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CHAPTER 3
Alternatives Screening

This Chapter presents the development and screening of alternatives for regionalizing the wastewater treatment and disposal/reuse services for the four existing wastewater service areas within West County.[1,2] The purpose of this evaluation is to establish baseline infrastructure needs and capital costs for each regional alternative and to screen the alternatives down to one or more preferred alternatives. The topics addressed are as follows:

- Regionalization Alternatives Overview
- Anticipated Flows and Loads
- Local Facility Scenarios
- Export Scenarios
- Combination Scenarios
- Alternatives Screening

3.1 REGIONALIZATION ALTERNATIVES OVERVIEW

Eight alternatives have been identified for this screening evaluation. The eight alternatives, organized by major category, are as follows:

1. **Local Facility Scenarios**: Flows from all West County agencies are treated at upgraded/expanded WWTPs within West County as follows:
   - **1a. Two Local Facilities:** Wastewater is treated at two different plants, the existing RRCSD plant and a new, combined FWD/GCSD plant.
   - **1b. One Facility at RRCSD:** All wastewater is directed to an expanded plant at the RRCSD site.
   - **1c. One Facility at FWD:** All wastewater is directed to a new plant at the FWD site, with recycled water facilities split across the existing FWD/GCSD systems.
2. **Export Scenarios:** Flows from all West County agencies are conveyed for treatment at WWTPs outside West County, as follows:
   - **2a. Export to Windsor:** All wastewater is directed to the Windsor WWTP.
   - **2b. Export to Santa Rosa's Laguna WWTP:** All wastewater is directed to the Santa Rosa Regional Laguna WWTP (Laguna WWTP).
   - **2c. Export to Windsor and Santa Rosa's Laguna WWTP**: Wastewater generated from RRCSD is directed to the Windsor WWTP, and wastewater generated from FWD/GCSD is directed to the Laguna WWTP.

[1] The analysis incorporates the planned discharge of OCSD flows to the GCSD and costs related to this project element are not included in this assessment The proposed alignment for the planned OCSD to GCSD pipeline is shown on figures, where relevant.

[2] The evaluation is limited to consolidation of treatment and recycled water facilities only. Collection system infrastructure improvements are not evaluated.

3. **Combination Scenarios:** Some flows from West County agencies are treated locally while other flows are exported, as follows:
   - **3a. Treat at RRCSD; FWD/GCSD Export to Santa Rosa's Laguna WWTP**: RRCSD flows continue to be treated at the existing plant, while FWD/GCSD/OCSD flows get directed to the Laguna WWTP.
   - **3b. Treat at FWD/GCSD; RRCSD Export to Windsor**: FWD/GCSD/OCSD flows are treated at a new combined FWD/GCSD plant, while RRCSD flows get directed to the Windsor WWTP.

3.2 ANTICIPATED FLOWS AND LOADS

This section presents the design flows and loads for the eight alternatives considered in this evaluation. For four of the alternatives (1a, 2c, 3a and 3b), the wastewater generated within the West County area will be split between two different facilities, where RRCSD flow is treated at one site and FWD/GCSD/OCSD flows are treated at an alternative site. The remaining four alternative (1b, 1c, 2a and 2b) assumes all of the wastewater generated within West County will be treated at a single location.

3.2.1 Alternatives 1a, 2c, 3a and 3b

The projected flows and loads under Alternatives 1a, 2c, 3a and 3b are presented in Table 3-1 and Table 3-2, respectively, based on the information presented for each individual facility in Chapter 2.

Table 3-1. Projected Flows for Alternatives 1a, 2c, 3a and 3b

Scenario	ADWF, mgd	MMF, mgd	MWF, mgd	PDF, mgd
Treatment at the RRCSD WWTP				
Projected Flows	0.38	2.2	3.5[(a)]	4.2/5.0[(a)]
Treatment at the FWD/GCSD WWTP				
Projected GCSD/OCSD Flows	0.15	0.64	1.1	1.5
Projected FWD Flows	0.064	0.25	0.39	0.79
Total Combined GCSD/OCSD/FWD Flows	**0.21**	**0.89**	**1.5**	**2.3**

ADWF = Average Dry Weather Flow
MMF = Maximum 30-Day Flow
MWF = Maximum 7-Day Flow
PDF = Maximum Day Flow
(a) Equalized flow. The RRCSD Treatment Plant Master Plan indicates that Peak Day flows through the WWTP can be equalized to 5.0 mgd with use of existing Emergency Storage Pond. If 0.4 MG EQ basin is also available, flows can be equalized to 4.2 mgd. RRCSD Treatment Plant Master Plan indicates that un-equalized maximum 7-day flow is 3.65 mgd and un-equalized sustained peak flows are 5.2 mgd.

Table 3-2. Projected BOD and TSS Loads for Alternatives 1a, 2c, 3a and 3b

Scenario	BOD Loads, lb/day		TSS Loads, lb/day	
	Average Annual	Maximum 30 day	Average Annual	Maximum 30 day
Treatment at the RRCSD WWTP				
Projected Loads	1,310	2,620	1,310	2,620
Treatment at the FWD/GCSD WWTP				
Projected GCSD/OCSD Loads	470	680	420	620
Projected FWD Loads	170	270	160	250
Total Combined GCSD/OCSD/FWD Loads	**640**	**950**	**580**	**870**

3.2.2 Alternatives 1b, 1c, 2a and 2b

The projected flows and loads under Alternatives 1b, 1c, 2a and 2b are presented in Table 3-3 and Table 3-4, respectively, based on the information presented in Chapter 2.

Table 3-3. Projected Flows for Alternatives 1b, 1c, 2a and 2b

Scenario	ADWF, mgd	MMF, mgd	MWF, mgd	PDF, mgd
Projected RRCSD Flows	0.38	2.2	3.5[(a)]	4.2/5.0[(a)]
Projected GCSD/OCSD Flows	0.15	0.64	1.1	1.5
Projected FWD Flows	0.064	0.25	0.39	0.79
Total Flows	**0.59**	**3.1**	**5.0**	**6.5-7.3**

ADWF = Average Dry Weather Flow
MMF = Maximum 30-Day Flow
MWF = Maximum 7-Day Flow
PDF = Maximum Day Flow
(a) Equalized flow. The RRCSD Treatment Plant Master Plan indicates that Peak Day flows through the WWTP can be equalized to 5.0 mgd with use of existing Emergency Storage Pond. If 0.4 MG EQ basin is also available, flows can be equalized to 4.2 mgd. RRCSD Treatment Plant Master Plan indicates that un-equalized maximum 7-day flow is 3.65 mgd and un-equalized sustained peak flows are 5.2 mgd.

Table 3-4. Projected BOD and TSS Loads for Alternatives 1b, 1c, 2a and 2b

Scenario	BOD Loads, lb/day		TSS Loads, lb/day	
	Average Annual	Maximum 30 day	Average Annual	Maximum 30 day
Projected RRCSD Loads	1,310	2,620	1,310	2,620
Projected GCSD/OCSD Loads	470	680	420	620
Projected FWD Loads	170	270	160	250
Total Loads	**1,950**	**3,570**	**1,890**	**3,490**

3.3 LOCAL FACILITY SCENARIOS

This section describes the three local facility scenarios, as follows:

- Alternative 1a: Two Local Facilities
- Alternative 1b: One Facility at RRCSD
- Alternative 1c: One Facility at FWD

3.3.1 Alternative 1a: Two Local Facilities

This alternative has two different elements, as follows:

1. RRCSD flows treated at the existing RRCSD WWTP, and
2. FWD, GCSD and OCSD flows treated at a combined, upgraded FWD/GCSD WWTP.

Because each element would entail distinct infrastructure needs, these two elements are discussed separately below.

3.3.1.1 RRCSD Flows Treated at RRCSD WWTP

Under this element of Alternative 1a, the existing RRCSD WWTP and associated recycled water system would continue to be used to treat wastewater from the RRCSD service area.

3.3.1.1.1 Treatment Infrastructure Improvements

An analysis of the capacity of the RRCSD WWTP to accommodate the anticipated flows and loads associated with the RRCSD service area was presented in Chapter 2. As discussed, the facility should be able to provide adequate treatment capacity for the anticipated flows and loads from the RRCSD service area. However, the following improvements will be needed:

- An estimated $30 million in condition-related projects, which includes an estimated $3 million in headworks improvements based on West Yost's Headworks, Lift Stations, and Force Main project for Sonoma Water/RRCSD[3], and
- An estimated $0.7 million in hydraulic capacity improvements.

The RRCSD WWTP schematic would remain unchanged from existing conditions shown in Figure 2-4.

3.3.1.1.2 Recycled Water Infrastructure Improvements

Water balances were developed to evaluate recycled water infrastructure needs. In accordance with current Regional Water Board policies, these water balances account for projected influent flows and direct rainfall during a 100-year rainfall year. Additional assumptions applied in this evaluation were as follows:

- Disposal on the Northwood Golf Course would accommodate about 50 AFY, distributed in accordance with historical monthly average values;

[3] The RRCSD also needs to address significant collection system deficiencies. These critical improvements are common to all the alternatives evaluated in this study and are not addressed in this analysis.

- Disposal capacity of the 17-acre of wooded irrigation area of 105 AFY, including 75 AFY of percolation based on estimated percolation rates of 0.6 and 0.3 inches per day for the upper and lower portions, respectively, plus 30 AFY of irrigation demand for the overlying grass;
- Storage is limited to current available storage capacity of 3.5 MG (10.7 acre-feet (AF));
- Surface water discharge would continue up to a maximum monthly flow rate of no more than 1 percent of Russian River flow.

The following conclusions can be drawn from the water balance analysis:

- Existing storage and disposal capacities are adequate to accommodate current flows.
- An additional 5 acres of land application area would be needed to accommodate 8 AFY of water[4][5]. It is assumed that RRCSD would be able to identify 5 acres of irrigated space on either the 17-acre irrigation property or on the 394-acre forested property purchased in August 2024.

3.3.1.1.3 Conveyance Infrastructure Improvements

No new major conveyance infrastructure would be needed for this part of Alternative 1a.

3.3.1.2 GCSD/OCSD/FWD Flows Treated at Combined FWD/GCSD WWTP

GCSD and FWD staff have expressed an interest in working together to implement zero surface water discharge (i.e. reuse only) in lieu of making treatment improvements to meet the nitrogen effluent limitations that have been prescribed for surface discharge. Moreover, both systems are currently experiencing some difficulties with operation of their filtration and/or disinfection systems. Therefore, for this element of Alternative 1a, GCSD and FWD are assumed to implement a strategy where secondary treatment would continue to be provided at both WWTPs in their respective pond systems, but tertiary treatment and disinfection would be consolidated. Similarly, the existing recycled water storage and recycled water use areas would be combined and shared by both agencies.

3.3.1.2.1 Treatment Infrastructure Improvements

As presented in Chapter 2, the GCSD WWTP pond-based treatment system will need to be modified/upgraded to provide additional treatment capacity.[6] For this analysis, it is assumed the treatment capacity of the GCSD pond system would be increased by upgrading the ponds with a new diffused aeration system, which would provide complete mixing and higher reaction rates for BOD removal. These aeration upgrades would also require installation of blowers. A preliminary analysis demonstrates the effluent BOD treatment target of 30 mg/L could be readily met with these aeration upgrades.

[4] The amount of land application area could potentially be decreased if storage capacity were increased.

[5] The RRCSD Treatment Facility Master Plan had a similar finding, identifying approximately three acres of expansion area is required.

[6] As discussed in Chapter 2, the GCSD pond system does not have adequate capacity to treat projected flow to meet an effluent BOD treatment target of 30 mg/L. However, the FWD WWTP has adequate pond treatment capacity.

The tertiary filtration facilities at the GCSD and FWD WWTPs are nearing the end of their useful lives. Moreover, GCSD requires a new disinfection system. Therefore, it has been assumed that new tertiary filtration and disinfection facilities would be constructed at the FWD WWTP to provide treatment for the combined FWD/GCSD/OCSD flows. This system would be composed of the following elements:

- A new SAF system for treatment ahead of filtration ,
- A new cloth disk filtration system, and
- Expansion of the chlorine contact basins (CCBs)and associated expanded chlorine dosing equipment.

Based on a review of FWD and GCSD operating records, the existing tertiary filtration systems at each plant operate at a maximum flow rate between the maximum 7-day and maximum 30-day flow values. Therefore, it is expected a new combined treatment system would need to treat flows in this same range. The capacity needed at the FWD WWTP for tertiary treatment and advanced disinfection are shown in Table 3-5, with the current FWD WWTP design and operational capacities shown for reference.

Table 3-5. Future Flows to Combined Tertiary Treatment Facilities at FWD WWTP

FWD WWTP Disinfection Capacity	*0.58*	
FWD WWTP Filter Winter-Season Operational Capacity	*0.29*	
Future FWD Flows to Tertiary Facilities (Maximum 7-Day)	0.39	0.25
Future GCSD/OCSD Flows to Tertiary Facilities	1.10	0.64
Total Future Flows to Tertiary Facilities, mgd	**1.49**	**0.89**

The FWD WWTP has limited space available on site for new treatment facilities. Moreover, the existing facilities would need to be kept in service while new facilities are under construction. Therefore, it has been assumed that the existing effluent storage pond area at the FWD WWTP would be repurposed for siting the new treatment facilities.

A schematic of the proposed treatment process at the combined FWD/GCSD WWTP is shown on Figure 3-1.

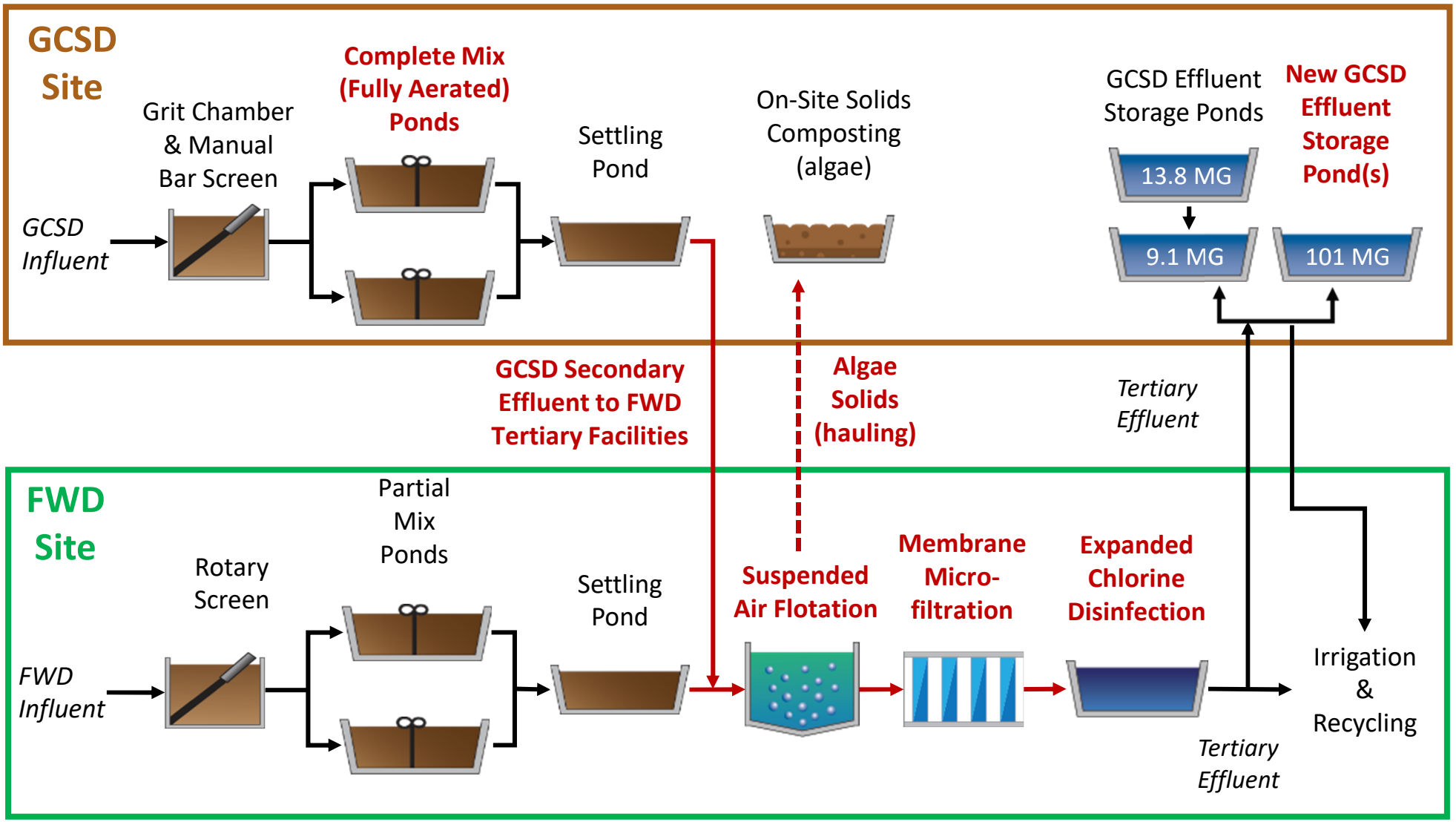


Figure 3-1. Combined FWD/GCSD WWTP Treatment Operation Schematic for Alternative 1a

3.3.1.2.2 Recycled Water Infrastructure Improvements

Water balances were developed for the combined FWD/GCSD system to determine future recycled water infrastructure requirements. In accordance with current Regional Water Board policies, these water balances account for projected influent flows and direct rainfall during a 100-year rainfall year. Additional assumptions applied in this evaluation were as follows:

- Disposal on the 301 acres of vineyards currently served by GCSD and FWD would accommodate up to 440 AFY, distributed in accordance with historical monthly average values;
- Disposal capacity of the existing 24 acres of turf and landscaped areas serviced by FWD would accommodate up to about 50 AFY, distributed in accordance with historical monthly average values;
- The existing 20.5-acre GCSD land application area would be repurposed to provide additional storage, and would no longer be available for disposal;
- The existing GCSD 22.9 MG (70.3 AF) storage capacity is available; and
- There would be no surface water discharge.

The following conclusions can be taken from the water balance analysis:

- The existing irrigation reuse sites would be able to accommodate the combined recycled water flow generated.
- 310 AF of additional storage volume would be required.

The 20.5-acre land application area owned by GCSD would be adequately sized to accommodate the new storage basin if the ponds are at least 30 feet in depth. The FWD recycled water system also includes seasonal storage of 14.7 MG (45 AF) at the Iron Horse Vineyards, which has not been considered as part of this analysis.

3.3.1.2.3 Conveyance Infrastructure Improvements

To accommodate the flow of water between the two facilities the following pipelines and pump stations are needed:

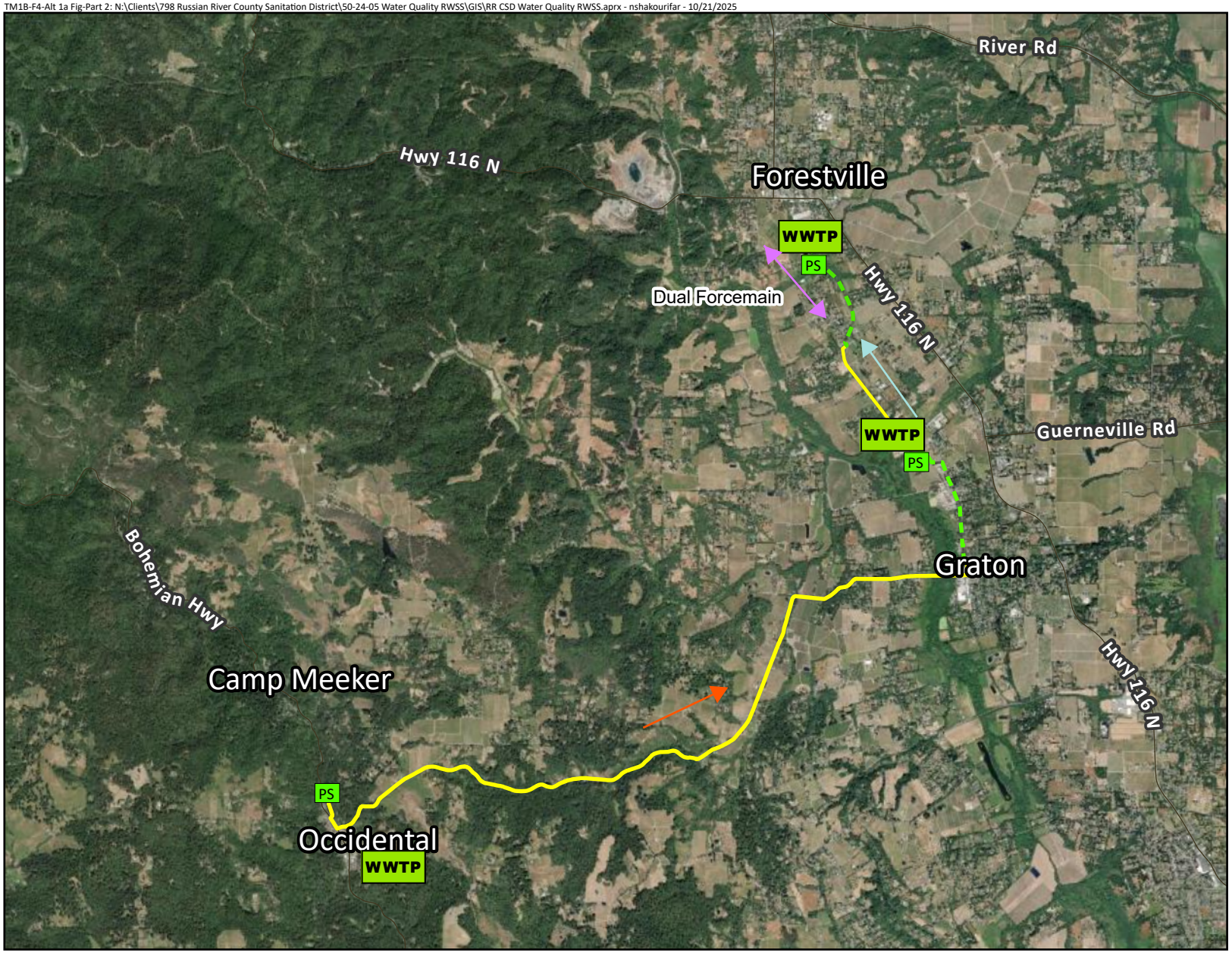
- **Secondary Effluent from GCSD to FWD:**
  - The existing 1.7-mile long, 8-inch diameter DI pipeline between the FWD and GCSD WWTPs would be rehabilitated to allow for transfer of up to 1.1 mgd of GCSD/OCSD secondary effluent from the GCSD WWTP to the FWD WWTP.
  - A new, 1.1 mgd effluent pump station to convey flow from the GCSD is also needed for secondary effluent transfer.[7]

[7] GCSD has identified the need for a new effluent pump station. It is assumed that the facility would be sized to accommodate the proposed use. The new pump station is assumed to be adequately designed to accommodate the effluent flow detailed herein.

- **Tertiary Effluent from FWD to GCSD Storage Ponds and Recycled Water Customers:**
  - A new 0.8-mile, 6-inch pipeline between the GCSD WWTP and the existing 6-inch PVC pipe connecting to the FWD WWTP along with a new, parallel 1.7 mile 6-inch pipeline would be constructed to allow for transfer of 1.5 mgd of tertiary effluent from the FWD WWTP to the storage ponds at the GCSD WWTP (and for distribution to recycled water customers).
  - The existing 0.7 mgd effluent pump station at the FWD WWTP needs to be expanded to 1.5 mgd to allow for transfer of flows from the FWD site to the ponds at the GCSD site.
- **Tertiary Effluent from GCSD Storage Ponds to Recycled Water Customers:**
  - A new, 1.5 mgd recycled water pump station at the GCSD site is needed to distribute recycled water from the storage ponds to recycled water customers.

A conceptual alignment of these conveyance components is shown on Figure 3-2.

TM1B-F4-Alt 1a Fig-Part 2: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/21/2025



WWTP Wastewater Treatment Plant

Existing Pipeline

Proposed New Pipeline

PS Pump Station

Direction of Secondary Effluent Flow

Direction of Tertiary Effluent Flow

Direction of Raw Wastewater Flow

Prepared by:

WEST YOST

N

0 0.5 1 Miles

Prepared for:

Russian River County Sanitation District

Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

Pipeline Alignments for Alternative 1a

Figure 3-2

3.3.2 Alternative 1b: One Facility at RRCSD

Alternative 1b entails treatment of all West County flows at an expanded RRCSD WWTP, with recycled water returned to the FWD/GCSD systems to allow for continued delivery to the existing recycled water users in this area. Recycled water would also continue to be provided to the Northwood Golf Course.

3.3.2.1.1 Treatment Infrastructure Improvements

The existing aerated treatment ponds at both the FWD and GCSD WWTPs would be converted to EQ. Both facilities would continue to operate an influent screening facility (including the new screening facility planned at the GCSD WWTP). Flows exceeding the discharge pumping capacity would be diverted to the ponds and held there until they can be conveyed to the RRCSD facility. With this approach, the peak flows at the GCSD and FWD facilities could be equalized to the MMF conditions, for a total peak flow of 0.9 mgd. Combined with the equalized peak flow at the RRCSD of 4.2 mgd, the total flow that would be treated through the RRCSD WWTP would be 5.1 mgd.

At the RRCSD WWTP, the following improvements will be needed:

- An estimated $30 million in condition-related projects, which includes an estimated $3. million in headworks improvements based on West Yost's Headworks, Lift Stations, and Force Main project for Sonoma Water/RRCSD[8], and
- An estimated $0.7 million in hydraulic capacity improvements.

As shown in Table 3-3, the projected combined maximum 30-day BOD loads are approximately 3,600 lb/day. As presented in the Treatment Facilities Master Plan, the aeration basins should be capable of treating up to the maximum month load capacity assumed to be reached in 2033, or approximately 3,650 lb/day. Therefore, the aeration basins should be able to accommodate the additional influent load without requiring an expansion of the biological treatment or solids processing system[9].

The secondary clarifiers were designed to handle a solids loading rate of 20 lb/sf/day for the two, 40-foot diameter clarifiers and 36 lb/sf/day for the 60-foot diameter clarifier. Given these values, a fourth secondary clarifier will not be needed to accommodate the FWD/GCSD flows based on the following analysis:

- At a 3,000 mg/L Mixed Liquor Suspended Solids (MLSS) concentration and a sustained peak flow of 5.1 mgd, the solids loading rates to the clarifiers would be 16 lb/sf/day to the two 40-foot diameter clarifiers and 28 lb/sf/day to the 60-foot diameter clarifier, assuming approximately 3.5 mgd is directed to the 60-foot diameter clarifier. These values are well below the design loading rate values.

[8] The RRCSD also needs to address significant collection system deficiencies. These critical improvements are common to all the alternatives evaluated in this study and are not addressed in this analysis.

[9] This assumes the maximum month load peaking factors used to develop the Treatment Plant Master Plan are overstated and the 2.0 AAL to MML peaking factors defined herein are determined to be more representative.

- At a 3,000 mg/L MLSS concentration and a potential sustained peak flow of 5.9 mgd,[10] the solids loading rates to the clarifiers would be 18 lb/sf/day to the two 40-foot diameter clarifiers and 36 lb/sf/day for the 60-foot diameter clarifier, assuming approximately 4.4 mgd is directed to the 60-foot diameter clarifier. These values are just at the design values.

As presented in Chapter 2 (Table 2-4), the filtration system would need to be expanded to increase the firm capacity above approximately 4.0 mgd. A third, 4 mgd filtration unit is assumed to be installed.

The UV disinfection system would also need to be expanded to accommodate a combined peak flow of 5.1 mgd, as the UV disinfection system capacity rating is expected to be 5 mgd following the current re-rating process. However, because the existing UV equipment is nearing the end of its useful life, it is assumed the existing equipment would be replaced with new equipment having a slightly higher capacity. Therefore, no additional UV channels are needed.

The RRCSD WWTP schematic would also remain unchanged from existing conditions shown in Figure 2-4 under this alternative.

3.3.2.1.2 Recycled Water Infrastructure Improvements

Water balances were developed for the combined FWD/GCSD/OCSD/RRCSD system to determine future recycled water infrastructure requirements. In accordance with current Regional Water Board policies, these water balances account for projected influent flows and direct rainfall during a 100-year rainfall year. Additional assumptions applied in this evaluation were as follows:

- Disposal on the 301 acres of vineyards currently served by GCSD and FWD would accommodate up to 440 AFY, distributed in accordance with historical monthly average values;
- Disposal capacity of the existing 24 acres of turf and landscaped areas serviced by FWD and the existing 20.5-acre GCSD land application area would accommodate up to about 90 AFY, distributed in accordance with historical monthly average values;
- Disposal on the Northwood Golf Course would accommodate about 50 AFY, distributed in accordance with historical monthly average values;
- The existing GCSD 22.9 MG (70.3 AF) storage capacity is available;
- The existing FWD 2.3 MG (7 AF) storage capacity is available;
- The existing RRCSD 3.5 MG (10.7 AF) storage capacity is available; and
- Surface water discharge would continue at a maximum monthly flow rate of up to 1 percent of Russian River flows.

The water balances demonstrate that the combined storage and irrigation reuse areas described above would provide adequate capacity.

[10] Assumes RRCSD peak flows are equalized to 5.0 mgd and FWD/GCSD flows are equalized to a MMF of 0.9 mgd.

3.3.2.1.3 Conveyance Infrastructure Improvements

To accommodate the flow of water between the two facilities the following pipelines and pump stations are needed:

- **Raw Wastewater from GCSD to FWD:**
  - The existing 1.7-mile long, 8-inch diameter DI pipeline between the FWD and GCSD WWTPs would be rehabilitated to allow for transfer of 0.64 mgd of equalized, raw OCSD/GCSD wastewater.
  - A new 0.64 mgd effluent pump station for GCSD is needed for raw wastewater transfer to the FWD WWTP site.[11]
- **Raw Wastewater from FWD to RRCSD:**
  - A new 10.4-mile, 10-inch diameter pipeline to convey the 0.9 mgd equalized, raw FWD/GCSD/OCSD flows. This pipeline would have two river crossings.[12]
  - A new 0.9 mgd, high-head pump station to convey the 0.9 mgd equalized, raw FWD/GCSD/OCSD flows.
- **Recycled Water from RRCSD to FWD:**
  - A new 10.4-mile, 12-inch diameter pipeline to convey an estimated 1.5 mgd tertiary flows to the recycled water storage ponds at the FWD WWTP. This pipeline would have two river crossings.
  - A new 1.5 mgd, high-head pump station to convey tertiary flows to the recycled water storage ponds at the FWD WWTP.
- **Recycled Water from FWD to GCSD:**
  - A new 1.7-mile, 8-inch pipeline between the GCSD WWTP and the FWD WWTP would be constructed to allow for transfer up to 1.0 mgd of tertiary effluent from the storage ponds at the FWD WWTP to the storage ponds at the GCSD WWTP.[13]
  - The existing 0.7 mgd effluent pump station at the FWD site needs to be expanded to 1.0 mgd to allow for transfer of flows from the FWD site to the ponds at the GCSD ponds.

[11] GCSD has identified the need for a new effluent pump station. It is assumed that the facility would be sized to accommodate the proposed use. The new pump station is assumed to be adequately designed to accommodate the effluent flow detailed herein.

[12] River crossings will require special construction and additional cost over open trench pipeline construction.

[13] Flows will be transferred to the GCSD ponds during the non-discharge season only. A detailed assessment of dry season flows has not been completed, so sizing is based on projected Annual Average flows.

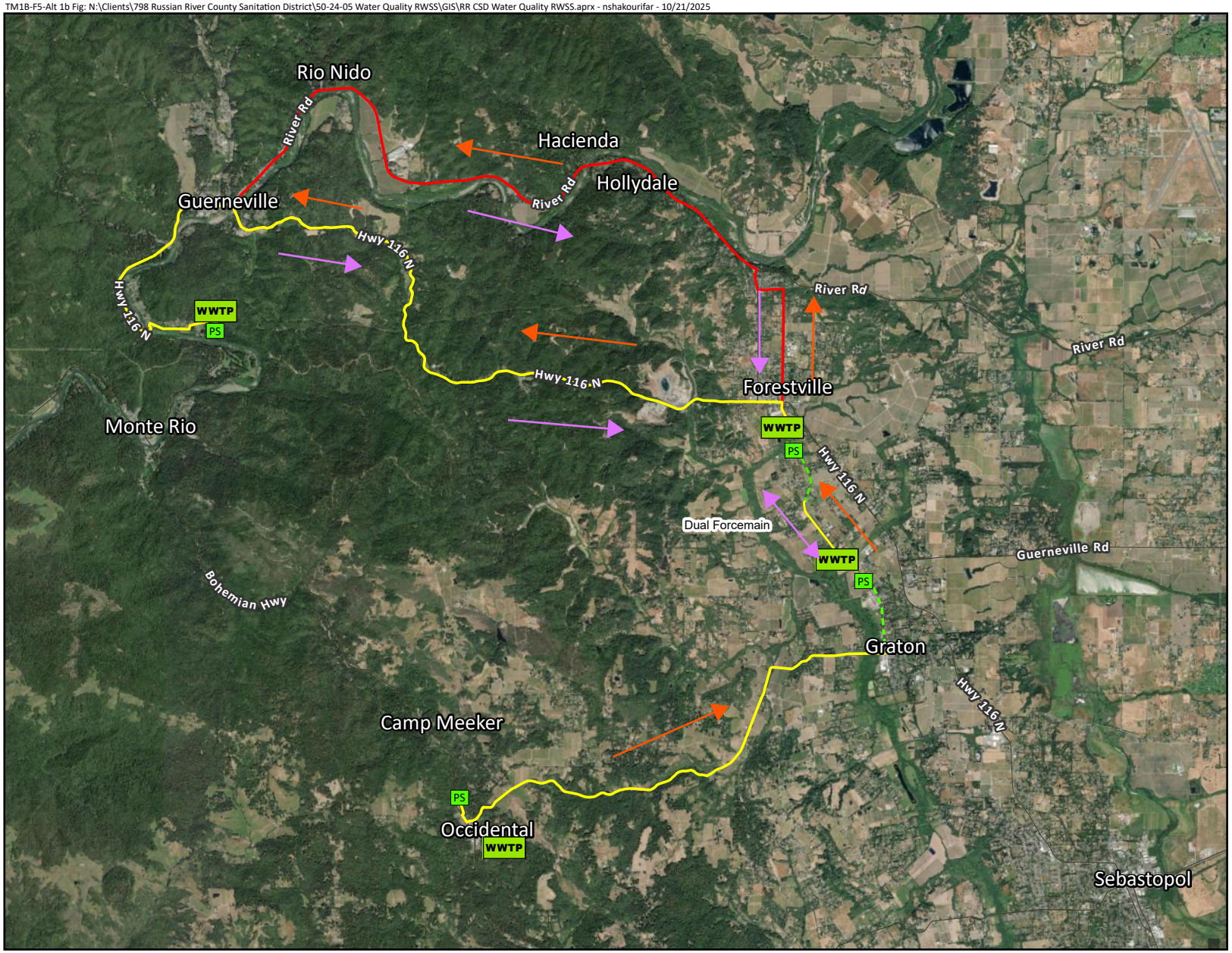
- **Recycled Water from GCSD to Recycled Water Customers:**
  - A new 0.8-mile, 6-inch pipeline between the GCSD WWTP and the existing 6-inch PVC pipe connecting to the FWD WWTP would be constructed to allow for transfer of 0.6 mgd of tertiary effluent from the storage ponds at the GCSD WWTP to recycled water customers.
  - A new, 0.6 mgd recycled water pump station at the GCSD site is needed to distribute recycled water from the storage ponds to recycled water customers.

These proposed conveyance alignments are shown on Figure 3-3. For the alignment between FWD and the RRCSD, two potential pipeline alignments are shown, as follows:

- A north alignment along the Russian River, which follows Highway 116 through Guerneville and then River Road, until turning south toward the FWD WWTP at Mirabel Road.
- A middle alignment that continues along Highway 116 to Forestville.

While the middle alignment is the most direct, the north alignment passes unsewered communities of interest (Hacienda and Hollydale).

TM1B-F5-Alt 1b Fig: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/21/2025



WWTP Wastewater Treatment Plant

Existing Pipeline

Proposed New Pipeline

Alternative New Pipeline Alignment

PS Pump Station

Direction of Raw Wastewater Flow

Direction of Tertiary Effluent Flow

Prepared by:

WEST YOST

N

0 0.75 1.5 Miles

Prepared for:

Russian River County Sanitation District

Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

Pipeline Alignments for Alternative 1b

Figure 3-3

3.3.3 Alternative 1c: One Facility at FWD

Alternative 1c entails treating all West County flows at a new, expanded WWTP at the location of the current FWD WWTP. This treatment system would be designed to remove nitrogen and therefore allow for continued surface water discharge[14]. However, to ensure that surface water discharge meets the required 100:1 dilution ratio, a new outfall to the Russian River would be constructed. The system would also rely on the combined FWD/GCSD recycled water system to provide for dry season reuse.[15]

3.3.3.1 Treatment Infrastructure Improvements

Under this scenario, the GCSD and FWD treatment ponds and RRCSD storage pond would be reconfigured so they could provide EQ. With this approach, the GCSD and FWD flows could be equalized to the maximum 30-day average values shown in Table 3-3 (i.e. 0.9 mgd) and RRCSD flows could be equalized to the maximum 7-day average flows shown in Table 3-3 (i.e. 3.5 mgd). Like Alternative 1b, all three facilities would have influent screening and conveyance infrastructure to allow flows exceeding the discharge pumping capacity to be diverted to the ponds and held there until they can be conveyed to the new treatment facilities at the FWD site.

While several options are potentially available to provide the level of treatment required for surface water discharge, this analysis assumes a new membrane bioreactor (MBR) treatment plant followed by a new UV disinfection system would be constructed at the FWD site to provide the required treatment. Because of limited space available at the FWD WWTP for these new facilities, the new treatment facilities are assumed to be constructed within the footprint of the existing effluent storage pond. An aerobic solids digester is also assumed to be provided along with dewatering equipment.

The combined treatment operation is shown schematically with new treatment facilities at FWD are on Figure 3-4.

[14] Water balances for this alternative demonstrate that year-round zero discharge would be infeasible due to an excessive volume of recycled water storage that would be required.

[15] Existing recycled water use from RRCSD on the Northwood Golf Course is assumed to cease.

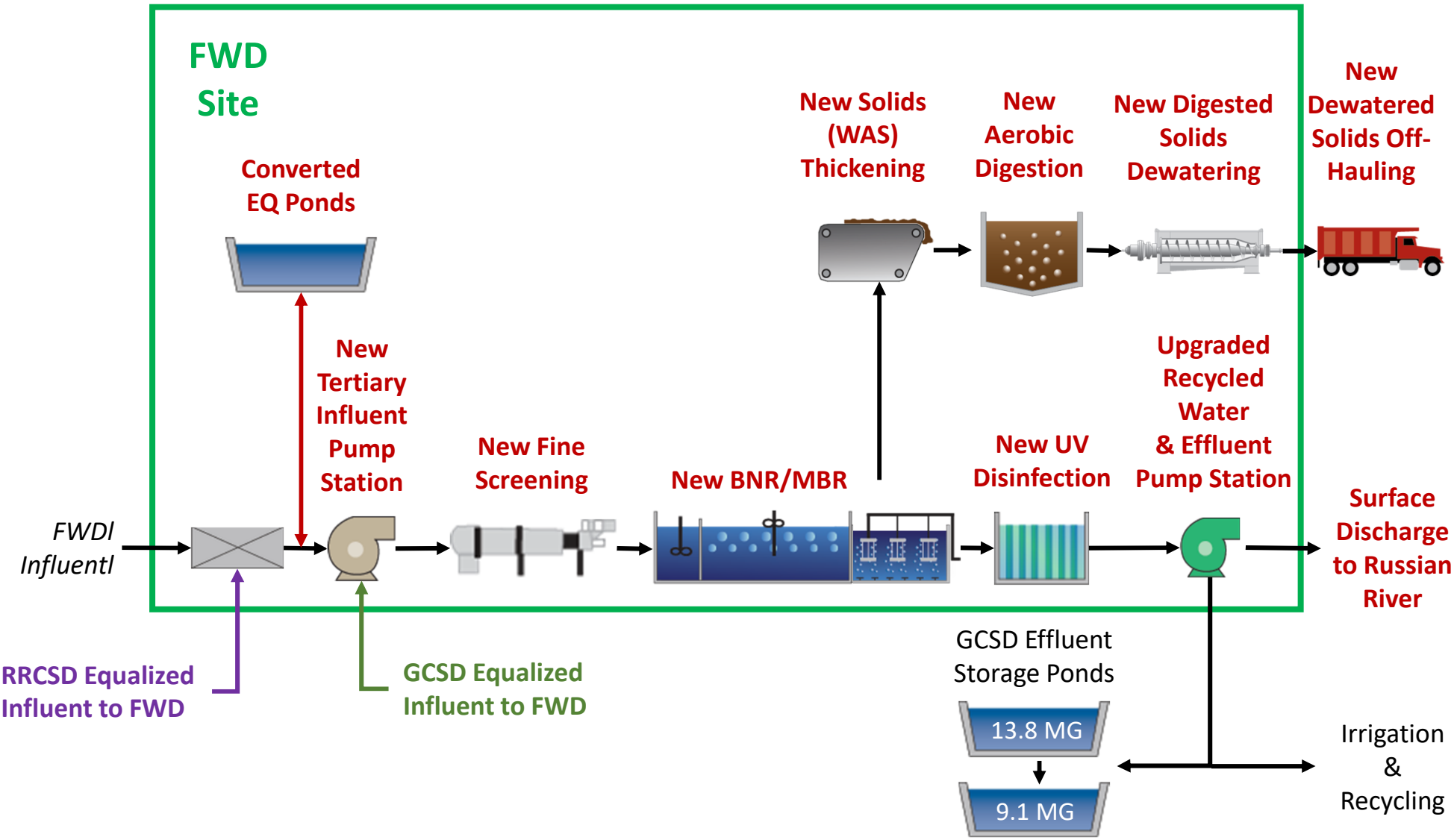


Figure 3-4. Flow Schematic for Alternative 1c

3.3.3.2 Recycled Water Infrastructure Improvements

Water balances were developed for the combined FWD/GCSD/RRCSD system to determine future recycled water infrastructure requirements. In accordance with current Regional Water Board policies, these water balances account for projected influent flows and direct rainfall during a 100-year rainfall year. Additional assumptions applied in this evaluation were as follows:

- Disposal on the 301 acres of vineyards currently served by GCSD and FWD would accommodate up to 440 AFY, distributed in accordance with historical monthly average values;
- Disposal capacity of the existing 24 acres of turf and landscaped areas serviced by FWD and the existing 20.5-acre GCSD land application area would accommodate up to about 90 AFY, distributed in accordance with historical monthly average values;
- The existing GCSD 22.9 MG (70.3 AF) storage capacity is available; and
- Surface water discharge would be maintained at a maximum monthly flow rate of approximately 2.3 mgd.

The water balances demonstrate that the combined storage and irrigation reuse areas described above would provide adequate capacity for the expected flows.

3.3.3.3 Conveyance Infrastructure Improvements

To accommodate the flow of water between the two facilities the following pipelines and pump stations are needed:

- **Raw Wastewater from GCSD to FWD:**
  - The existing 1.7-mile long, 8-inch diameter DI pipeline between the FWD and GCSD WWTPs would be rehabilitated to allow for transfer of 0.64 mgd of equalized, raw OCSD/GCSD wastewater.
  - A new 0.64 mgd effluent pump station for GCSD is needed for raw wastewater transfer to the FWD WWTP site.[16]
- **Raw Wastewater RRCSD to FWD:**
  - A new 10.4-mile, 20-inch diameter pipeline to convey an estimated 3.5 mgd raw wastewater flows to the new facilities at the FWD WWTP. This pipeline would have two river crossings.
  - A new 3.5 mgd, high-head pump station to convey raw wastewater flows to the new facilities at the FWD WWTP.

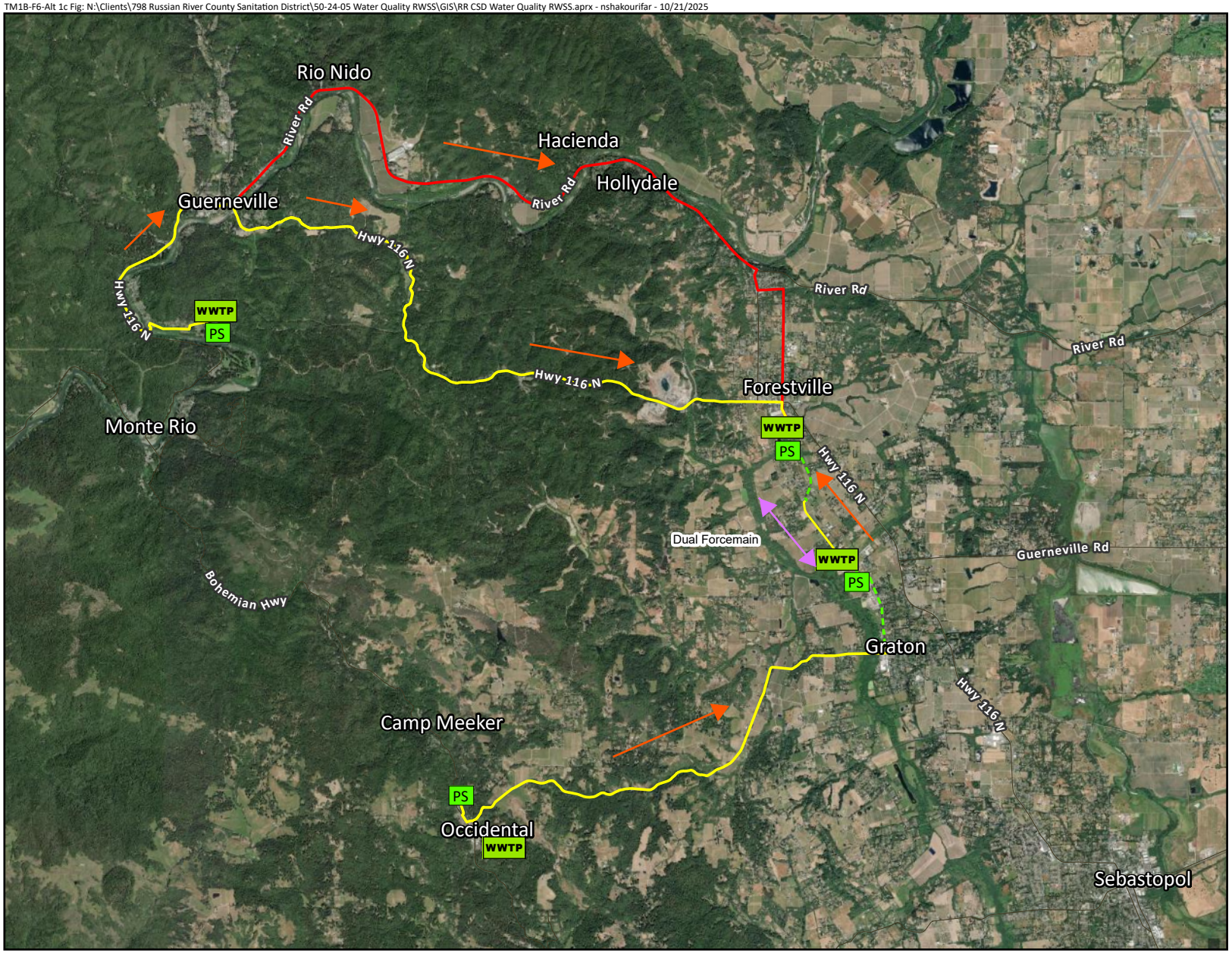
[16] GCSD has identified the need for a new effluent pump station. It is assumed that the facility would be sized to accommodate the proposed use. The new pump station is assumed to be adequately designed to accommodate the effluent flow detailed in this analysis.

- **Treated Water from FWD to GCSD:**
  - A new, 1.7-mile, 16-inch pipeline between the GCSD WWTP and the FWD WWTP would be constructed to allow for transfer up to 4.4 mgd of tertiary effluent from the FWD WWTP to the GCSD storage ponds and/or the existing discharge location at the GCSD WWTP.
  - A new 4.4 mgd effluent pump station at the FWD site needs to be constructed to allow for discharge to surface waters and/or transfer to the GCSD ponds.
- **Recycled Water from GCSD to Recycled Water Customers:**
  - A new 0.8-mile, 6-inch pipeline between the GCSD WWTP and the existing 6-inch PVC pipe connecting to the FWD WWTP would be constructed to allow for transfer of 0.6 mgd of tertiary effluent from the storage ponds at the GCSD WWTP to recycled water customers.
  - A new, 0.6 mgd recycled water pump station at the GCSD site is needed to distribute recycled water from the storage ponds to recycled water customers.

These proposed conveyance alignments are shown on Figure 3-5. Like Alternative 1b, the alignment between RRCSD and FWD has the potential to pass through unsewered communities of interest (Hacienda and Hollydale). However, that alternative route is not as direct as the alignment along Highway 116.

To accommodate the new discharge into the Russian River, a new 24 inch, 4.1-mile long outfall from the FWD WWTP to the Russian River will be constructed. The proposed alignment and location of the new outfall is shown on Figure 3-6. While a more direct alignment is feasible, this alignment has been selected so the outfall is located substantially downstream of Sonoma Water's Marabel surface water supply intake facilities.

TM1B-F6-Alt 1c Fig: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/21/2025



WWTP Wastewater Treatment Plant

Existing Pipeline

Proposed New Pipeline

Alternative New Pipeline Alignment

PS Pump Station

Direction of Raw Wastewater Flow

Direction of Tertiary Effluent Flow

Prepared by:

WEST YOST

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0 0.75 1.5 Miles

Prepared for:

Russian River County Sanitation District

Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

Pipeline Alignments for Alternative 1c

Figure 3-5

Russian River
Hollydale
RUSSIAN RIVER
River Rd
Martinelli Rd
Green Valley Creek
RUSSIAN RIVER
River Rd
Holt Cir
Martinelli Rd
Vellutini Rd
Denno Ln
Martinelli Rd
Denno Ln
Mirabel Rd
Poplar Dr
Steve Olson Ln
Station Rd
Westside Rd
Dell Rd
RUSSIAN RIVER
River Rd
RUSSIAN RIVER
Martinelli Rd
Westside Rd
El Molino High School
Youth Park
Nolan Rd
Russell Ln
Vine Hill Rd
Laguna Rd
Lewis Dr
Mefford Rd
Laguna Rd
Pocket Canyon Rd
116
Pocket Canyon Rd
Martinelli Rd
Highway 116
Highway 116 Ext
Covey Rd
Forestville
Forestville Academy
Jones Creek
Vine Hill Rd
Vine Hill Rd
Vine Hill Rd
Vine Hill School Rd
WWTP
Gravenst
Pap
Rd
renton

TM1C F9 Alt1c FWD Discharge Pipe: N:\Clients\798 Russian River County Sanitation District\SD-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourfar - 11/19/2025

Prepared by:
WEST YOST

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Prepared for:
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Sonoma Water

Surface Discharge Pipeline Alignment for Alternative 1c

Figure 3-6

3.4 EXPORT SCENARIOS

This section discusses the three export scenarios, as follows:

- Alternative 2a: Export to Windsor
- Alternative 2b: Export to the Laguna WWTP
- Alternative 2c: Export to Windsor and the Laguna WWTP

3.4.1 Alternative 2a: Export to Windsor

Alternative 2a would entail conveying all untreated wastewater flows from West County to the Windsor WWTP for treatment. With this alternative, no recycled water would be delivered in the West County area.

3.4.1.1 Treatment Infrastructure Improvements

The existing GCSD and FWD treatment ponds and RRCSD storage pond would be reconfigured so they could provide EQ at each site. With this approach, the peak flows would be reduced. Like the previous alternatives, the three facilities would have influent screening and conveyance infrastructure to allow flows exceeding the discharge pumping capacity to be diverted to the ponds and held there until they can be conveyed to Windsor. For purposes of this preliminary analysis, it is assumed that GCSD and FWD flows could be equalized to the maximum 30-day average values shown in Table 3-3 (i.e. 0.9 mgd) and RRCSD flows could be equalized to the maximum 7-day average flows shown in Table 2-2 (i.e. 3.5 mgd).

Windsor is in the process of designing a major WWTP upgrade that is intended to provide capacity for 38 percent growth in Windsor and the Airport-Larkfield-Wikiup Sanitation Zone (Airport) service areas through the year 2040. The design also includes a Membrane Aerated Biofilm Reactor (MABR) process intensification step that will allow for further increases in capacity to allow for up to 110 percent growth in the Airport service area. In addition, future expansion beyond the two design growth scenarios was integrated into the planning, and space for two additional BNR trains was included.

A summary of the capacity of the planned new treatment facilities for key parameters of interest is provided in Table 3-6, along with current flows and loads from the Windsor and Airport service areas and the total projected flow and load from the four West County agencies. As shown, the addition of the West County wastewater would require the majority of the available, planned capacity, including the capacity provided by the MABR intensification process. Therefore, it is likely the planned Windsor secondary treatment facilities would need to be expanded to accommodate both West County wastewater and the wastewater generated from planned growth within the Windsor and Airport areas.

Table 3-6. Characterization of Future West County Connections to the Windsor WWTP for Alternative 2a

Service Area	ADWF, mgd	PDF, mgd	Maximum 30 day BOD Load, lb/day
Planned Capacity for Windsor WWTP			
Capacity of New Facility	2.6	16.3	12,100
Capacity of New Facility with MABR Intensification	2.9	18.5	14,200
Combined Flows and Loads			
Current Town of Windsor	1.5	8.5	6,700
Current Airport	0.4	3.1	2,800
West County Flows (RRCSD, FWD, GCSD, OCSD)	0.59	4.4	3,600
Total Flow and Load	**2.5**	**16.2**	**13,100**

Treatment costs would be incurred through a connection/capacity fee paid to Windsor. Based on discussions with Windsor staff, details of the connection fee for West County flows would need to be negotiated; however, it is likely that the agencies would need to cover the cost to increase the treatment capacity. Windsor staff provided details regarding the capital costs for the current and planned WWTP projects and indicated that these costs should be used to estimate the cost for a potential expansion to accommodate the West County flows and loads. The estimated cost for expanding the facilities to accommodate West County flows was specifically determined based on the ratio of respective West County flows to the flows/loads that will be treated by Windsor's proposed facilities. The resulting estimate for the West County share was found to be $69.6 million[17].

3.4.1.2 Recycled Water Infrastructure Improvements

Windsor has an existing recycled water customer base, including the Geysers Recharge Project in northern Sonoma County. Therefore, this alternative assumes no use of recycled water in the West County area.

Windsor staff have expressed interest in potentially sending tertiary recycled water back to West County, given potentially limited options to expand the existing Windsor recycled water customer base. Further evaluation of returning exported water for West County recycled water use is provided in Chapter 6 of this report.

[17] This estimate is almost twice the cost estimated using Windsor's existing connection fee calculation spreadsheet, which is approximately $38 million for the future West County ADWF of 0.6 mgd and average BOD and TSS concentrations of 310 mg/L and 300 mg/L, respectively.

3.4.1.3 Conveyance Infrastructure Improvements

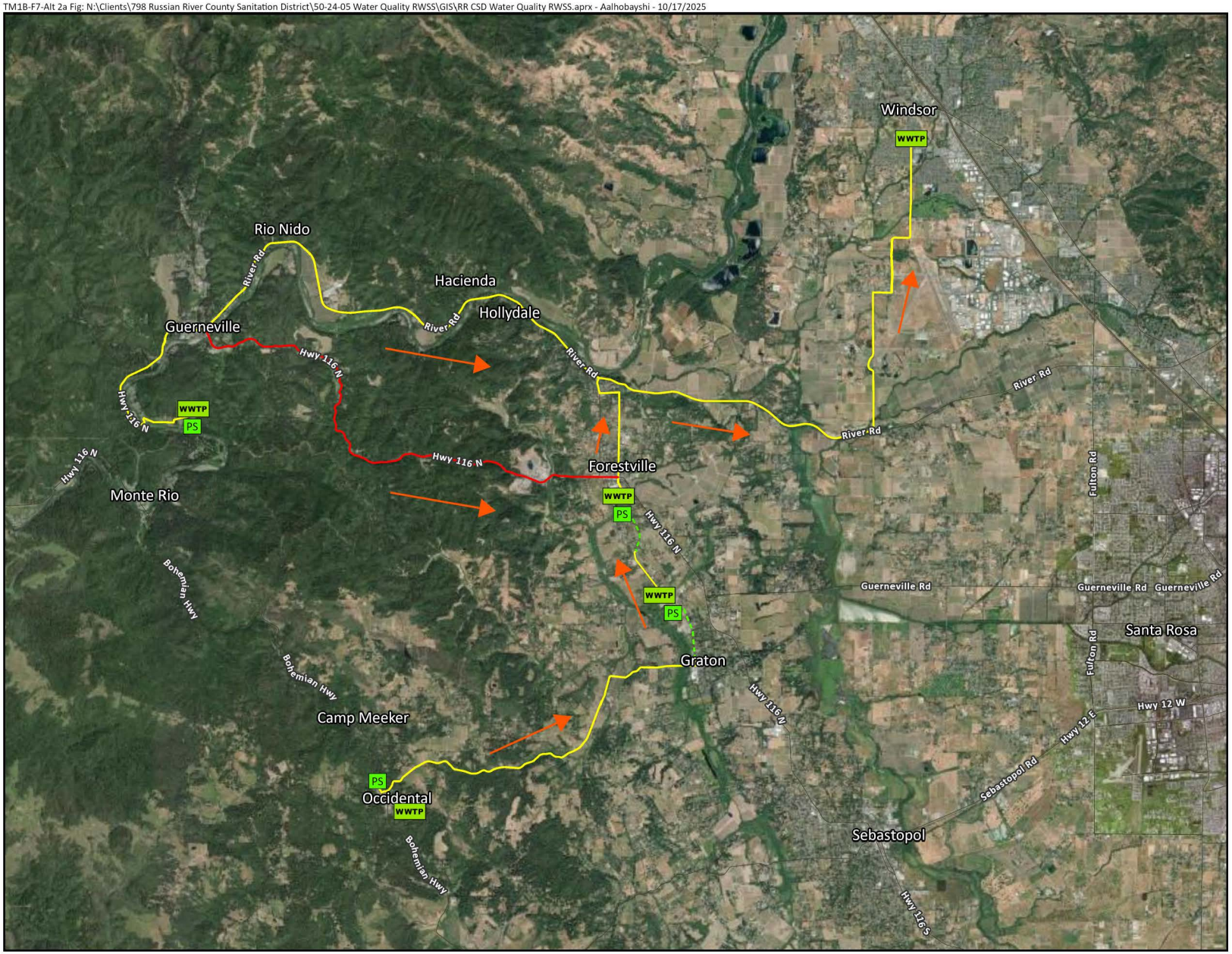
To accommodate the flow of water between the various facilities, the following pipelines and pump stations are needed:

- **Raw Wastewater from GCSD to FWD:**
  - The existing 1.7-mile long, 8-inch diameter DI pipeline between the FWD and GCSD WWTPs would be rehabilitated to allow for transfer of 0.64 mgd of equalized, raw OCSD/GCSD wastewater.
  - A new 0.64 mgd effluent pump station for GCSD is needed for raw wastewater transfer to the FWD WWTP site.[18]
- **Raw Wastewater from FWD to New Export Pipeline Junction:**
  - A new 1.6-mile, 8-inch diameter pipeline to convey an estimated 0.9 mgd raw wastewater flows from the FWD WWTP to a new export pipeline junction.
  - A new 0.9 mgd, high-head pump station to convey raw wastewater flows to the new export pump station.
- **Raw Wastewater RRCSD to New Export Pipeline Junction:**
  - A new 10.9-mile, 20-inch diameter pipeline to convey an estimated 3.5 mgd raw wastewater flows to the new export pipeline junction. This pipeline would have two river crossings.
  - A new 3.5 mgd, high-head pump station to convey raw wastewater to the export pump station.
- **Raw Wastewater from Export Pipeline Junction to the Windsor WWTP:**
  - A new, 8.0 mile, 24-inch diameter pipeline to convey an estimated 4.4 mgd of raw wastewater flow to the Windsor WWTP. This pipeline would also have five river crossings.

The potential alignments for Alternative 2a are shown on Figure 3-7. With this approach, the export pipeline junction is expected to be located along the northern alignment, making this approach more cost effective. Therefore, this alternative provides the most cost-effective approach for accommodating the unsewered communities along River Road.

[18] GCSD has identified the need for a new effluent pump station. It is assumed that the facility would be sized to accommodate the proposed use. The new pump station is assumed to be adequately designed to accommodate the effluent flow detailed in this analysis.

TM1B-F7-Alt 2a Fig: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - Aalhobayshi - 10/17/2025



WWTP Wastewater Treatment Plant

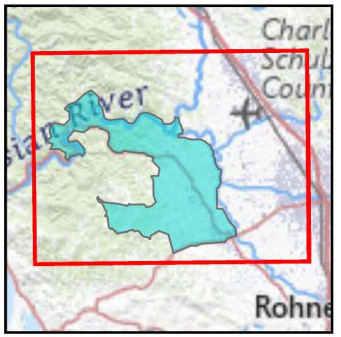
Existing Pipeline

Proposed New Pipeline

Alternative New Pipeline Alignment

PS Pump Station

Direction of Raw Wastewater Flow



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Prepared for:

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Pipeline Alignments for Alternative 2a

Figure 3-7

3.4.2 Alternative 2b: Export to the Laguna WWTP

Alternative 2b would entail conveying all untreated wastewater flows from West County to the Laguna WWTP for treatment. With this alternative, no recycled water would be delivered in the West County area.

3.4.2.1 Treatment Infrastructure Improvements

Alternative 2b would have a similar treatment concept as Alternative 2a. As with Alternative 2a, the GCSD and FWD treatment ponds and RRCSD storage pond would be reconfigured so they could provide EQ at each site. With this approach, the peak flows from the GCSD and FWD flows would be equalized to the maximum 30-day average values shown in Table 3-3 (i.e. 0.9 mgd) and RRCSD flows could be equalized to the maximum 7-day average flows shown in Table 2-2 (i.e. 3.5 mgd).

A connection/capacity fee would also be paid to the regional partners of the Laguna WWTP to cover relevant capital costs for treatment and depend on the extent of WWTP improvements required to accommodate West County flows and loads. Based on discussions with Santa Rosa staff, details of the connection fee for West County flows would need to be negotiated. The team was informed the connection fees costs would need to consider Santa Rosa's existing connection fee schedule detailed in the City Code as well as a share of the costs that will be associated with significant improvements needed at the Laguna WWTP. The following elements are therefore included in the estimate:

- The Santa Rosa City code specifies connection fees of $2,099 per 1,000 gallons per month of base flows, or about $64 million per mgd. Using this rate, the connection fee would be $38.1 million for the West County ADWF of 0.59 mgd.
- The improvements needed at the Laguna WWTP may cost as much as $530 million. The Laguna WWTP currently serves about 230,000 customers, and the West County population served by the four agencies is estimated to increase this by 6 percent (or by 13,300 people[19]). Assuming the West County dischargers were to pay 6 percent of this cost based on population served, an additional $30.7 million from the West County agencies may be necessary.

Therefore, the total connection costs could be as high as $68.8 million.

3.4.2.2 Recycled Water Infrastructure Improvements

The Laguna WWTP has an existing recycled water customer base, including the Geysers Recharge Project in northern Sonoma County. Therefore, this alternative assumes no use of recycled water in the West County Area.

However, Santa Rosa staff did express concerns about the need to expand their recycled water storage should they receive additional influent flows from West County. They indicated that some cost to West County users may be incurred for this expansion. A nominal cost of $5 million has been assumed. Further evaluation of returning exported water for West County recycled water use is provided in Chapter 6 of this report.

[19] Applying 5,319 West County ESDs and assuming 2.5 people per ESD.

3.4.2.3 Conveyance Infrastructure Improvements

A review of Santa Rosa's recently completed *Sanitary Sewer Master Plan Update*[20] indicates there is a reasonable connection point to the existing Santa Rosa collection system where a large sewer trunk line is available near the intersection of Hall and Fulton Roads. Conveyance to this connection point is assumed to allow the West County flows to be conveyed to the Laguna WWTP.

To accommodate conveyance of flows via this route to the Laguna WWTP, the following pipelines and pump stations are needed:

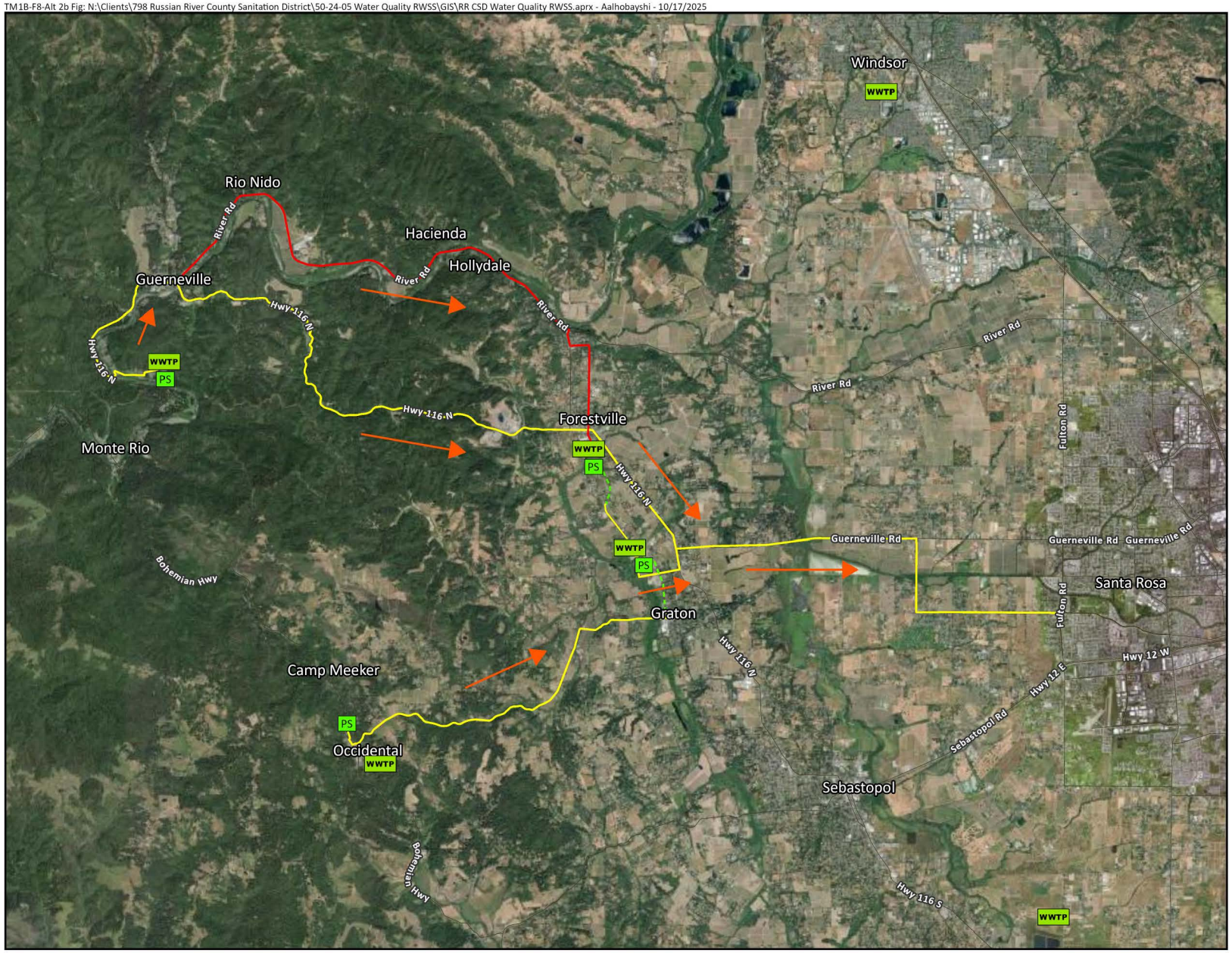
- **Raw Wastewater from GCSD to Export Pipeline Junction:**
  - A new 1.1-mile long, 8-inch diameter pipeline to convey 0.64 mgd of equalized, raw OCSD/GCSD wastewater.
  - A new 0.64 mgd effluent pump station for GCSD is needed for raw wastewater transfer to the Laguna WWTP.[21]
- **Raw Wastewater from RRCSD to FWD:**
  - A new 10.4-mile, 20-inch diameter pipeline to convey an estimated 3.5 mgd raw wastewater flows to the FWD site. This pipeline would have two river crossings.
  - A new 3.5 mgd, high-head pump station to convey raw wastewater to the FWD site.
- **Raw Wastewater from FWD to Export Pipeline Junction:**
  - A new 1.7-mile, 16-inch diameter pipeline to convey an estimated 3.8 mgd raw wastewater flows from the FWD WWTP to the Export Pipeline Junction.
- **Raw Wastewater from Export Pipeline Junction to the Laguna WWTP:**
  - A new, 7.6 mile, 24-inch diameter pipeline to convey an estimated 4.4 mgd of raw wastewater flow to the Laguna WWTP. This pipeline would also have two river crossings.

The potential alignments for Alternative 2b are shown on Figure 3-8. Like Alternatives 1b and 1c, the alignment between RRCSD and FWD has the potential to pass through unsewered communities of interest (Hacienda and Hollydale). However, that route is not as direct as the alignment along Highway 116.

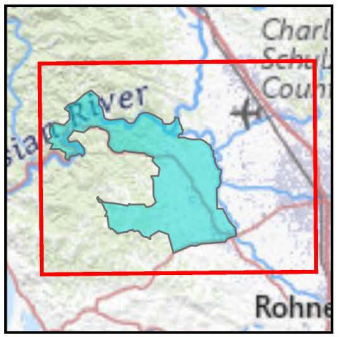
[20] City of Santa Rosa, 2023. *City of Santa Rosa Sanitary Sewer Master Plan Update Final Report*. Prepared by Woodard & Curran. August 2023.

[21] GCSD has identified the need for a new effluent pump station. However, the pump station required under this alternative would require significantly more pumping head than would be provided by a new effluent pump station sized for current GCSD operations.

TM1B-F8-Alt 2b Fig: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - Aalhobayshi - 10/17/2025



- WWTP — Wastewater Treatment Plant
- Existing Pipeline
- Proposed New Pipeline
- Alternative New Pipeline Alignment
- PS — Pump Station
- Direction of Raw Wastewater Flow



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Pipeline Alignments for Alternative 2b

Figure 3-8

3.4.3 Alternative 2c: Export to Windsor and the Laguna WWTP

Alternative 2c would be a combination of two separate parts from Alternatives 2a and 2b, as follows:

1. Convey untreated wastewater flows from the RRCSD service area to the Windsor WWTP, and
2. Convey FWD/GCSD/OCSD flows to the Laguna WWTP.

Similarly, this alternative assumes no recycled water would be delivered in the West County area.

3.4.3.1 Treatment Infrastructure Improvements

As with Alternatives 2a and 2b, the GCSD and FWD treatment ponds and RRCSD storage pond would be reconfigured so they could provide EQ at each site. With this approach, the peak flows from the GCSD and FWD flows would be equalized to the maximum 30-day average values shown in Table 3-3 (i.e. 0.9 mgd) and RRCSD flows could be equalized to the maximum 7-day average flows shown in Table 2-2 (i.e. 3.5 mgd).

A summary of the capacity of the planned Windsor treatment facilities for key parameters of interest is provided in Table 3-7, along with current flows and loads from the Windsor and Airport service areas and the total project flow and load from the RRCSD. As shown, by limiting wastewater sources to only the RRCSD, the planned facilities would have more capacity to accommodate planned growth within the Windsor and Airport areas.

Table 3-7. Characterization of Future West County Connections to the Windsor WWTP for Alternative 2c

Service Area	ADWF, mgd	PDF, mgd	Maximum 30 day BOD Load, lb/day
Planned Capacity for Windsor WWTP			
Capacity of New Facility	2.6	16.3	12,100
Capacity of New Facility with MABR Intensification	2.9	18.5	14,200
Combined Flows and Loads			
Current Town of Windsor	1.5	8.5	6,700
Current Airport	0.4	3.1	2,800
RRCSD	0.4	3.5	2,900
Total Flow and Load	**2.3**	**15.1**	**12,400**

The estimated connection fees for Windsor and Santa Rosa were calculated using the same methodologies described for Alternatives 2a and 2b and are presented in Table 3-8. The table shows the total connection fees, as well as a breakdown of the two components for the Laguna WWTP connection fee. As shown, these would total $69 million for the combined 0.59 mgd ADWF.

Table 3-8. Estimated Connection Fees for Alternative 2c		
Total Future RRCSD Flows to Windsor WWTP	0.38	45
Total Future FWD/GCSD/OCSD flows to Laguna WWTP	0.21	24
Code connection fee ($2,099 per 1,000 gallons per month)[(a)]		*14*
Estimated fee for additional WWTP improvements[(a)]		*10*
Combined Total Fee		**69**

(a) As described in Section 3.4.2.1, the connection fee for the Laguna WWTP includes two components, one based on the current code and another for potential improvements needed at the Laguna WWTP.

3.4.3.2 Recycled Water Infrastructure Improvements

Like Alternative 2b, Alternative 2c would likely involve some cost to West County users for expansion of the Laguna WWTP recycled water system. A nominal cost of $2.5 million has been assumed. Further evaluation of returning exported water for West County recycled water use is provided in Chapter 6 of this report.

3.4.3.3 Conveyance Infrastructure Improvements

The conveyance infrastructure improvements needed for Alternative 2c are subsets of the conveyance improvements described for Alternatives 2a and 2b. The main distinction is no connecting pipeline between the two systems for Alternatives 2a and 2b. Accordingly, the following pipelines and pump stations are needed:

- **Raw Wastewater from GCSD to Laguna WWTP Export Pipeline Junction:**
  - A new 1.1-mile long, 8-inch diameter pipeline to convey 0.64 mgd of equalized, raw GCSD/OCSD wastewater.
  - A new 0.64 mgd effluent pump station for GCSD is needed for raw wastewater transfer to the Laguna WWTP.[22]
- **Raw Wastewater from FWD to Laguna WWTP Export Pipeline Junction:**
  - A new 1.7-mile, 6-inch diameter pipeline to convey an estimated 0.25 mgd raw wastewater flows from the FWD WWTP to a new export pipeline junction.
  - A new 0.25 mgd, high-head pump station to convey raw wastewater flows to the Laguna WWTP.
- **Raw Wastewater from Export Pipeline Junction to the Laguna WWTP:**
  - A new, 7.6 mile, 10-inch diameter pipeline to convey an estimated 0.9 mgd of raw wastewater flow to the Laguna WWTP. This pipeline would also have two river crossings.

[22] GCSD has identified the need for a new effluent pump station. However, the pump station required under this alternative would require significantly more pumping head than would be provided by a new effluent pump station sized for current GCSD operations.

- **Raw Wastewater RRCSD to Windsor:**
  - A new 18.9-mile, 20-inch diameter pipeline to convey an estimated 3.5 mgd raw wastewater flows to the Windsor WWTP. This pipeline would have seven river crossings.
  - A new 3.5 mgd, high-head pump station to convey raw wastewater to the Windsor WWTP.

The proposed pipeline alignments for this alternative are shown on Figure 3-9. As with Alternative 2a, additional unsewered flows could also potentially be picked up along the conveyance route from RRCSD to Windsor.

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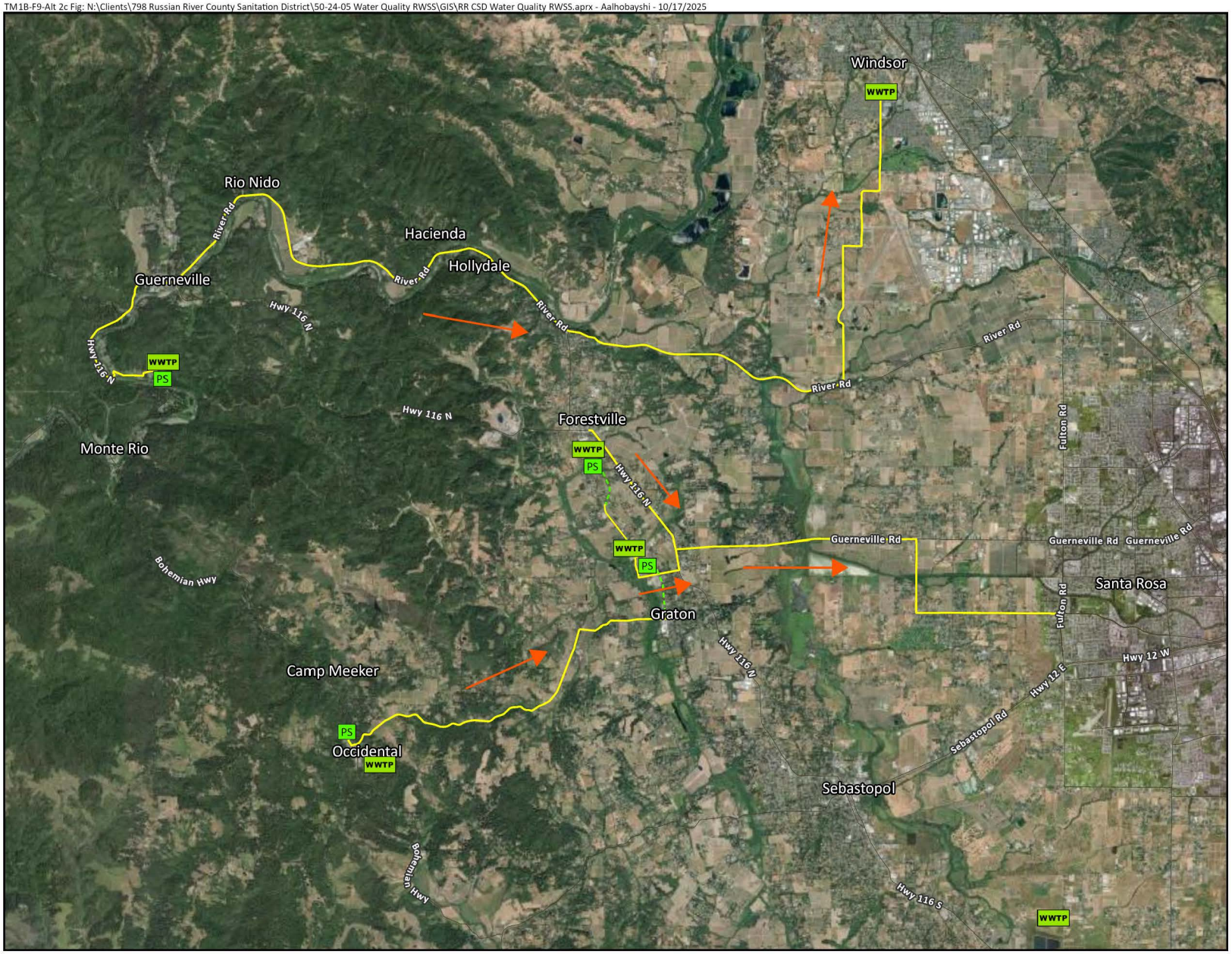


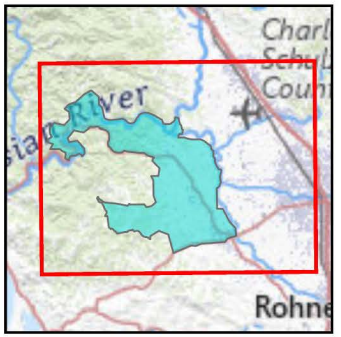
WWTP Wastewater Treatment Plant

Existing Pipeline

Proposed New Pipeline

PS Pump Station

Direction of Raw Wastewater Flow



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Pipeline Alignments for Alternative 2c

Figure 3-9

3.5 COMBINATION SCENARIOS

This section discusses the two combination scenarios, as follows:

- Alternative 3a: Local RRCSD WWTP and FWD/GCSD/OCSD Flows Export to the Laguna WWTP
- Alternative 3b: Local FWD/GCSD WWTP and RRCSD Flows Export to Windsor WWTP

3.5.1 Alternative 3a: Treat at RRCSD and FWD/GCSD/OCSD Export to the Laguna WWTP

Alternative 3a would include two separate parts from Alternatives 1a and 2c, as follows:

- RRCSD flows would be treated at the existing RRCSD WWTP, and
- FWD/GCSD/OCSD flows would be conveyed to the Laguna WWTP.

3.5.1.1 Treatment Infrastructure Improvements

As previously discussed in this Chapter, the RRCSD facility should be able to provide adequate treatment capacity for the anticipated flows and loads from the RRCSD service area. However, the following improvements will be needed:

- An estimated $30 million in condition-related projects, which includes an estimated $3 million in headworks improvements based on West Yost's Headworks, Lift Stations, and Force Main project for Sonoma Water/RRCSD[23], and
- An estimated $0.7 million in hydraulic capacity improvements.

As with all the export alternatives, the GCSD and FWD treatment ponds would be reconfigured so they could provide EQ at each site prior to discharge to the Laguna WWTP. It is assumed with this approach that the GCSD and FWD flows could be equalized to the maximum 30-day average values shown in Table 3-2 (i.e. 0.9 mgd).

As described in Section 3.4.3.1 (Table 3-8), a $24 million connection fee is envisioned for FWD/GCSD/OCSD flows to be discharged to the Laguna WWTP system. In addition, the existing aerated treatment ponds at the FWD and GCSD WWTPs would be converted to allow for raw wastewater EQ.

3.5.1.2 Recycled Water Infrastructure Improvements

As previously discussed in this Chapter, an additional 5 acres of land application area would be needed to accommodate disposal of 8 AFY of water at the RRCSD site. It is assumed that 5 acres of irrigated space could be obtained either on the 17-acre wooded RRCSD property or on the 394-acre forested property purchased in August 2024.

In addition, some additional costs may be incurred for the FWD/GCSD/OCSD communities to support the expansion of the Laguna WWTP recycled water system. A nominal cost of $2.5 million has been assumed.

[23] The RRCSD also needs to address significant collection system deficiencies. These critical improvements are common to all the alternatives evaluated in this study and are not addressed in this analysis.

3.5.1.3 Conveyance Infrastructure Improvements

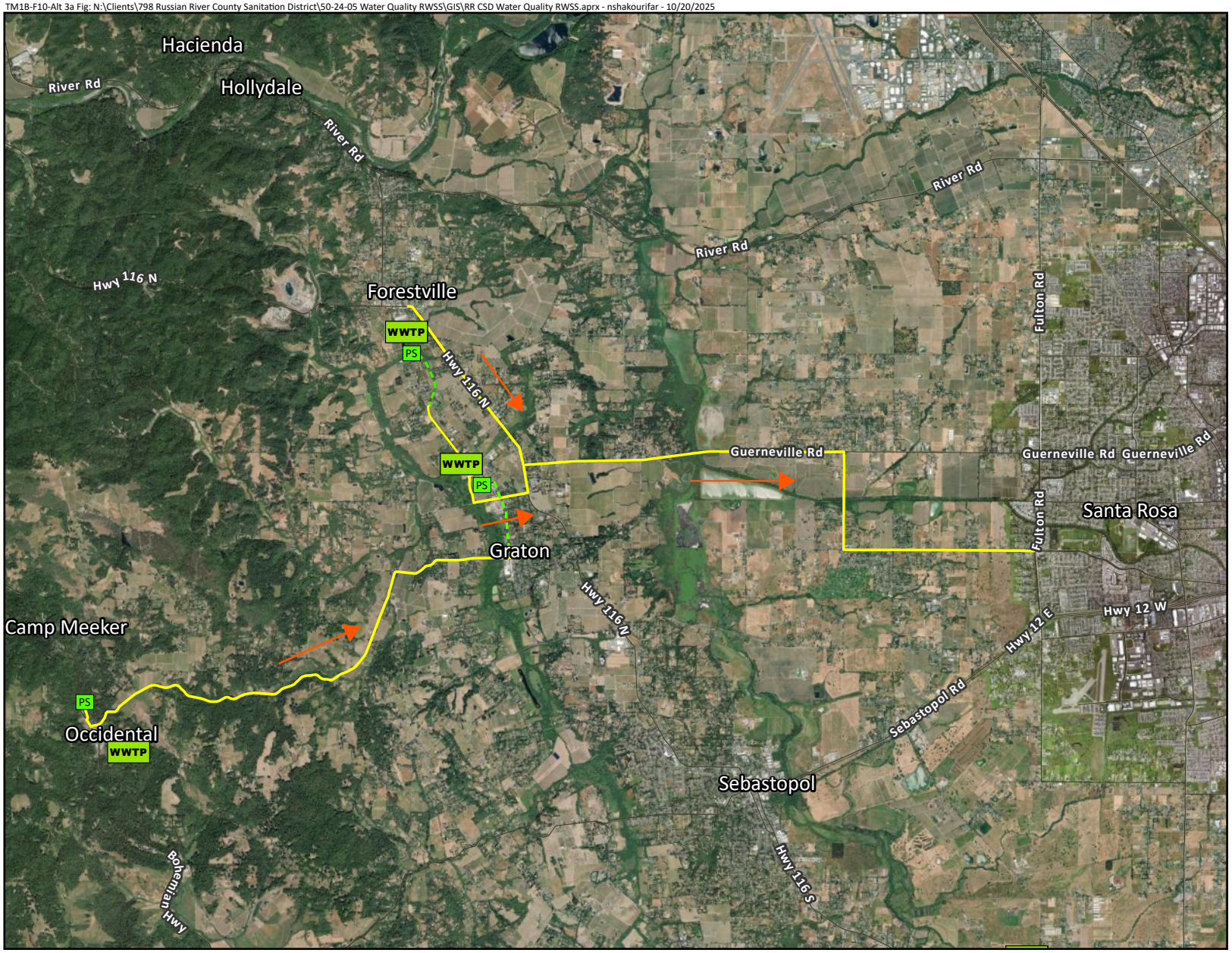
The FWD/GCSD/OCSD flows would be conveyed to the Laguna WWTP for treatment as described in Alternative 2c, as follows:

- **Raw Wastewater from GCSD to Laguna WWTP Export Pipeline Junction:**
  - A new 1.1-mile long, 8-inch diameter pipeline to convey 0.64 mgd of equalized, raw GCSD/OCSD wastewater.
  - A new 0.64 mgd effluent pump station for GCSD is needed for raw wastewater transfer to the Laguna WWTP.[24]
- **Raw Wastewater from FWD to Laguna WWTP Export Pipeline Junction:**
  - A new 1.7-mile, 6-inch diameter pipeline to convey an estimated 0.25 mgd raw wastewater flows from the FWD WWTP to a new export pipeline junction.
  - A new 0.25 mgd, high- head pump station to convey raw wastewater flows to the Laguna WWTP.
- **Raw Wastewater from Export Pipeline Junction to the Laguna WWTP:**
  - A new, 7.6 mile, 10-inch diameter pipeline to convey an estimated 0.9 mgd of raw wastewater flow to the Laguna WWTP. This pipeline would also have two river crossings.

The proposed pipeline alignments for Alternative 3a are presented on Figure 3-10.

[24] GCSD has identified the need for a new effluent pump station. However, the pump station required under this alternative would require significantly more pumping head than would be provided by a new effluent pump station sized for current GCSD operations.

TM1B-F10-Alt 3a Fig: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nshakourifar - 10/20/2025



WWTP Wastewater Treatment Plant

Existing Pipeline

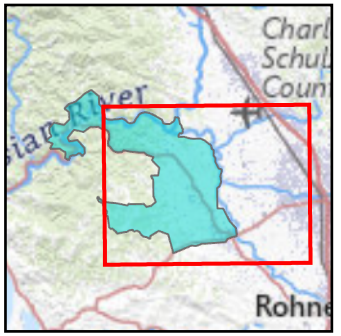
Proposed New Pipeline

PS Pump Station

Direction of Raw Wastewater Flow

Note: The RRCSD WWTP is off the extent of the figure

Note:
Occidental WWTP site is now primarily used for storage.



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0 0.75 1.5 Miles

Prepared for:

Russian River County Sanitation District

Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

Pipeline Alignments for Alternative 3a

Figure 3-10

3.5.2 Alternative 3b: Treat at FWD and Export to Windsor

Alternative 3b would also entail two separate parts from Alternative 1a and Alternative 2c, as follows:

1. FWD/GCSD/OCSD flows would be treated at a combined, upgraded FWD/GCSD WWTP, and
2. RRCSD flows would be exported to the Windsor WWTP.

3.5.2.1 Treatment Infrastructure Improvements

As described in Section 3.3.1.2.1 with Alternative 1a, the following treatment upgrades would be needed for the upgraded FWD/GCSD WWTP:

- The GCSD WWTP partial mix pond treatment system will be upgraded to complete mix system by installing new diffuser aeration system;
- FWD ponds would continue to be used to treat FWD flows; and
- New SAF, tertiary filtration, and disinfection facilities would be constructed at the FWD WWTP to provide treatment for the combined FWD/GCSD/OCSD flows.

As with the several of the previous alternatives, the RRCSD storage pond would be reconfigured so they could provide EQ. With this approach, the peak flows from the RRCSD flows could be equalized to the maximum 7-day average flows shown in Table 2-2 (i.e. 3.5 mgd).

For the RRCSD flows to Windsor, a connection/capacity fee would be paid to Windsor to cover needed treatment capital costs that are proportional to the fees identified under Alternative 2a. For the connection/capacity fee, the estimated cost is $44.8 million.

3.5.2.2 Recycled Water Infrastructure Improvements

As described in Section 3.3.1.2.2, the existing irrigation reuse sites would be able to accommodate the combined recycled water flow generated. However, 310 AF of additional storage volume would need to be constructed on the 20.5-acre land application area owned by GCSD.

3.5.2.3 Conveyance Infrastructure Improvements

To accommodate the flow of water between the GCSD and FWD sites the following pipelines and pump stations are needed:

- **Secondary Effluent from GCSD to FWD:**
  - The existing 1.7-mile long, 8-inch diameter DI pipeline between the FWD and GCSD WWTPs would be rehabilitated to allow for transfer of up to 1.1 mgd of GCSD/OCSD secondary effluent from the GCSD WWTP to the FWD WWTP.
  - A new, 1.1 mgd effluent pump station to convey flow from the GCSD is also needed for secondary effluent transfer.[25]

[25] GCSD has identified the need for a new effluent pump station. It is assumed that the facility would be sized to accommodate the proposed use. The new pump station is assumed to be adequately designed to accommodate the effluent flow detailed in this analysis.

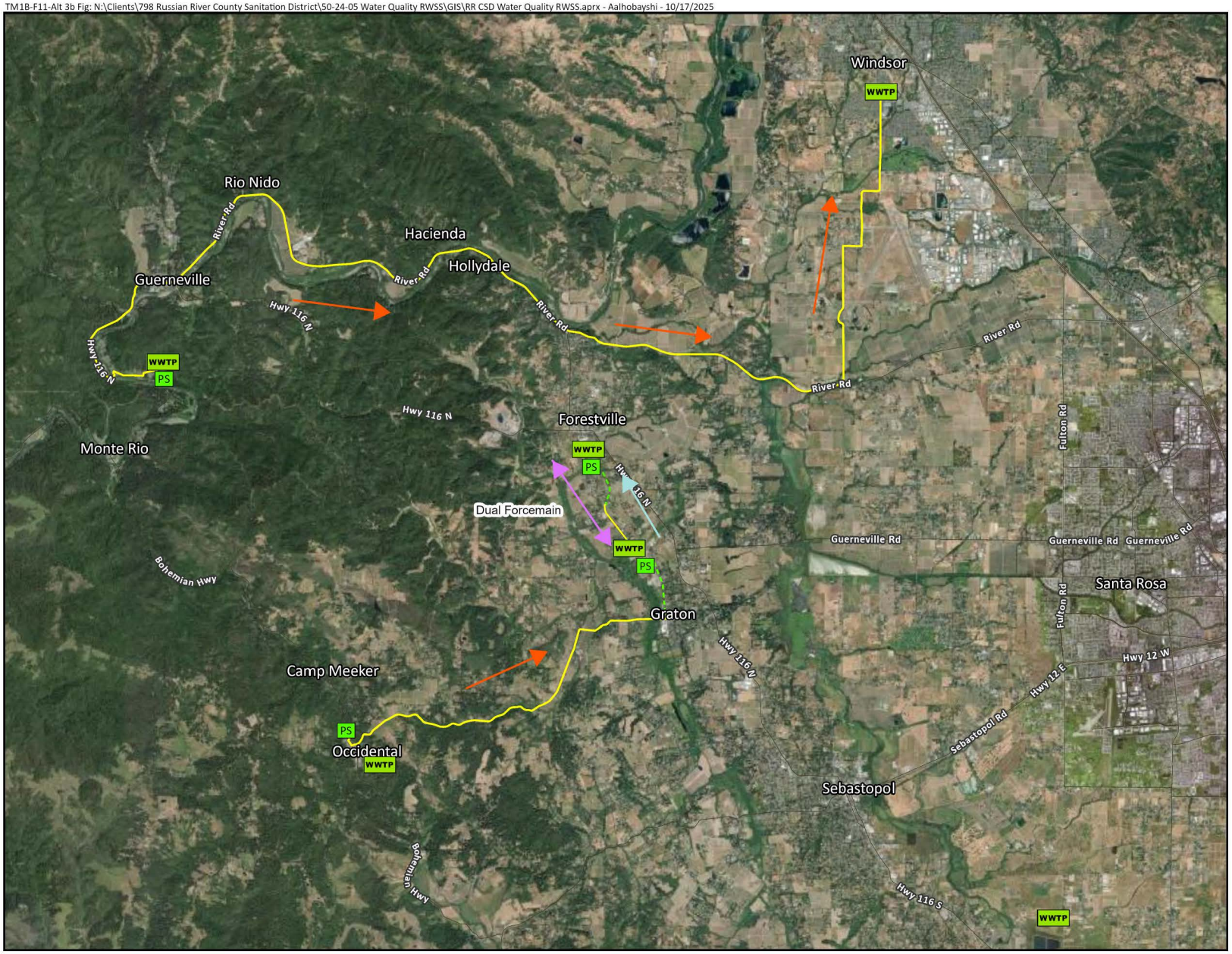
- **Tertiary Effluent from FWD to GCSD Storage Ponds and Recycled Water Customers:**
  - A new 0.8-mile, 6-inch pipeline between the GCSD WWTP and the existing 6-inch PVC pipe connecting to the FWD WWTP along with a new, parallel 1.7 mile 6-inch pipeline would be constructed to allow for transfer of 1.5 mgd of tertiary effluent from the FWD WWTP to the storage ponds at the GCSD WWTP (and for distribution to recycled water customers).
  - The existing 0.7 mgd effluent pump station at the FWD WWTP needs to be expanded to 1.5 mgd to allow for transfer of flows from the FWD site to the ponds at the GCSD site.
- **Tertiary Effluent from GCSD Storage Ponds to Recycled Water Customers:**
  - A new, 1.5 mgd recycled water pump station at the GCSD site is needed to distribute recycled water from the storage ponds to recycled water customers.

In addition, the following infrastructure is needed to convey flows from RRCSD to the Windsor WWTP:

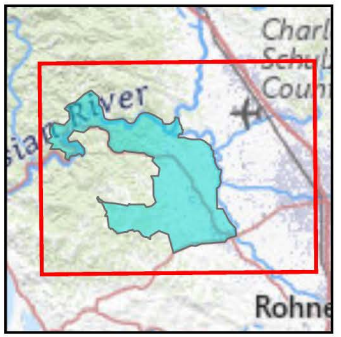
- A new 18.9-mile, 20-inch diameter pipeline to convey an estimated 3.5 mgd raw wastewater flows to the Windsor WWTP. This pipeline would have seven river crossings.
- A new 3.5 mgd, high-head pump station to convey raw wastewater to the Windsor WWTP.

The proposed pipeline alignments for Alternative 3b are presented on Figure 3-11.

TM1B-F11-Alt 3b Fig: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - Aalhobayshi - 10/17/2025



- WWTP — Wastewater Treatment Plant
- Existing Pipeline
- Proposed New Pipeline
- PS — Pump Station
- Direction of Raw Wastewater Flow
- Direction of Secondary Effluent Flow
- Direction of Tertiary Effluent Flow



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Prepared for:

Russian River County Sanitation District

Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

Pipeline Alignments for Alternative 3b

Figure 3-11

3.6 ALTERNATIVES SCREENING

3.6.1 Infrastructure Needs and Costs

The major infrastructure components required for each Alternative are summarized in Table 3-9. A capital cost range has been defined for each alternative based on preliminary assessment of costs for each infrastructure element shown in Table 3-9. These costs were then used to assign a cost score for each alternative. The estimated cost ranges and associated cost scores are presented in Table 3-10.

Table 3-9. Summary of Major Infrastructure Required

Facility/Component	1a: Two Local Facilities	1b: One Facility at RRCSD	1c: One Facility at FWD	2a: Export to Windsor	2b: Export to Santa Rosa	2c: Export to Windsor and Santa Rosa	3a: Treat at RRCSD; FWD/GCSD Export to Santa Rosa	3b: Treat at FWD/GCSD; RRCSD Export to Windsor
Treatment								
RRCSD	• Condition-related improvements • Hydraulic Capacity Improvements	• Filtration capacity expansion to accommodate all West County flows • Condition-and hydraulic capacity related improvements	• Convert storage ponds to equalization facility	• Convert storage ponds to equalization facility	• Convert storage ponds to equalization facility	• Convert storage ponds to equalization facility	• Condition-related improvements	• Convert storage ponds to equalization facility
FWD	• Expansion of Tertiary Filtration and Disinfection	• Convert treatment ponds to equalization facility	• Construct new nitrogen removal/tertiary treatment facility (MBR)	• Convert treatment ponds to equalization facility	• Convert treatment ponds to equalization facility	• Convert treatment ponds to equalization facility	• Convert treatment ponds to equalization facility	• Expansion of Tertiary Filtration and Disinfection
GCSD	• Headworks Improvements • Convert treatment ponds to complete mix system	• Headworks Improvements • Convert treatment ponds to equalization facility	• Headworks Improvements • Convert treatment ponds to equalization facility	• Headworks Improvements • Convert treatment ponds to equalization facility	• Headworks Improvements • Convert treatment ponds to equalization facility	• Headworks Improvements • Convert treatment ponds to equalization facility	• Headworks Improvements • Convert treatment ponds to equalization facility	• Headworks Improvements • Convert treatment ponds to complete mix system
Windsor	-	-	-	• ~$70 million connection fee	-	• ~$45 million connection fee	-	• ~$45 million connection fee
Santa Rosa	-	-	-	-	• ~$69 million connection fee	• ~$24 million connection fee	• ~$24 million connection fee	-
Conveyance								
Wastewater New Pipelines	-	• 12.1 miles	• 16.2 miles	• 20.5 miles	• 20.8 miles	• 29.3 miles	• 10.4 miles	• 18.9 miles
New Pump Stations	• GCSD (low head) for secondary transfer • GCSD (relatively low head) for tertiary transfer • FWD (relatively low head) for tertiary transfer	• GCSD to FWD (low head) • FWD to GCSD (low head) • GCSD to recycled water customers (low head) • FWD (high head) • RRCSD (high head)	• 2 at GCSD (low head) • RRCSD (high head, high flow) • FWD (low head, high flow)	• GCSD (low head) • FWD (high head) • RRCSD (high head, high flow)	• GCSD (high head) • FWD (high head, high flow) • RRCSD (high head, high flow)	• GCSD (high head) • FWD (high head) • RRCSD (high head, high flow)	• GCSD (high head) • FWD (high head)	• GCSD (low head) for secondary transfer • GCSD (relatively low head) for tertiary transfer • FWD (relatively low head) for tertiary transfer • RRCSD (high head)
River Crossings	--	4 crossings	2 crossings	7 crossings	4 crossings	9 crossings	3 crossings	7 crossings
Other	• Rehab existing 1.7 mile, 8-inch pipeline between GCSD and FWD	• Rehab existing 1.7 mile, 8-inch pipeline between GCSD and FWD	• Rehab existing 1.7 mile, 8-inch pipeline between GCSD and FWD	• Rehab existing 1.7 mile, 8-inch pipeline between GCSD and FWD	-	-	-	• Rehab existing 1.7 mile, 8-inch pipeline between GCSD and FWD
Recycled Water Pipelines	• 0.8 mile, 6-inch pipeline • 1.7 mile, 6-inch pipeline	• 0.8 mile, 6-inch pipeline • 1.7 mile, 8-inch pipeline	• 0.8 mile, 6-inch pipeline • 1.7 mile, 16-inch pipeline	-	-	-	-	• 0.8 mile, 6-inch pipeline • 1.7 mile, 6-inch pipeline
Recycled Water								
Land Application Area	• 5 acres (RRCSD)	-	-	-	-	-	• 5 acres (RRCSD)	-
Storage	• 310 AF (GCSD)	-	-	-	• Potential need for additional storage at Santa Rosa	• Potential need for additional storage at Santa Rosa	• Potential need for additional storage at Santa Rosa	• 310 AF (GCSD)
New Pipelines	-	• 12.2 miles of new pipeline from RRCSD to FWD	-	-	-	-	-	-

Table 3-10. Summary of Estimated Capital Costs, $ million

Score Category	Alternatives							
	1a: Two Local Facilities	1b: One Facility at RRCSD	1c: One Facility at FWD	2a: Export to Windsor	2b: Export to the Laguna WWTP	2c: Export to Windsor and the Laguna WWTP	3a: Treat at RRCSD; Export FWD/GCSD to the Laguna WWTP	3b: Treat at FWD/GCSD; Export RRCSD to Windsor
Treatment	40.0 – 60.0	25.6 – 38.4	53.6 – 80.4	64.0 – 96.0	63.2 – 94.8	63.2 – 94.8	48.0 – 72.0	55.2 – 82.8
Conveyance	8.6 – 12.8	47.8 – 71.6	69.6 – 104.4	103.8 – 155.6	98.6 – 147.8	118.5 – 177.7	34.6 – 51.8	97.7 – 146.5
Recycled Water	6.4 – 9.6	24.1 – 36.1	0	0	4.0 – 6.0	2.4 – 3.6	2.4 – 3.6	6.4 – 9.6
Combined Total	**55.0 – 82.4**	**97.4 – 146.2**	**123.2 – 184.8**	**167.8 – 251.6**	**165.8 – 248.6**	**184.1 – 276.1**	**85.0 – 127.4**	**159.3 – 238.9**
Normalized Score[(a)]	**5.0**	**2.8**	**2.2**	**1.6**	**1.7**	**1.5**	**3.2**	**1.7**

(a) Combined total costs are normalized by dividing 345 by the costs to have a maximum value of 5.0 to compare with subject criteria scores.

3.6.2 Qualitative Screening Criteria and Scoring

The eight alternatives were also evaluated based on six subjective screening criteria. The six subjective screening criteria are described in Table 3-11. The preliminary screening scores for these criteria for each alternative are provided in Table 3-12, along with descriptions of how the scores were assigned. Scores are assigned on a scale of 1 to 5 for each screening criterion based on relative challenges and opportunities, where a higher score indicates fewer challenges and more opportunities for meeting the intent of the criterion.

Table 3-11. Selected Subjective Screening Criteria

Reliability/Ease of Operation	Are the proposed infrastructure components relatively simple to operate and maintain for the West County agencies?
Long-Term Regulatory Compliance	Does the alternative entail a long-term reliable treatment solution for meeting effluent quality requirements? Is there more risk for non-compliance?
Flexibility for Adding Unsewered Communities	To what extent does the proposed alignment allow for connections to unsewered, disadvantaged communities of interest?
Local Recycled Water Benefits	Does the alternative support West County recycled water opportunities?
Environmental	Is there potential for impacts to flood plains, wetlands, endangered species, historical and archaeological properties? Are efforts associated with handling wastes minimized? Is the alternative energy efficient and/or minimize power usage?
Resiliency	Is the proposed or retained infrastructure vulnerable to flooding, climate change and/or seismic impacts?
Ease of Implementation	Would the project construction be relatively simple, with regard to both treatment improvements and pipelines? What level of governance structure and agency coordination would be required? Can the project be reasonably phased into smaller elements to increase funding resources?

Table 3-12. Preliminary Screening Criteria Scoring

Criteria	Scoring of Alternative[a]								Scoring Comments
	1a: Two Local Facilities	1b: One Facility at RRCSD	1c: One Facility at FWD	2a: Export to Windsor	2b: Export to Santa Rosa	2c: Export to Windsor and Santa Rosa	3a: Treat at RRCSD; Export FWD/GCSDD to Santa Rosa	3b: Treat at FWD/GCSD; Export RRCSD to Windsor	
Reliability/ Ease of Operation	1	2	3	5	5	4	2.5	2.5	• The Export Scenarios (2a, 2b and 2c) involve sending flow to larger, regional facilities and would offer greater reliability and ease of operation for West County agencies. • Alternative 2c was slightly derated because two different export systems would be needed. • The remaining alternatives were scored lower depending on how many, smaller facilities would continue to be operated and whether additional flow equalization would be provided. • The lowest score assigned to the alternative that continues to have three facilities in operation with no additional equalization for peak flows (1a). • Alternative 1b scored higher because only one facility would need to be operated. However, ongoing operations at RRCSD is complicated by peak flow issues. • Alternative 1c score the highest of the local facility scenarios, as it provides for equalization at all three existing sites and provides for a new treatment system. • Alternative 3a was slightly derated from Alternative 1c. Management of FWD/GCSD flows would be significantly simplified. However, ongoing management of RRCSD WWTP with no added equalization would continue to provide challenges. • Alternative 3b was also slightly derated from Alternative 1c. The RRCSD system would be similar under both options, but the FWD treatment system would involve two different treatment plants with no additional equalization.
Long-Term Regulatory Compliance	2.5	1	3	5	5	5	2	4	• The Export Scenarios (2a, 2b and 2c) involve sending flow to larger, regional facilities and would offer greater potential for adjusting to future regulatory changes. The local facilities would be operated to provide equalization, which would also help to mitigate compliance concerns related to peak flows. • Alternative 3b scored the second highest because it includes a GSCD/FWD facility that has zero surface water discharge and export from the RRCSD. A zero-surface water discharge approach provides significant resilience to changing regulatory requirements. • The four remaining alternatives all include one local treatment facility that discharges to surface water. – Having all treatment at RRCSD (1b) scored the lowest due to the ongoing compliance issues at this site related to management of peak flows. These issues would only be exacerbated if the facility had to also manage peak flows from other sites. – The other two alternatives that continue to provide treatment for RRCSD flows only at the RRCSD WWTP (1a and 3a) scored higher. While the ongoing peak flow issues would continue at the RRCSD WWTP, they would not be amplified. Alternative 1a scored slightly higher than 3a because having zero surface water discharge provides a higher level of resilience than discharging to the Santa Rosa facility that continues to provide surface water discharge. – Providing all treatment at FWD (1c) scored the highest of the local treatment surface water discharge scenarios. Although all the flow would be discharged to surface waters, the new facility would be properly sized to accommodate this flow. Moreover, all three of the existing treatment systems would have equalization to help mitigate peak flow concerns.
Flexibility for Adding Critical Unsewered Communities	1	3	3	5	3	5	1	5	• Alternatives that involve export to Windsor (2a, 2c and 3b) would include a pipeline alignment along Russian River to pick up critical unsewered communities and received the highest ranking. • Scenarios that can be modestly altered to include a pipeline alignment along Russian River to pick up critical unsewered communities (1b, 1c and 2b) received a slightly derated scoring. • Scenarios 1a and 3a would require significant, additional piping along Russian River to pick up critical unsewered communities and received the lowest scoring.
Local Recycled Water Benefits	4.5	5	4	1	1	1	2.5	3.5	• The local scenarios (1a, 1b and 1c) ranked the highest because they preserve the highest amount of recycled water for local uses. Scenarios 1a and 1b would retain all existing recycled water uses, but 1b scored slightly higher than 1a because it includes export of recycled water to the higher use areas near Forestville/Graton. • Alternative 1c would maintain recycled water in West County but would consolidate it only in one area and eliminates existing recycled water use for the Northwood golf course. Therefore, this alternative scored slightly lower than the other two local scenarios. • The export scenarios (2a, 2b and 2c) scored the lowest because they involve loss of all locally available recycled water. • The combination scenarios (3a and 3b) scored lower than the local scenarios because they would retain some local recycled water. 3a scored lower than 3b because recycled water would be maintained only near the Russian River WWTP, which has limited opportunity for reuse, and would export recycled water currently used in the Forestville/Graton area.

Table 3-12. Preliminary Screening Criteria Scoring

Criteria	Scoring of Alternative[a]								Scoring Comments
	1a: Two Local Facilities	1b: One Facility at RRCSD	1c: One Facility at FWD	2a: Export to Windsor	2b: Export to Santa Rosa	2c: Export to Windsor and Santa Rosa	3a: Treat at RRCSD; Export FWD/GCSDD to Santa Rosa	3b: Treat at FWD/GCSD; Export RRCSD to Windsor	
Environmental	5	2.5	2	2	3	1	2.5	2.5	• Alternative 1a scored the highest because it requires the least amount of additional construction. It also allows for continued pond-based treatment at the Forestville/Graton plants, which is a relatively low energy-use approach to wastewater treatment. • Alternative 1b involves expansion of the Russian River WWTP and 1c construction of a new conventional facility at the Forestville WWTP site. Both would require major construction. In addition, both involve construction of new, major conveyance pipelines. Alternative 1c scored slightly lower due to the need for a new river outfall. • Alternative 2a, 2b and 2c would include pumping of wastewater to large, conventional wastewater facilities that in themselves use significant energy. Therefore, these alternatives would require the most energy usage. Alternative 2a would also require construction along River Road, which could have construction-related environmental impacts. Therefore, 2a scored slightly lower than 2b. Alternative 2c scored the lowest because it would involve construction of two major export pipelines in addition to the above impacts. • Alternative 3a is similar to 2b (both involve export to Russian River) but 3a was scored slightly lower than 2b due to the distance from the Russian River WWTP to areas where biosolids can be disposed. • Alternative 3b is similar to 2a (both involve export to Windsor) but 3b was scored slightly higher because a significant amount of wastewater would be treated using a lower-energy pond-based treatment system.
Resiliency	2	1	3	4	5	4	2.5	3	• The export scenarios (2a, 2b and 2c) will be more resilient because the larger, regional facilities will have more resources to maintain resiliency over the long term. These scenarios therefore scored the highest; with 2a and 2c being slightly derated because of a need for construction of the pipeline along River Road which could be more susceptible to seismic and flooding impacts. • Alternatives that continue to rely on the Russian River WWTP are scored the lowest (1a, 1b, 3a) due to their reliance on a treatment facility that is near the Russian River and thus particularly vulnerable to seismic and flooding impacts. 1b scored the overall lowest because all treatment would be occurring at the Russian River facility. 3a was slightly higher than 1a because export to Santa Rosa would be more resilient than providing all treatment at the existing Forestville/Graton WWTPs. • Alternatives relying partially or fully on the Forestville/Graton WWTPs (1a, 1c and 3b) are considered more resilient than those that rely on the Russian River WWTP. Alternatives 1c and 3b were considered equivalent because export of flow from the Russian River WWTP to a new Forestville/Graton WWTP or to Windsor would have similar levels of resiliency.
Ease of Implementation	5	3	3	1.5	1	1.5	2	2.5	• Alternative 1a is the most similar to the status quo. It also offers flexibility of phasing the project elements to increase funding potential. Thus, it is considered easiest to implement. • Alternatives 1b and 1c both could be phased to optimize funding opportunities like Alternative 1a. However, both would require expanding and/or constructing new facilities, which would increase the implementation complexity over Alternative 1a. Expanding the Russian River WWTP would likely be more complicated than constructing a new facility at the Forestville WWTP, but Alternative 1c also includes construction of a new river outfall. Finally, both of these alternatives are slightly derated because they would likely require modifying the existing governance structure for the West County utilities. • The export alternatives (2a, 2b and 2c) are large linear construction projects that would bring some construction complexity. It also would generally not be feasible to phase these projects, with 2c offering some flexibility for phasing. These alternatives would also require coordination with the Town of Windsor or the City of Santa Rosa for a discharge agreement. Coordinating with the City of Santa Rosa will likely require more negotiation than with the Town of Windsor due to both the uncertainty in costs and a governance structure involving multiple external agencies. Alternative 2c would require coordination with both Windsor and Santa Rosa. It is assumed that the governance structure for the West County facilities would not change (each existing agency would still be responsible for management of their collection system). • The two combination scenarios (3a and 3b) would also be relatively simple to construct from a treatment perspective (like 1a). However, the large export pipeline brings added complexity, with the Windsor pipeline being significantly longer. These alternatives also provide less flexibility for phasing than the local treatment alternatives. Finally, 3a is further derated because coordinating with the City of Santa Rosa will likely require more negotiation than with the Town of Windsor.
Average Score	**3.0**	**2.5**	**3.0**	**3.4**	**3.3**	**3.1**	**2.1**	**3.3**	
Total Score	**21.0**	**17.5**	**21.0**	**23.5**	**23.0**	**21.5**	**15.0**	**23.0**	

(a) Not all categories include scores of 1 or 2 because the relative scoring is similar among the alternatives.

3.6.3 Scoring Sensitivity Analysis

There are several stakeholders involved with this effort, and the weighting of the evaluation criteria are likely to range depending on the stakeholder's perspective and needs. Therefore, in lieu of assigning one weight to each score, a range of weightings was considered using a Monte Carlo analysis. With this approach total scores were calculated for a range of various weighting assumptions (about 6,100 permutations were developed), as follows:

- Each of the seven subjective categories were evaluated based on a range of weighting between 5 percent to 20 percent each, where a 13 percent weighting would be an even weighting across eight score categories.
- The capital cost scores were evaluated based on a weighting between about 13 percent to 49 percent, where 49 percent is the highest value that could be generated given the ranges of weightings for the other categories.

This Monte Carlo analysis results in the box-and-whiskers plot on Figure 3-12. The legend on the figure describes what the boxes and whiskers show.

The results in Figure 3-12 reveal the following:

- Alternative 1a: Two Local Facilities has the highest overall rankings.
- Two alternatives have similar rankings as the second highest (medians of 3.0):
  - Alternative 2a: Export to Windsor
  - Alternative 3b: Treat at FWD/GCSD; Export RRCSD to Windsor
- Alternative 2b: Export to Santa Rosa has a lower median (2.9) but still falls in the same range as Alternatives 2a and 3b.
- Alternative 1c: One Facility at FWD has a median (2.8) similar to Alternative 2b but more limited variability, indicating this approach is less sensitive to potential prioritization of the qualitative criteria.

Based on this information, all five of these alternatives were selected for further evaluation. Chapter 4 includes further definition of the facilities and costs for each of the preferred alternatives.

Figure 3-12. Monte Carlo Analysis Results