CHAPTER 5
Unsewered Areas Characterization

This chapter provides the results of an analysis used to identify the unsewered community clusters within the West County area that have been included in this wastewater regionalization feasibility evaluation. The topics addressed are as follows:

- Risk and Opportunity Analysis Scoring Approach
- Risk and Opportunity Analysis Ranking
- Selected Community Clusters
- Estimated Community Cluster Wastewater Flow and Load Generation Rates

5.1 RISK AND OPPORTUNITY ANALYSIS SCORING APPROACH

GIS data collected and developed by Sonoma County was used to complete an analysis to identify the areas that should be prioritized for incorporation into a potential regional wastewater system for the West County area. All the unsewered parcels within the Project Study Area, which was defined in Chapter 2 (see Figure 5-1), were included in this evaluation.

As noted in Chapter 1, the Monte Rio Study Report included a separate evaluation of strategies for management of wastewater within the Monte Rio/Villa Grande area and is therefore not included in the Study Area for this project. However, to integrate the Monte Rio/Villa Grande area into this current study, it is included as a selected community cluster for this analysis.

For each parcel within the Study Area, the relative ranking was determined by assessing an opportunity score and a likelihood/consequence of failure score.[1] Opportunities evaluated include the following:

- Proximity to an existing sanitation district service area boundary
- Proximity to major roadways
- Parcel density, with higher-density areas scored higher than lower-density areas[2]

Likelihood of OWTS failure or potential consequences of failure were evaluated based on the following:

- Slope of parcel, with steeper parcels scoring higher as being less likely to have adequate space for a properly sized septic system
- Rating for septic tank absorption
- Proximity to rivers or streams
- Proximity to the 100-year floodplain
- Proximity to drinking water wells

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[1] A parcels ranking analysis was completed for this study to identify potential clusters of parcels that could be connected to a future regional wastewater system. The ranking is not meant to define what parcels/communities will be part of a future regional project or to imply priority of connection. The only purpose is to provide a general framework for the current Feasibility Study.

[2] Parcel density also can be viewed as a likelihood/consequence of failure criteria, as more densely clusters parcels have a higher likelihood of causing impacts due to failures.

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Specific scores between 1 and 4 were assigned for each criterion, based on the information presented in Table 5-1.

Table 5-1. GIS Scoring Criteria for Unsewered Parcels				
Criteria Descriptions	Score			
	1	2	3	4
Opportunities				
Proximity to existing sanitation district service area boundary	Outside > 3.0 miles	Outside 1.5 - 3.0 miles	Outside < 1.5 miles	Inside boundary (Distance of 0)
Proximity to major roads/highways (Highway 116/Bohemian Highway, River Rd., Graton Rd., Mirabel Rd.)	> ½ mile (2,640 feet)	500 feet - ½ mile	250 - 500 feet	< 250 feet
Parcel density, acres per parcel	> 10	2 - 10	0.25 - 2	≤ 0.25
Failure Likelihood/Consequences (Risk)				
Slope of parcel	Acceptable (< 25 percent)	-	-	Not Acceptable (> 25 percent)
Rating for Septic Tank Absorption	-	-	Somewhat limited	Very limited
Proximity to Russian River or other surface water body, feet	> 1,000	500 - 1,000	250 - 500	< 250
Proximity to 100-year floodplain	Outside > 600 feet	Outside by 200-600 feet	Outside < 200 feet	In floodplain
Proximity to water wells	No wells within 100 feet	-	-	Wells within 100 feet

Numeric scores were then assigned to each parcel within the Study Area based on the criteria listed in Table 5-1. The distribution of the individual scores, presented as the percentage of parcels assigned each score, is provided in Table 5-2.

Table 5-2. Percentage of Parcels for Each Score				
Criteria Descriptions	**Score**			
	1	**2**	**3**	**4**
Opportunities				
Proximity to existing sanitation district service area boundary	< 1	36	60	4
Proximity to major roads/highways (Highway 116/Bohemian Highway, River Rd., Graton Rd., Mirabel Rd.)	33	43	9	15
Parcel density, acres per parcel	7	24	41	28
Failure Likelihood/Consequences (Risk)				
Slope of parcel	86			14
Rating for Septic Tank Absorption			6	94
Proximity to Russian River or other surface water body, feet	44	21	13	22
Proximity to 100-year floodplain	69	11	8	12
Proximity to water wells	83			17

As shown in Table 5-2, a significant percentage of parcels do not exhibit features that have a high likelihood/consequence of failure, indicating most parcels in the Study Area have limited risks associated with a potential septic tank failure. One notable exception is the septic tank absorption rating, which has almost all (94 percent) parcels receiving a score of 4 (relative high risk). This rating is based on the underlying soil, and is a function of properties like permeability, depth to water table and flooding. The opportunities scores are more evenly distributed across the study area.

5.2 RISK AND OPPORTUNITY ANALYSIS RANKING

The total scores for each parcel were used to rank the estimated risk and opportunity level for inclusion in a potential regional wastewater project as follows:

- Green – Low Risk and Opportunity

- Yellow – Low to Medium Risk and Opportunity

- Orange – Medium to High Risk and Opportunity

- Red – High Risk and Opportunity

The results of the risk and opportunity analysis are shown in Table 5-3 as a percentage of OWTS parcels within each combination of scores for opportunities and likelihood/consequences.

Table 5-3. Percentage of Unsewered Parcels by Opportunity and Likelihood/Consequence Scores									
Combined Likelihood/ Consequence Score	Combined Opportunities Score								
	4	5	6	7	8	9	10	11	12
7-8	< 1	2	4	7	8	4	2	< 1	< 1
9-10	< 1	2	4	4	3	4	3	< 1	(a)
11-12	< 1	3	7	6	5	5	4	2	< 1
13-14	< 1	1	2	2	4	3	2	< 1	< 1
15-16	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
17-18	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
19-20			< 1	< 1	< 1	< 1			

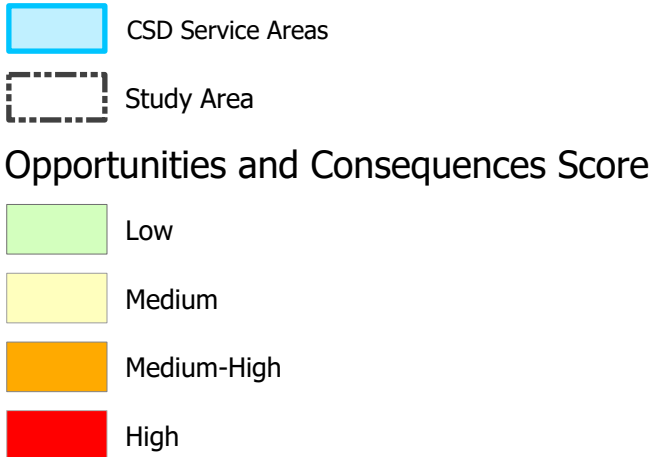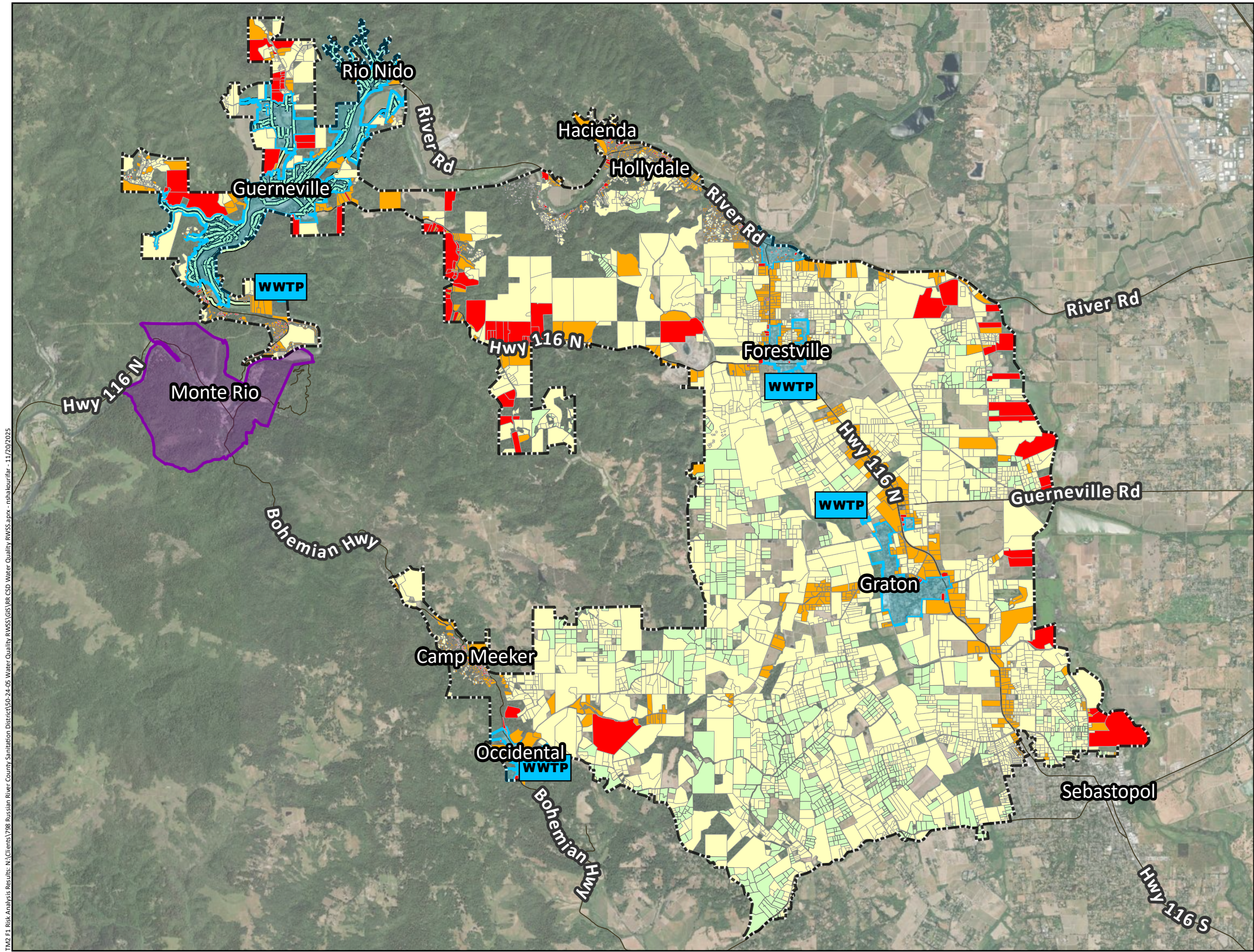(a)   Score combinations shown in gray had no results.

The number of parcels within each of the four categories are summarized in Table 5-4, which also shows the percentage of total parcels for each category. As shown, the two highest categories (orange and red colors) represent about a third of all parcels.

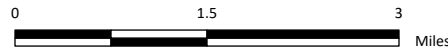| Table 5-4. Summary of Parcel Counts by Score Level		
Relative Score	Total Number or Parcels	Percentage of Total Parcels
Low	788	12
Medium	3,469	53
Medium-High	1,835	28
High	428	7

The risk and opportunity analysis results are shown on Figure 5-1 for each parcel with a known or suspected OWTS within the Study Area. The following conclusions can also be drawn from the information presented on the figure:

- The red parcels are generally smaller parcels and surround major roadways and/or the Russian River.
- Groupings of red and orange parcels are located near the boundary of the existing West County service area and on both sides of the Russian River.

Legend

CSD Service Areas

Study Area

Opportunities and Consequences Score
- Low
- Medium
- Medium-High
- High

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Risk and Opportunities Analysis Results

Figure 5-1

TM2 F1 Risk Analysis Results: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx – mbakour\far – 11/20/2025

Labels on map: Rio Nido, Hacienda, Hollydale, Guerneville, River Rd, Hwy 116 N, Monte Rio, WWTP, Forestville, WWTP, Hwy 116 N, Guerneville Rd, WWTP, Graton, Bohemian Hwy, Camp Meeker, Occidental, WWTP, Sebastopol, Bohemian Hwy, Hwy 116 S

Scale: 0 — 1.5 — 3 Miles

5.3 IDENTIFICATION OF COMMUNITY CLUSTERS

Groupings of at least 50 red and orange parcels were identified to define the locations of the selected community clusters. These cluster locations are shown on Figure 5-2.[3] As indicated, eleven clusters were identified in addition to the Monte Rio/Villa Grande study area, which for this study is included as Cluster 12.

The cluster boundaries were then defined by first laying out a conceptual framework for the cluster collection system infrastructure that would be needed to incorporate the red and orange parcels within each cluster area. All parcels that would have reasonable access to the conceptual system (regardless of risk and opportunity analysis result) were then included in the cluster boundary. The defined boundaries are shown on Figure 5-3. Additional descriptions of the clusters are provided in Table 5-5, which also defines the total number of parcels assumed to be included in each cluster.

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[3] Location and refined boundary for Monte Rio/Villa Grande (Cluster 12) shown on Figure 5-2 and Figure 5-3 for completeness, but the parcel ranking analysis did not include evaluation of that area. The area has been separately studied and identified as a community of concern.
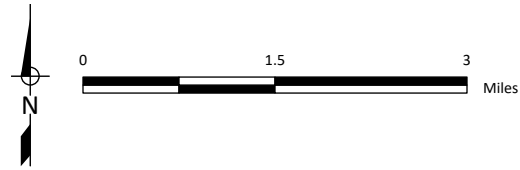
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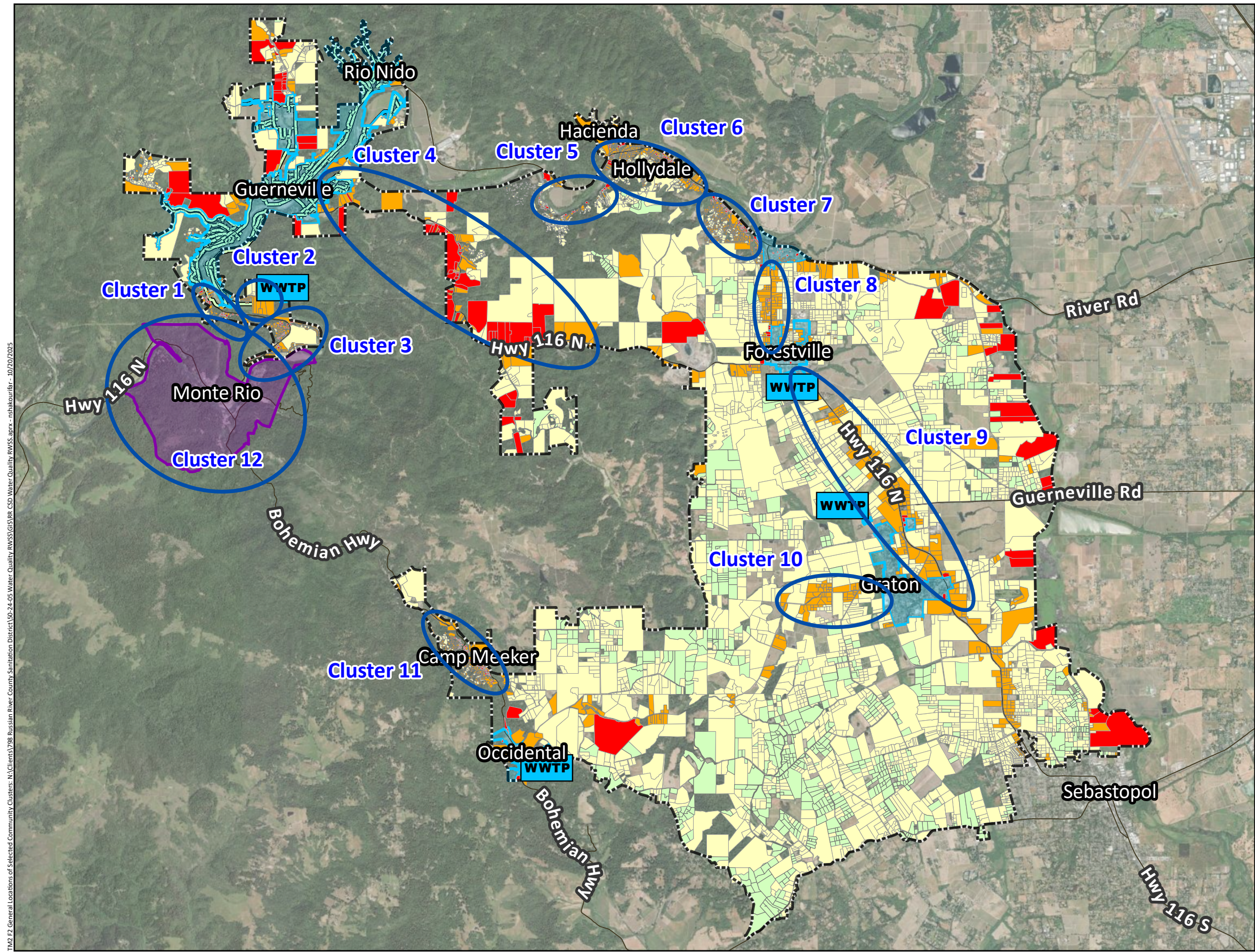
	CSD Service Areas
	Study Area
	Cluster Location

Opportunities and Consequences Score

	Low
	Medium
	Medium-High
	High

ID	Name
1	Guerneville South of River
2	Guerneville North of River
3	Northwood
4	Hwy 116 East of Guerneville
5	Summerhome Park Road
6	Hacienda and Hollydale
7	River Road North of Forestville
8	Forestville
9	Hwy 116 between Forestville and Graton
10	Graton West
11	Camp Meeker
12	Monte Rio/Villa Grande

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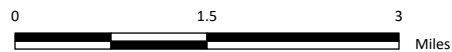**General Locations of Selected Community Clusters**

Figure 5-2

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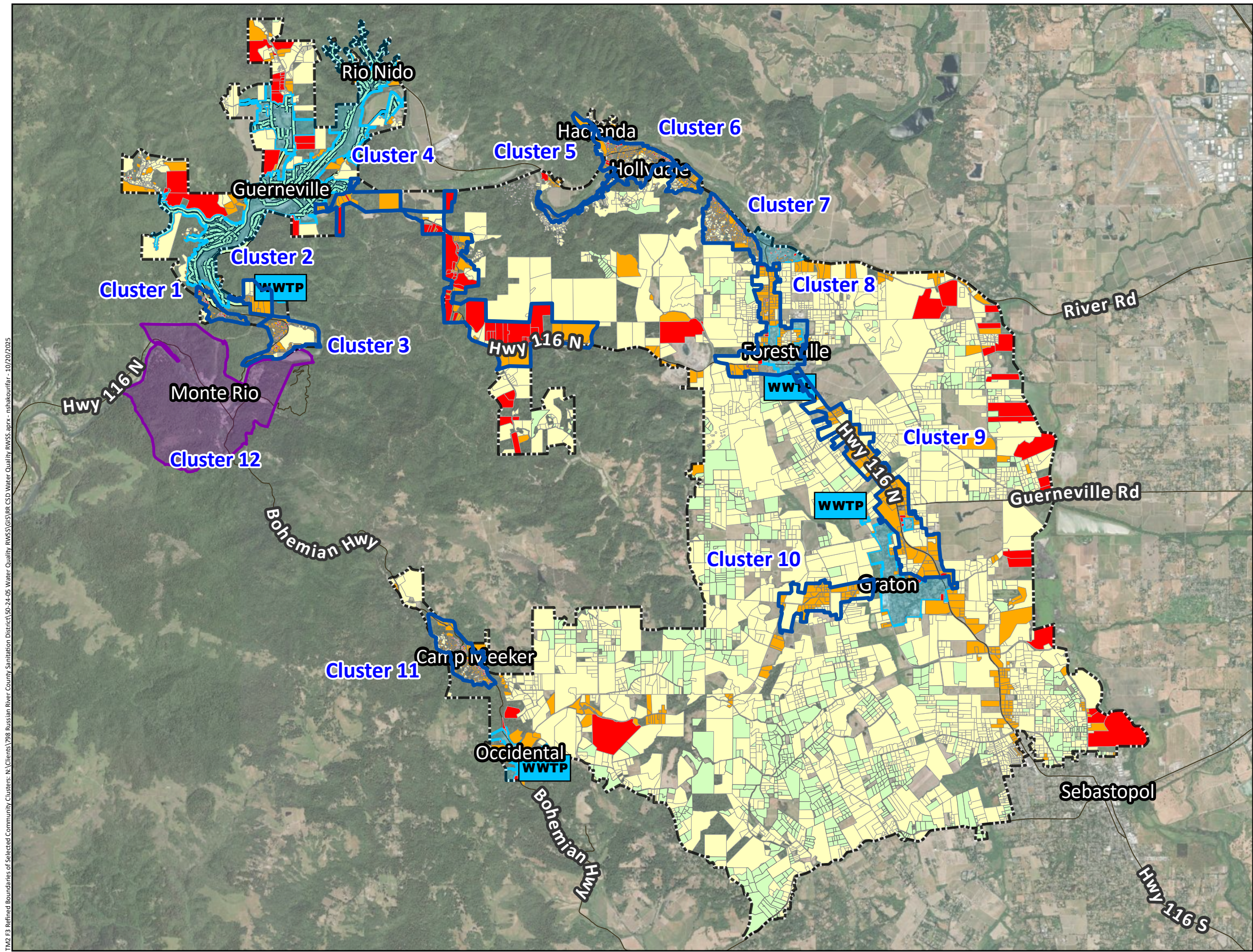
CSD Service Areas

Study Area

Cluster Boundaries

Opportunities and Consequences Score

Low

Medium

Medium-High

High

ID	Name
1	Guerneville South of River
2	Guerneville North of River
3	Northwood
4	Hwy 116 East of Guerneville
5	Summerhome Park Road
6	Hacienda and Hollydale
7	River Road North of Forestville
8	Forestville
9	Hwy 116 between Forestville and Graton
10	Graton West
11	Camp Meeker
12	Monte Rio/Villa Grande

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Refined Boundaries of Selected Community Clusters

Figure 5-3

TM2 F3 Refined Boundaries of Selected Community Clusters: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\RR CSD Water Quality RWSS.aprx - nsbakourifar - 10/20/2025

ID	Name	Description	Number of Parcels
		Table 5-5. Description of Selected Community Clusters	
1	Guerneville S. of River	These clusters are located near the existing Russian River Community Services District service area. These are separated into two clusters because of Russian River provides a potential barrier for conveyance infrastructure.	50
2	Guerneville N. of River		60
3	Northwood	This cluster includes all parcels for the Northwood Golf Course community, most of which are identified at an orange or red.	190
4	Hwy 116 E. of Guerneville	This cluster incorporates approximately 55 orange and red parcels along Highway 116 east of, and relatively close to, the Russian River CSD service area boundary.[a]	110
5	Summerhome Park Road	This cluster captures parcels southwest of the Hollydale community, along Summerhome Park Road and adjacent to the Russian River.	100
6	Hacienda and Hollydale	The cluster incorporates approximately 300 red and orange parcels within the Hacienda and Hollydale area. Due to their proximity, this area was identified as one community cluster.	440
7	River Road North of Forestville	The cluster incorporates approximately 390 red and orange parcels in the area northwest of the FWD service area boundary and along River Road and/or within the proximity of to the Russian River.	450
8	Forestville	The cluster incorporates approximately 150 red and orange parcels that are within the FWD service area, but do not receive wastewater services.[b]	170
9	Hwy 116 between Forestville and Graton	This cluster includes all of the 115 parcels identified as orange or red level that are grouped around Highway 116 between the FWD and Graton CSD service are boundaries. Likely, these would be served by one conveyance pipeline and are thus grouped together in one community cluster.[c]	140
10	Graton West	This cluster incorporates approximately 60 orange parcels that are west of, and relatively close to, the Graton CSD service area boundary and Highway 116, and are in proximity of Atascadero and Green Valley Creeks.[d] There are no red parcels in this area.	70
11	Camp Meeker	This cluster incorporates approximately 340 red and orange parcels that are in the Camp Meeker community, which is north of the Occidental CSD service area.	370
12	Monte Rio/Villa Grande	The separately defined Monte Rio/Villa Grande study area is included its entirety.	780
		Total	**2,930**

(a) An additional ~20 parcels along Highway 116 were identified at a red level but were not identified as a cluster for the study due to the number and location of the parcels. Connecting some of these parcels to a regional wastewater system may be possible if an adequately sized wastewater transmission pipeline is constructed along Highway 116.

(b) As noted in TM 1A, FWD has identified potential for connecting 30 additional parcels within their service area, which has been included in defining future flows for FWD. It is assumed that 20 of these additional planned parcels overlap with the Forestville cluster, and they have thus been excluded from the parcel count.

(c) There are several potential groupings of yellow and green parcels in the areas between, and west of, Graton and Forestville that are also in close proximity to Green Valley and Atascadero Creeks. These areas were not flagged as orange or red parcels primarily due to their limited accessibility. However, it may be reasonable to connect some of these parcel groupings to a regional wastewater system if an adequately sized wastewater transmission pipeline is constructed between the Graton CSD and FWD treatment plants.

(d) Several smaller (< 50 parcels) groupings of orange and red parcels were identified along Graton Road but were not identified as clusters due the number and location of the parcels. Connecting some of these groupings to a regional wastewater system may be possible if the wastewater transmission pipeline that is planned along Graton Road between Graton and Occidental is adequately sized.

5.4 ESTIMATED COMMUNITY CLUSTER FLOWS AND LOADS

The flow and load conditions of interest for this study are the average flows, peak flows and maximum 30-day BOD loads. The Monte Rio Study Report defines average and peak wastewater flow generation rates for the four land use/connection types within the Monte Rio/Villa Grande area. These unit average flows per connection are summarized in Table 5-6.

Table 5-6. Wastewater Generation Estimates		
Connection Type	Average Wastewater Generation per Connection, gpd	Peak Wastewater Generation per Connection[a], gpd
Single Family Dwelling	158	632
Multi-Family Dwelling	390	1,560
Commercial	420	1,680
Public	1,356	5,424
(a) Based on an assumed average to peak flow factor of 4. Actual peaking factors could possibly be lower depending on the collection system design and age.		

Maximum 30-day BOD loads were developed using the following methodology:

- Average annual BOD loads were calculated based on average flows and an assumed average BOD concentration of 240 mg/L.[4]
- Maximum 30-day BOD loads were defined by multiplying the calculated average annual loads by a factor of 1.5.

Table 5-7 presents the average and peak flows and maximum 30-day BOD loads calculated for each cluster.

Table 5-7. Wastewater Flow Estimates for Community Clusters				
ID	Name	Total Average Flow, mgd	Total Peak Flow, mgd	Maximum 30-Day BOD Load, lb/day
1	Guerneville South of River	0.009	0.035	30
2	Guerneville North of River	0.009	0.037	30
3	Northwood	0.031	0.124	90
4	Hwy 116 East of Guerneville	0.012	0.048	40
5	Summerhome Park Road	0.016	0.065	50
6	Hacienda and Hollydale	0.070	0.280	210
7	River Road North of Forestville	0.072	0.287	220
8	Forestville	0.027	0.109	80
9	Hwy 116 between Forestville and Graton	0.025	0.102	80
10	Graton West	0.011	0.044	30
11	Camp Meeker	0.059	0.238	180
12	Monte Rio/Villa Grande	0.149	0.596	450
	Total	**0.49**	**1.96**	**1,490**

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[4] This value is calculated from the projected RRCSD influent average annual flow and BOD load values used for the Master Plan under development.

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