CHAPTER 7
Climate Change Resiliency

This Chapter documents an analysis of the resiliency of the four WWTPs of interest and the unsewered parcels within the Study Area to flooding and associated climate change impacts. The topics addressed are as follows:

- Background
- Water Supply Resiliency
- Existing Federal Flood Mapping
- Climate Change Scenarios
- Impacts to Unsewered Parcels
- Impacts to Existing WWTP Infrastructure

7.1 BACKGROUND

This section presents relevant background information related to this analysis under the following topics:

- Evaluation Objectives
- Data Sources
- Methodology

7.1.1 Evaluation Objectives

Climate change is expected to impact both water supply and water demands within Sonoma County in various ways. For instance, climate change may increase the variability and reliability of Sonoma County's surface water supplies for production of potable water. Climate change may also lead to more frequent or longer droughts, hotter temperatures, and higher water demands. Therefore, expanded water supply through local production of recycled water generated from unsewered communities could play a role in mitigating these climate change conditions. This Chapter summarizes readily available information from Sonoma Water regarding water supply impacts under future climate change scenarios and potential benefits of increased recycled water supply.

Climate change also has the potential to cause increased flooding depths and extents in the Russian River and surrounding watersheds due to increased rainfall intensity. For the four West County WWTPs, increased flood levels may result in more frequent or extended inundation of critical infrastructure during flood conditions. OWTS leachate contains pathogens and other contaminants. Under flooding conditions, the leachate from any OWTS has the potential to enter the river and put public and environmental health at risk. Therefore, increased flooding depths expected to occur due to climate change impacts have the potential to increase the risks of impacts associated with OWTS. For these reasons, this evaluation assesses the impacts of the increased flooding associated with climate change on the OWTSs and the four existing WWTPs located in the Study Area.

To assess climate change impacts to OWTSs in the Russian River watershed, an evaluation of baseline flooding conditions and three projected climate change flooding scenarios was completed to quantify the number of unsewered parcels likely to be adversely impacted by partial or full inundation due to flooding, specifically unsewered parcels within both the project Study Area broadly and the identified community clusters defined in Chapter 5. The analysis also defines the increasing flooding extents that occur within the impacted community clusters. Parcels identified as vulnerable under the evaluated flooding scenarios may benefit from future connection to a centralized sewer system to reduce the risk of contamination, thereby protecting the water quality of the Russian River and supporting long-term regional resilience to climate change.

To assess climate change impacts to the WWTPs, baseline and projected flood level information was used in combination with Federal Emergency Management Agency (FEMA) mapping data to define potential future 100-year and 500-year flood elevations at each WWTP site and identify what infrastructure may become vulnerable under the future climate change conditions.

7.1.2 Data Sources

This study utilizes data from a variety of sources, including but not limited to the following:

1. Water Supply and Climate Change Planning Documents:
   - 2021 Sonoma Water *Climate Adaptation Plan*[1]
   - 2022 Sonoma Water Regional Water Supply Resiliency Study[2]
2. **FEMA Floodplain GIS Shapefile:** FEMA floodplain data for Sonoma County from the FEMA website. The 100-year baseline floodplain boundary was used to intersect with parcel data and identify impacted parcels under baseline conditions.
3. **Baseline Data:** Baseline data from Sonoma Water[3]. The data reflects a 1986 flooding event, which is approximately equivalent to a 50-year (2 percent annual chance) flood event. The file includes flood depth data (in feet) for the baseline flooding condition.
4. **Climate Change Data:** Three climate change scenarios (early_1986, mid_1986, and late_1986) data from Sonoma Water[1]. These datasets show flood depths (in feet) equivalent to a 50-year flood event, produced using climate model projections. These scenarios represent projections for Early Century (Years 2016 to 2045), Mid Century (Years 2046 to 2075) and Late Century (Years 2070 to 2099).
5. **GIS Data From Wastewater Regionalization Study:** Additional data have been used in the analysis from other parts of the project, such as GIS shapefiles for the Study Area boundary and locations of WWTPs and communities of unsewered parcels.

[1] Sonoma Water, 2021. Accessed at https://www.sonomawater.org/media/PDF/Environment/Climate%20Adaptation%20Planning/SW_CAP_Final_October_2021.pdf.

[2] Sonoma Water, 2022. Accessed at https://www.sonomawater.org/media/PDF/About/WAC/2022_05/7.2.%20Sonoma%20Water%20Resiliency%20Study%20-%20Drought%20Analysis%20TM%20FINAL%20DRAFT.pdf

[3] All data received from Sonoma Water were processed using the Raster Domain tool, which converted raster datasets to shapefiles while preserving the original geometry configuration. The raster corresponding to the 50-year flood event represented flood depth and was used as a proxy for the inundation boundary in the analysis.

7.1.3 Methodology

To quantify the number of impacted unsewered parcels, the GIS Intersect tool was applied to overlay parcel boundaries with the floodplain extent for each baseline and climate change scenario. This intersection identified parcels located within flood-impacted areas. Subsequently, the intersected parcels were overlaid with the identified community cluster boundaries, allowing determination of the number of impacted parcels within each defined community cluster. The projected flood levels were also defined within each impacted community cluster under the four scenarios evaluated. Following the completion of all GIS processing steps, the resulting datasets were exported to spreadsheets for further quantitative analysis and reporting.

In addition, the flood depths defined for the clusters located near the West County WWTPs were used in combination with the FEMA mapping information to estimate the potential increases in the 100-year and 500-year flood elevations near these facilities. This information was then used in combination with available LIDAR ground surface elevation data to identify potential areas within each facility that could be adversely impacted by the increased flood levels.

7.2 WATER SUPPLY RESILIENCY

The 2021 *Climate Adaptation Plan* lists several climate change vulnerabilities of Sonoma's water supply, including temperature, extreme precipitation, river flooding, drought and wildfire. Extreme drought within the Russian River watershed is specifically discussed as a major risk area, with the following projected changes listed:

- Increased variability in water supply due to greater variability in precipitation, combined with warming.
- Potential reduction in early and late wet season runoff by end of the century, leading toward extended summer dry season.

The *Climate Adaptation Plan* lists several possible water supply adaption concepts that could be implemented to address climate change vulnerabilities, including "Increase Production and Use of Recycled Water." In addition, "Expand Opportunities for Reuse" is one of five major actions identified as part of a sanitation adaptation strategy. The description of that action includes "expansion of partnerships with wineries and other irrigators…to increase the service area for recycled water" and that "opportunities exist for increased reuse opportunities in most sanitation entities [i.e. in the region]." "Expand recycled water supply" and "Increase recycled water storage" are also listed in the Sonoma Water's 2022 Regional Water Supply Resiliency Study report as drought mitigation option for increasing water supply and improving operations, respectively, and expanding recycled water supply as one of the longer-term actions offering potential for resiliency during prolonged, extreme droughts.

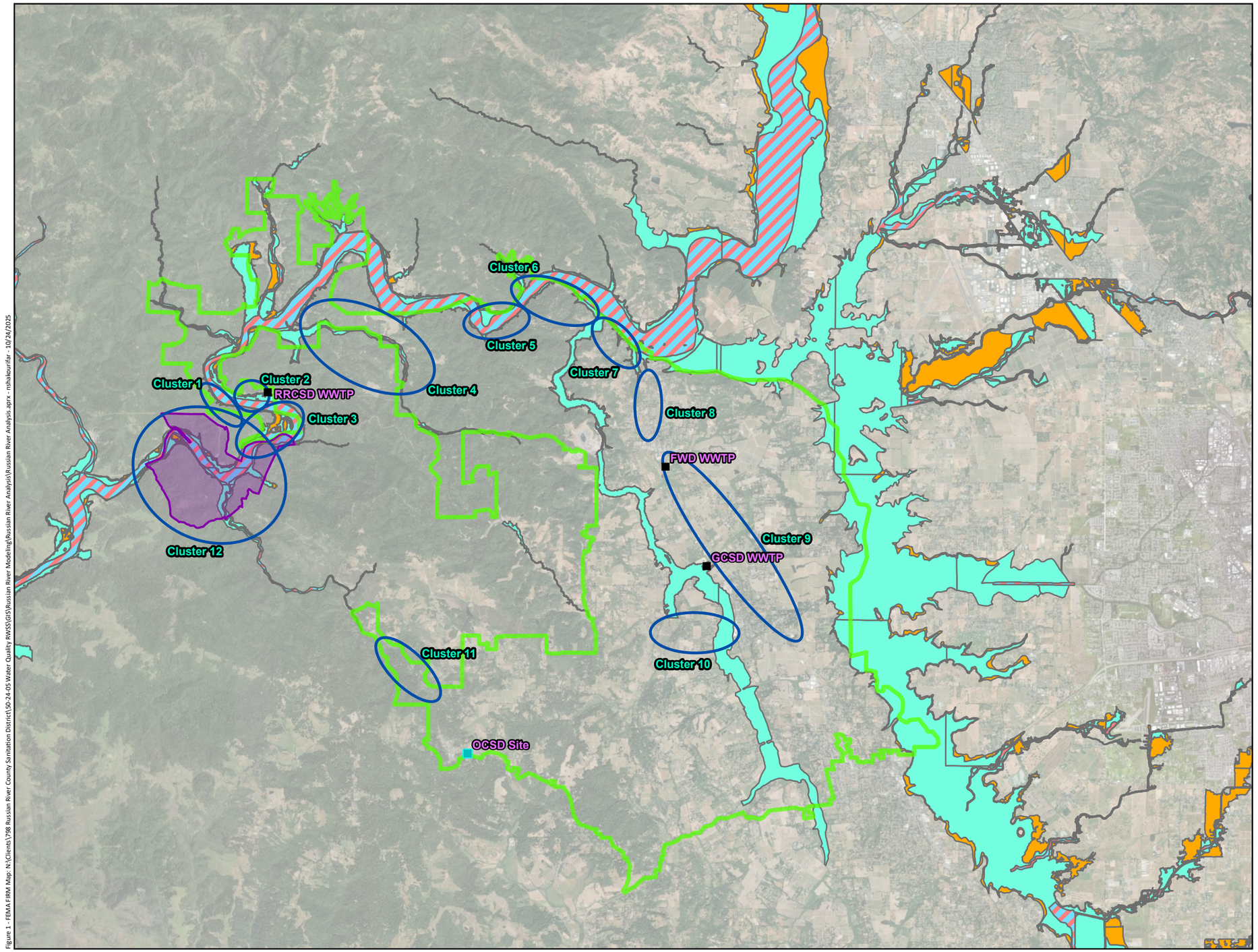
The 2021 plan also lists an adaptation concept of "Increase Regional Partnerships to Support Climate Resilience" as applying across various Sonoma Water water/wastewater systems, with a description that "[e]xpansion of existing, and development of new, regional partnerships will promote and enable greater climate resilience for Sonoma Water."

7.3 EXISTING FEDERAL FLOOD MAPPING

The Russian River is a FEMA-mapped river with a designated floodway in Zone AE. The Study Area is located within the unincorporated areas of Sonoma County (Community Number: 060375), as shown in Flood Insurance Rate Map panels 06097C0519F, 06097C0538F, 06097C0540F, 06097C0657F and 06097C0676F. FEMA flood hazard layers for the 100-year (1 percent annual chance) and 500-year (0.5 percent annual chance).

FEMA flood zones are shown on Figure 7-1, which also shows the Study Area, locations of the four West County WWTPs, and the locations of the unsewered community clusters established for this project. This mapping shows at least nine of the 12 clusters are impacted by flooding (Clusters 1 through 7, 10 and 12). In addition, only two of the WWTP sites are in/near mapped floodplain areas, the RRCSD WWTP and GCSD WWTP[4].

[4] The OCSD discharge pump station is located adjacent to a small creek. However, flood mapping is not available for this small waterway.



WWTP

Cluster Location

FEMA Flood Hazard Layer

0.2% Annual Chance Flood Hazard

1% Annual Chance Flood Hazard

Regulatory Floodway

Monte Rio & Villa Grande Study Area

Study Area

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 East of Graton
10	Graton West
11	Camp Meeker
12	*Monte Rio/Villa Grande*

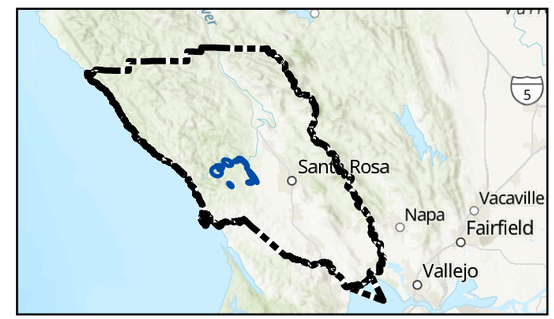


Figure 1 - FEMA FIRM Map: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\Russian River Modeling\Russian River Analysis\Russian River Analysis.aprx - nshakourifar - 10/24/2025

Prepared by:

WEST YOST

N

0 4,000 8,000 Feet

Prepared for:

Russian River County Sanitation District

Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

Russian River Basin

FEMA Baseline Information

Russian River Basin FEMA Floodplain Mapping

Figure 7-1

7.4 CLIMATE CHANGE SCENARIOS

Sonoma Water conducted Risk Assessment Special Studies and published a report in October 2021 focusing on climate change impacts on water resources within Sonoma County. This report is included as Appendix E. Among several topics, that study primarily focused on the hydrologic impacts of climate change on water supply management, operations and flooding of the Russian River. The Russian River analysis in this study was generally limited to the main stem of the river and some primary tributaries to about 2 miles upstream along those reaches. That study extent thus does not represent all impacts to flooding within the Study Area. More specific to the current analysis, the study does not address impacts to flooding along Atascadero Creek south of around Forestville, which has the potential to cause flooding around the GCSD WWTP.

The Sonoma Water analysis used climate projections from the Coupled Model Intercomparison Project – Phase 5 model. A total of 20 individual daily climate projections were analyzed to support a quantitative risk assessment. The Localized Constructed Analogs statistical downscaling method was applied to downscale daily climate data from 10 General Circulation Models. These projections incorporated two Representative Concentration Pathways (RCPs), RCP 4.5 (moderate emissions) and RCP 8.5 (high emissions). The list of General Circulation Models used in that analysis is provided in Table C-1 of the Risk Assessment Special Study Report (Appendix E).

The Sonoma Water hydrologic and hydraulic analysis included the following efforts:

- After applying bias correction to the climate data, it was prepared for input into the U.S. Army Corps of Engineers' hydrology (HEC-HMS) model.
- The hydrology model was then used to develop hydrographs, which were then input into the Russian River hydraulics (HEC-RAS) model to evaluate the impacts on flooding.

To quantify the potential impacts of climate change over time, the analysis was divided into three future time periods (time horizons):

1. Early Century – Years 2016 to 2045
2. Mid Century – Years 2046 to 2075
3. Late Century – Years 2070 to 2099

The referenced study also included comparison of the hydrologic and hydraulic results from the three future time periods to the baseline flooding extent to quantify the changes and identify trends in peak flow, flood depth and water surface elevation under the three climate change scenarios. For more details, refer to the Climate Change Impact Analysis Report (Appendix E).

7.5 IMPACTS TO UNSEWERED PARCELS

This section describes the following results related to evaluation of impacts of increased flooding to unsewered parcels and associated OWTSs:

- Study Area Impacts of Flooding
- Community Cluster Inundation
- Community Cluster Flood Depths
- Summary

7.5.1 Study Area Impacts of Flooding

The baseline floodplain boundary and impacted unsewered parcels within the Sonoma Water Risk Assessment Special Studies area are presented on Figure 7-2, along with the community clusters that also fall within this area[5]. The floodplain boundary and impacted unsewered parcels for the Early, Mid, and Late Century climate change scenarios are shown on Figures F-1, F-2 and F-3, respectively, in Appendix F.

A comparison of inundation extents and impacted parcels in the Study Area across the baseline and climate change scenarios is provided in the Table 7-1 and Table 7-2 below. Compared to baseline conditions, the total inundated areas within the Study Area could increase by 6 percent to 30 percent under climate change conditions. The total number of impacted parcels could also increase by similar percentages, 8 to 30 percent.

Table 7-1. Inundated Surface Areas under Baseline and Climate Change Scenarios

Scenario	Total Inundated Area, acres	Increased Inundated Area over Baseline, acres	Increased Inundated Area over Baseline, percent
Baseline	20,860	-	-
Early Century	22,190	1,330	6
Mid Century	23,360	2,500	12
Late Century	27,140	6,280	30

Table 7-2. Numbers of Impacted Parcels under Baseline and Climate Change Scenarios

Scenario	Number of Parcels Impacted	Increased Number	Increased, percent
Baseline	641	-	-
Early Century	690	49	8
Mid Century	729	88	14
Late Century	832	191	30

[5] As previously noted, Cluster 10 (Graton West) is potentially impacted by flooding in Atascadero Creek. However, the Risk Assessment Special Studies for the Russian River completed by Sonoma Water does not evaluate flooding impacts south of Forestville. Therefore, an assessment of climate change impacts on flooding within Cluster 10 could not be completed through this effort.

Cluster Location
Baseline Inundation Mapping
Impacted Parcels Under Baseline Conditions
Study Area
Monte Rio & Villa Grande Study Area

Notes:
1. The flood depth raster was received from the Sonoma County Water Agency (SCWA).
2. The total number of impacted parcels under baseline conditions is 641.
3. The parcel count does not quantify the inundated area of each parcel; it includes all parcels that are impacted, regardless of whether they are only slightly inundated or completely flooded.
4. Clusters that are not shown have not impacted parcels.

Prepared by:
WEST YOST

N
0 4,000 8,000 Feet

Prepared for:
Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study
Sonoma Water

Russian River Basin
Baseline Inundation Mapping

Figure 7-2

Figure 2 - Baseline Floodplain Inundation Map: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\Russian River Modeling\Russian River Analysis\Russian River Analysis.aprx - nshakourifar - 10/24/2025

7.5.2 Community Cluster Inundation

Eight of the 12 community clusters within the area evaluated by Sonoma Water are impacted by the identified baseline and/or climate change flood conditions[6]. A summary of the impacted parcels in each cluster is provided in Table 7-3 for the baseline and three future climate change scenarios. The percentages of parcels within a cluster impacted are presented in Table 7-4.

Table 7-3. Numbers of Impacted Parcels by Community Cluster under Baseline and Climate Change Scenarios

ID	Cluster Name	Number of Impacted Parcels by Scenario			
		Baseline	Early Century	Mid Century	Late Century
1	Guerneville South of River	6	6	6	6
2	Guerneville North of River	16	16	17	19
3	Northwood	78	83	86	99
4	Hwy 116 East of Guerneville	4	4	4	5
5	Summerhome Park Road	41	43	45	50
6	Hacienda and Hollydale	153	160	170	195
7	River Road North of Forestville	17	19	22	35
12	Monte Rio/Villa Grande	227	241	248	259
	Total	542	572	598	668

Table 7-4. Percent of Impacted Parcels by Community Cluster under Baseline and Climate Change Scenarios

ID	Cluster Name	Percent of Impacted Parcels by Scenario			
		Baseline	Early Century	Mid Century	Late Century
1	Guerneville South of River	11	11	11	11
2	Guerneville North of River	28	28	29	33
3	Northwood	41	44	45	52
4	Hwy 116 East of Guerneville	6	6	6	7
5	Summerhome Park Road	41	43	45	50
6	Hacienda and Hollydale	35	37	39	45
7	River Road North of Forestville	4	4	5	8
12	Monte Rio/Villa Grande	29	31	32	33

[6] As previously noted, Cluster 10 (Graton West) is potentially impacted by flooding in Atascadero Creek. However, an assessment of climate change impacts on flooding within Cluster 10 could not be completed with the available information.

The results in Table 7-3 and Table 7-4 show a consistent increase in impacted parcels over time. The following observations are also made:

- The Hacienda and Hollydale cluster (Cluster 6) experiences the highest number of affected parcels in all scenarios, increasing from 153 (35 percent) under baseline conditions to 195 (45 percent) under the Late Century scenario.
- As a percentage of parcels, the Northwood and Summerhome Park Road clusters (Clusters 3 and 5, respectively) show the greatest impact under all scenarios, with about half their respective parcels impacted under the Early Century scenario.
- Clusters such as Northwood (Cluster 3) and River Road North of Forestville (Cluster 7) also show significant increases, while areas like Guerneville South of River (Cluster 1) and Hwy 116 East of Guerneville (Cluster 4) remain relatively stable and with relatively low percentages of parcels impacted.

7.5.3 Community Cluster Flood Depths

The absolute flood depths under baseline conditions and each of the three climate change scenarios in the eight impacted community clusters are summarized in Table 7-5, based on Sonoma Water's modeling. These results clearly demonstrate a constant increase in flood depth across the Early, Mid, and Late Century scenario. On average, flood depths increase by 1.8 feet in the Early Century scenario, 3.1 feet in the Mid Century, and 6.3 feet in the Late Century scenario, when compared to the baseline condition. This trend underscores the growing severity of flood events driven by climate change and highlights the increasing exposure of vulnerable communities to deeper and potentially more damaging inundation.

Table 7-5. Flood Depths under Baseline and Climate Change Scenarios, feet

Cluster ID	Name of Cluster	Baseline	Early Century	Mid Century	Late Century
1	Guerneville South of River	25.3	27.0	28.3	31.4
2	Guerneville North of River	27.6	29.3	30.7	33.8
3	Northwood	45.3	47.1	48.5	51.6
4	Hwy 116 East of Guerneville	18.1	20.0	21.4	24.6
5	Summerhome Park Road	32.2	34.0	35.4	38.5
6	Hacienda and Hollydale	46.5	48.3	49.6	52.7
7	River Road North of Forestville	28.2	29.9	31.3	34.5
12	Monte Rio/Villa Grande	38.4	40.2	41.6	44.7

7.5.4 Summary

Sonoma Water's hydrologic and hydraulic modeling that defines Russian River watershed flood levels under three future time periods (Early, Mid, and Late Century) as compared to a 1986 baseline flooding condition was used to assess current and potential future flooding impacts on the West County unsewered parcels. Results show substantial increases in both floodplain extent and flood depth, with the number of impacted parcels in the Study Area rising from 641 to 832 and inundated surface areas growing by over 30 percent by the Late Century climate change scenario. If converted to a centralized sewer system, currently unsewered parcels susceptible to flooding will have increased resilience.

7.6 IMPACTS TO EXISTING WWTP INFRASTRUCTURE

Of the West County WWTPs evaluated in this study, only the RRCSD WWTP and GCSD WWTP are near a FEMA designated floodplain boundary and therefore currently potentially susceptible to flooding, as noted earlier in this Chapter. Moreover, even with the increased flood levels projected under the climate change conditions, the remaining two facilities (OCSD WWTP and FWD WWTP) are not expected to be impacted by significant flooding. Therefore, the analysis presented below is limited to the two potentially impacted facilities.

7.6.1 RRCSD WWTP

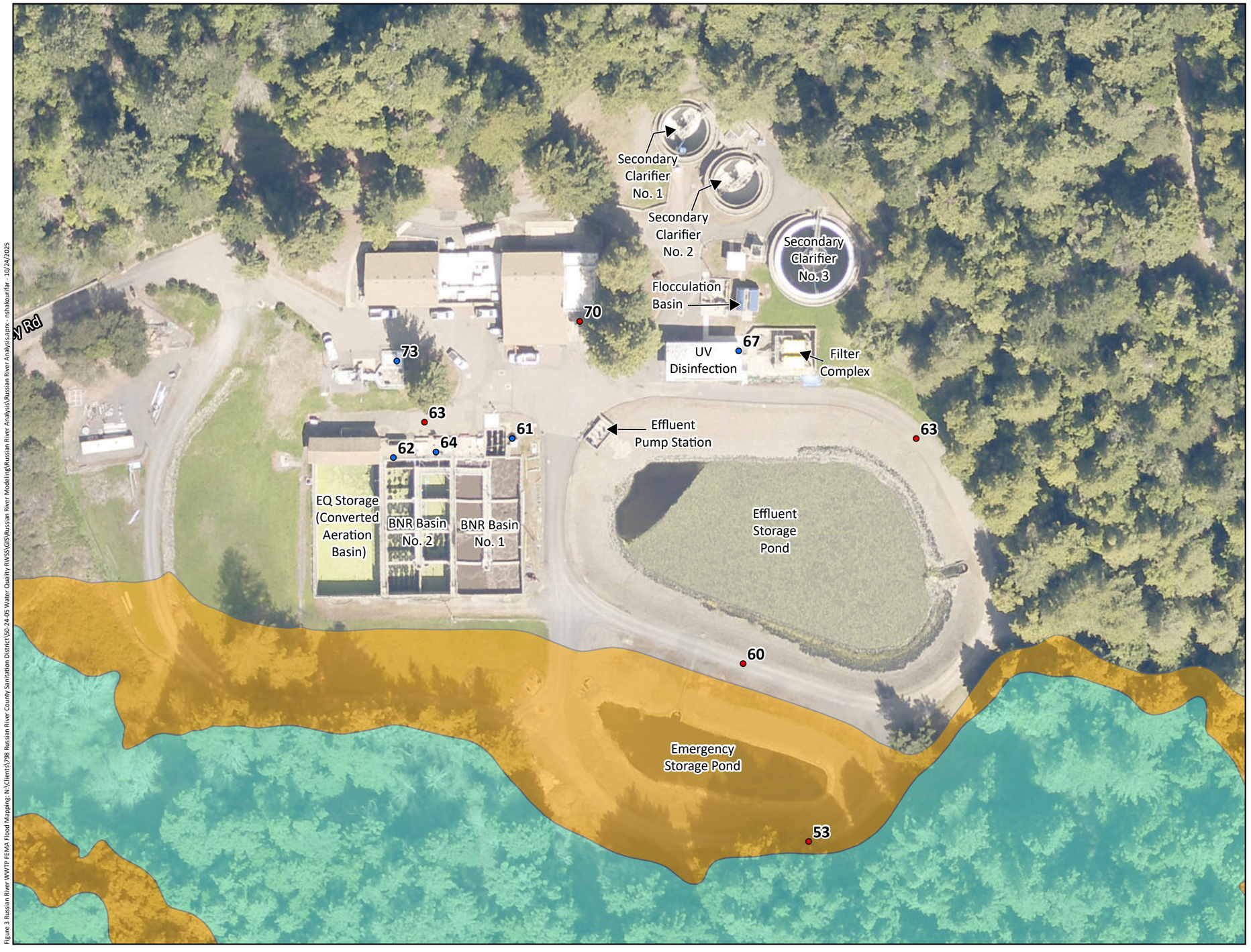
FEMA flood mapping in and around the RRCSD WWTP is shown on Figure 7-3 along with relevant elevations taken from 2013 USGS LiDAR data and the RRCSD WWTP design drawings. The flood zone in this area is mapped as Zone AE, with 100-year flood elevations defined as being between 51.7 feet and 50.9 feet. On average, the FEMA 100-year flood elevation at the WWTP site is thus about 51.5 feet. The following information is noted from this figure:

- The entire WWTP site is outside the mapped 100-year floodplain (1 percent chance flood hazard).
- The Emergency Storage Pond on the south side of the site is within the 500-year floodplain (0.2 percent chance flood hazard).
- LiDAR elevation data shows the following:
  - The elevation of the road located on the south side of the Emergency Storage Pond is approximately 53 feet.
  - The elevation of the road between the Emergency Storage Pond and the Effluent Storage Pond is around 60 feet.
  - The elevation of the road on the north of the Effluent Storage Pond and aeration basins is approximately 63 feet.
  - The elevation of the area around the headworks, the Administration Building, and Filter Complex facilities are at or above approximately 70 feet. (Elevations north of these facilities are even higher.)
- Elevation data in the design drawings for the RRCSD WWTP indicates the following:
  - The elevation of the headworks is 73 feet at the top of the structure.
  - The elevation of the flow split structure is 64 feet at the top of the structure.
  - The elevation of the aeration basins is 62 feet at the top of the structure.
  - The elevation of the UV Disinfection facility is 67 feet at the top of the structure.
  - The elevation of the old chlorine contact basin (which is used for effluent flow transfer to the Effluent Storage Pond) is 61 feet at the top of the structure.
- Based on the elevation of the road located between the Emergency Storage Pond and the Effluent Storage Pond, the 500-year floodplain elevation in the area of the RRCSD WWTP is estimated to be slightly less than 60 feet.

The climate change modeling indicates Russian River flood depths near Clusters 1 and 2 could rise by about two feet in the Early Century condition and by six feet in the Late Century condition. Applying these depths to the FEMA flood elevation, the following findings are made:

- An Early Century rise of two feet could raise the 100-year flood depth to 53.5 feet. That is just above the elevation of the road located south side of the Emergency Storage Pond, but well below the 60 feet elevation of the road located between the Emergency Storage Pond and the Effluent Storage Pond.
- A Late Century rise of six feet could raise the 100-year flood elevation to 57.5 feet, which is still more than two feet below the 60-foot elevation of the road located between the Emergency Storage Pond and the Effluent Storage Pond but would clearly overtop the road south of the Emergency Storage Pond.
- An Early Century rise of two feet could raise the 500-year flood depth to approximately 62 feet, which would overtop the Emergency Storage Pond and potentially overtop the Effluent Storage Pond, aerations basins and the old chlorine contact basin.
- A Late Century rise of six feet could raise the 500-year flood elevation to approximately 66 feet, which would overtop the Emergency Storage Pond and Effluent Storage Pond and very likely overtop the aerations basins, old chlorine contact basin, and flow split structure.

Based on this information, the majority of RRCSD WWTP would maintain resiliency in a 100-year flood event under the projected climate change conditions. However, the Emergency Storage Pond would potentially be inundated under the Early Century Conditions and would very likely be inundated in the Mid to Late Century conditions. In addition, assuming the 500-year flood depth is currently 60 feet, increases in flood level could result in inundation of several facilities within the main WWTP site under the Early Century 500-year flood conditions.



FEMA Flood Hazard Layer

- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- LiDAR Elevation in feet
- Design Drawing Elevation in feet

N

0 50 100 Feet

Figure 3 Russian River WWTP FEMA Flood Mapping: N:\Clients\798 Russian River County Sanitation District\50-24-05 Water Quality RWSS\GIS\Russian River Modeling\Russian River Analysis\Russian River Analysis.aprx - nshakourifar - 10/24/2025

Prepared by:

WEST YOST

Prepared for:

Russian River County Sanitation District
Water Quality and Recycled Water Supply Feasibility Study

Sonoma Water

Russian River WWTP FEMA Flood Mapping

Figure 7-3

7.6.2 GCSD WWTP

FEMA flood mapping in and around the GCSD WWTP is shown on Figure 7-4. The flood area is mapped as a Zone A floodplain, which means the 100-year flood elevations are not established and the 500-year flooded area is not defined. Figure 7-4 also shows approximate elevations based on 1976 design drawings for the GCSP WWTP[7] and 2013 USGS LiDAR data. The following information is noted from this figure:

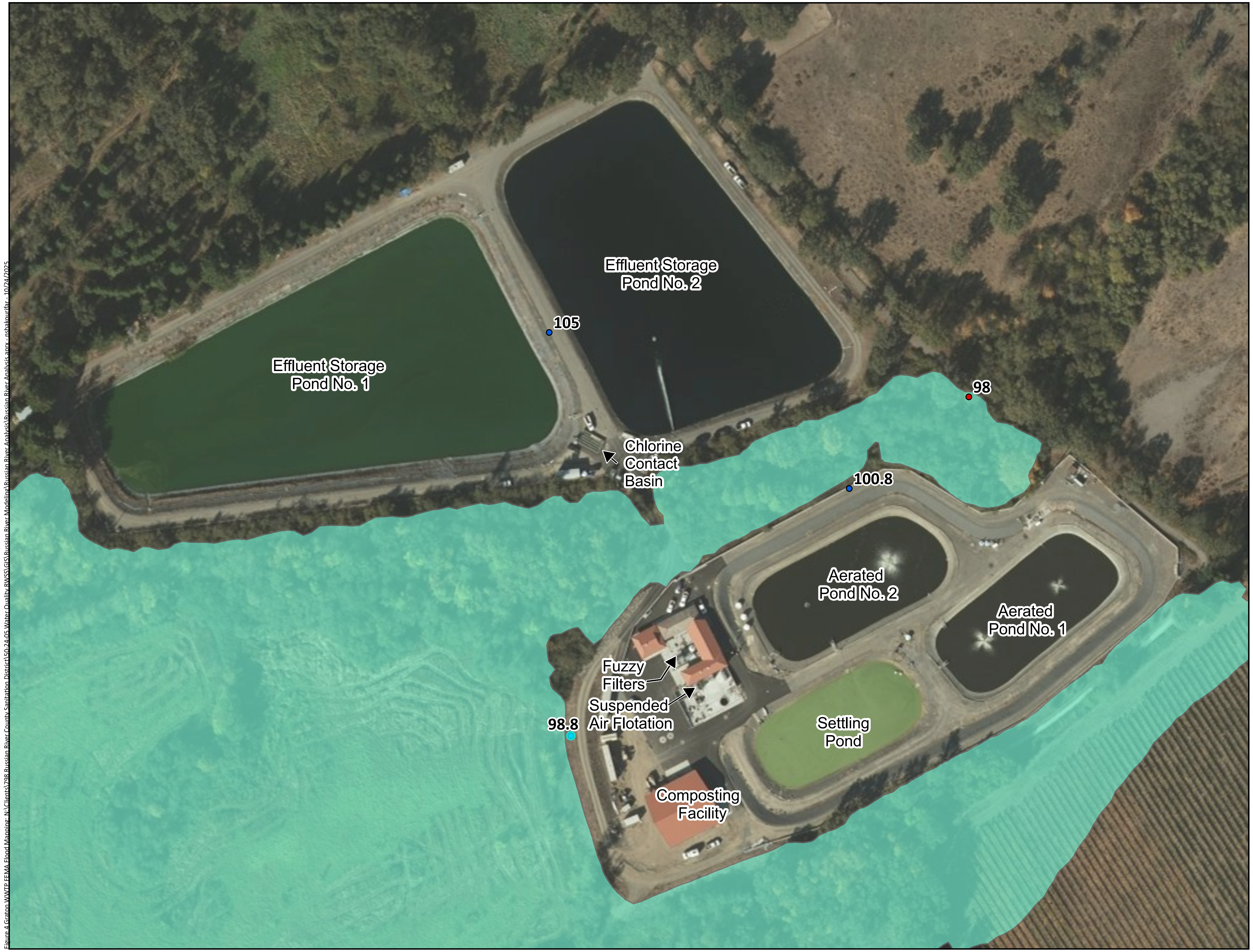
- The main treatment facilities at the GCSD WWTP are outside the 100-year floodplain due to the presence of an engineered floodwall.
- The flood wall around the WWTP is estimated to have an approximate top elevation of approximately 100.8 feet.
- The storage ponds, which are located adjacent to the flood-protected area, are constructed with levees that have elevations of approximately 105 feet.
- Based on ground surface LiDAR elevation data near the site, it is estimated that the 100-year flood elevation is approximately 98 feet, which is three feet below the flood wall elevation. Based on the WWTP design drawings, the 100-year flood elevation is defined as 98.8 feet, which is two feet below the flood wall elevation. Although the flood elevation derived from the LiDAR data is only an estimate, the observed differences could also be associated with a change in the flood map elevation that occurred since 1976.

The flooding source for the GCSD WWTP is the nearby Atascadero Creek, which was not evaluated as part of the Russian River climate change flood analysis. Nevertheless, the climate change analysis does show an increase in flood elevations between two and six feet in the Russian River near Cluster 7. Conservatively applying these flood elevation rises to the 100-year floodplain near the GCSD WWTP site leads to the following findings:

- A flood elevation rise of two feet would result in a 100-year flood elevation of 100 to 101 feet, significantly reducing/potentially eliminating the freeboard protection provided by the WWTP flood wall.
- The storage pond levees would continue to provide protection from flooding with a two-foot rise.
- A rise of six feet would result in an estimated elevation of 104 to 105 feet. These flood elevations would overtop the flood wall and would potentially overtop the storage pond levees.

Based on this information, the GCSD WWTP could be vulnerable to flooding under climate change scenarios. However, additional mapping and analysis of potential flooding impacts in the Atascadero Creek watershed is needed to confirm these findings. This analysis should include an investigation of the current mapped flood elevation near the WWTP.

[7] There is an approximate 3-foot difference in elevation between the LiDAR data and the elevation data included in the 1976 WWTP design drawings. This is likely due a different datum reference for these two sources. In the area of the Graton WWTP, the NAVD 88 datum is approximately 2.8 feet higher than NGVD 29 datum. For presentation in this Chapter, the elevations shown on the 1976 WWTP design drawings were adjusted by 2.8 feet.



FEMA Flood Hazard Layer

- 1% Annual Chance Flood Hazard
- Design Drawing Elevation in feet
- LiDAR Elevation in feet

N

0 80 160
Feet

Prepared by:
WEST YOST

Prepared for:
Russian River County Sanitation District
Water Quality and Recycled
Water Supply Feasibility Study
Sonoma Water

Graton WWTP FEMA Flood Mapping
Figure 7-4

7.6.3 Summary

The analysis documented herein shows no existing flooding impacts on two of the West County WWTPs of interest. However, climate change impacts related to more severe flooding could increase the flooding risks, as follows:

- The RRCSD WWTP should generally remain resilient to flooding under the projected 100-year flood conditions, except for the Emergency Storage Pond.
- The RRCSD WWTP could experience more widespread flooding at 500-year flood conditions under the climate change scenarios evaluated.
- The GCSD WWTP would be vulnerable to flooding in a 100-year event under the Mid to Late Century climate change scenarios.
- Additional analysis of flooding potential in Atascadero Creek watershed is needed to better define potential impacts to the GCSD WWTP.

The FWD WWTP and existing OCSD WWTP sites do not have known impacts from flooding and are thus not evaluated as being further impacted under the climate change scenarios.