
E20	PSE													0	85	0	0	510	0.16	1.86	0.29	0	107	0.15	0.44	10	0.0027	2.20	0.56	-0.7	21.0	21.7
E21	PSE						26.0							26	26	0	156	156	0.05	1.95	0.09	62	62	0.09	0.18	8	0.0050	2.14	0.38	10.0	19.0	9.0
PSE	G6												46	46	504	0	0	2748	0.85	1.71	1.46	0	543	0.76	2.22	15		3.50	1.0			
F1	F4									2.0				2	2	2	1	1	0.0003	2.30	0.001	2	2	0.00	0.003	8	0.0050	0.52	0.05	16.0	29.2	13.2
F2	F4					8.0								8	8	0	48	48	0.01	2.04	0.03	12	12	0.02	0.05	8	0.0050	1.30	0.15	15.9	28.5	12.6
F3	F4		20.0											20	20	0	128	128	0.04	1.97	0.08	21	21	0.03	0.11	8	0.0050	1.76	0.26	18.7	30.8	12.1
F4	F6									2.0				2	32	4	1	178	0.06	1.94	0.11	5	40	0.06	0.16	8	0.0037	1.84	0.38	13.7	29.0	15.3
F5	F6									5.0				5	5	5	3	3	0.001	2.24	0.002	8	8	0.01	0.01	8	0.0050	0.75	0.08	12.9	30.0	17.1
F6	F15													0	37	9	0	181	0.06	1.94	0.11	0	48	0.07	0.18	8	0.0037	1.92	0.41	11.0	29.5	18.5
F7	F15					26.0								26	26	0	156	156	0.05	1.95	0.09	27	27	0.04	0.13	8	0.0050	1.92	0.3	14.4	28.5	14.1
F8	F10		13.0											13	13	0	83	83	0.03	2.00	0.05	14	14	0.02	0.07	8	0.0050	1.54	0.21	17.1	29.9	12.8
F9	F10									5.0				5	5	5	3	3	0.001	2.24	0.002	6	6	0.01	0.01	8	0.0050	0.75	0.08	16.6	31.4	14.8
F10	F12													0	18	5	0	86	0.03	2.00	0.05	0	20	0.03	0.08	8	0.0037	1.51	0.26	14.4	31.0	16.6
F11	F12		17.0											17	17	0	109	109	0.03	1.98	0.07	18	18	0.02	0.09	8	0.0050	1.76	0.26	17.6	32.8	15.2
F12	F14													0	35	5	0	195	0.06	1.94	0.12	0	37	0.05	0.17	8	0.0037	1.92	0.41	13.1	31.0	17.9
F13	F14		34.0											34	34	0	218	218	0.07	1.93	0.13	34	34	0.05	0.18	8	0.0050	2.14	0.38	16.5	32.2	15.7
F14	F15		23.0											23	92	5	147	559	0.17	1.85	0.32	25	97	0.14	0.46	10	0.0027	2.20	0.56	11.1	31.0	19.9
F15	F17									3.0				3	158	17	2	897	0.28	1.81	0.50	22	194	0.27	0.78	12	0.0022	2.31	0.62	7.4	29.0	21.6
F16	F17					17.0								17	17	0	102	102	0.03	1.99	0.06	21	21	0.03	0.09	8	0.0050	1.76	0.26	8.9	31.2	22.3
F17	F26													0	175	17	0	999	0.31	1.80	0.56	0	215	0.30	0.86	12	0.0027	2.56	0.62	4.9	30.5	25.6
F18	F20		25.0											25	25	0	160	160	0.05	1.95	0.10	25	25	0.03	0.13	8	0.0050	1.92	0.3	17.6	32.4	14.8
F19	F20		37.0											37	37	0	237	237	0.07	1.92	0.14	40	40	0.06	0.20	8	0.0050	2.23	0.41	17.6	34.0	16.4
F20	F24													0	62	0	0	397	0.12	1.88	0.23	0	65	0.09	0.32	8	0.0037	2.25	0.58	11.6	34.0	22.4
F21	F24									10.0				10	10	10	5	5	0.002	2.20	0.003	16	16	0.02	0.03	8	0.0050	1.20	0.09	9.7	31.4	21.7
F22	F24		30.0											30	30	0	192	192	0.06	1.94	0.12	34	34	0.05	0.16	8	0.0050	2.04	0.34	13.7	32.2	18.5
F23	F24		22.0											22	22	0	141	141	0.04	1.96	0.09	23	23	0.03	0.12	8	0.0050	1.92	0.3	13.5	31.4	17.9
F24	F26													0	124	10	0	735	0.23	1.83	0.42	0	137	0.19	0.61	10	0.0027	2.32	0.67	7.7	34.0	26.3
F25	F26					27.0								27	27	0	162	162	0.05	1.95	0.10	34	34	0.05	0.14	8	0.0050	2.04	0.34	10.1	30.3	20.2
F26	F29													0	326	27	0	1896	0.59	1.75	1.03	0	386	0.54	1.57	15	0.0018	2.50	0.71	3.3	33.3	30.0
F27	F29							26.0						26	26	0	156	156	0.05	1.95	0.09	78	78	0.11	0.20	8	0.0050	2.23	0.41	9.8	30.5	20.7
F28	F29					35.0								35	35	0	210	210	0.07	1.93	0.13	41	41	0.06	0.18	8	0.0050	2.14	0.38	6.5	26.6	20.1
F29	F33													0	387	27	0	2262	0.70	1.73	1.21	0	504	0.71	1.92	18	0.0015	2.50	0.62	1.3	32.0	30.7
F30	F32						50.0							50	50	0	300	300	0.09	1.90	0.18	96	96	0.13	0.31	8	0.0050	2.52	0.53	17.0	25.0	8.0
F31	F32					16.0								16	16	0	96	96	0.03	1.99	0.06	40	40	0.06	0.12	8	0.0050	1.92	0.3	15.8	26.9	11.2
F32	F33													0	66	0	0	396	0.12	1.88	0.23	0	136	0.19	0.42	10	0.0037	2.39	0.47	11.8	25.5	13.7
F33	PSF													0	453	27	0	2658	0.82	1.72	1.42	0	639	0.90	2.31	18	0.0015	2.57	0.71	0.8	31.5	30.7
PSF	H6												58	58	511	27	0	2658	0.82	1.72	1.42	0	639	0.90	2.31	15		3.63	1.0			

Node ID	Down-stream Node	Area by Land Use												Area			ESD		ADWF	PF	PDWF	Gross Area		$Q_{i/i}$	Qd PWWF	Pipe Size	Slope	PWWF velocity	d/D	Flowline Elevation	Rim Elevation	Depth
		LDR (3ESD/AC)	MDR (6.4ESD/AC)	HDR (18.5ESD/AC)	E1 (6ESD/AC)	E1F (6ESD/AC)	E2 (6ESD/AC)	CR (6ESD/AC)	MU (9.7ESD/AC)	Parks (0.5ESD/AC)	K-8 School (6ESD/school)	H. School (6 ESD/AC)	Roads (0ESD/AC)	Per Node (AC)	Cum. (AC)	Cum. Park (AC)	Dir.	Cum.	(mgd)		(mgd)	Per Node (AC)	Cum. (AC)	(mgd)	(mgd)	(in)	(ft/ft)	(fps)	(in/in)			(ft)
G1	G4					37.0								37	37	0	222	222	0.07	1.93	0.13	69	69	0.10	0.23	8	0.0050	2.33	0.44	17.5	30.0	12.6
G2	G4						43.0							43	43	0	258	258	0.08	1.91	0.15	49	49	0.07	0.22	8	0.0050	2.33	0.44	10.5	24.0	13.5
G3	G4						31.0							31	31	0	186	186	0.06	1.94	0.11	33	33	0.05	0.16	8	0.0050	2.04	0.34	9.3	27.0	17.7
G4	G7													0	111	0	0	666	0.21	1.84	0.38	0	151	0.21	0.59	10	0.0027	2.32	0.67	4.4	26.0	21.6
G5	G7				69.0									69	69	0	414	414	0.13	1.88	0.24	80	80	0.11	0.35	10	0.0035	2.26	0.44	6.8	22.0	15.2
G6	G7									9.0				9	513	9	5	2753	0.85	1.71	1.46	17	560	0.78	2.25	18	0.0015	2.57	0.71	3.3	20.0	16.7
G7	G10													0	693	9	0	3833	1.19	1.68	2.00	0	791	1.11	3.11	21	0.0014	2.74	0.67	-0.2	24.0	24.2
G8	G10		19.0											19	19	0	122	122	0.04	1.97	0.07	20	20	0.03	0.10	8	0.0050	1.76	0.26	4.6	23.0	18.5
G9	G10		13.0											13	13	0	83	83	0.03	2.00	0.05	14	14	0.02	0.07	8	0.0050	1.54	0.21	2.6	19.0	16.5
G10	G13													0	725	9	0	4037	1.25	1.68	2.10	0	825	1.16	3.26	21	0.0014	2.76	0.71	-2.7	19.2	21.9
G11	G12		23.0											23	23	0	147	147	0.05	1.96	0.09	25	25	0.03	0.12	8	0.0050	1.92	0.3	5.1	24.0	18.9
G12	G13									3.0				3	26	3	2	149	0.05	1.96	0.09	3	28	0.04	0.13	8	0.0037	1.75	0.34	-2.9	24.0	26.9
G13	G15													0	751	12	0	4186	1.30	1.68	2.18	0	853	1.19	3.37	21	0.0014	2.76	0.71	-5.9	18.5	24.4
G14	G15		35.0											35	35	0	224	224	0.07	1.92	0.13	36	36	0.05	0.18	8	0.0050	2.14	0.38	0.9	19.0	18.1
G15	G17									30.0				30	816	42	15	4425	1.37	1.67	2.29	31	919	1.29	3.58	21	0.0014	2.77	0.74	-7.7	18.3	26.0
G16	G17		47.0											47	47	0	301	301	0.09	1.90	0.18	49	49	0.07	0.25	8	0.0050	2.33	0.44	0.8	18.0	17.3
G17	G29													0	863	42	0	4726	1.46	1.67	2.44	0	968	1.36	3.79	21	0.0014	2.79	0.78	-9.0	17.5	26.5
G18	G20		35.0											35	35	0	224	224	0.07	1.92	0.13	37	37	0.05	0.19	8	0.0050	2.14	0.38	10.8	20.0	9.2
G19	G20									9.0				9	9	9	5	5	0.001	2.20	0.003	9	9	0.01	0.02	8	0.0050	1.20	0.09	6.3	19.4	13.2
G20	G22													0	44	9	0	229	0.07	1.92	0.14	0	46	0.06	0.20	8	0.0037	2.00	0.44	2.3	19.6	17.4
G21	G22		30.0											30	30	0	192	192	0.06	1.94	0.12	31	31	0.04	0.16	8	0.0050	2.04	0.34	7.2	19.0	11.8
G22	G25													0	74	9	0	421	0.13	1.87	0.24	0	76	0.11	0.35	8	0.0037	2.28	0.62	-1.1	19.0	20.1
G23	G24									27.0				27	27	27	14	14	0.00	2.13	0.01	28	28	0.04	0.05	8	0.0050	1.30	0.15	0.7	18.0	17.3
G24	G25		18.0											18	45	27	115	129	0.04	1.97	0.08	18	46	0.06	0.14	8	0.0050	2.04	0.34	-0.6	18.2	18.8
G25	G27													0	119	36	0	549	0.17	1.85	0.32	0	122	0.17	0.49	10	0.0027	2.23	0.58	-2.7	18.4	21.1
G26	G27		19.0											19	19	0	122	122	0.04	1.97	0.07	20	20	0.03	0.10	8	0.0050	1.76	0.26	-3.3	17.0	20.3
G27	G29													0	138	36	0	671	0.21	1.84	0.38	0	142	0.20	0.58	10	0.0027	2.29	0.65	-6.2	17.7	23.9
G28	G29									18.0				18	18	18	9	9	0.00	2.16	0.01	18	18	0.03	0.03	8	0.0050	1.30	0.15	-4.6	16.0	20.6
G29	G32													0	1019	96	0	5406	1.68	1.65	2.77	0	1128	1.58	4.35	24	0.0013	2.88	0.67	-10.0	17.2	27.2
G30	G32		42.0											42	42	0	269	269	0.08	1.91	0.16	43	43	0.06	0.22	8	0.0050	2.23	0.41	5.3	18.0	12.8
G31	G32		16.0											16	16	0	102	102	0.03	1.99	0.06	17	17	0.02	0.09	8	0.0050	1.76	0.26	7.5	17.0	9.5
G32	PSG													0	1077	96	0	5777	1.79	1.65	2.95	0	1188	1.66	4.61	24	0.0013	2.90	0.71	-11.5	17.4	28.9
G33	G34										21			21	21	0	126	126	0.04	1.97	0.08	22	22	0.03	0.11	8	0.0050	1.76	0.26	-4.4	18.0	22.4
G34	PSG									5.0				5	26	5	3	129	0.04	1.97	0.08	6	27	0.04	0.12	8	0.0050	1.92	0.3	-7.4	17.5	24.9
G35	G37		13.0											13	13	0	83	83	0.03	2.00	0.05	13	13	0.02	0.07	8	0.0050	1.54	0.21	8.3	21.5	13.3
G36	G37		25.0											25	25	0	160	160	0.05	1.95	0.10	26	26	0.04	0.13	8	0.0050	1.92	0.3	10.0	18.0	8.0
G37	G40													0	38	0	0	243	0.08	1.92	0.14	0	39	0.05	0.20	8	0.0037	2.00	0.44	6.5	18.7	12.2
G38	G40		13.0											13	13	0	83	83	0.03	2.00	0.05	14	14	0.02	0.07	8	0.0050	1.54	0.21	3.5	21.5	18.1
G39	G40		17.0											17	17	0	109	109	0.03	1.98	0.07	19	19	0.03	0.09	8	0.0050	1.76	0.26	7.9	18.5	10.6
G40	G43									1.0				1	69	1	1	436	0.14	1.87	0.25	1	73	0.10	0.35	8	0.0037	2.28	0.62	1.0	18.5	17.6
G41	G43		22.0											22	22	0	141	141	0.04	1.96	0.09	22	22	0.03	0.12	8	0.0050	1.92	0.3	3.5	18.0	14.5
G42	G43		26.0											26	26	0	166	166	0.05	1.95	0.10	27	27	0.04	0.14	8	0.0050	2.04	0.34	4.5	18.0	13.5
G43	G47									22.0				22	139	23	11	754	0.23	1.83	0.43	23	145	0.20	0.63	12	0.0027	2.38	0.5	2.0	18.2	16.2
G44	G46		50.0											50	50	0	320	320	0.10	1.90	0.19	52	52	0.07	0.26	8	0.0050	2.40	0.47	5.8	18.0	12.2
G45	G46									40.0				40	40	40	20	20	0.01	2.10	0.01	35	35	0.05	0.06	8	0.0050	1.54	0.21	0.8	17.0	16.2
G46	G47													0	90	40	0	340	0.11	1.89	0.20	0	87	0.12	0.32	8	0.0037	2.25	0.58	2.0	16.6	14.6
G47	PSG													0	229	63	0	1094	0.34	1.79	0.61	0	232	0.32	0.93	15	0.0022	2.42	0.47	-8.3	16.7	25.0
PSG	K5												62	62	1394	164	0	6999	2.17	1.63	3.53	0	1447	2.03	5.56	21		4.47	1.0			

Node ID	Down-stream Node	Area by Land Use											Area			ESD		ADWF	PF	PDWF	Gross Area		$Q_{i/i}$	Qd PWWF	Pipe Size	Slope	PWWF velocity	d/D	Flowline Elevation	Rim Elevation	Depth
		LDR (3ESD/AC)	MDR (6.4ESD/AC)	HDR (18.5ESD/AC)	E1 (6ESD/AC)	E1F (6ESD/AC)	E2 (6ESD/AC)	CR (6ESD/AC)	MU (9.7ESD/AC)	Parks (0.5ESD/AC)	K-8 School (6ESD/school)	H. School (6 ESD/AC)	Roads (0ESD/AC)	Per Node (AC)	Cum. (AC)	Cum. Park (AC)	Dir.	Cum.	(mgd)		(mgd)	Per Node (AC)	Cum. (AC)	(mgd)	(mgd)	(in)	(ft/ft)	(fps)	(in/in)			(ft)
H1	H2									6.0				6	6	6	3	3	0.001	2.23	0.002	6	6	0.01	0.01	8	0.0050	0.75	0.08	23.1	32.0	8.9
H2	H5		18.0											18	24	6	115	118	0.04	1.97	0.07	19	26	0.04	0.11	8	0.0037	1.65	0.3	18.9	33.2	14.4
H3	H5										21			21	21	0	126	126	0.04	1.97	0.08	22	22	0.03	0.11	8	0.0050	1.76	0.26	21.2	36.0	14.8
H4	H5	29.0												29	29	0	87	87	0.03	2.00	0.05	30	30	0.04	0.10	8	0.0050	1.76	0.26	22.2	33.0	10.8
H5	H7													0	74	6	0	331	0.10	1.89	0.19	0	78	0.11	0.30	8	0.0037	2.22	0.56	14.6	34.0	19.4
H6	H7		21.0											21	532	27	134	2792	0.87	1.71	1.48	26	665	0.93	2.41	18	0.0015	2.59	0.74	11.2	32.9	21.7
H7	H10													0	606	33	0	3124	0.97	1.70	1.65	0	743	1.04	2.69	21	0.0015	2.73	0.58	9.9	32.0	22.1
H8	H10		25.0											25	25	0	160	160	0.05	1.95	0.10	29	29	0.04	0.14	8	0.0050	1.92	0.3	12.8	31.0	18.2
H9	H10					35.0								35	35	0	210	210	0.07	1.93	0.13	46	46	0.06	0.19	8	0.0050	2.14	0.38	15.3	30.0	14.7
H10	H15													0	666	33	0	3494	1.08	1.69	1.83	0	817	1.14	2.98	21	0.0014	2.70	0.65	7.8	30.5	22.7
H11	H12									119.0				119	119	119	60	60	0.02	2.03	0.04	121	121	0.17	0.21	8	0.0050	2.23	0.41	18.6	28.5	9.9
H12	H15		21.0											21	140	119	134	194	0.06	1.94	0.12	25	145	0.20	0.32	8	0.0050	2.52	0.53	9.6	26.5	16.9
H13	H15									5.0				5	5	5	3	3	0.001	2.24	0.002	6	6	0.01	0.01	8	0.0050	0.75	0.08	7.6	27.0	19.4
H14	H15					26.0								26	26	0	156	156	0.05	1.95	0.09	34	34	0.05	0.14	8	0.0050	2.04	0.34	12.6	30.0	17.4
H15	H18													0	837	157	0	3846	1.19	1.68	2.01	0	1001	1.40	3.41	21	0.0014	2.76	0.71	4.4	28.0	23.6
H16	H17	24.0												24	24	0	72	72	0.02	2.01	0.04	26	26	0.04	0.08	8	0.0050	1.54	0.21	12.2	26.0	13.8
H17	H18										19			19	43	0	114	186	0.06	1.94	0.11	23	49	0.07	0.18	8	0.0050	2.14	0.38	8.5	25.0	16.6
H18	H20													0	880	157	0	4032	1.25	1.68	2.10	0	1050	1.47	3.57	21	0.0014	2.77	0.74	3.0	26.2	23.2
H19	H20					58.0								58	58	0	348	348	0.11	1.89	0.20	87	87	0.12	0.33	8	0.0050	2.52	0.53	6.5	26.0	19.5
H20	H29													0	938	157	0	4380	1.36	1.67	2.27	0	1137	1.59	3.86	24	0.0014	2.92	0.62	1.0	26.4	25.4
H21	H24				21.0									21	21	0	126	126	0.04	1.97	0.08	26	26	0.04	0.11	8	0.0050	1.92	0.3	15.1	25.0	9.9
H22	H24						69.0							69	69	0	414	414	0.13	1.88	0.24	70	70	0.10	0.34	8	0.0050	2.58	0.56	17.9	30.0	12.1
H23	H24					24.0								24	24	0	144	144	0.04	1.96	0.09	35	35	0.05	0.14	8	0.0050	1.92	0.3	9.9	25.0	15.1
H24	H27													0	114	0	0	684	0.21	1.83	0.39	0	130	0.18	0.57	10	0.0027	2.29	0.65	5.6	31.0	25.4
H25	H27						105.0							105	105	0	630	630	0.20	1.84	0.36	108	108	0.15	0.51	10	0.0050	2.87	0.5	14.0	28.0	14.0
H26	H27					28.0								28	28	0	168	168	0.05	1.95	0.10	35	35	0.05	0.15	8	0.0050	2.04	0.34	6.0	22.0	16.0
H27	H29													0	247	0	0	1482	0.46	1.77	0.81	0	273	0.38	1.20	15	0.0018	2.39	0.58	0.4	29.0	28.6
H28	H29					28.0								28	28	0	168	168	0.05	1.95	0.10	37	37	0.05	0.15	8	0.0050	2.04	0.34	-2.3	21.0	23.3
H29	H43													0	1213	157	0	6030	1.87	1.64	3.07	0	1447	2.03	5.10	24	0.0013	2.93	0.78	16.2	27.0	10.8
H30	H32		37.0											37	37	0	237	237	0.07	1.92	0.14	44	44	0.06	0.20	8	0.0050	2.23	0.41	16.0	25.0	9.0
H31	H32	17.0												17	17	0	51	51	0.02	2.04	0.03	18	18	0.03	0.06	8	0.0050	1.54	0.21	16.0	24.0	8.0
H32	H36													0	54	0	0	288	0.09	1.90	0.17	0	62	0.09	0.26	8	0.0050	2.40	0.47	12.8	28.0	15.3
H33	H36		10.0											10	10	0	64	64	0.02	2.02	0.04	14	14	0.02	0.06	8	0.0050	1.54	0.21	12.3	26.0	13.8
H34	H36									97.0				97	97	97	49	49	0.02	2.04	0.03	99	99	0.14	0.17	8	0.0050	2.14	0.38	14.6	23.3	8.7
H35	H36		28.0											28	28	0	179	179	0.06	1.94	0.11	32	32	0.05	0.15	8	0.0050	2.04	0.34	12.5	21.5	9.0
H36	H38		63.0											63	252	97	403	983	0.30	1.80	0.55	64	271	0.38	0.93	15	0.0022	2.42	0.47	4.5	26.4	21.9
H37	H38		66.0											66	66	0	422	422	0.13	1.87	0.25	71	71	0.10	0.34	8	0.0050	2.58	0.56	8.7	24.0	15.4
H38	H40													0	318	97	0	1405	0.44	1.77	0.77	0	342	0.48	1.25	15	0.0018	2.42	0.62	0.4	24.4	24.0
H39	H40									3.0				3	3	3	2	2	0.0005	2.27	0.0011	6	6	0.01	0.0099	8	0.0050	0.75	0.08	2.1	25.0	23.0
H40	H43									3.0				3	324	103	2	1408	0.44	1.77	0.77	6	355	0.50	1.27	15	0.0018	2.42	0.62	1.1	26.5	25.5
H41	H42									5.0				5	5	5	3	3	0.001	2.24	0.002	5	5	0.01	0.01	8	0.0050	0.75	0.08	4.9	22.0	17.1
H42	H43		28.0											28	33	5	179	182	0.06	1.94	0.11	31	36	0.05	0.16	8	0.0050	2.04	0.34	3.4	23.0	19.6
H43	PSH													0	1570	265	0	7620	2.36	1.62	3.83	0	1838	2.57	6.40	27	0.0013	3.14	0.71	-3.1	25.0	28.1
PSH	K22												81	81	1651	265	0	7620	2.36	1.62	3.83	0	1838	2.57	6.40	21		5.13	1.0			

Node ID	Down-stream Node	Area by Land Use												Area			ESD		ADWF	PF	PDWF	Gross Area		$Q_{i/i}$	Qd PWWF	Pipe Size	Slope	PWWF velocity	d/D	Flowline Elevation	Rim Elevation	Depth
		LDR (3ESD/AC)	MDR (6.4ESD/AC)	HDR (18.5ESD/AC)	E1 (6ESD/AC)	E1F (6ESD/AC)	E2 (6ESD/AC)	CR (6ESD/AC)	MU (9.7ESD/AC)	Parks (0.5ESD/AC)	K-8 School (6ESD/school)	H. School (6 ESD/AC)	Roads (0ESD/AC)	Per Node (AC)	Cum. (AC)	Cum. Park (AC)	Dir.	Cum.	(mgd)		(mgd)	Per Node (AC)	Cum. (AC)	(mgd)	(mgd)	(in)	(ft/ft)	(fps)	(in/in)			(ft)
I1	I4		40.0											40	40	0	256	256	0.08	1.91	0.15	42	42	0.06	0.21	8	0.0050	2.23	0.41	30.0	38.0	8.0
I2	I4		28.0											28	28	0	179	179	0.06	1.94	0.11	29	29	0.04	0.15	8	0.0050	2.04	0.34	24.0	33.0	9.0
I3	I4	16.0												16	16	0	48	48	0.01	2.04	0.03	17	17	0.02	0.05	8	0.0050	1.30	0.15	23.1	33.0	9.9
I4	I8													0	84	0	0	483	0.15	1.86	0.28	0	88	0.12	0.40	8	0.0037	2.34	0.67	20.6	33.0	12.4
I5	I8		26.0											26	26	0	166	166	0.05	1.95	0.10	27	27	0.04	0.14	8	0.0050	2.04	0.34	21.4	34.0	12.6
I6	I8	13.0												13	13	0	39	39	0.01	2.06	0.02	13	13	0.02	0.04	8	0.0050	1.30	0.15	18.6	30.0	11.4
I7	I8									14.0				14	14	14	7	7	0.002	2.18	0.005	15	15	0.02	0.03	8	0.0050	1.22	0.12	19.4	32.5	13.1
I8	I11													0	137	14	0	696	0.22	1.83	0.40	0	143	0.20	0.60	10	0.0027	2.32	0.67	16.7	30.0	13.3
I9	I11	18.0												18	18	0	54	54	0.02	2.03	0.03	18	18	0.03	0.06	8	0.0050	1.54	0.21	16.7	30.0	13.3
I10	I11		47.0											47	47	0	301	301	0.09	1.90	0.18	48	48	0.07	0.24	8	0.0050	2.33	0.44	18.2	30.0	11.8
I11	I14													0	202	14	0	1050	0.33	1.80	0.59	0	209	0.29	0.88	15	0.0020	2.31	0.47	11.8	29.5	17.7
I12	I14		47.0											47	47	0	301	301	0.09	1.90	0.18	48	48	0.07	0.24	8	0.0050	2.33	0.44	15.9	35.0	19.1
I13	I14	18.0												18	18	0	54	54	0.02	2.03	0.03	19	19	0.03	0.06	8	0.0050	1.54	0.21	13.4	28.0	14.6
I14	I18													0	267	14	0	1405	0.44	1.77	0.77	0	277	0.39	1.16	15	0.0018	2.39	0.58	8.1	29.0	20.9
I15	I18									68.0				68	68	68	34	34	0.01	2.07	0.02	72	72	0.10	0.12	8	0.0050	1.92	0.3	16.0	28.0	12.0
I16	I18	21.0												21	21	0	63	63	0.02	2.02	0.04	23	23	0.03	0.07	8	0.0050	1.54	0.21	13.5	24.0	10.5
I17	I18				89.0									89	89	0	534	534	0.17	1.85	0.31	95	95	0.13	0.44	8	0.0050	2.68	0.65	16.5	35.0	18.5
I18	I25													0	445	82	0	2036	0.63	1.74	1.10	0	466	0.65	1.75	18	0.0015	2.46	0.58	4.5	27.0	22.5
I19	I23		29.0											29	29	0	186	186	0.06	1.94	0.11	34	34	0.05	0.16	8	0.0050	2.04	0.34	15.1	25.0	9.9
I20	I22			11.0										11	11	0	153	153	0.05	1.95	0.09	13	13	0.02	0.11	8	0.0050	1.76	0.26	12.1	24.0	11.9
I21	I22							18.0						18	18	0	108	108	0.03	1.98	0.07	22	22	0.03	0.10	8	0.0050	1.76	0.26	13.1	38.0	24.9
I22	I23													0	29	0	0	261	0.08	1.91	0.15	0	35	0.05	0.20	8	0.0050	2.23	0.41	10.6	25.0	14.4
I23	I25													0	58	0	0	446	0.14	1.87	0.26	0	68	0.10	0.35	8	0.0037	2.28	0.62	7.1	27.0	19.9
I24	I25							11.0						11	11	0	66	66	0.02	2.02	0.04	14	14	0.02	0.06	8	0.0050	1.54	0.21	10.6	28.0	17.4
I25	I28													0	514	82	0	2548	0.79	1.72	1.36	0	547	0.77	2.13	18	0.0015	2.56	0.67	2.7	28.2	25.6
I26	I28							11.0						11	11	0	66	66	0.02	2.02	0.04	14	14	0.02	0.06	8	0.0050	1.54	0.21	7.8	24.0	16.3
I27	I28				21.0									21	21	0	126	126	0.04	1.97	0.08	24	24	0.03	0.11	8	0.0050	1.76	0.26	9.0	23.5	14.5
I28	PSI													0	546	82	0	2740	0.85	1.71	1.46	0	585	0.82	2.28	18	0.0028	3.32	0.56	1.0	23.5	22.5
I29	PSI			36.0										36	36	0	500	500	0.15	1.86	0.29	38	38	0.05	0.34	10	0.0035	2.26	0.44	4.7	23.0	18.3
I30	I33	110.0												110	110	0	330	330	0.10	1.89	0.19	94	94	0.13	0.33	8	0.0050	2.52	0.53	12.8	31.0	18.3
I31	I33	131.0												131	131	0	393	393	0.12	1.88	0.23	156	156	0.22	0.45	8	0.0050	2.72	0.67	20.0	28.0	8.0
I32	I33									4.0				4	4	4	2	2	0.001	2.26	0.001	4	4	0.01	0.01	8	0.0050	0.75	0.08	6.3	30.5	24.3
I33	PSI									56.0				56	301	60	28	753	0.23	1.83	0.43	56	310	0.43	0.86	12	0.0024	2.43	0.65	3.8	30.8	27.1
PSI	K28												56	56	939	142	0	3993	1.24	1.68	2.08	0	932	1.31	3.39	15		5.34	1.0			
J1	J2									5.0				5	5	5	3	3	0.001	2.24	0.002	5	5	0.01	0.01	8	0.0050	0.75	0.08	13.0	21.0	8.0
J2	J6										21			21	26	5	126	129	0.04	1.97	0.08	22	27	0.04	0.12	8	0.0050	1.92	0.3	9.8	21.0	11.3
J3	J4									34.0				34	34	34	17	17	0.01	2.12	0.01	35	35	0.05	0.06	8	0.0050	1.54	0.21	7.0	17.0	10.0
J4	J6		76.0											76	110	34	486	503	0.16	1.86	0.29	77	112	0.16	0.45	10	0.0035	2.40	0.5	5.1	17.4	12.3
J5	J6									108.0				108	108	108	54	54	0.02	2.03	0.03	115	115	0.16	0.20	8	0.0050	2.23	0.41	1.4	19.0	17.7
J6	PSJ													0	244	147	0	686	0.21	1.83	0.39	0	254	0.36	0.75	12	0.0027	2.49	0.56	-1.1	18.5	19.6
J7	J9		90.0											90	90	0	576	576	0.18	1.85	0.33	94	94	0.13	0.46	10	0.0035	2.45	0.53	-1.0	17.0	18.0
J8	J9									5.0				5	5	5	3	3	0.001	2.24	0.002	4	4	0.01	0.01	8	0.0050	0.75	0.08	2.4	18.0	15.6
J9	PSJ													0	95	5	0	579	0.18	1.85	0.33	0	98	0.14	0.47	10	0.0035	2.45	0.53	-4.2	17.5	21.7
J10	J11									27.0				27	27	27	14	14	0.004	2.13	0.01	28	28	0.04	0.05	8	0.0050	1.30	0.15	6.0	15.0	9.0
J11	J13		81.0											81	108	27	518	532	0.16	1.86	0.31	85	113	0.16	0.46	10	0.0037	2.47	0.5	4.3	14.5	10.2
J12	J13											53		53	53	0	318	318	0.10	1.90	0.19	58	58	0.08	0.27	8	0.0050	2.40	0.47	0.2	19.5	19.3
J13	PSJ													0	161	27	0	850	0.26	1.82	0.48	0	170	0.24	0.72	12	0.0027	2.43	0.53	-4.2	18.0	22.2
PSJ	K31												18	18	518	179	0	2114	0.66	1.74	1.14	0	522	0.73	1.87	12		4.60	1.0			

Node ID	Down-stream Node	Area by Land Use												Area			ESD		ADWF	PF	PDWF	Gross Area		$Q_{i/i}$	Qd PWWF	Pipe Size	Slope	PWWF velocity	d/D	Flowline Elevation	Rim Elevation	Depth
		LDR (3ESD/AC)	MDR (6.4ESD/AC)	HDR (18.5ESD/AC)	E1 (6ESD/AC)	E1F (6ESD/AC)	E2 (6ESD/AC)	CR (6ESD/AC)	MU (9.7ESD/AC)	Parks (0.5ESD/AC)	K-8 School (6ESD/school)	H. School (6 ESD/AC)	Roads (0ESD/AC)	Per Node (AC)	Cum. (AC)	Cum. Park (AC)	Dir.	Cum.	(mgd)		(mgd)	Per Node (AC)	Cum. (AC)	(mgd)	(mgd)	(in)	(ft/ft)	(fps)	(in/in)			
K1	K5		64.0											64	64	0	410	410	0.13	1.88	0.24	74	74	0.10	0.34	8	0.0050	2.58	0.56	8.0	16.0	8.0
K2	K4		80.0											80	80	0	512	512	0.16	1.86	0.29	89	89	0.12	0.42	10	0.0035	2.33	0.47	6.4	24.0	17.6
K3	K4									8.0				8	8	8	4	4	0.001	2.21	0.003	2	2	0.00	0.01	8	0.0050	0.75	0.08	6.7	22.0	15.4
K4	K5													0	88	8	0	516	0.16	1.86	0.30	6	96	0.13	0.43	10	0.0035	2.40	0.5	3.2	20.6	17.4
K5	K7													0	1546	172	0	7925	2.46	1.62	3.97	0	1617	2.26	6.24	27	0.0013	3.14	0.71	-3.9	16.5	20.4
K6	K7			13.0										13	13	0	180	180	0.06	1.94	0.11	16	16	0.02	0.13	8	0.0050	1.92	0.3	0.7	16.0	15.4
K7	K10													0	1559	172	0	8105	2.51	1.62	4.06	0	1632	2.29	6.34	27	0.0013	3.14	0.71	-5.4	15.8	21.2
K8	K10									5.0				5	5	5	3	3	0.001	2.24	0.002	11	11	0.02	0.02	8	0.0050	1.20	0.09	-1.9	15.5	17.4
K9	K10							51.0						51	51	0	306	306	0.09	1.90	0.18	65	65	0.09	0.27	8	0.0050	2.40	0.47	7.6	16.0	8.4
K10	K12													0	1615	177	0	8414	2.61	1.61	4.20	0	1708	2.39	6.59	27	0.0013	3.16	0.74	-5.9	19.5	25.4
K11	K12							25.0						25	25	0	150	150	0.05	1.96	0.09	32	32	0.05	0.14	8	0.0050	1.92	0.3	3.0	15.0	12.0
K12	K47													0	1640	177	0	8564	2.65	1.61	4.27	0	1740	2.44	6.71	27	0.0013	3.16	0.74	-7.0	17.0	24.0
K13	K47								54.0					54	54	0	527	527	0.16	1.86	0.30	66	66	0.09	0.40	8	0.0050	2.66	0.62	1.0	14.0	13.0
K14	K16		30.0											30	30	0	192	192	0.06	1.94	0.12	36	36	0.05	0.17	8	0.0050	2.04	0.34	11.7	22.0	10.3
K15	K16							7.0						7	7	0	42	42	0.01	2.05	0.03	10	10	0.01	0.04	8	0.0050	1.30	0.15	7.2	21.4	14.3
K16	K19													0	37	0	0	234	0.07	1.92	0.14	0	46	0.06	0.20	8	0.0037	2.00	0.44	4.7	22.0	17.4
K17	K19							11.0						11	11	0	66	66	0.02	2.02	0.04	14	14	0.02	0.06	8	0.0050	1.54	0.21	5.9	23.5	17.6
K18	K19			12.0										12	12	0	167	167	0.05	1.95	0.10	15	15	0.02	0.12	8	0.0050	1.92	0.3	7.6	21.4	13.8
K19	K23									4.0				4	64	4	2	469	0.15	1.87	0.27	9	83	0.12	0.39	8	0.0037	2.34	0.67	3.4	23.0	19.6
K20	K22		18.0											18	18	0	115	115	0.04	1.98	0.07	19	19	0.03	0.10	8	0.0050	1.76	0.26	3.7	23.0	19.3
K21	K22			28.0										28	28	0	389	389	0.12	1.88	0.23	31	31	0.04	0.27	8	0.0050	2.40	0.47	7.0	19.0	12.0
K22	K23													0	1697	265	0	8123	2.52	1.61	4.07	0	1887	2.64	6.71	27	0.0013	3.16	0.74	-2.5	27.5	30.0
K23	K26													0	1761	269	0	8592	2.66	1.61	4.29	0	1970	2.76	7.05	27	0.0013	3.17	0.78	-3.7	24.8	28.5
K24	K26		25.0											25	25	0	160	160	0.05	1.95	0.10	30	30	0.04	0.14	8	0.0050	2.04	0.34	3.4	21.0	17.6
K25	K26		29.0											29	29	0	186	186	0.06	1.94	0.11	34	34	0.05	0.16	8	0.0050	2.04	0.34	2.4	20.0	17.6
K26	K34													0	1815	269	0	8938	2.77	1.61	4.45	0	2034	2.85	7.30	30	0.0013	3.30	0.65	-4.8	20.5	25.3
K27	K28		83.0											83	83	0	531	531	0.16	1.86	0.31	88	88	0.12	0.43	10	0.0035	2.40	0.5	6.7	21.5	14.8
K28	K31													0	1022	142	0	4524	1.40	1.67	2.34	0	1021	1.43	3.77	21	0.0014	2.79	0.78	-1.7	20.0	21.7
K29	K30									21.0				21	21	21	11	11	0.00	2.15	0.01	25	25	0.04	0.04	8	0.0050	1.30	0.15	4.4	23.4	19.0
K30	K31										21			21	42	21	126	137	0.04	1.96	0.08	23	48	0.07	0.15	8	0.0037	1.84	0.38	2.4	23.0	20.6
K31	K33													0	1582	342	0	6775	2.10	1.63	3.43	0	1591	2.23	5.66	27	0.0014	3.19	0.65	-3.5	22.8	26.3
K32	K33		52.0											52	52	0	333	333	0.10	1.89	0.20	57	57	0.08	0.28	8	0.0050	2.40	0.47	2.9	23.0	20.1
K33	K34													0	1634	342	0	7108	2.20	1.63	3.59	0	1648	2.31	5.89	27	0.0013	3.12	0.67	-4.6	22.5	27.1
K34	K38													0	3449	611	0	16045	4.97	1.55	7.71	0	3682	5.16	12.86	36	0.0013	3.78	0.67	-7.0	19.5	26.5
K35	K36									5.0				5	5	5	3	3	0.001	2.24	0.002	5	5	0.01	0.01	8	0.0050	0.75	0.08	-0.4	16.0	16.4
K36	K38		33.0											33	38	5	211	214	0.07	1.93	0.13	35	40	0.06	0.18	8	0.0050	2.14	0.38	-2.4	15.5	17.9
K37	K38									52.0				52	52	52	26	26	0.01	2.09	0.02	54	54	0.08	0.09	8	0.0050	1.76	0.26	-2.7	14.9	17.6
K38	CPS													0	3539	668	0	16285	5.05	1.55	7.82	0	3777	5.29	13.10	36	0.0013	3.78	0.67	-8.7	15.2	23.9
K39	K42		65.0											65	65	0	416	416	0.13	1.88	0.24	65	65	0.09	0.33	8	0.0050	2.58	0.56	7.9	17.0	9.1
K40	K42									6.0				6	6	6	3	3	0.001	2.23	0.002	6	6	0.01	0.01	8	0.0050	0.75	0.08	5.9	15.0	9.1
K41	K42										19			19	19	0	114	114	0.04	1.98	0.07	19	19	0.03	0.10	8	0.0050	1.76	0.26	5.4	14.0	8.6
K42	K46													0	90	6	0	533	0.17	1.85	0.31	0	91	0.13	0.43	10	0.0035	2.40	0.5	3.0	14.2	11.2
K43	K44		22.0											22	22	0	141	141	0.04	1.96	0.09	22	22	0.03	0.12	8	0.0050	1.92	0.3	6.3	17.0	10.7
K44	K46			47.0										47	69	0	652	793	0.25	1.82	0.45	56	78	0.11	0.56	12	0.0022	2.15	0.5	-0.4	13.7	14.1
K45	K46								14.0					14	14	0	137	137	0.04	1.96	0.08	22	22	0.03	0.11	8	0.0050	1.92	0.3	-0.9	15.0	15.9
K46	K47								12.0					12	1687	6	117	9871	3.06	1.60	4.89	14	1901	2.66	7.55	30	0.0013	3.30	0.65	-6.8	15.0	21.8
K47	CPS													0	3381	183	0	18962	5.88	1.53	9.01	0	3708	5.19	14.20	36	0.0013	3.83	0.74	-8.3	14.5	22.8
K48	CPS			38.0										38	38	0	527	527	0.16	1.86	0.30	44	44	0.06	0.36	8	0.0050	2.62	0.58	1.1	15.5	14.4
CPS													107	107	7065	851	0	35774	11.09	1.47	16.30	0	7528	10.54	26.84	48	0.0013	4.57	0.67	-9.5	15.0	24.5
TOTALS		397.0	1966.0	185.0	281.0	383.0	2011.0	188.0	80.0	851.0	122.0	53.0		7065			35774														

(1) Acreages used in this table were obtained from the Land Use Plan dated April 23, 2007 prepared by EDAW.

(2) PF=3.5 - 1.8(ADWF)$^{0.05}$

(3) Pipes with a d/D greater than 0.7 will either not have direct service lateral connections or the pipe size will be upsized at a later time.

(4) This table will be revised and kept current as project elements change in the future design of facilities.

Force main sized using 125% of PWWF at Pump Station

Appendix B

Preliminary Opinion of Probable Construction Cost

(Alternative 1)

PRELIMINARY COST ESTIMATE

Sewer Master Plan

SUTTER POINTE

Sutter County, California

November 14, 2008

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 929-6092

NOTES

Sutter Pointe Sewer Master Plan

Sutter County, California

1. This estimate is prepared as a guide only and is subject to possible change. It has been prepared to a standard of accuracy which, to the best of our knowledge and judgment, is sufficient to satisfy our understanding of the purpose of this estimate. MacKay & Somps makes no warranty, either expressed or implied, as to the accuracy of this estimate.

2. This estimate is based on the March 21, 2008 Addendum to the Sutter Pointe Sewer Plan, prepared by Mackay and Somps. Minor adjustments were made to facilities within individual phases, subsequent to March, 2008.

3. Costs for PWWF storage attenuation are included in this estimate under Section 2 "Offsite Sewer" . Storage requirements are currently being developed by Sacramento Regional County Sanitation District (SRCSD). Estimated storage cost per phase is estimated based on 25% of ADWF. (Source: HDR)

4. This estimate does not consider the following:

a. Cost associated with environmental (wetland) mitigations or biological surveys
b. Phased construction or out-of-regular-sequence construction
c. Costs associated with ground water or inclement weather conditions
d. Financial Charges
e. Bonds
v. Land costs, acquisition of right of way, easements, and/or rights of entry
w. Assessments from assessment, lighting & landscaping, Mello-Roos districts or the like

5. Costs presented herein represent an opinion based on historical information. No provision has been made for inflation.

6. The "cash flow" situation may be different than the fees, credits, and reimbursements itemized in this estimate.

7. Interim improvements may be required depending on development timing of individual units.

8. SRCSD Connection Fees, shown in this estimate, are based on the latest CSD-1/SRCSD "Impact/Connection Fee" schedule. Commercial/Industrial and Public Facilities connection fees are assumed to be the same rate as single-family residential ($7100/ESD) for purposes of this estimate. A more detailed connection fee analysis for commercial users can be performed when specific "use categories" are determined within the Inustrial/Commercial regions.

9. Pump station costs are based on recent bid information for the Sacramento region, including public information provided by CSD-1. Pump station costs are intended to cover all expenses associated with sewer pump station as well as site work.

10. Costs for all "Offsite" Sewer improvements are from then Central Pump Station (CPS) to the Point of Connection (POC) to the Upper Northwest Interceptor-3 (Shown in Section 2).

11. Estimate assumes all "Onsite" sewer materials and construction methods conforming to the County of Sutter Department of Public Works Design Standards, dated November 2005.

12. Bore and jacking for "Offsite" Sanitary Sewer Force Main (SSFM) assumes 300 LF for the NEMDEC Channel Crossing and 250 LF for crossing additional small culverts and wetlands.

13. Intended route for "Offsite" SSFM 'Line A' is: Northerly from CPS to Riego Road, easterly on Riego Road to Pleasant Grove Road, Southly on Pleasant Grove to Rio Linda Blvd, Rio Linda Road becomes Elwyn Ave, then southly on 2nd Avenue, westerly on M Street and southerly on 6th Street to POC at Elkhorn Blvd. (Total length +/- 46,600 LF, within roadway).

PRELIMINARY COST ESTIMATE

Sutter Pointe - Sewer Master Plan

Sutter County

Date: November 10, 2008

CONSTRUCTION COSTS			PHASE 1			PHASE A			PHASE 2			PHASE B			PHASE 3			PHASE C			PHASE 4			PHASE D			TOTAL		
ITEM No.	DESCRIPTION	UNIT PRICE	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT
1.0 - ONSITE SEWER																													
1.A COLLECTION SYSTEM																													
1.	8" Sanitary Sewer	$38.00 LF	21,500 LF		$817,000	3,750 LF		$142,500	8,400 LF		$319,200	9,900 LF		$376,200	6,800 LF		$258,400	9,250 LF		$351,500	5,950 LF		$226,100	11,950 LF		$454,100	77,500 LF		$2,945,000
2.	10" Sanitary Sewer	$42.00 LF	2,500 LF		$105,000	5,500 LF		$231,000	750 LF		$31,500	2,350 LF		$98,700	1,600 LF		$67,200	2,150 LF		$90,300	3,500 LF		$147,000	6,800 LF		$285,600	25,150 LF		$1,056,300
3.	12" Sanitary Sewer	$57.00 LF	3,850 LF		$219,450	0 LF		$0	4,700 LF		$267,900	950 LF		$54,150	0 LF		$0	2,300 LF		$131,100	4,200 LF		$239,400	0 LF		$0	16,000 LF		$912,000
4.	15" Sanitary Sewer	$90.00 LF	7,500 LF		$675,000	3,400 LF		$306,000	0 LF		$0	3,250 LF		$292,500	350 LF		$31,500	0 LF		$0	600 LF		$54,000	1,000 LF		$90,000	16,100 LF		$1,449,000
5.	18" Sanitary Sewer	$120.00 LF	5,000 LF		$600,000	1,250 LF		$150,000	1,100 LF		$132,000	350 LF		$42,000	2,500 LF		$300,000	650 LF		$78,000	50 LF		$6,000	150 LF		$18,000	11,050 LF		$1,326,000
6.	21" Sanitary Sewer	$158.00 LF	1,800 LF		$284,400	2,900 LF		$458,200	3,850 LF		$608,300	400 LF		$63,200	4,150 LF		$655,700	1,400 LF		$221,200	0 LF		$0	0 LF		$0	14,500 LF		$2,291,000
7.	24" Sanitary Sewer	$188.00 LF	3,550 LF		$667,400	0 LF		$0	950 LF		$178,600	350 LF		$65,800	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	4,850 LF		$911,800
8.	27" Sanitary Sewer	$230.00 LF	14,900 LF		$3,427,000	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	14,900 LF		$3,427,000
9.	30" Sanitary Sewer	$282.00 LF	2,400 LF		$676,800	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	2,400 LF		$676,800
10.	36" Sanitary Sewer	$375.00 LF	2,550 LF		$956,250	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	2,550 LF		$956,250
11.	48" Sanitary Sewer	$510.00 LF	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0	0 LF		$0
12.	48" SSMH (min. 400' spacing)	$6,650.00 EA	101 EA		$670,819	35 EA		$231,088	37 EA		$248,544	42 EA		$279,300	28 EA		$187,031	36 EA		$238,569	36 EA		$237,738	50 EA		$330,838	365 EA		$2,423,925
13.	60" SSMH (min. 400' Spacing)	$13,650.00 EA	13 EA		$182,569	7 EA		$98,963	12 EA		$163,800	2 EA		$25,594	10 EA		$141,619	4 EA		$47,775	0 EA		$0	0 EA		$0	48 EA		$660,319
14.	72" SSMH (min. 400' Spacing)	$15,750.00 EA	12 EA		$194,906	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	12 EA		$194,906
15.	48" Reception SSMH	$7,000.00 EA	2 EA		$14,000	1 EA		$7,000	0 EA		$0	1 EA		$7,000	1 EA		$7,000	1 EA		$7,000	0 EA		$0	0 EA		$0	6 EA		$42,000
16.	60" Reception SSMH	$14,000.00 EA	3 EA		$42,000	0 EA		$0	1 EA		$14,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	4 EA		$56,000
17.	Dewater Trench	$10.00 LF	65,550 LF		$655,500	16,800 LF		$168,000	19,750 LF		$197,500	17,550 LF		$175,500	15,400 LF		$154,000	15,750 LF		$157,500	14,300 LF		$143,000	19,900 LF		$199,000	185,000 LF		$1,850,000
	TOTAL COLLECTION SYSTEM				**$10,188,094**			**$1,792,750**			**$2,161,344**			**$1,479,944**			**$1,802,450**			**$1,322,944**			**$1,053,238**			**$1,377,538**			**$21,178,300**
1.B PUMP STATIONS																													
1.	Sewer Pump Station A - Phase C (1.2 mgd - PWWF)	$1,100,000.00 mgd/EA	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$1,320,000	0 EA		$0	0 EA		$0	1 EA		$1,320,000
2.	Sewer Pump Station B - Phase A (3.5 mgd - PWWF)	$900,000.00 mgd/EA	0 EA		$0	1 EA		$3,150,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$3,150,000
3.	Sewer Pump Station C - Phase C (1.1 mgd - PWWF)	$1,100,000.00 mgd/EA	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$1,210,000	0 EA		$0	0 EA		$0	1 EA		$1,210,000
4.	Sewer Pump Station D - Phase A (6.7 mgd - PWWF)	$900,000.00 mgd/EA	0 EA		$0	1 EA		$6,030,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$6,030,000
5.	Sewer Pump Station E - Phase D (2.3 mgd - PWWF)	$1,100,000.00 mgd/EA	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$2,530,000	1 EA		$2,530,000
6.	Sewer Pump Station F - Phase C (2.2 mgd - PWWF)	$1,100,000.00 mgd/EA	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$2,420,000	0 EA		$0	0 EA		$0	1 EA		$2,420,000
7.	Sewer Pump Station G - Phase 1 (5.6 mgd - PWWF)	$900,000.00 mgd/EA	1 EA		$5,040,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$5,040,000
8.	Sewer Pump Station H - Phase 1 (6.2 mgd - PWWF)	$900,000.00 mgd/EA	1 EA		$5,580,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$5,580,000
9.	Sewer Pump Station I - Phase 2 (3.4 mgd - PWWF)	$900,000.00 mgd/EA	1 EA		$3,060,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$3,060,000
10.	Sewer Pump Station J - Phase 2 (1.7 mgd - PWWF)	$1,100,000.00 mgd/EA	1 EA		$1,870,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$1,870,000
11.	Central Pump Station - Phase 1 (27.0 mgd - PWWF)	$750,000.00 mgd/EA	1 EA		$20,250,000	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	0 EA		$0	1 EA		$20,250,000
	TOTAL PUMP STATIONS				**$35,800,000**			**$9,180,000**			**$0**			**$0**			**$0**			**$4,950,000**			**$0**			**$2,530,000**			**$52,460,000**

CONSTRUCTION COSTS

ITEM No.	DESCRIPTION	UNIT PRICE	UNIT	PHASE 1 QTY	PHASE 1 UNIT	PHASE 1 AMOUNT	PHASE A QTY	PHASE A UNIT	PHASE A AMOUNT	PHASE 2 QTY	PHASE 2 UNIT	PHASE 2 AMOUNT	PHASE B QTY	PHASE B UNIT	PHASE B AMOUNT	PHASE 3 QTY	PHASE 3 UNIT	PHASE 3 AMOUNT	PHASE C QTY	PHASE C UNIT	PHASE C AMOUNT	PHASE 4 QTY	PHASE 4 UNIT	PHASE 4 AMOUNT	PHASE D QTY	PHASE D UNIT	PHASE D AMOUNT	TOTAL QTY	TOTAL UNIT	TOTAL AMOUNT
1.C ONSITE FORCE MAINS																														
1	8" Force Main	$80.00	LF	0	LF	$0	0	LF	$0	0	LF	$0	350	LF	$28,000	0	LF	$0		LF	$0	0	LF	$0	0	LF	$0	350	LF	$28,000
2	10" Force Main	$100.00	LF	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	1,950	LF	$195,000	0	LF	$0	0	LF	$0	1,950	LF	$195,000
3	12" Force Main	$120.00	LF	1,100	LF	$132,000	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	1,100	LF	$132,000
4	15" Force Main	$150.00	LF	3,300	LF	$495,000	1250	LF	$187,500	0	LF	$0	0	LF	$0	0	LF	$0	2,650	LF	$397,500	0	LF	$0	2050	LF	$307,500	9,250	LF	$1,387,500
5	21" Force Main	$270.00	LF	11,600	LF	$3,132,000	2450	LF	$661,500	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	14,050	LF	$3,793,500
6	8" Line Isolation Valve	$1,800.00	EA	0	EA	$0	0	EA	$0	0	EA	$0	1	EA	$1,800	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	1	EA	$1,800
7	10" Line Isolation Valve	$2,000.00	EA	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	1	EA	$2,000	0	EA	$0	0	EA	$0	1	EA	$2,000
8	12" Line Isolation Valve	$2,200.00	EA	0	EA	$0	0	EA	$0	1	EA	$2,200	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	1	EA	$2,200
9	15" Line Isolation Valve	$3,200.00	EA	0	EA	$0	1	EA	$3,200	1	EA	$3,200	0	EA	$0	0	EA	$0	1	EA	$3,200	0	EA	$0	1	EA	$3,200	4	EA	$12,800
10	21" Line Isolation Valve	$4,500.00	EA	3	EA	$13,500	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	3	EA	$13,500
11	6" Air/Vac Assembly (inc. precast vault)	$10,000.00	EA	17	EA	$170,000	11	EA	$110,000	7	EA	$70,000	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	0	EA	$0	35	EA	$350,000
12	2" Air/Vac Assembly	$2,500.00	EA	0	EA	$0	0	EA	$0	1	EA	$2,500	1	EA	$2,500	0	EA	$0	5	EA	$12,500	0	EA	$0	2	EA	$5,000	9	EA	$22,500
13	Dewater Trench	$35.00	LF	16,000	LF	$560,000	3700	LF	$129,500	0	LF	$0	350	LF	$12,250	0	LF	$0	4600	LF	$161,000	0	LF	$0	2050	LF	$71,750	26,700	LF	$934,500
	TOTAL FORCE MAIN					**$4,502,500**			**$1,091,700**			**$77,900**			**$44,550**			**$0**			**$771,200**			**$0**			**$387,450**			**$6,875,300**
1.D BORE AND JACK																														
1.	Bore and Jack under HWY 99/70 (42" Casing)	$1,300.00	LF	600	LF	$780,000		LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	0	LF	$0	600	LF	$780,000
	TOTAL BORE AND JACK					**$780,000**			**$0**			**$0**			**$0**			**$0**			**$0**			**$0**			**$0**			**$780,000**

2.0 - OFFSITE SEWER

A. SUTTER POINTE INTERCEPTOR (LINE 'A')

1.	Parallel Forcemain (1-12", 1-18") (Forcemains - Open cut inside roadway)	$345.00	LF	46,600	LF	$11,500,000	INC.	LS	INC.	0	LF	$0	INC.	LF	INC.	0	LF	$0	INC.	LF	INC.	0	LF	$0	INC,.	LF	INC.	1	LF	$11,500,000
2.	24" Forcemain	$400.00	LF	0	LF	$0	INC.	LS	INC.	0	LF	$0	INC.	LF	INC.	46,600	LF	$19,400,000	INC.	LF	INC.	0	LF	$0	INC.	LF	INC.	46,600	LF	$19,400,000
3.	Pipe Bore and Jack (24" casing for 12" pipe)	$750.00	LF	550	LF	$412,500	INC.	LS	INC.	0	LF	$0	INC.	LF	INC.	0	LF	$0	INC.	LF	INC.	0	LF	$0	LF	LF	INC.	550	LF	$412,500
4.	Pipe Bore and Jack (30" Casing for 18" pipe)	$950.00	LF	550	LF	$522,500	INC.	LS	INC.	0	LF	$0	INC.	LF	INC.	0	LF	$0	INC.	LF	INC.	0	LF	$0	LF	LF	INC.	550	LF	$522,500
5.	Pipe Bore and Jack (36" Casing for 24" pipe)	$1,100.00	LF	0	LF	$0	INC.	LS	INC.	0	LF	$0	INC.	LF	INC.	550	LF	$605,000	INC.	LF	INC.	0	LF	$0	LF	LF	INC.	550	LF	$605,000
6.	SS Monitoring Station	$250,000.00	LS	1	LS	$250,000	INC.	LS	INC.	0	LS	$0	INC.	LS	INC.	0	LS	$0	INC.	LS	INC.	0	LS	$0	INC.	LS	INC.	1	LS	$250,000
7.	Storage (3.9 MG)	$15,600,000.00	LS	0	LS	$0	INC.	LS	INC.	1	LS	$15,600,000	INC.	LS	INC.	0	LS	$0	INC.	LS	INC.	0	LS	$0	INC.	LS	INC.	1	LS	$15,600,000
	TOTAL SUTTER POINTE INTERCEPTOR (LINE 'A')					**$12,685,000**			**INC.**			**$15,600,000**			**INC.**			**$20,005,000**			**INC.**			**$0**			**INC.**			**$48,290,000**

CONSTRUCTION COSTS			PHASE 1			PHASE A			PHASE 2			PHASE B			PHASE 3			PHASE C			PHASE 4			PHASE D			TOTAL		
ITEM No.	DESCRIPTION	UNIT PRICE	UNIT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT	QTY	UNIT	AMOUNT
	CONSTRUCTION COST ESTIMATE SUMMARY																												
	1.0 - ONSITE SEWER																												
	A. COLLECTION SYSTEM					$10,188,094			$1,792,750			$2,161,344			$1,479,944			$1,802,450			$1,322,944			$1,053,238			$1,377,538			$21,178,300
	B. PUMP STATIONS					$35,800,000			$9,180,000			$0			$0			$0			$4,950,000			$0			$2,530,000			$52,460,000
	C. FORCE MAIN					$4,502,500			$1,091,700			$77,900			$44,550			$0			$771,200			$0			$387,450			$6,875,300
	E. BORE AND JACK					$780,000			$0			$0			$0			$0			$0			$0			$0			$780,000
	2.0 - OFFSITE SEWER																												
	A. SUTTER POINTE INTERCEPTOR (LINE 'A')					$12,685,000			INC.			$15,600,000			INC.			$20,005,000			INC.			$0			INC.			$48,290,000
	Subtotal Construction Costs					$63,955,594			$12,064,450			$17,839,244			$1,524,494			$21,807,450			$7,044,144			$1,053,238			$4,294,988			$129,583,600
	15% Engineering/Inspection					$9,593,339			$1,809,668			$2,675,887			$228,674			$3,271,118			$1,056,622			$157,986			$644,248			$19,437,540
	20% Contingency					$12,791,119			$2,412,890			$3,567,849			$304,899			$4,361,490			$1,408,829			$210,648			$858,998			$25,916,720
	GRAND TOTAL CONSTRUCTION COST					**$86,340,052**			**$16,287,008**			**$24,082,979**			**$2,058,067**			**$29,440,058**			**$9,509,594**			**$1,421,871**			**$5,798,233**			**$174,937,860**
	CREDITS/FEES																												
	3.0 SRCSD CONNECTION FEE																												
	a. Residential Land Use	$7,100.00	ESD	7,391	ESD	$52,476,100	822	ESD	$5,836,200	4,097	ESD	$29,088,700	0	ESD	$0	2,922	ESD	$20,746,200	0	ESD	$0	2,993	ESD	$21,250,300	0	ESD	$0	18,225	ESD	$129,397,500
	b. Commercial/Industrial Land Use	$7,100.00	ESD	611	ESD	$4,338,100	2,680	ESD	$19,028,000	0	ESD	$0	4,624	ESD	$32,830,400	565	ESD	$4,011,500	3,734	ESD	$26,511,400	553	ESD	$3,926,300	3,727	ESD	$26,461,700	16,494	ESD	$117,107,400
	c. Public Facilities	$7,100.00	ESD	792	ESD	$5,623,200	0	ESD	$0	308	ESD	$2,186,800	0	ESD	$0	185	ESD	$1,313,500	0	ESD	$0	176	ESD	$1,249,600	0	ESD	$0	1,461	ESD	$10,373,100
	TOTAL SRCSD CONNECTION FEE					**$62,437,400**			**$24,864,200**			**$31,275,500**			**$32,830,400**			**$26,071,200**			**$26,511,400**			**$26,426,200**			**$26,461,700**			**$256,878,000**