

The seal of the City of Petaluma, California, is a circular emblem. It features a central figure, likely a woman, holding a staff and a basket. The text "PETALUMA" is written around the top inner edge of the circle, and "1858" is at the bottom. The seal is semi-transparent and overlaid on the top text.


*Petaluma, California*

# water recycling

EXPANSION PROGRAM

**Draft EIR**

July 7, 2008

A photograph of a wetland area with a pond. Several geese are visible, some swimming in the water and others on the grassy bank. The background shows a line of trees under a clear blue sky.

# **CITY OF PETALUMA**

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## **PETALUMA WATER RECYCLING EXPANSION PROGRAM**

**DRAFT EIR**

**JULY 7, 2008**

**State Clearinghouse #2007052146**

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# 1 INTRODUCTION AND SUMMARY

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## ENVIRONMENTAL REGULATION

Pursuant to the California Environmental Quality Act (CEQA), discretionary decisions by public agencies regarding public projects are subject to environmental review. The purpose of an environmental impact report (EIR) is to identify the significant effects of the project on the environment, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided (Section 21002.1(a)). Each public agency is required to mitigate or avoid the significant effects on the environment of projects it approves or carries out whenever it is feasible.

This Draft Environmental Impact Report (EIR) has been prepared by the City of Petaluma, California (lead agency) for the Water Recycling Expansion Program pursuant to CEQA and the CEQA Guidelines (California Administrative Code Section 15000 et seq.). Environmental effects of the project that must be addressed include the significant adverse effects of the project, growth-inducing effects of the project, and significant cumulative effects of past, present, and reasonably anticipated future projects. This EIR tiers from the *Petaluma General Plan 2025 EIR*<sup>1</sup> and serves as both a project-level EIR and a Program EIR for the Water Recycling Expansion Program (WREP).

## EXISTING CONDITIONS, BACKGROUND, AND THE PROJECT

In California, all discharge to surface water is regulated by the State Water Resources Control Board. Nine regional boards protect and enhance the quality of the waters in each watershed basin and issue case-specific permits for all dischargers under the National Pollutant Discharge Elimination System (NPDES).

The City of Petaluma's NPDES permit, as regulated by the San Francisco Bay Regional Water Quality Control Board, prohibits discharge into the Petaluma River during the dry months of the year (May 1 through October 20). Therefore, in the 1980's, the City began providing secondary-treated recycled water for the summertime irrigation of approximately 550 acres of pasture land. The City prepared a Subsequent EIR for the agricultural irrigation project in 1981 (Brown and Caldwell). Later, the City expanded its recycled water irrigation program by adding a vineyard on Lakeville Highway, Adobe Creek Golf Course, and Rooster Run Golf Course. In 2007 the existing agricultural irrigation system used 811 million gallons of secondary treated recycled water during the dry months (City of Petaluma 2007).

The City of Petaluma currently provides secondary treatment for dry weather flows up to 5.2 million gallons per day (mgd) at the wastewater treatment facility at Hopper Street and the oxidation ponds on Lakeville Highway. Approximately 30% of the total wastewater generated is used in the existing secondary recycled water irrigation program, and the remainder is discharged to the Petaluma River.

In 2005, the City began constructing the Ellis Creek Water Recycling Facility (WRF) adjacent to the oxidation pond site. The Ellis Creek WRF was sized based on future flow and loads identified in the *Water Recycling Facility Project, Project Report* (Carollo Engineers 2000) at 6.7 mgd average dry weather flow (ADWF). The future flow and loads were developed using historical data and future population projections as identified in the *City of Petaluma 1987-2005 General Plan*, as well as the City's service agreement with

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<sup>1</sup> The EIR for the *Petaluma General Plan 2025* was certified on April 7, 2008 by City Council Resolution 2008-058.

Sonoma County for wastewater generated in Penngrove. The report indicated there would be approximately 1,000 MG per year available for reuse under buildout of the 1987 General Plan.

To accommodate annual flows the Ellis Creek WRF, when complete in 2009, will be able to produce secondary recycled water up to 8 mgd and tertiary recycled water up to 6.7 mgd. The tertiary recycled water will be of the quality to support various uses allowed by Title 22 for tertiary recycled water, including irrigation of food and pasture crops; irrigation of landscaping, parks, and schools; industrial and commercial uses such as concrete mixing, car washes, and cooling towers; and indoor uses such as fire sprinkler systems and toilet flushing in commercial or institutional buildings.

In 2006, the City completed a Water Demand and Supply Analysis (Dodson 2006). The analysis found that using recycled water for irrigation of fields and other landscaped areas currently dependent on potable water, in conjunction with water conservation, is critical to conserving the City's potable water supply, especially during drought periods.

The Water Supply and Demand Analysis calls for use of 650 MG per year of tertiary recycled water for irrigation of parks, athletic fields, open space, golf courses, agricultural use, and for various uses at the Ellis Creek WRF. Of the 650 MG, approximately 464 MG would replace potable water use, freeing up 464 MG of potable water supply. In addition, the analysis identifies approximately 350 MG<sup>2</sup> of secondary recycled water use, which would continue to support agricultural irrigation.

In 2008, the City prepared *Ellis Creek Water Recycling Facility Flow Projection – General Plan 2025* (Carollo 2008), included in this EIR as Appendix G. This report updated projections for the Ellis Creek WRF based on General Plan 2025 demand from 6.7 to 7.3 mgd ADWF. With the City's adoption of the Water Conservation Plan (Dodson 2008), the Ellis Creek WRF ADWF would be reduced to 6.4 mgd at buildout. In addition, the report determined the recycled water available for reuse to be 1,025 to 1,070 MG per year. The additional 25 to 70 MG per year, over the 1,000 MG identified in the *Water Recycling Facility Project, Project Report* (2000) and used in the Water Supply and Demand Analysis (2006), would likely go to the secondary agricultural system, thus increasing the amount of secondary recycled water available at buildout of the 2025 General Plan to between 375 and 420 MG.

The WREP includes the infrastructure required for the distribution and application of 1,025 to 1,070<sup>3</sup> MG of tertiary and secondary recycled water within and around the City of Petaluma. This level of use is anticipated at buildout of General Plan 2025.

Please refer to Chapter 5, Alternatives to the Proposed Project for a discussion of alternatives. Two alternatives are analyzed: the Manor Lane Alternative which provides an alternative to the near-term improvements and the No Project Alternative. Chapter 5 also discusses alternatives that have been considered but eliminated from further evaluation and provides a comparison of the environmental impacts of the alternatives.

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<sup>2,3</sup> The volume of recycled water produced by the WRF at buildout of the *General Plan 2025* is expected to vary due to weather; the volumes given here are for a normal weather year. A range of recycled water volumes is provided in this EIR to account for maximum and minimum volumes of water conservation that would be achieved through implementation of the *Water Conservation Plan* (January 2008) through buildout.

## **PUBLIC AND AGENCY INVOLVEMENT**

On May 30, 2007, a Notice of Preparation was distributed to the State Clearinghouse and to interested and responsible local and state agencies. On May 31, 2007, the City held a public informational prescoping meeting at the Petaluma Community Center at Lucchesi Park. At this meeting the City presented the project to the public and discussed the various ways in which the public could participate in the EIR process. On June 12, 2007 the City held a Scoping Meeting, also at the Community Center, to solicit comments about the issues that should be addressed in the EIR. The meetings were noticed in the Press Democrat (three times) and the Petaluma Argus Courier (two times), as well as via two email distributions to interested persons. The scoping period ended on July 2, 2007. Two comment letters were received from agencies and one from a member of the public; they are included in Appendix A.

### **Public Information and Notification**

The City maintains a website (<http://www.cityofpetaluma.net/waterrecycling>) as an interactive tool for the public to obtain information about the Program and to contact Program representatives. For example, the website has information about the Program Objectives, Frequently Asked Questions, and Schedule, and makes CEQA-related reports available for downloading. The website also contains a page specifically providing information about public participation, including a description of opportunities for public involvement and contact information. As part of the contact information, the website offers a link allowing individuals and organizations to add their name to the City's WREP mailing list. The mailing list is used to send information about the Program, including notification of meetings and availability of documents.

### **Availability of the Draft EIR and Public Comment Period**

The Draft EIR will be circulated for 45 days, from July 7, 2008 to August 20, 2008, to allow public agencies and interested individuals to review and comment on the document. Two public hearings on the Draft EIR will be held at the Petaluma Council Chamber on August 26 and September 8, 2008 to receive oral comments. Written comments on the Draft EIR will be accepted by the City until 5:00 p.m. on August 20, 2008. Public agencies and interested organizations and individuals are encouraged to submit comments on the Draft EIR for consideration by the City. All written comments should be sent to:

Margaret P. Orr, PE, Engineering Manager  
Department of Water Resources and Conservation  
City of Petaluma  
202 North McDowell Boulevard  
Petaluma, CA 94954  
Fax: 707-778-4508  
E-Mail: [morr@ci.petaluma.ca.us](mailto:morr@ci.petaluma.ca.us)

Written comments also may be delivered to the Petaluma Water Resources and Conservation Department between 8:00 a.m. 5:00 p.m. Monday through Friday.

To facilitate understanding of the comments, please provide a separate sentence or paragraph for each comment, and note the page and chapter of the Draft EIR to which the comment is directed. This approach to commenting will help the City to provide a clear and meaningful response to each comment.

The Draft EIR and appendices will be available for review at the Petaluma Library, Petaluma Community Center, and Petaluma Senior Center. The Draft EIR, including appendices is also available in downloadable Adobe Acrobat format on the WREP web site at <http://www.petaluma.waterrecycling.com>. The Draft EIR,

appendices and reference material cited in the Draft EIR are available for review at the Water Resources and Conservation Department, located at 202 North McDowell Blvd., Petaluma.

## AREAS OF CONTROVERSY AND KEY ISSUES TO BE RESOLVED

The Scoping phase of the environmental review for the WREP identified a number of key issues to be addressed in the EIR. These issues are listed below with references to the chapter and sections in which each issue is addressed.

**TABLE 1-1**  
**Key Issues to be Resolved in the EIR**

<b>Issues</b>	<b>Chapter/Section of EIR where Issue Is Evaluated</b>
Agricultural irrigation uses	4.2 Agriculture and Soil Quality 4.4 Hydrology and Water Quality 4.11 Visual Resources
Agriculture soil productivity	4.2 Agriculture and Soil Quality
Alternatives	5 Alternatives
Water quality	4.4 Hydrology and Water Quality 4.7 Public Health and Safety
Air Quality	4.7 Public Health and Safety 4.5 Air Quality
Biological impacts	4.8 Biological Resources
Community separator	4.1 Land Use 4.2 Agriculture and Soil Quality 4.11 Visual Resources
Earthquake-induced ground shaking and liquefaction	4.3 Geology, Soils, and Seismicity
Emergency preparedness	4.3 Geology, Soils, and Seismicity 4.7 Public Health and Safety
Fish and wildlife	4.8 Biological Resources
Greenhouse gases	4.5 Air Quality
Groundwater	4.4 Hydrology and Water Quality 4.12 Public Services, Utilities and Energy
Growth impacts	6 Growth-inducing Impacts
Hazardous Waste Sites	4.7 Public Health and Safety
Historical and cultural resources	4.10 Cultural Resources
Odor	4.5 Air Quality
Public exposure to chemicals and pathogens	4.7 Public Health And Safety 4.4 Hydrology and Water Quality 4.5 Air Quality

**TABLE 1-1**  
**Key Issues to be Resolved in the EIR**

<b>Issues</b>	<b>Chapter/Section of EIR where Issue Is Evaluated</b>
Public health and safety	4.7 Public Health and Safety
Rare and endangered species and habitats	4.8 Biological Resources
Unstable slopes	4.3 Geology, Soils, and Seismicity
Visual impacts	4.1 Visual Resources
Water supply and potential resources	4.12 Public Services, Utilities and Energy
Wetlands	4.8 Biological Resources

## **SUMMARY OF CEQA-REQUIRED SECTIONS**

### **Growth-inducing Impacts**

Growth can be induced in a number of ways, including through the elimination of obstacles to growth or through the stimulation of economic activity within the region. A project's growth-related impacts are generally secondary impacts. For example, a project may cause an increase in an area's population, which can result in added strain to existing facilities and services. Depending upon the status of the existing facilities and services as well as the extent of growth added by the project, this increase in use may or may not have an adverse impact.

The WREP has been designed to provide the capacity necessary to accommodate growth consistent with population growth projections of the Petaluma General Plan 2025 and the Sonoma County General Plan relative to Penngrove, and the WREP EIR tiers from the General Plan 2025 EIR. The certified EIR for the General Plan 2025 concludes that the General Plan 2025 does not ultimately have growth inducing impacts. All possible growth-inducing impacts of the General Plan 2025 are identified, analyzed and evaluated in its EIR. That analysis is relied on for evaluation of the growth-inducing impacts of the WREP, which was included in the General Plan EIR at a programmatic level. The WREP would allow increases in wastewater capacity and water supply to facilitate the growth envisioned in the General Plan 2025. However, the rate of growth is less under General Plan 2025 than recent historic growth rates, and slightly less than would be permitted under the existing 1987 General Plan.

Because the General Plan 2025 is self-mitigating to the fullest extent possible, it contains goals, policies and programs designed to reduce the impacts of growth it envisions to less than significant levels, to the fullest extent possible. All growth-inducing impacts of the General Plan have been analyzed in the General Plan EIR. The WREP provides an essential share of the water and wastewater capacity needed to serve planned General Plan 2025 growth, and its growth-inducing impacts are mitigated by the same policies and programs that mitigate effects of General Plan 2025 growth.

The impacts of induced growth have been evaluated in the General Plan EIRs certified for both the City and County. These two General Plan EIRs are incorporated by reference and the impacts identified in them are summarized in Chapter 6 and Appendix E of this EIR.

### **Environmentally Superior Alternative**

The California Environmental Quality Act requires the identification of an Environmentally Superior Alternative; that is, the alternative which has no significant effect or has the least significant effect on the environment. For reference, significance is determined based on substantial or potentially substantial adverse changes of any of the physical environmental conditions due to the Project. The degree of change is evaluated against existing environmental conditions.

The No Project Alternative is the Environmentally Superior Alternative, in that it requires no new construction. However, the No Project Alternative has impacts, because it discharges additional effluent to the Petaluma River and does not provide mitigation. It also has significant public services impacts, in that it does not accommodate the water supply needs for Petaluma's General Plan 2025 and does not allow the necessary increase in wastewater disposal capacity needed for Penngrove and Petaluma. The No Project Alternative does not meet the project objectives.

When the No Project Alternative is selected as the Environmentally Superior Alternative, the CEQA Guidelines require that an environmentally superior alternative be selected from among the other alternatives. The analysis presented in Chapter 5, Alternatives to the Proposed Project, indicates that the Manor Lane Alternative is expected to potentially have greater impacts than the project relative to Agriculture (Williamson Act contract), Noise (closer sensitive receptors), Biological Resources (pipeline crossing of Adobe Creek), Cultural Resources (pipeline near Petaluma Adobe State Historical Landmark), and Visual Resources (tank visible from Adobe Road, a County-designated Scenic Corridor). The only other alternative evaluated in this EIR is the proposed project, and it is therefore, environmentally superior, in that no feasible alternatives that meet most of the project objectives have been identified that reduce significant environmental impacts.

Agency and public comments to the City of Petaluma relative to the environmentally superior alternative are welcome. The City will weigh the environmental effects of the project against the effects of the alternatives during their consideration of approval of a project.

### **Summary of Significant Impacts**

The following table identifies, by environmental topic, the significant project impacts and measures that are proposed to mitigate these impacts. Additional information about the impacts and mitigation measures can be found in the other sections of this EIR, as referenced for each topic. The numbering of the impacts corresponds to the numbering within each section in Chapter 4.

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
<b>1. Land Use</b>				
LU-1. Will the WREP conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project?	No Impact	No Impact	No mitigation is necessary	No Impact
LU-2. Will the WREP be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	No Impact	Less than Significant	No mitigation is necessary	Less than Significant
LU-3. Will the WREP introduce inappropriate uses in a Sonoma County Community Separator or a Petaluma Urban Separator?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
LU-4. Will the WREP increase potential for conflict as a result of incompatible land uses?	No Impact	No Impact	No mitigation is necessary	No Impact
LU-5. Will the WREP convert non-urban land to urban uses for Project facilities?	No Impact	No Impact	No mitigation is necessary	No Impact
LU-6. Will the WREP convert public open space for Project facilities?	No Impact	Significant	LU-1 Replacement of Open Space Easements	Less than Significant
LU-7. Will the WREP result in loss of homes or businesses due to construction of facilities?	No Impact	No Impact	No mitigation is necessary	No Impact
LU-C1 and C4. Will the WREP plus cumulative projects conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project, or increase potential for conflict as a result of incompatible land?	No Impact	No Impact	No mitigation is necessary	No Impact

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
LU-C2. Will the WREP plus cumulative projects be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	No Impact	Less than Significant	No mitigation is necessary	Less than Significant
LU-C3. Will the WREP plus cumulative projects introduce inappropriate uses in a Community Separator?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
LU-C5. Will the WREP plus cumulative projects convert non-urban land to urban uses for Project facilities?	No Impact	No Impact	No mitigation is necessary	No Impact
LU-C6. Will the WREP plus cumulative projects convert public open space for project facilities?	No Impact	Less than Significant	No mitigation is necessary	Less than Significant
LU-C7. Will the WREP plus cumulative projects result in loss of homes or businesses due to construction of facilities?	No Impact	No Impact	No mitigation is necessary	No Impact
<b>2. Agriculture and Soil Quality</b>				
AG-1. Will the WREP cause loss of farmland?	No Impact	No Impact	No mitigation is necessary	No Impact
AG-2. Will the WREP cause Williamson Act contracts to be canceled?	No Impact	No Impact	No mitigation is necessary	No Impact
AG-3. Will the WREP reduce agricultural soil and non-agricultural soil productivity due to erosion of topsoil from application of recycled water?	No Impact	Less than Significant	No mitigation is necessary	Less than Significant
AG-4. Will the WREP reduce agricultural soil and non-agricultural soil productivity due to build-up of trace elements and salinity?	No Impact	Less than Significant	No mitigation is necessary	Less than Significant



**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
AG-5. Will the WREP cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	Significant	Significant	AG-1 Purchase Locally Grown or Inspected Plants	Less than Significant
AG-C1 through C5. Will the WREP plus cumulative projects create impacts to agricultural resources based on evaluation criteria 1 through 5?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
<b>3. Geology, Soils and Seismicity</b>				
GS-1. Will the WREP be located on a geologic unit or an unstable area that could potentially result in on- or off-site landslides?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
GS-2. Will the WREP be located on a geologic unit or soil that is susceptible to liquefaction or lateral spreading during an earthquake?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
GS-3. Will the WREP be located on expansive soil, as defined in the Sonoma County soil survey?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
GS-4. Will the WREP be located on corrosive soil, as defined in the Sonoma County soil survey?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
GS-5. Will earthquake-induced strong ground shaking damage WREP facilities?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
GS-6. Will construction of the WREP cause off-site water-related erosion?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
GS-7. Will the WREP be subject to ground rupture due to location near a surface trace of an active fault?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
GS-C1 - C7. Will the WREP plus cumulative projects create geologic or seismic impacts based on evaluation criteria 1 through 7?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
<b>4. Hydrology and Water Quality</b>				
HWQ-1. Will operation of the WREP cause a violation of any narrative or numeric water quality standard or result in non-attainment of established TMDLs?	No Impact	Significant	HWQ-1 Pond or Dam Seepage	Less than Significant
HWQ-2. Will the construction and operation of the WREP result in a substantial degradation of surface water runoff quality?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
HWQ-3. Will the WREP alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
HWQ-4. Will operation of the WREP cause flooding?	Less than Significant	Less than Significant	No mitigation is necessary.	Less than Significant
HWQ-5. Will the WREP degrade groundwater quality at existing or future drinking water wells, resulting in a public health hazard?	Less than Significant	Significant	HWQ-1 Pond Seepage	Less than Significant
HWQ-6. Will the WREP cause groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
HWQ-7. Will the WREP substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
HWQ-C1-7. Will the WREP plus cumulative projects result in hydrologic or water quality impacts based on criteria 1 through 7?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
<b>5. Air Quality</b>				
AQ-1. Will construction of the WREP generate emissions that expose people to high levels of dust and equipment exhaust?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
AQ-2. Will the WREP emissions cumulatively exceed allowable limits?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
AQ-3. Will the WREP expose sensitive receptors to substantial levels of toxic air contaminants?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
AQ-4. Will the WREP violate or contribute to violation of ambient air quality standards?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
AQ-5. Will the WREP cause potential odors?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
AQ-6. Will the WREP increase greenhouse gas emission levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?	Less than Significant	Less than Significant	No mitigation is necessary	No Impact

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
AQ-C1-C5. Will the WREP plus cumulative projects create impacts to air quality based on evaluation criteria 1 through 6?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
AQ-C6. Will the WREP plus cumulative projects increase greenhouse gas emissions levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?	Significant <sup>4</sup>	Significant <sup>4</sup>	No additional feasible mitigation has been identified.	Significant
<b>6. Noise</b>				
NOI-1. Will construction of the WREP generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
NOI-2. Will construction of the WREP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
NOI-3. Will operation of the WREP generate noise levels exceeding local regulatory criteria or cause a substantial permanent increase in ambient noise levels above existing levels in the vicinity?	No Impact	Significant	NOI-1 Pump Station Noise Control	Less than Significant

<sup>4</sup> This impact is no greater than the cumulative greenhouse gas emissions impact which was studied in the General Plan 2025 EIR and made the subject of a Statement of Overriding Considerations.

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
NOI-C1 – C3. Will the WREP plus cumulative projects disturb noise-sensitive receptors during or after construction based on evaluation criteria 1 through 3?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
<b>7. Public Health and Safety</b>				
PHS-1. Will the WREP expose the public to pathogenic viruses, bacteria, or other disease organisms at concentrations detrimental to human health?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PHS-2. Will the WREP expose workers or the public to hazards from a known hazardous waste site?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PHS-3. Will the WREP increase potential exposure of the public to hazardous materials due to a chemical release?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PHS-4. Will the WREP expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PHS-5. Will the WREP increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?	No Impact	Less than Significant	No mitigation is necessary	Less than Significant

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
PHS-6. Will the WREP expose people or structures to a risk of loss, injury or death involving wildland fires?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PHS-7. Will the WREP expose the public to a flooding hazard?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PHS-8. Will the WREP create a safety hazard for people residing or working near a public or private airport or airstrip?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PHS-C1 through C8. Will the WREP plus cumulative projects have an impact on public health and safety based on criteria 1 through 8?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
<b>8. Biological Resources</b>				
BIO-1. Will the WREP result in the loss of any species identified as a threatened, endangered, candidate, sensitive or special-status species or its habitat?	Significant	Significant	BIO-1a Avoid the Loss of Candidate, Sensitive, or Special Status Species and their Habitats BIO-1b Rare, Threatened and Endangered Plant Protection Program BIO-4a Native Wildlife Nursery Protection Program	Less than Significant
BIO-2. Will the WREP have a substantial adverse effect on any riparian habitat or other sensitive natural community?	Less than Significant	Significant	BIO-2a Avoid Loss of Riparian Habitat or Other Sensitive Natural Communities BIO-2b Avoid Loss of Aquatic Habitat due to Open Reservoir	Less than Significant
BIO-3. Will the WREP have a substantial adverse effect on protected wetlands or waters through direct removal, filling, or other means?	Less than Significant	Significant	BIO-3 Avoid Fill and Other Impacts to Jurisdictional Waters and Wetlands	Less than Significant

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
BIO-4. Will the WREP interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?	Significant	Significant	BIO-4a Native Wildlife Nursery Protection Program BIO-4b Avoid Blocking Major Wildlife Migration or Travel Corridors	Less than Significant
BIO-5. Will the WREP result in the loss of protected trees or Sonoma County designated critical habitat?	No Impact	Significant	BIO-5 Avoid Permanent Impacts to Protected Trees	Less than Significant
BIO-6. Will the WREP conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?	Significant	Significant	BIO-1a Avoid the Loss of Candidate, Sensitive, or Special Status Species and their Habitats BIO-1b Rare, Threatened and Endangered Plant Protection Program	Less than Significant
BIO-7. Will the WREP expose organisms to hazardous levels of toxic substances?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
BIO-C1. Will the WREP cumulatively impact biological resources?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
<b>9. Transportation and Circulation</b>				
TR-1. Will the WREP traffic cause congestion along project area roadways?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
TR-2. Will lane closures due to WREP construction cause traffic delays, transit delays, restricted access, and rerouting of traffic, including emergency vehicles?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
TR-3. Will the WREP construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
TR-4. Will WREP construction traffic damage public or private roadbeds?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
TR-5. Will there be inadequate parking for WREP activities?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
TR-6. Will WREP construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
TR-C1 through C6. Will the WREP plus cumulative projects cause impacts to traffic based on evaluation criteria 1 through 6?	Less than Significant	Significant	No feasible mitigation identified	Significant
<b>10. Cultural and Paleontological Resources</b>				
CR-1. Will the WREP cause a substantial adverse change in the significance of a historical or archeological resource as defined in Title 14, California Code of Regulations §15064.5 or have an adverse effect on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places?	Significant	Significant	CR-1a Identify and Avoid or Minimize Impacts to Cultural Resources (Project Level) CR-1b Identify and Avoid or Minimize Impacts to Cultural Resources (Program Level)	Less than Significant
CR-2. Will the WREP disturb any human remains, including those interred outside of formal cemeteries or will the project disturb any Native American human remains, associated grave goods, or items of cultural patrimony?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant



**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
CR-3. Will the WREP directly or indirectly destroy a unique paleontological resource or site?	Significant	Significant	CR-2 Evaluation and Treatment of Paleontological Resources	Less than Significant
CR-C1 and C2. Will the WREP have a cumulative potential to impact cultural resources?	Less than Significant	Less than Significant	No additional mitigation is necessary	Less than Significant
CR-C3. Will the WREP have a cumulative potential to impact paleontological resources?	Less than Significant	Less than Significant	No additional mitigation is necessary	Less than Significant
<b>11. Visual Resources</b>				
VR-1. Will the WREP be inconsistent with the Sonoma County General Plan regarding Community Separators or the Petaluma General Plan regarding Urban Separators?	No Impact	Less than Significant	No mitigation is necessary	Less than Significant
VR-2. Will the WREP be inconsistent with the Sonoma County General Plan regarding Scenic Landscape Units?	Significant	Less than Significant	VR-1 Landscape Screening	Less than Significant
VR-3. Will the WREP be inconsistent with the Sonoma County or Petaluma General Plans regarding scenic corridors?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
VR-4. Will the WREP be inconsistent with the Petaluma General Plan goal to preserve the scenic and natural resources of the open ridgelines and hillsides?	Significant	Less than Significant	VR-1 Landscape Screening	Less than Significant
VR-5. Will the WREP cause an adverse effect on foreground or middle-ground views from a recreation area, other public use area, or private residence?	Significant	Less than Significant	VR-1 Landscape Screening	Less than Significant

**TABLE 1-2**  
**Impact and Mitigation Summary**

<b>Impact</b>	<b>Near-Term Pre-mitigation Significance</b>	<b>Program Level Pre-mitigation Significance</b>	<b>Mitigation Measure</b>	<b>Post-mitigation Significance</b>
VR-6. Will the WREP create a new source of substantial light and glare that would adversely affect day or nighttime views in the area?	Less than Significant	Less than Significant	No mitigation is necessary.	Less than Significant
VR-C1: Will the WREP cumulatively impact Visual Resources?	Less than Significant	Less than Significant	No mitigation is necessary.	Less than Significant
<b>12. Public Services, Utilities and Energy</b>				
PS-1. Will the WREP increase demand for police, fire, water, sewage treatment and disposal, solid waste removal, or energy to such a degree that accepted service standards are not maintained?	No Impact	No Impact	No mitigation is necessary	No Impact
PS-2. Will WREP construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	No Impact	No Impact	No mitigation is necessary	No Impact
PS-3. Will the WREP conflict with wells, septic fields, or water or wastewater utilities?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant
PS-C1 and C2. Will the WREP plus cumulative projects increase demand or disrupt facilities to such a degree that accepted service standards are not maintained based on criteria 1 and 2?	No Impact	No Impact	No mitigation is necessary	No Impact
PS-C3. Will the WREP plus cumulative projects conflict with wells, septic fields, or water or wastewater utilities?	Less than Significant	Less than Significant	No mitigation is necessary	Less than Significant

## REFERENCES

- Brown and Caldwell. 1981. Subsequent Environmental Impact Report for the City of Petaluma Wastewater Irrigation Project. May 11.
- Carollo Engineers. 2002. Technical Memorandum No 9A Water Balance. February.
- Carollo Engineers. 2002. Technical Memorandum No 9B Recycled Water Storage and Pumping Facilities. February.
- Carollo Engineers. 2008. *Ellis Creek Water Recycling Facility Flow Projection – General Plan 2025*. May.
- City of Petaluma. 2008. General Plan 2025 EIR. March.
- City of Petaluma. 2008. *General Plan 2025*. May.
- City of Petaluma. 2008. *Water Conservation Plan*. January.
- City of Petaluma. Secondary Recycled Water Annual Usage Data, available at the Department of Water Resources and Conservation, 702 N. McDowell Blvd., Petaluma, CA.
- Dodson. 2006. Water Supply and Demand Analysis Report. June.

## 2 PROJECT DESCRIPTION

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### PROJECT LOCATION

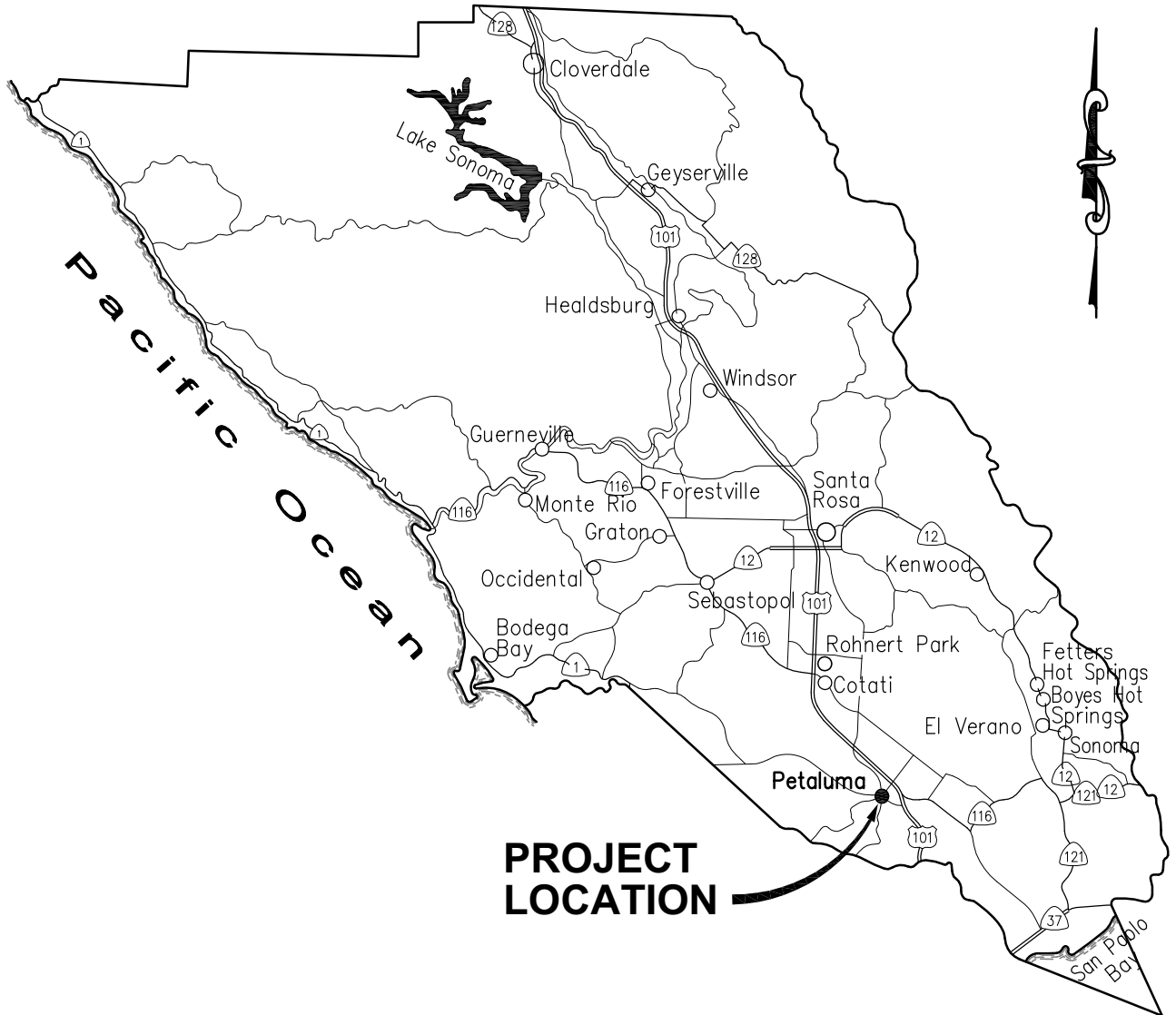
The City of Petaluma, located in southern Sonoma County, is situated at the northernmost navigable end of the Petaluma River, a tidal estuary that snakes southward to San Pablo Bay, approximately 40 miles north of San Francisco. The Petaluma Water Recycling Expansion Program is located within the Urban Growth Boundary of the City of Petaluma as well as on lands located in unincorporated Sonoma County to the south and east of the City. Refer to Figure 2-1 Vicinity Map for additional details.

### PROGRAM OBJECTIVES

The City of Petaluma's Water Recycling Expansion Program is intended to achieve the following objectives:

- To enhance the water supply by providing recycled water for non-potable uses to create a new source of water that is sustainable, drought proof, and readily available within the City of Petaluma;
- To recycle secondary and tertiary water effectively to remain in compliance with regulatory permit requirements during the period of restricted discharge to the Petaluma River (May 1 through October 20);
- To meet regulatory requirements for reuse of approximately 1,025 to 1,070 million gallons (MG) a year of water through a flexible, economical program that provides water application locations in a drought or wet year making the program ecologically sustainable;
- To provide a comprehensive, phased program to construct, improve and expand the facilities, conveyance systems and irrigation systems necessary for the distribution of recycled water to meet user demands and restricted discharge requirements as population buildout occurs under General Plan 2025;
- To provide tertiary recycled water for irrigation reuse applications, and other uses as permitted under Title 22, where the City is currently supplying potable water, secondary recycled water, or for new users such as the Ellis Creek Water Recycling Facility (WRF) and industrial customers' cooling towers, etc.; and
- To continue to support the Water Conservation programs so as to offset potable water demands as described in the Water Conservation Plan.

# SONOMA COUNTY



**Figure 2-1**  
**Project Location**

WREP EIR  
Petaluma, California

## PROJECT CHARACTERISTICS

The WREP consists of recycled water use for agricultural and urban uses within the Urban Growth Boundary of the City of Petaluma and unincorporated areas of Sonoma County south and east of the City. At buildout, the WREP would provide approximately 650 MG per year of tertiary recycled water for urban reuse and approximately 375 to 420 MG per year of secondary recycled water for agricultural reuse for a total of 1,025 to 1,070 MG per year (Carollo 2008). Of the tertiary recycled water to be used, approximately 464 MG would contribute to potable offset. Refer to Appendix F, WREP Size Requirements, for a detailed evaluation of the sizing needed for the project.

The WREP requires conveyance facilities, including distribution pipelines, a 2.2-MG storage tank for tertiary treated recycled water, a 0.5- to 1.0-MG open reservoir for secondary treated recycled water, one new pump station, and associated connecting pipelines and other appurtenances. The project would occur in phases starting in 2009. Near-term conveyance improvements (pipelines and storage tank) are evaluated at a project level of detail; the remainder of the improvements and the use of recycled water are evaluated at a program level of detail, as described below. Refer to Figure 2-2 Concept Plan for the recycled water service area boundary and the location of the near-term conveyance improvements.

### Project-Level Near-Term Conveyance Improvements

The near-term improvements include a 2.2-MG storage tank and approximately 1.6 miles of pipeline to convey tertiary treated recycled water (tertiary pipeline) and 0.4 mile of pipeline to convey secondary treated recycled water (secondary pipeline).

#### ***Tank***

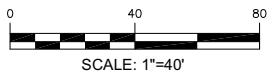
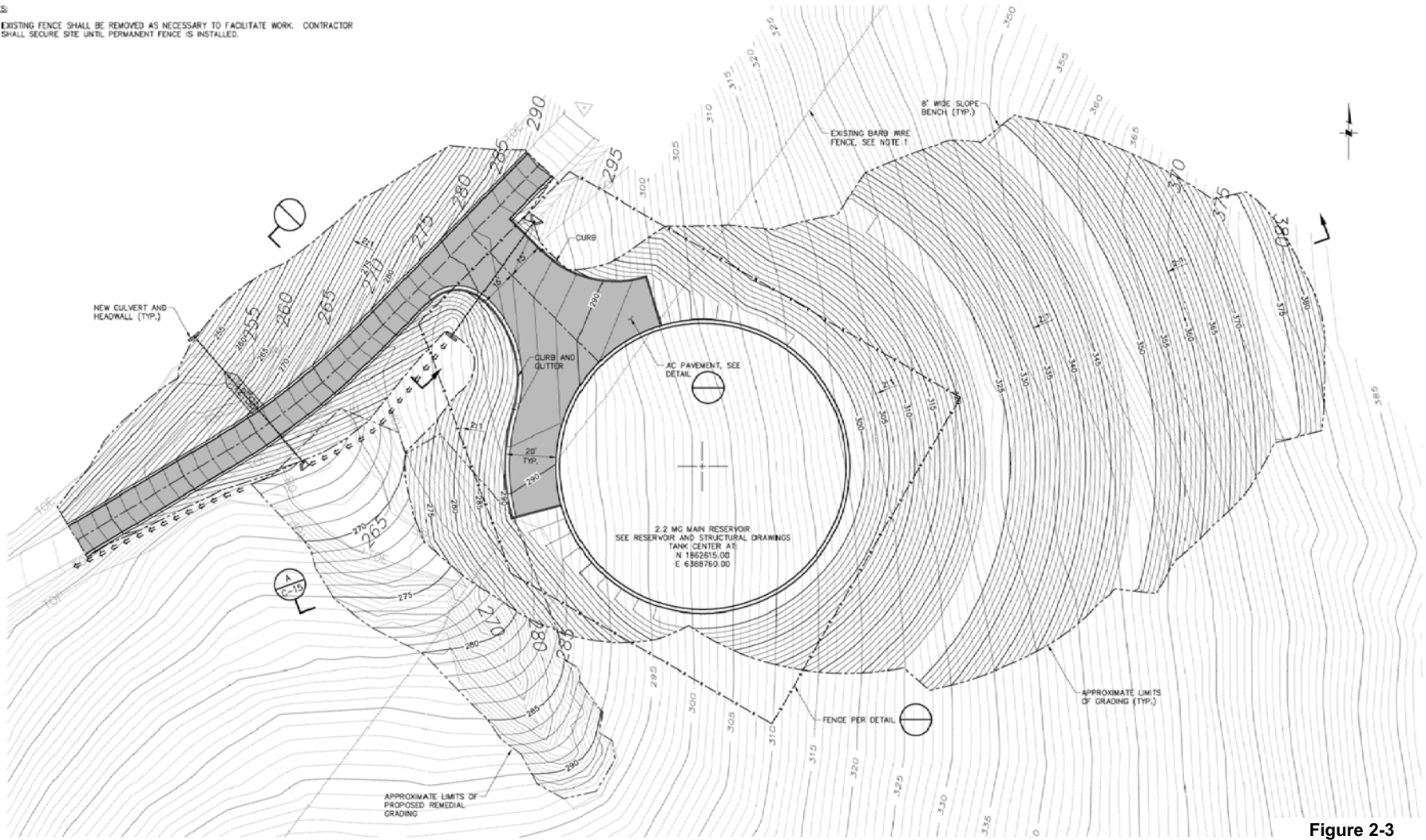
The storage tank would hold 2.2 MG of tertiary treated water and is required to serve the reuse system during times when demand exceeds the maximum day average hourly flow and is also required to maintain system pressure at all times. The tank would be located at an elevation of 280 feet above sea level, northeast of the intersection of East Washington Street and Adobe Road (refer to Figure 2-3 Storage Tank Site Plan). The 280-foot elevation is required to provide adequate pressure to the tertiary customers in the recycled water distribution system when flow is being served by the tank. Property for the tank may be leased or purchased. If purchased, the City could decide to annex the tank site. Any annexation would be limited in area and would be consistent with the voter-approved Urban Growth Boundary (UGB) because the tank site is part of municipal public facilities providing services within the UGB and the existing Penngrove wastewater service area.

The storage tank would be 33.5 feet high and 117 feet in diameter, constructed of pre-stressed concrete, and partially buried in the hillside (refer to Figure 2-4 Storage Tank Profile). The tank and its associated facilities would require approximately 1 acre. Construction of the new tank would include site preparation and clearing, excavation, and earth movement. Approximately 19,000 cubic yards of material would be excavated from the hillside, and approximately 4,000 cubic yards of fill would be brought in to level the site. Construction would temporarily disturb an additional 4 acres, which would be revegetated upon completion.



NOTES

- 1. EXISTING FENCE SHALL BE REMOVED AS NECESSARY TO FACILITATE WORK. CONTRACTOR SHALL SECURE SITE UNTIL PERMANENT FENCE IS INSTALLED.



**Figure 2-3**  
**Storage Tank**  
**Site Plan**

WREP EIR  
Petaluma, California





A 7-foot high (6-foot high chain link with 1 foot barb-wire) fence would be installed around the tank site. A manual gate would provide access to the site. Emergency lighting would be installed at the gate and around the tank.

Any overflow from the storage tank would be piped approximately 500 feet northeast of the storage tank to a system of two existing stormwater detention basins. The larger detention basin has a 175-foot by 135-foot interior pool with 3.5-foot berms and the smaller has an 80-foot by 80-foot interior pool with 5.0-foot berms (refer to Figure 2-5 Location of Detention Basin and Overflow Pipe). Two emergency overflow control systems would have to fail at the storage tank before water would enter either detention basin. An ultrasonic level transmitter would send the tank-level signal to the Ellis Creek WRF, and the pumps would be shut off based on the level signal. If this fails there would be a redundant backup control to the primary control. The high-high float switch would send a separate signal to shut off the Ellis Creek WRF pumps. This would override primary level control and prohibit overfilling in the event of a failure of the ultrasonic level transmitter. If there were to be a loss of communication between the tank site and the Ellis Creek WRF, the Ellis Creek WRF pumps would automatically turn off, which would prevent additional flows to the tank thus preventing any possibility of overflow.

If both control systems fail, which is extremely unlikely, then the water would be piped to the existing stormwater detention basins via the overflow piping system. The detention basins have a total capacity of approximately 3.2 hours of maximum pump run time.

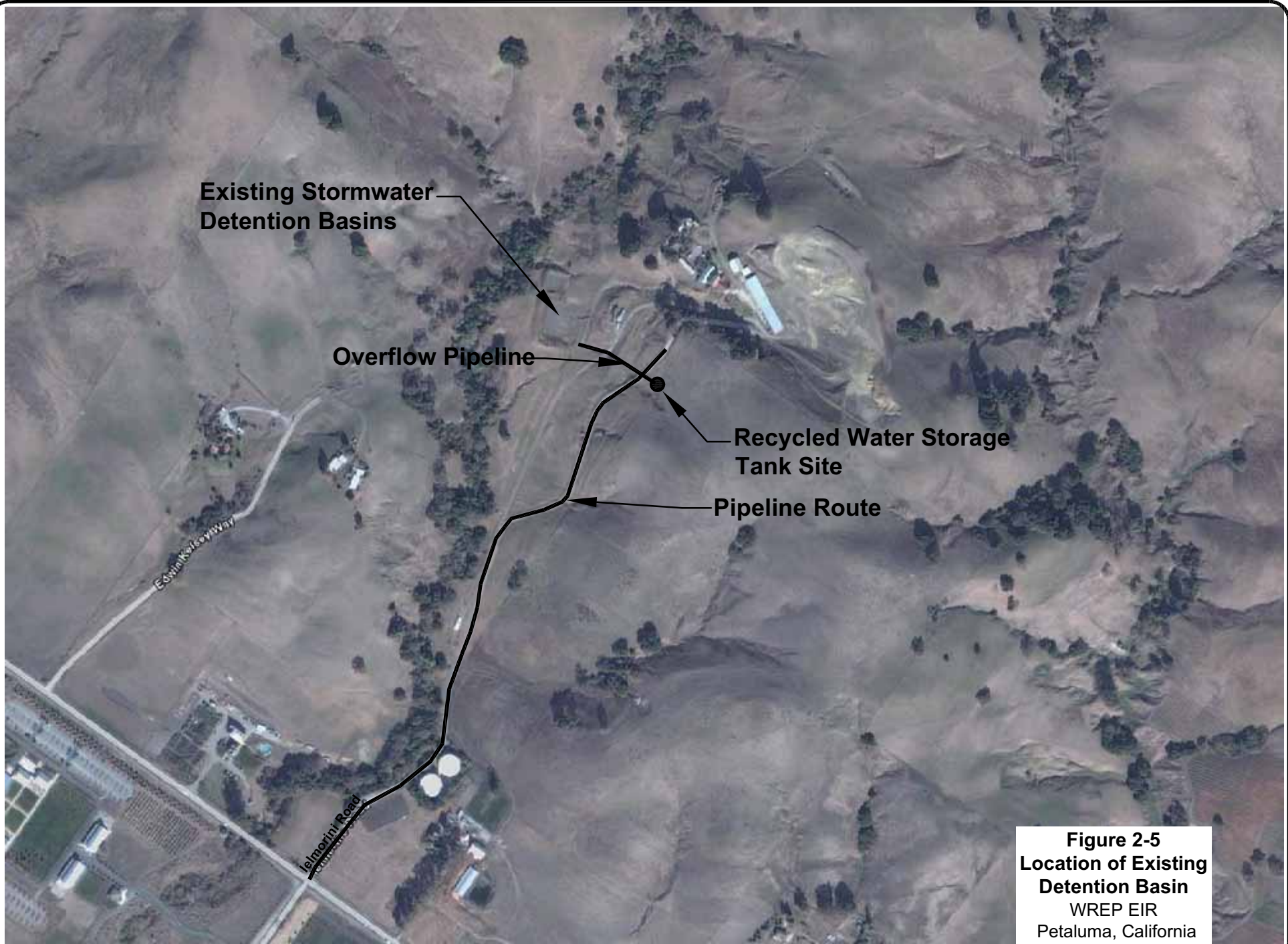
### **Pipelines**

All pipelines would be buried. A 20-inch diameter tertiary pipe would be placed within the public right-of-way along East Washington Street from Parkland Drive to Adobe Road and then along private Ielmorini Road from Adobe Road to the storage tank site. This pipeline segment is approximately 7,500 linear feet and would connect an existing 20-inch tertiary pipe to the proposed tank. The existing 20-inch secondary recycled water line serving Rooster Run Golf Course would carry tertiary recycled water, once construction of the near-term conveyance improvements is complete.

In addition, two 20-inch pipelines, one tertiary and one secondary, would be placed in Browns Lane between the Ellis Creek WRF and Ely Road. The pipes would begin at Booster Pump Station No. 1 at the existing oxidation ponds, cross under Lakeville Highway, and then cut across grassland for approximately 140 feet, where the pipes would enter and continue down Browns Lane. This segment is approximately 1,900 linear feet. The new tertiary pipeline would connect to an existing 20-inch pipe in Ely Road. The new secondary pipeline would replace an existing secondary pipeline and would connect to an existing 20-inch pipeline in Browns Lane. The existing secondary pipeline in Browns Lane, an asbestos cement pipe installed in 1984, requires replacement due to age and deterioration. In addition, the pipe is not adequately rated for the pressures from Booster Pump Station No.1. The old 20-inch pipe would be filled, plugged and abandoned in place.

A 12-inch diameter pipe, 535 feet long would connect the storage tank to the detention basin. The pipe would cross two private gravel roads but would mostly be buried beneath open fields; refer to Figure 2-5 Location of Detention Basin and Overflow Pipe.

The pipes would be installed using an open cut trenching method of construction, except at the location where the pipelines cross Lakeville Highway. At that location, the pipelines would be installed using a conventional auger bore and jack method under Lakeville Highway.



**Figure 2-5**  
**Location of Existing**  
**Detention Basin**  
WREP EIR  
Petaluma, California

The open cut trenching technique includes clearing of the construction site, saw cutting of the pavement where applicable, trench excavation, pipe installation, backfill operations, and repaving where applicable. The temporary construction zone would be up to 30 feet wide, allowing the contractor to cast the excavated material to the side of the trench, install the pipe and backfill the trench. The estimated trench width would be approximately 3.5 to 4 feet, and estimated trench depth would be approximately 6 to 7 feet; however the dimensions may vary depending on existing site conditions such as the location of existing utilities. During construction, vertical wall trenches along roadways would be temporarily closed at the end of each work day, either by covering them with steel trench plates or backfill material to restrict access depending on physical conditions and requirements of the encroachment permit.

At Lakeville Highway, the conventional auger bore and jack process would involve jacking a steel casing through the ground while simultaneously removing soil from inside the casing with rotating continuous flight augers. Vertical shafts would be required at each end of the linear tunnel. The jacking pits would be approximately 36 feet by 12 feet. The receiving pits would be approximately 10 feet by 10 feet. The temporary pits would be excavated to a depth of about 12 feet.

All unusable spoils excavated along roadways would be hauled off site to permitted disposal facilities, and backfill material would be imported from permitted sources, as required.

East Washington Street and Browns Lane are paved roads, while Ielmorini Road is a private paved road. Paved roads would be returned to existing or better condition as part of the project. Ielmorini Road, between East Washington and the tank site, would be overlaid after pipe installation, and the tank site would be paved as part of the project.<sup>1</sup>

All pipelines would have intermediate isolation valves at points along the pipeline. The number and spacing of these valves would vary depending upon the size and location of the pipeline. At each isolation valve location, a valve would be located below grade and buried. A valve operating nut would be located inside a valve box at grade for access by the operations staff. Pipeline air release /vacuum valve stations would be located at local high points along the pipeline alignment with a vent at grade within a valve box.

### **Staging Areas**

The staging area for the storage tank would be within the temporary disturbance area discussed above. Staging for the East Washington Street pipeline would require up to one acre at two different sites or would occur within the 30-foot construction corridor. Locations would be proposed by the contractor, approved by the City, and would occur only in existing paved lots or disturbed vacant lots where no biological or cultural resources occur. Staging for the Browns Lane pipelines would be along the pipeline route within the 30-foot construction corridor or within City-approved areas as described above.

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<sup>1</sup> Improvements are also expected to be made to approximately 900 feet of roadway inside the Ellis Creek Water Recycling Facility as part of the same construction contract. However, these improvements were evaluated in the Water Recycling Facility and River Access Improvements EIR (2003) and are not part of the project description of this EIR.

### ***Construction Schedule***

Construction for the near-term improvements would begin in Spring of 2009 and be complete in 2009 or 2010.

### **Improvements to be Evaluated at a Program Level**

Components of the project to be evaluated at a program level of detail include use of both secondary and tertiary recycled water, secondary and tertiary pipelines, a small open reservoir for secondary recycled water, new and upgraded pump stations, and associated facilities.

### ***Use of Secondary and Tertiary Recycled Water***

Implementation of the project would include phased delivery and use of secondary and tertiary recycled water between 2008 and buildout of the General Plan 2025. The majority of tertiary recycled water, approximately 650 MG per year, would be utilized mainly in the urbanized areas of Petaluma for such uses as irrigation of golf courses, playing fields, parks, business parks, schools, and at the Ellis Creek WRF for process water and fire protection. Two existing agricultural customers would be converted to tertiary because the tertiary line passes near their property thus making it more cost effective to serve tertiary water. Other allowable uses could include those allowed by Title 22, such as in the commercial/industrial setting for concrete make-up water, toilet flushing, fire suppression systems, and cooling towers. The secondary recycled water, approximately 375 to 420 MG per year, would mainly go to rural agricultural users along Lakeville Highway and Browns Lane. Agricultural uses include forage crops, pasture, and vineyards. Refer to Figure 2-2 Concept Plan for the recycled water service area boundary and potential recycled water users. Also, refer to Appendix F WREP Size Requirements for a detailed explanation of how the size of the WREP is determined by the two primary objectives which the project is designed to fulfill: disposal of recycled water produced at the Ellis Creek WRF, a requirement of the wastewater treatment system; and irrigation with recycled water to offset the use of potable water, a requirement of the water supply system.

There are two types of components that would occur over time as demand for recycled water increases. The first is transition from use of potable water to application of tertiary recycled water for irrigation, or other allowed uses. The second type is removal of some agricultural lands from recycled water use as demand for tertiary water (i.e., potable water) increases. The volume of recycled water that would be transitioned from agricultural irrigation to urban irrigation would be approximately 350 to 395 MG per year, or 58 to 65 percent of the existing system, by 2025. This decrease in the use of secondary treated water would decrease the amount of historically irrigated land south and east of the City by the same percentage. There is no specific time line for the transition from potable to tertiary use or from secondary to tertiary use; changes would occur as water demand requires. Table 2-1 provides additional information on the existing and proposed use of recycled water for agricultural use. The City has modeled a reasonable rate of implementation for recycled water pipe sizes, reservoir size, and possible routes to recycled water irrigation sites that are anticipated to be good candidates based on cost effectiveness for water applications. Other locations that meet applicable regulations would also be considered as the program grows through buildout of the General Plan 2025.

**TABLE 2-1**  
**Existing and Proposed Recycled Water Use for Agriculture through Buildout (2025)**

	<b>Existing Use<sup>1</sup></b> MG Per Year	<b>Remove from Existing System</b>	<b>Use at Buildout</b> MG Per Year
Recycled Water	607	350 to 395	213 to 258 <sup>2</sup>

<sup>1</sup>As reported for year 2005 in the Water Supply and Demand Analysis Report (2006). Actual usage varies each year depending on weather.

<sup>2</sup>Includes 39 MG in the existing system that will convert from secondary to tertiary recycled water.

To provide operational flexibility for management of recycled water, the program includes purchase or long-term lease of up to 205 acres of land for use by the City as contingent irrigation areas to be used when needed. For instance, this City land could be irrigated in the case of late spring rains.

### **Pipelines**

Modeling analysis and conceptual design for the future phases of the recycled water storage and distribution system have been completed; however, the exact location of pipelines has not been determined. The recycled water pipelines would distribute tertiary water from the Ellis Creek WRF to users within the recycled water service area shown on Figure 2-2. There also would be a secondary pipeline from the Ellis Creek WRF to a reservoir north of Lakeville Highway (refer to the following section for a description of the reservoir). Also, secondary pipelines in the existing system may need to be replaced over time due to age and deterioration. Refer to Table 2-2 for a summary of existing and proposed pipelines, including pipelines to be built as part of the near-term improvements.

**TABLE 2-2**  
**Existing and Proposed Pipelines**

<b>Pipelines</b>	<b>Existing</b>	<b>Project-level Near-term Improvements</b>	<b>Program-level Improvements</b>
Tertiary Pipelines	0.0 miles	1.6 miles	25 miles
Secondary Pipelines	7.4 miles	0.4 mile	3.0 miles
Converted from Secondary to Tertiary	NA	6.0	0.0
<b>TOTAL</b>	<b>7.4 miles</b>	<b>8.0 miles</b>	<b>28 miles</b>

The pipes would range in size from 6 to 20 inches in diameter depending on the needs of the user. The pipelines would be installed primarily in paved roads, but also in some unpaved roads and off-road if needed to serve recycled water users or to meet elevation requirements of the reservoir. Under most conditions the pipes would be installed using an open cut trenching method of construction.

The open cut trenching technique includes clearing of the construction site, saw cutting of the pavement where applicable, trench excavation, pipe installation, backfill operations, and repaving, where applicable. The estimated trench width for a 20-inch-diameter recycled water pipeline (i.e., largest size) would be approximately 4 feet and estimated trench depth would be approximately 7 feet; however the dimensions would vary with the location along the route and the diameter of the pipeline. The temporary construction zone would be up to 30 feet wide, allowing the contractor to cast the excavated material to the side of the trench, install the pipe and backfill the trench.

Trenchless pipe installation methods, such as bore and jack, horizontal directional drilling or microtunneling, would be employed in areas where open cut trenching is not feasible due to limited construction area, geotechnical conditions, traffic, or presence of sensitive biological resources, such as wetlands or riparian habitat.

*Bore and Jack.* The conventional auger bore and jack process involves jacking a steel casing through the ground while simultaneously removing soil from inside the casing with rotating continuous flight augers. Shafts are required at each end of the linear tunnel. The face of the tunnel is unsupported and therefore relies on soil stand-up time to maintain stability and avoid over excavation. Bore and jack is best suited for firm ground conditions above groundwater but can be used slightly below groundwater in stiff clay soils.

*Horizontal Directional Drilling.* Horizontal directional drilling is a three-step process of pipeline or casing installation. First, a guided and steerable pilot bore is drilled beneath the crossing. Drilling is typically surface launched (i.e., no shafts required) and the pilot bore path is vertically (and sometimes horizontally) curved. Bore hole stability is maintained by drilling fluids. The second step involves reaming the pilot bore by incremental reaming passes to a sufficient size to allow pull back of the pipeline or casing. The third step involves pull back of the pipeline which must be done in one continuous effort. This requires that the entire pipeline be pre-welded and laid out for pull back.

*Microtunneling.* Microtunneling is defined as a pipe-jacking process that is remotely controlled, guided and steerable, with a closed face that provides continuous positive support for the tunnel face. Water-tight shafts are required at each end of the linear tunnel. Microtunneling is best suited for non-cohesive soil in the presence of groundwater but is often used above groundwater at crossings where tunnel-face stability is critical.

Service turnouts would connect the main pipeline to the recycled water user. Service turnouts would include piping, valves, meters, and appurtenances to control the pressure of water to specific properties or users.

### ***Open Reservoir***

An open reservoir, for secondary recycled water, would be located north of Lakeville Highway between elevation 300 and 400 feet (the area within which the open reservoir could be located is shown on Figure 2-2). The reservoir would hold between 0.5 and 1.0 MG and require up to 2 acres of land. Temporary disturbance during construction would be up to 5 acres. Associated facilities located at the reservoir would include on-site pumping facilities, circulation piping, lighting facilities, valve structures, SCADA/instrumentation, miscellaneous appurtenances, fencing and access roads.

### **Pump Stations**

On the Ellis Creek WRF site, the Main Recycled Water Pump Station (located at the southeastern corner of the oxidation pond site), the Recycled Water Booster Pump Station #1 (located near Lakeville Highway on the oxidation pond site), and the Recycled Water Booster Pump Station #2 (located along Browns Lane northeast of the Ellis Creek WRF) would need to be upgraded. The upgrades would occur within the main pump building and at the existing Booster Pump Station sites and would not disturb new ground. A new pump station would be located in the general vicinity of the Petaluma Golf and Country Club to convert the golf course from potable water irrigation to recycled water irrigation. The pump station would require up to 0.5 acre and likely be housed within a structure that blends with the surrounding neighborhood or have other screening features. In addition, temporary impacts would disturb up to 1 acre.

### **Staging**

Staging areas of up to 1 acre may be established at various locations during construction of any project component. Staging is required to store pipe, construction equipment, and materials, and to provide parking for construction workers. Locations would be proposed by the contractor, approved by the City, and would occur in existing paved lots or disturbed vacant lots. Additional staging areas would be located within the 30-foot construction corridor along the pipeline alignment where available.

### **Construction Schedule**

Construction for program-level improvements would begin in 2010 and occur in phases through buildout of the *Petaluma General Plan 2025*.

## **COST**

The construction and land costs for the near-term improvements are estimated to be \$9 to 10 million (in 2006 dollars). The construction and land costs for the longer-term improvements are estimated to be \$40 million for the tertiary system and approximately \$6 to 10 million for the secondary system (in 2006 dollars).

## **CUMULATIVE PROJECTS SCENARIO**

Cumulative impacts are defined as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts” (CEQA Guidelines Section 15355). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

### **Identification of Projects with Potential for Cumulative Impacts**

Cumulative projects have been identified using two methods (as defined under Section 15130 of the CEQA Guidelines): General Plan projections and the list approach.

- Cumulative Project Study Area. The study area for the cumulative impact evaluation is shown in Figure 2-6.
- General Plan Projections. Using the City and County General Plans and General Plan EIRs, projections of residential, commercial, industrial, and agricultural projects were identified.

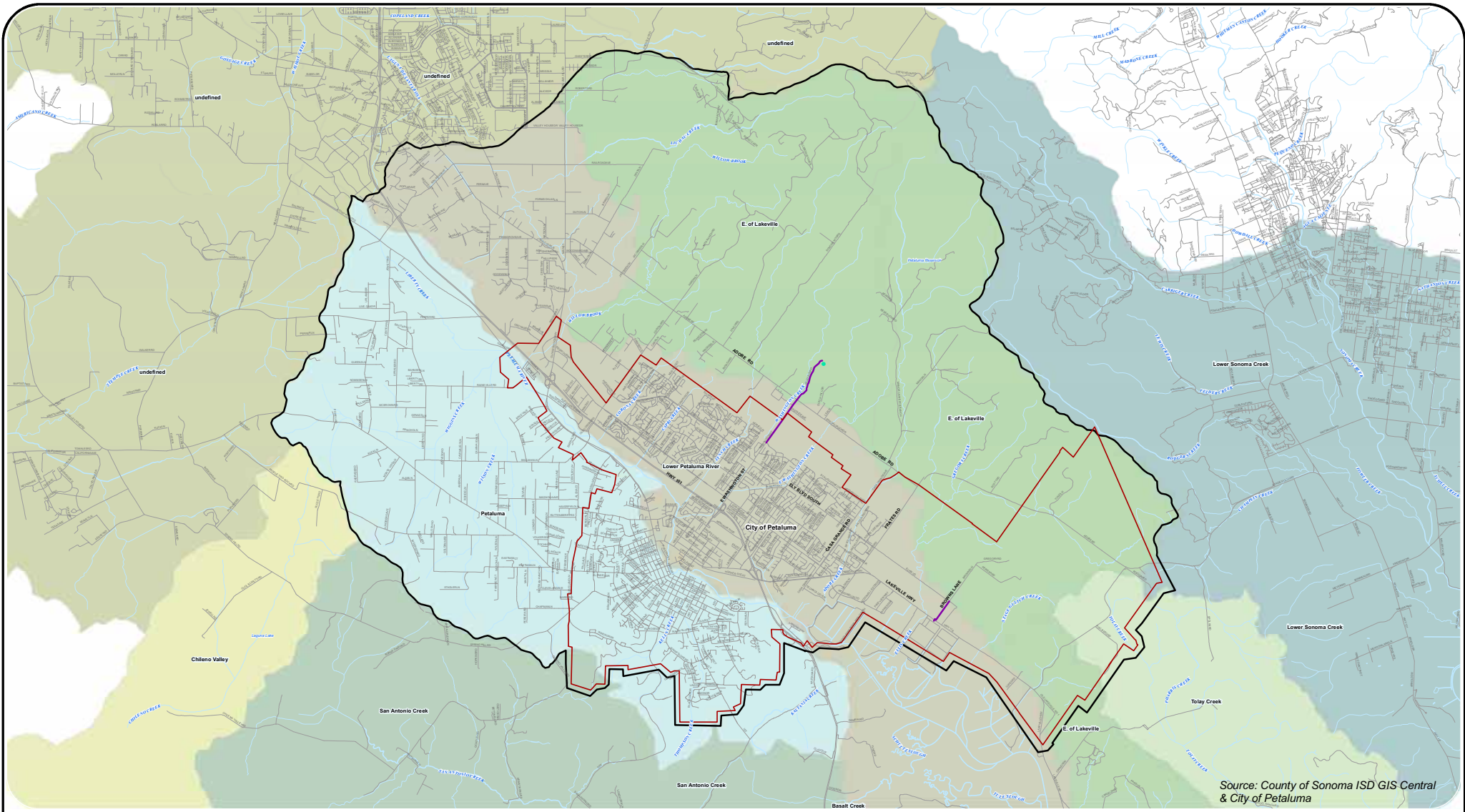


- The List Approach. The projections included in the general plans were considered the primary tool for identification of cumulative projects. However, individual cumulative projects were identified where necessary to adequately assess impacts for a particular topic area (e.g., General Plan amendments or related projects not adequately covered by the General Plans). Refer to Appendix B for a list of the projects.
- Past, Present, or Reasonably Foreseeable Projects. The impacts of past and present projects are evaluated in the baseline environmental data presented in the Environmental Setting section of the EIR. Reasonably foreseeable future projects were identified as suggested in the CEQA Guidelines in the discussion following Section 15130: "...the Lead Agency is required to discuss not only approved projects under construction and approved related projects not yet under construction, but also unapproved projects currently under environmental review...". When agencies were contacted, the projects in their jurisdictions that met these criteria were requested. Projects were included on the cumulative list without limitation in regard to type of environmental documentation available.
- Actions, Regardless of Who Undertakes Them. The following agencies were contacted to develop a list of cumulative projects:
  - City of Petaluma
  - Sonoma County Permit and Resources Management Department
  - Sonoma County Water Agency
  - Sonoma County Public Works Department
  - Caltrans

All agencies contacted responded, although it was evident that some agencies had more complete lists than others.

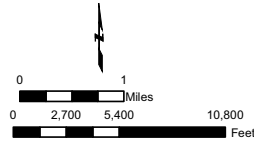
### **Evaluation of Impacts of Cumulative Projects**

The analysis of cumulative impacts is presented in Chapter 4 under each discipline. If significant cumulative impacts are identified, mitigation is recommended.



Source: County of Sonoma ISD GIS Central & City of Petaluma

- |                                 |                             |                   |
|---------------------------------|-----------------------------|-------------------|
| <b>Legend</b>                   |                             |                   |
| Near-Term Pipelines             | <b>Watershed Boundaries</b> |                   |
| Rivers and Creeks               | Basalt Creek                | Petaluma          |
| Recycled Water Service Boundary | Chileno Valley              | San Antonio Creek |
| Proposed Tertiary Storage Tank  | E. of Lakeville             | Tolay Creek       |
|                                 | Lower Petaluma River        | undefined         |
|                                 | Lower Sonoma Creek          |                   |



**Figure 2-6**  
Cumulative Projects Area

WREP EIR  
Petaluma, California



## **AGENCIES AND APPROVALS**

The following agencies may be Responsible Agencies under CEQA, that is, they may need to issue approvals for the project and thus need to rely upon the EIR.

### **U.S. Army Corps of Engineers**

A Section 404 Permit may need to be obtained to fill wetlands or waters of the U.S. under the Clean Water Act.

#### ***U.S. Fish and Wildlife Service/National Marine Fisheries Service***

Before granting a permit, the Corps would ask these agencies to concur with their decision to issue the permit. If there are potential impacts to species or migratory fish listed under the federal Endangered Species Act, then a consultation under Section 7 of the Endangered Species Act may be required.

#### ***State Office of Historic Preservation***

Before granting a permit, the Corps would ask for this agency to concur with their decision to issue the permit. The City will need to manage the historical and archaeological resources on affected property in accordance with Section 106 of the National Historic Preservation Act, as implemented by the State Historic Preservation Officer. The City also must abide by the requirements of Public Resources Code §5097.98, Health and Safety Code §7050.5, and the Native American Graves Protection and Repatriation Act in dealing with human remains.

### **Caltrans**

Any work performed on or beneath Caltrans right-of-way at Lakeville Highway, State Route 116, or Highway 101 would require an Encroachment Permit. Transport of heavy or oversized loads during construction may require a Transportation Permit.

### **Federal Aviation Administration**

The Federal Aviation Administration (FAA) will need to be notified of the proposed construction of the water storage tank on Ielmorini Drive in accordance with the procedures outlined in F.A.R. Part 77, Subpart B and the California Public Utilities Code Sections 21658 and 21659. This would include filing an executed copy of FAA Form 7460-1 (Notice of Proposed Construction or Alteration).

The notification process will provide a basis for determining the significance of the proposed construction on air navigation. The FAA study will determine if the tank will be adequately shielded by the natural terrain so as to not result in a hazard to air navigation, or if the tank needs to be marked and lighted in accordance with Advisory Circular AC 70/7460-1 (Obstruction Marking and Lighting).

### **State Water Resources Control Board**

The City may apply for a State Revolving Fund loan from the Board. Also, the project may need to comply with the General Construction Activity Stormwater NPDES permit requiring preparation of a Stormwater Pollution Prevention Plan.

## **State Department of Water Resources, Division of Safety of Dams**

The State Water Code (Division 3) stipulates that the supervision of non-federal dams in California is generally under the jurisdiction of the Department of Water Resources, Division of Safety of Dams (DSOD). The DSOD supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. The DSOD has jurisdiction over all non-federal dams in the State that are 25 feet or higher (regardless of storage capacity) and dams with a storage capacity of 50 acre-feet of water or greater (regardless of height).

An exception exists in the Water Code for certain water impoundments that are part of wastewater control facilities. Specifically, a wastewater impoundment that is less than 1,500 acre-feet in volume, and with a maximum depth less than 15 feet, may qualify as non-jurisdictional. For purposes of determining jurisdictional authority the maximum depth is defined as the vertical distance between the maximum possible water surface and the lowest elevation of the outboard toe of the embankment. It is unlikely that the open reservoir would exceed this criterion, and in that case DSOD approval would not be required.

## **California Department of Fish and Game**

A Streambed Alteration Agreement, pursuant to Section 1602 of the state Fish and Game Code, would be required for any work in streams. In addition, if there are affected endangered species as listed under the California Endangered Species Act, a Section 2081 Management Authorization may be required.

## **California Department of Public Health**

An engineer's report on the manner by which the recycled water program will comply with the Water Recycling Criteria contained in the California Code of Regulations Title 22, has already been submitted to and approved by the Department of Public Health. A copy of this report is available online at <http://www.cityofpetaluma.net/waterrecycling>.

## **California Occupational Safety and Health Administration**

The California Occupational Safety and Health Administration (Cal OSHA) may need to issue permits for construction, trench excavation, or bore and jack.

## **San Francisco Bay Regional Water Quality Control Board**

The City filed a Notice of Intent with and received approval from the Board on October 21, 2005 indicating regulation under General Order 96-011 (General Water Reuse Order).

The Board may need to issue a Section 401 certification for fill of any wetlands or waters of the U.S. in support of a 404 application, or for wetlands or waters under state jurisdiction, if applicable for the various construction projects.

## **County of Sonoma**

The following permits or approvals may be needed from the Permit and Resource Management Department: grading permit, a Use Permit, encroachment permit, and a 3836R stream crossing permit. The Public Works Department may need to issue a Transportation Permit for heavy or oversized loads during construction and an encroachment permit.

**City of Petaluma**

The Petaluma Community Development Department may need to issue a grading permit and the Public Works Department may need to issue an encroachment permit.

## 3 MITIGATION MONITORING PROGRAM

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### INTRODUCTION

This Chapter presents the Mitigation and Monitoring Program for the Petaluma Water Recycling Expansion Program (WREP). The mitigation measures listed herein are required by law or regulation, are adopted by the City as part of the Project, or are recommended by the environmental team.

The project measures or mitigation measures listed below have been identified in Chapter 4 Environmental Analysis, as feasible and effective in mitigating Project-related environmental impacts. The effectiveness of each measure is identified in this Chapter and discussed in detail in Chapter 4.

### Legal Basis

The legal basis for the development and implementation of a Mitigation and Monitoring Program lies within the California Environmental Quality Act (CEQA), Sections 21002 and 21002.1:

- Public agencies are not to approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects; and
- Each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so.

CEQA Section 21081.6 further requires that: the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation. The monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of project approval in order to mitigate significant effects on the environment.

### Program Implementation and Monitoring

The City of Petaluma shall be responsible for overall implementation and administration of the Mitigation and Monitoring Program. The City may partner with others, such as tertiary and secondary water users, who will need to implement the Program as well. The City shall designate a Coordinator to oversee implementation of the mitigation measures and ensure they are completed to the standards specified in the EIR. The Coordinator will also ensure that the mitigation measures are completed in a timely manner.

Duties of the Coordinator include the following:

- Coordinate with applicable agencies that have mitigation monitoring and reporting responsibility;
- Coordinate activities with the construction manager;
- Coordinate activities of all in-field monitors;
- Develop work plan and schedule for monitoring activities;
- Coordination of activities of consultants hired by the City when such expertise and qualifications are necessary;
- Routine inspections and reporting activities;

- Plan checks;
- Assure follow-up and response to citizen inquiries and complaints;
- Develop, maintain, and compile Verification Report form(s);
- Maintain the Mitigation Monitoring Checklist or other suitable mitigation compliance summary; and
- Coordinate and assure implementation of corrective actions or enforcement measures, as needed.

### **Measures Included in the Project**

This section presents a listing and description of measures and standards which have been incorporated into the project design. These measures are denoted by the “PD” in the measure name. The City has adopted these measures and incorporated them as part of the project in order to avoid or minimize potential environmental impacts. These measures represent standard engineering, design, construction, and maintenance practices. The process for the development of these measures began during the scoping and early planning phase of the project. Measures were developed to change the project and avoid potential impacts identified by the public and federal, state, and local agencies. Other measures were developed as a result of air quality, noise, geotechnical, biological, cultural, and hydrological analysis in order to avoid or minimize potential impacts.

Because these measures are part of the project, they do not qualify under the normal definition of mitigation. However, these measures have been included in this chapter to provide a mechanism to ensure that these measures are implemented and monitored, and to assist the reader in understanding the commitments made by the City of Petaluma.

This section includes measures to be implemented in all phases of the project, including planning and design, construction, operation, and maintenance. Compliance with these measures will result in avoidance and/or minimization of adverse environmental impacts.

### **Mitigation Measures**

This section contains a listing and description of mitigation measures recommended in Chapter 4 Environmental Analysis. The mitigation measures listed in this section are recommended by the consultant team to avoid or reduce environmental impacts. As described above under Background, the City is required to mitigate impacts whenever it is feasible. Mitigation measures will be adopted by the City at the time of project approval. At that time, the City has the option of approving alternate mitigation measures, if they can be shown to be effective and feasible.

Some of the mitigation measures will only be implemented during the final planning and detailed design of the project. They often require the refinement of the final project design to accommodate particular environmental constraints. Other mitigation measures are intended to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Finally, there are mitigation measures to be implemented during operation of the project. These measures generally require monitoring of operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with all of these measures would result in the reduction of adverse environmental impacts.

## Project and Mitigation Measure Format

Table 3-1 explains the format of the measures.

### TABLE 3-1

#### Mitigation Measure Format

**XX-X Mitigation Measure Title**

This is the number and title of the mitigation measure. This is the only portion of the measure that is presented in Chapter 4 Environmental Analysis. In Chapter 4 the mitigation number and title are cited after the analysis discussion of each impact.

Brief description of the Mitigation Measure.

**Alternatives:** The alternatives for which this measure is recommended.

**Implementing Agency:** The agency or individual that has the responsibility for implementing or performing the measure.

**Timing: Start:** The appropriate time at which the measure is to be implemented.

**Complete:** The appropriate time at which the measure is to be complete.

**Monitoring Agency:** The public agency that has the responsibility for monitoring to insure that the mitigation measure is effective in mitigating the impact.

**Validation:** The means by which the monitoring agency will verify that the measure has been carried out.

## Mitigation Monitoring Status Reporting

The City shall compile a Mitigation Monitoring Status Report on an annual basis when any of the following conditions occur: construction; revegetation or compensatory habitat creation during the five-year monitoring period; first year of operation. The report shall contain the following:

- Mitigation Monitoring Checklist to provide the status of every mitigation measure;
- List of completed mitigation measures;
- List of non-compliance incidences, with action taken or required;
- Evaluation of the effectiveness of the mitigation measures;
- Recommendations to improve mitigation effectiveness; and
- Required modifications to the Mitigation and Monitoring Program to comply with legislation and policies adopted in the previous year (e.g. newly listed threatened species).



## COMPLIANCE WITH EXISTING PROGRAMS

This section presents the applicable federal, state, regional, county, and local policies and regulations with which the Project may need to comply.

### Federal

Archaeological and Historic Data Preservation Act of 1974

Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977; Section 404

Code of Federal Regulations, Title 40 Parts 6, 51, and 93

Federal Antiquities Act of 1906

Federal Clean Air Act of 1970, amended 1977 and 1990

Federal Endangered Species Act of 1973, as amended

Mining Law of 1872, amended 1988

National Historic Preservation Act of 1966, Sections 106 and 110

National Natural Landmarks Program, Historic Sites Act of 1935

Rivers and Harbors Act of 1899, Section 10

Surface Mining Control and Reclamation Act of 1977

### State

California Environmental Quality Act

California Endangered Species Act

California Clean Air Act

California Occupational Safety and Health Administration (Cal-OSHA)

California Department of Fish and Game Code Section 1602

California Department of Fish and Game Wildlife/Hardwood Management Guidelines (Revised 1994)

California Division of Safety of Dams Regulations

California Health and Safety Code, Section 25500 et seq. - Hazardous Materials Release Response Plans and Inventory

California Department of Transportation requirements for encroachment permits for work conducted on State highways

Native Plant Protection Act (Fish and Game Code Section 1900-1913)

Public Resources Code, Sections 5097.5 and 30244

Public Resources Code, Sections 5020-5024 (California Register of Historic Places)

Public Resources Code, Section 6301 et seq.

Public Resources Code, Section 6501 et seq.

Title 8, California Code of Regulations, Section 1539 - 1541.1 - Excavations

Title 8, California Code of Regulations, Sections 1539 - 1541.1 - Excavations

Title 8, California Code of Regulations, Sections 1509 & 3203 - Injury and Illness Prevention Program

Title 8, California Code of Regulations, Sections 1597 - 1599 - Vehicles, Traffic Control, Flaggers, Barricades, and Warning Signs

Title 8, California Code of Regulations, Section 5194 - Hazard Communication

Title 22, California Code of Regulations, Section 60301 et seq. - Reclaimed Water

Title 22, California Code of Regulations, Section 66260.1 et seq. - California Hazardous Waste Regulations

### **Regional**

Bay Area Clean Air Plan

Bay Area Air Quality Management District Risk Management Policy

Bay Area Air Quality Management District Rules and Regulations

San Francisco Regional Water Quality Control Board Basin Plan

### **Sonoma County**

Sonoma County Aggregate Resource Management Plan

Sonoma County General Plan

Sonoma County Tree Ordinance (No. 4014)

Sonoma County Vineyard Erosion and Sediment Control Ordinance (N. 5216)

Sonoma County Zoning Ordinance

Sonoma County Building Codes

### **City of Petaluma**

Building and Grading Regulations

Petaluma General Plan

Petaluma Zoning Ordinance

Petaluma Water Conservation Ordinance

## **MEASURES INCLUDED IN THE PROJECT**

This section presents a listing and description of measures and standards that have been incorporated into the Project Description.

**PD-1 Site and Design Facilities to Achieve Compatible Land Use**

The City of Petaluma shall attempt to achieve compatibility with the City's and County's General Plan, zoning code, and other regulations, to the extent feasible. The City shall site facilities to avoid creating land use conflicts due to incompatibility with adjacent uses or loss of natural or scenic resources, to the extent feasible. The City shall design facilities to achieve compatibility with neighborhood character, to the extent feasible.

**Implementing Agency:** City of Petaluma Water Resources and Conservation Department

**Timing:** **Start:** At onset of project design.

**Complete:** Prior to the beginning of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% design plans conform with measure.

## **PD-2 Revegetate Temporarily Disturbed Sites**

The City shall revegetate sites disturbed or scarred by construction activities. Revegetation of disturbed sites should occur prior to the start of the rainy season. The Revegetation Program shall include the following:

### ***Streams and other Waters of the U.S.***

- Restore original contours and drainage patterns.
- Prior to erosive weather events, implement stream bank stabilization measures such as placement of willow wattles at woody crossings and covering disturbed stream banks with a biodegradable fiber (jute) cloth, coconut fiber rolls, or another similar erosion control fabric.
- If the disturbed or scarred site is in a riparian area, collect native seed stock or cuttings near the stream crossing (taking into consideration microclimate and time of year for propagation) to use for hydroseeding.
- Avoid use of soil amendments such as lime or fertilizers.
- Spread a cover of straw, rice straw if available, over disturbed soils and work into soil.
- Apply an organically based tackifier on disturbed areas to reduce air and water erosion of soils.

### ***Upland Non-Urban Sites***

- Restore pre-project topographic features. In those cases where full restoration is not possible, graded contours shall be rounded to emulate the natural landforms of the adjacent area.
- Use drought-tolerant native plant species.
- Collect seed material of woody and herbaceous plants from the construction corridor and/or adjacent undisturbed vegetation during a suitable season for each group of plants. Use potted plant materials to replace woody vegetation (i.e., trees and shrubs).
- Apply dried seed material collected as specified earlier evenly to the finish-graded topsoil surface.

### ***Urban Sites***

- Restore pre-project topographic features. In those cases where full restoration is not possible, graded contours shall be rounded to emulate the natural landforms of the adjacent area.
- Use species comparable to those removed from the disturbed area or use native, drought resistant species, if possible.

### ***Topsoil***

The first six inches of topsoil shall be stripped from areas to be occupied by structures, and areas to be excavated, graded, or filled. The stripped topsoil shall be stockpiled on-site, in designated areas and not mixed with other soils. Topsoil shall be stockpiled free from vegetation, trash, large stones, and other extraneous materials, to the extent possible. Stockpiled topsoil shall be protected from disturbance, rainfall, and erosion until it can be placed as final grade or otherwise reused.

***Planting Density and Survival Rate***

A survey shall be conducted to identify plant types and locations prior to the start of construction. Plants shall be installed, maintained, and replaced such that 120 percent of the original plant density is present on the five-year anniversary of plant installation.

***Monitoring***

Plant survival shall be monitored and summarized in an annual report. Annual reports shall include recommendations to be implemented to remediate the previous year's failures including replacement planting.

**Implementing Agency:** City of Petaluma, Construction Manager

**Timing:** **Start:** Prior to Final Completion.

**Complete:** Revegetation will be completed before completion of construction. Monitoring will continue annually for five years (if reseeding only than monitoring will occur the first year after application only).

**Monitoring Agency:** City of Petaluma

**Validation:** Prepare annual reports on success beginning with end of first growing season following construction. Conduct field monitoring on yearly basis for five years. Revegetate annually to meet success criteria (120%) if success criteria not being met.

### **PD-3 Storm Water Pollution Prevention and Mitigation Plans**

#### ***Storm Water Pollution Prevention Plan (SWPPP)***

The City shall prepare a site-specific SWPPP, as applicable, for each construction area, and if special measures are necessary for a site, these measures shall be incorporated into the Plan. The Plan shall include but is not limited to the following elements:

- Pollutant sources and construction implementation schedule.
- Type of construction allowed during the rainy season.
- General site and good housekeeping best management practices.
- Erosion and sediment control best management practices.
- Method of protection for new cut and fill slopes and soil stockpiles upon completion of permanent or temporary winter slopes.
- Diversion of runoff away from construction areas that have been denuded or otherwise disturbed.
- Retention of sediment on-site by the use of silt fences, hay bales, sedimentation basins, or other structures.
- Monitoring, inspection and maintenance schedule for erosion and sediment control facilities.
- Reduction of cut and fill along streams through the use of steepened side slopes, retaining walls and extended culverts.
- Cutting vegetation off at ground level, leaving existing root systems intact.
- Implement BMPs as needed to prevent increases in downstream runoff volume.
- Post-construction storm water management plan.
- Install of silt fencing or other erosion control material around culvert inlets along pipeline routes.

#### ***Standard Urban Storm Water Mitigation Plan (SUSMP)***

The City shall comply with the SUSMP requirements for any applicable project components located within the County SUSMP boundary. The City shall prepare a Preliminary Storm Water Mitigation Plan, a Final Storm Water Mitigation Plan, and a Written Certification of Best Management Practices (BMPs) installation in accordance with SUSMP requirements. The Plans shall include the following elements:

##### ***Preliminary Storm Water Mitigation Plan***

- Project description
- Impervious surface and proximity worksheets
- Estimated pre- and post-development runoff calculations
- Identified pollutants of concern
- Types of BMPs selected to mitigate pollutants
- Types of BMPs selected to limit channel-forming discharges
- Preliminary treatment control BMP sizing

- Waiver documents, if any
- Responsibility for BMP maintenance
- Location and conceptual design of BMPs on project drawings

*Final Storm Water Mitigation Plan*

- Detailed hydraulic calculations identifying the sizing criteria for each storm water treatment control BMP based upon the anticipated flow and/or volume.
- Maintenance plan, including maintenance assurances and funding mechanism.
- Plan view of the project showing all storm water related source and treatment control BMPs. The plan view may be included as part of the grading plan, site plan, other related plan, or on a separate plan sheet, included in the public improvement plans or building permit application.
- Construction details for each source and treatment control BMP.

*Written Certification of BMPs Installation*

After the BMPs have been installed, the project designer shall prepare and sign a written certification that the BMPs were installed as intended by the designer, or for manufactured BMPs, as recommended by the manufacturer. The written certification of BMP installation must be received by the County before acceptance of public improvements for BMPs located within the public right-of-way or public easements.

**Implementing Agency:** City of Petaluma, Construction Manager, Design Engineer

**Timing:** **Start:** During the Project design phase.

**Complete:** At the end of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** The City will monitor compliance with the Plans throughout construction.



#### **PD-4 Slope Stabilization**

The City of Petaluma shall utilize a licensed geotechnical engineer and, when appropriate, a structural engineer to conduct construction-level geotechnical investigation for facilities. If the geotechnical investigations identify hazards due to unstable slopes or actively eroding soils, the engineer shall identify slope stability risk areas and provide engineering design and construction recommendations to stabilize slopes and soft or unstable soils.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Prior to the beginning of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% design plans conform with measure.

**PD-5 Reduce Risk of Damage due to Liquefaction**

Where facilities must be sited in areas with high liquefaction potential, as mapped by California Division of Mines and Geology, the City shall utilize a registered geotechnical engineer to conduct a detailed, facility-specific, soil analysis in areas.

If the geotechnical investigations identify hazards due to liquefaction, the engineer shall identify risk areas and provide engineering design and construction recommendations to minimize damage.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Upon completion of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% plans conform with measure.

## **PD-6 Standard Engineering Methods for Expansive Soils**

The City shall utilize a qualified soil scientist or engineer to conduct a detailed, facility-specific soil survey and determine which facilities require shrink swell prevention measures. The survey shall record soil type and soil properties (including shrink swell characteristics). Where the detailed pre-design soil analysis has identified the presence of expansive soils, the City shall implement standard geotechnical practices to substantially lessen or avoid potential impacts from expansive soils. Measures could include the following standard methods:

- Removal of native soil and replacement with an engineered fill material not prone to shrinking and swelling;
- Soil stabilization, such as lime treatment to alter soil properties to reduce shrink-swell potential to an acceptable level; or
- Deepening footings or other support structures in the expansive soil to a depth where soil moisture fluctuation is minimized.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Upon completion of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% design plans conform with measure.

### **PD-7 Standard Engineering Methods for Corrosive Soils**

The City shall utilize a qualified soil scientist or engineer to conduct a detailed, facility-specific soil survey and determine which facilities require corrosion prevention measures. The survey shall record soil type and soil properties (including pH, salinity, chloride, and active sulfides).

The City shall design pipelines that traverse highly corrosive soils with non-corrodible materials or shall implement other effective corrosion avoidance and/or protection methods.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Upon completion of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% design plans conform with measure.

## **PD-8 Seismic Design to Resist Ground Shaking**

The City of Petaluma shall reduce the risk of damage to facilities from strong ground shaking to the extent feasible. All project facilities sites are located in strong ground shaking areas due to the proximity of the San Andreas and Rogers Creek faults.

Construction of all facilities and earth embankments shall incorporate earthquake-resistant design and materials that meet or exceed the current seismic engineering standards of the Uniform Building Code Seismic Zone 4 requirements. To decrease the amount of damage or period of interruption that may occur during a seismic event, the City of Petaluma may elect to increase the performance objective for a given facility beyond the code adopted minimums depending on the additional costs that may be incurred and site specific design considerations that may be required.

Building codes are not intended to be applicable to some types of pipelines, pump station equipment that are not enclosed, and other types of non-building structures. However, there are generally accepted “consensus” standards that can be applied in a similar manner to adopted building code performance objectives. For all non-building structures, “consensus” standards will be used, when available, to set minimum performance objectives that allow for changes to occur to a pipeline or equipment during a seismic event but damage to be minimal.

Again, the City of Petaluma may choose to raise the performance objective for a given non-building element beyond the “consensus” standard or minimum recommendation by the structural engineer, design specifications to decrease the amount of damage or period of interruption, depending on additional costs and require site specific design considerations.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Upon completion of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% design plans conform with measure.

## PD-9 Construction Management Program

The City of Petaluma shall manage construction to avoid or minimize potential impacts to public health and safety, to the extent feasible. The City shall develop and implement a Construction Management Program (Program), which may include the following measures:

- Excavations shall be guarded by readily visible barricades, rails or other effective means to avoid access by the public.
- Local police, public works and fire departments for each jurisdiction (city, county and state) where construction is expected to occur, shall receive advance notification of construction activities. Local residents and businesses shall also be notified and access shall be maintained if possible.
- Remove and clear away dry, combustible vegetation from construction sites in those areas that contain substantial forest fire risks and hazards, or are very high fire hazard severity zones as defined by California Division of Forestry and Fire Protection. Grass and other vegetation less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion. Vehicles shall not park in areas where exhaust systems contact combustible materials. Fire extinguishers shall be available on the construction site when working in high fire hazard areas to assist in quickly extinguishing any small fires. The Construction Manager shall have on site the phone number for the local fire department(s) and shall have a phone available when working in high fire hazard areas should additional fire fighting capabilities be required.
- Prior to construction, retain a Registered Environmental Assessor (REA) to perform a Hazardous Material Project Assessment following portions of the American Society of Testing Materials (ASTM) guidelines along pipeline corridors and near other project facilities to identify potential hazardous waste sites that may affect construction activities. If hazardous waste sites are discovered, during construction the City shall survey all pipeline alignments for contaminated soil and/or groundwater, recording the location, extent, and type of contamination.
- In the vicinity of hazardous materials/waste release sites, construction activities related that require excavation or exposure of soil or groundwater shall be monitored by the contractor for subsurface contamination. The City shall notify responsible agencies if any hazardous materials/wastes are encountered. Monitoring shall include, at minimum, visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training.
- In the vicinity of hazardous materials/waste release sites, groundwater brought to the surface as a result of construction dewatering shall be handled in a manner appropriate to the construction related permits for dewatering. If contamination is suspected or noted during the construction phase, then the groundwater shall be containerized and analyzed for contamination by a laboratory, certified by the California Environmental Protection Agency (CalEPA) Environmental Laboratory Accreditation Program (ELAP), using United States Environmental Protection Agency (USEPA)-approved analytical methods. Where contaminated groundwater is encountered, precautions shall be taken to assure that the installation of piping or other construction activities do not further disperse contamination.
- All potentially contaminated materials encountered during construction shall be evaluated in the context of applicable local, state and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous shall be remediated and/or disposed of in accordance with the most recent edition of applicable federal, state, and local regulations, standards, laws, ordinances and codes including, but not limited to, those applicable to worker and public safety, training, licensing and certifications, compliance notifications, abatement,

waste sampling, transportation, and disposal. Where conflicts occur, the most stringent requirements shall be adhered to. All evaluation, remediation, treatment, and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel.

**Implementing Agency:** City of Petaluma, Design Engineer  
City of Petaluma, Construction Manager

**Timing:** **Start:** At onset of design.  
**Complete:** At the completion of the construction phase.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% plans conform with measure.

**PD-10 Mosquito Prevention Program (applicable to the Program-Level Improvements only)**

The City of Petaluma shall develop a Mosquito Prevention Program to ensure that the new secondary open reservoir facility is designed in a manner that minimizes favorable conditions for the development of potential mosquito habitat as described in the California Department of Health Services and the Marin/Sonoma Mosquito Abatement District's Criteria for Mosquito Prevention in Wastewater Reclamation or Disposal Projects. The criteria identify three general principles of mosquito control: (1) the manipulation of the physical features of the impoundment, (2) biological control, and (3) chemical control. Specific measures may include:

- Water bodies may be of any shape but shall not have small coves or irregularities around the perimeter.
- Side slopes shall be as steep as feasible, without jeopardizing slope stability.
- Water bodies shall have an access ramp constructed on an inside slope for launching a small boat to conduct midge sampling and control.
- A maintenance program for weeds and erosion control on the inner slopes of the water body.
- Biological controls shall be used, such as stocking the reservoir with mosquito fish (*Gambusia affinis*).
- Irrigation sites shall not have water ponding.

**Implementing Agency:** City of Petaluma, Design Engineer  
City of Petaluma, Recycled Water Monitor

**Timing:** **Start:** The Program shall be developed during the design phase. The City shall begin monitoring during construction of the reservoir for conformance to physical features. The City shall monitor application sites monthly. The City shall respond to recommendations of the Marin/Sonoma Mosquito and Vector Control District when concerns are raised.

**Complete:** Throughout the life of the Project.

**Monitoring Agency:** City of Petaluma, Marin/Sonoma Mosquito and Vector Control District

**Validation:** Report that 90% plans conform with measure.  
Monitoring reports indicate if water is ponding.



## **PD-11 Standard Traffic Control Procedures**

The City of Petaluma shall adopt standard traffic control measures to minimize traffic congestion, traffic hazards, and damage to roads to the extent feasible. Construction flagging and signage, use of plates, and other safety measures shall be in conformance with the “California Manual on Uniform Traffic Control Devices” (California MUTCD). Other measures shall include:

### ***Encroachment Permits***

- Obtain all necessary Encroachment and Transportation Permits from the appropriate agencies. The City of Petaluma shall consult with the County of Sonoma Department of Transportation and Public Works (DTPW), Caltrans, and other affected agencies regarding site-specific details of construction prior to the preliminary design stage.

### ***Emergency Response, Transit and School Bus Routes***

- If temporary lane or road closures are required, the City shall contact emergency response (hospitals, police, fire, and ambulance), transit, and school bus providers and inventory the locations of their primary routes that may be affected by the construction.
- Where construction necessitates lane or road closures along emergency response routes, the City shall recommend and obtain approval of alternate routes or other means from the affected service providers, at a minimum of one week prior to construction.
- During construction, the City shall notify the service providers on a weekly basis of the timing, location, and duration of construction activities.

### ***Lane and Road Closures***

- Consistent with construction requirements, the minimum number of through traffic lanes shall be closed and the duration of such closures shall be minimized. Where construction requires closure of the road, temporary bypass roads may be built within the construction right-of-way allowing temporary access.
- Where temporary road closure is necessary, a temporary road closure plan shall be developed by the construction manager and submitted to, and approved by, the Traffic Engineer of the affected jurisdiction. The temporary road closure plan shall include alternate detour routing and notification of local fire and police departments and emergency service, transit and school bus providers.
- Pipelines crossing major freeways shall utilize tunneling methods so as not to disrupt the flow of traffic and commerce.

### ***Access to Businesses and Residences***

- The City shall provide public facilities, businesses, and residences within 500 feet of the construction zone with a notification packet that describes the construction activities scheduled for their neighborhood.
- The City shall maintain pedestrian and vehicular access to public facilities, businesses, and residences along the route during commute hours, and shall minimize the closure of pedestrian and vehicular access at other times. Peak commute hours are between 7:00 AM and 9:00 AM in the morning and 4:00 PM and 6:00 PM in the evening.

**Repair Road Damage**

- Prior to construction, the City shall prepare a summary of baseline conditions for roads scheduled to have construction on or adjacent to them. The survey shall identify road name, length, and width; surface type and condition; and shoulder surface type and condition.
- Within one year of completion of construction, roads damaged by construction traffic or pipeline construction shall be restored to their former state as near as may be possible.

**Park within Construction Easements**

- The City shall establish construction staging areas. Construction worker vehicles, construction equipment not in use, and stored materials shall be kept within the staging area. Designated areas within the construction easements shall be designed to accommodate all construction-related activity, and the designated areas shall be maintained for parking throughout the duration of the construction.

**Traffic Control Plans**

- The City shall prepare a Traffic Control Plan for those portions of the project that are within the Central Traffic District. The Plan would identify construction traffic routes, time of travel and other provisions for lessening construction traffic impacts in the central traffic district.

**Coordination of Construction Schedules**

- The City shall coordinate construction schedules with the County of Sonoma and other City projects so as to minimize traffic congestion impacts to the extent feasible. For the near-term improvements, construction at the intersection of East Washington Street and Adobe Road would be phased with other projects proposed for that intersection.

**Implementing Agency:** City of Petaluma, Design Engineer  
City of Petaluma, Construction Manager

**Timing:** **Start:** During design the contractor shall be constrained to meet these criteria, during construction the construction manager will monitor conformance with bid documents.

**Complete:** Implementation shall continue throughout construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** The City shall comply with this measure prior to starting construction near the affected roadway.

**PD-12 Avoidance of Airport Land Use Conflicts (applicable to the Near-Term Improvements only)**

The City of Petaluma shall notify the Federal Aviation Administration (FAA) of the proposed construction of the water storage tank on Ielmorini Drive in accordance with the procedures outlined in F.A.R. Part 77, Subpart B and the California Public Utilities Code Sections 21658 and 21659. F.A.R. Part 77, Subpart B requires filing an executed copy of FAA Form 7460-1 (Notice of Proposed Construction or Alteration). The form can be completed and submitted online at [www.oiaa.faa.gov](http://www.oiaa.faa.gov). The notice must be submitted at least 30 days before the earlier of the following dates:

- The date the proposed construction or alteration is to begin.
- The date an application for a construction permit is to be filed.

The City shall design facilities to achieve compatibility with FAA measures for safety of air navigation.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Prior to the project bidding.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% design plans conform with measure.

### **PD-13 Minimize Temporary and Permanent Visual Impacts**

The City shall avoid or substantially lessen impacts by reducing construction disturbance, relocating facilities, or using design features to decrease visual contrast. Measures may include:

- The size of construction zones and staging areas may be the minimum operable size. The location of such zones would be adjusted to minimize the visual impacts.
- Alignments and locations of facilities may be adjusted to avoid visually sensitive features and conditions that would result in major landform alteration or mature landscape removal. Visually sensitive features may include significant stands of oaks and other mature trees, visually significant rock outcroppings, highly visible steep slopes, and highly visible roadside foreground areas. Facilities may need to be sited away from visible ridgelines.
- On visual edges such as ridgelines, low profile design approaches for facilities, including above ground pipelines, may be employed. Roads and pipelines may be designed to lie parallel to existing terrain contours to minimize the visual contrast.
- Utilize local rock types for road and pad surfacing material to minimize color contrast between engineered and natural land forms.
- Provide for painting the pump station, control buildings, noise barriers and accessory structures a natural color, where applicable. Screening may also take the form of architectural remedies such as designing a pump station to appear as a structure that would blend with the surrounding neighborhood.
- If the pump station cannot be sited to avoid view obstruction from adjacent sensitive viewpoints, it shall be partially set into the ground to reduce height and mass.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** During design.

**Complete:** Prior to the beginning of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report on 90% plans to confirm consistency with measure.

## **PD-14 Adjust Facility Design to Avoid Wells and Septic Systems**

The City shall site facilities to avoid impacts to public or private wells or septic systems. Final design shall be prepared in accordance with CCR Title 17 and Title 22 separation guidelines. One or more of the following options shall be implemented, depending upon site-specific conditions:

### ***Septic System and Reserve Areas***

- Native, fine-grained, compacted soil or Controlled Low Strength Material (CLSM)<sup>1</sup> shall be used as backfill around pipelines when constructing greater than 25 feet but less than 50 feet from a septic system or reserve area.
- CLSM shall be used as backfill around the pipeline when constructing between 15 and 24 feet from a septic system or reserve area.
- If closer than 15 feet but not through a septic system or reserve area, portions of leachlines shall be relocated, if possible, in another portion of the property to obtain a minimum setback of 15 feet from the pipeline. CLSM shall be used as backfill over the pipeline (as referenced above).
- Construction of the pipeline through or below a leachfield shall be avoided whenever feasible. If avoidance is infeasible, then the City shall contact the Sonoma County PRMD Well and Septic Division, and shall incorporate the Division's recommendations.
- Relocation of septic system lines shall require a review and approval of plans by the property owner and the Sonoma County PRMD Well and Septic Division prior to leachline relocation. If leachlines that need to be relocated cannot be relocated due to limited space or poor soil conditions, other mitigations shall be implemented on a case-by-case basis by consulting with the Sonoma County PRMD Well and Septic Division personnel and property owner.

### ***Wells/Water Sources for Consumption***

- Pipelines shall not be constructed closer than 100 feet from a domestic well.
- The horizontal distance between pressurized potable water and recycled water lines shall be at least 10 feet. Potable and recycled water lines shall not be installed in a common trench.
- Where potable and recycled water lines cross, potable water lines shall be at least one foot above recycled water lines.
- No irrigation with recycled water shall take place within 50 feet of any domestic water well unless all of the following conditions have been met:
  - A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface.
  - The well contains an annular seal that extends from the surface into the aquitard.
  - The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities.
  - The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well.
  - The owner of the well approves of the elimination of the buffer zone requirement.

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<sup>1</sup> Also known as Controlled Density Fill (CDF).

**Monitoring Wells**

- Pipeline trenches shall be set back a minimum of 5 feet from the center of a monitoring well. A 3-foot set back is permissible with approval of the San Francisco Bay Regional Water Quality Control Board.
- Monitoring wells within the construction zone shall be clearly identified in the field prior to construction.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** During preliminary design.

**Complete:** Prior to the beginning of construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% design plans conform with measure.

## **PD-15 Lighting Design**

The City shall design lighting for the storage tank and pump station to utilize shielded, low-intensity light sources. Locate light sources low and directed away from off-site viewers. Direct personnel to turn lights on only when needed; do not operate exterior lighting continuously or automatically.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** Certification of the EIR.

**Complete:** Throughout the life of the project.

**Monitoring Agency:** City of Petaluma

**Validation:** Specifications for each construction contract. The design of the lighting will be verified during the review and certification of Final Engineering Drawings. The City will check compliance with installation of the specified lighting and controls during regular inspections of construction. The City will monitor conformance with the operational criteria as part of regular reviews of operation procedures. If graffiti becomes an issue, the City may increase monitoring by adding lighting with motion sensors and cameras to protect the assets further.

## **PD-16 Implement BMPs for Runoff, Erosion, and Agricultural Chemical Use**

As a purveyor of recycled water, the City of Petaluma is required to ensure that all of the city's recycled water users are aware of their responsibilities regarding the proper use of recycled water. To ensure that users are informed of the proper use of recycled water, the City provides each recycled water user with a copy of "Guidelines for Recycled Water Users". These guidelines are consistent with those promulgated by the California State Department of Public Health (CDPH) to protect the health of the public and the employees of recycled water users.

The guidelines for developing BMPs for efficient irrigation are located in the "Operational Control" section of the "Guidelines for Recycled Water Users". See the City of Petaluma, Recycled Water System, Notice of Intent (NOI) and the Water Reuse Program Technical Report and Engineering Report for the Production, Distribution, and Use of Recycled Water (City of Petaluma August 2005).

The City shall meet the requirements of General Water Reuse Order 96-011 authorizing municipal wastewater reuse by producers, distributors, and users of non-potable recycled wastewater and follow all provisions of the NOI. The City shall implement BMPs to prevent runoff, control erosion and infiltration, reduce water waste, and reduce impacts of agricultural chemical application on properties receiving recycled water for irrigation. The following measures, or alternative measures of equivalent effectiveness to those listed in Order No. 96-011 (Refer to Appendix C of this document), shall be implemented, depending upon their applicability to site-specific conditions:

### ***Runoff***

- Application method and rate shall consistently be equivalent to crop demand.
- For frost control, application method and rate shall consistently be equivalent to crop protection need.
- Irrigation methods shall be suitable to the site.
- Use measures that EPA has assembled about the best available, economically achievable means of reducing pollution of surface and ground water from agriculture in *National Management Measures to Control Nonpoint Source Pollution from Agriculture* (<http://www.epa.gov/owow/nps/agmm/index.html>).

### ***Erosion***

- Agricultural practices shall be designed to retain soil in place on the hillside, using methods such as cover crops.

### ***Irrigation Practices***

- Avoid over- or under-watering trees or shrubs;
- Prevent irrigation from spraying the trunks and bases of existing trees and shrubs, at least during the dry season; and
- Avoid soil compaction around trees and shrubs.

### ***General***

- Prospective recycled water customers must submit to the Recycled Water Program an Application for a Recycled Water Use Permit. For sites where recycled water is to be used inside a building, a more formal Engineering Report must be filed. Upon receipt of the permit application, the City of Petaluma shall conduct a plan check to verify that all design requirements are met. If not met, the City of Petaluma may require resubmittal of the missing



information and/or drawings. For retrofit sites, the City shall conduct a site inspection, and notify the customer of any repairs or modifications required. Upon completion of construction (or site modifications), the City of Petaluma shall conduct a final inspection to verify that all design requirements have been met and a cross-connection test to verify that there are no interconnections between the potable and recycled water systems. All final conditions must be recorded on the site drawings. Final approval for service shall be indicated by the City of Petaluma issuing a Recycled Water Permit. The Permit includes the customer's signed permit application, along with a listing of site-specific requirements, if any. The permit shall be the binding agreement between the City of Petaluma and the user.

### ***Water Waste and Related Provisions***

- A customer shall not allow potable or recycled water waste. Water waste is defined as water use in outdoor areas resulting in runoff; or breaks or leaks in the water delivery system.
- The Director may issue a written warning to anyone who violates the water waste prohibition. If a customer does not correct the violation within 72 hours of notification, or such other time as specified by the Director, the City may disconnect potable or recycled water service.
- Consumers shall furnish, construct, install, own, operate, maintain and repair that portion of the potable or recycled water system on the consumer's premises which begins at the coupling on the consumer's side of the water meter. The City, as determined by the Director, may require the consumer at his/her own expense to adjust, replace, repair, maintain or discontinue the use of any potable or recycled water receiving or regulating equipment on the consumer's side of the meter.
- Potable or recycled water service may be disconnected for the following reasons:
  - If the owner, occupant or consumer fails to comply with any of the regulations; or
  - For public health and/or safety reasons; or
  - If the utility customer who has received notice of violation of the water waste provisions fails to correct the conditions which caused the violation within 15 days, or other reasonable time as determined by the Director; or
  - For breach of the Recycled Water Use Permit as defined in the Recycled Water Regulations.

### ***Urban Recycled Water***

- Recycled Water User's Guide. The City shall at all times have a "Guideline for Recycled Water Users". The purpose of the Recycled Water User's Guide is to detail the requirements of the following rules and regulations as they apply to the City recycled water system: the adopted Mitigation Monitoring Program; the California Code of Regulations Title 22; other state and local rules and regulations related to the use of recycled water as they may be adopted or changed from time to time. Pursuant to the Recycled Water User's Guide, each user site is inspected annually, new sites are inspected on installation, and regular contact with the City is required. New site inspections shall include: the site being installed per approved plans; appropriate signage, identification and markings for the recycled water system; mandatory cross-connection test; and mandatory irrigation coverage test to insure no runoff or overspray.
- Recycled Water Use Permit. The City shall issue to each recycled water customer a Recycled Water Use Permit for each site, which grants permission to use recycled water and requires

the customer to use recycled water in accordance with the rules, regulations and standards of the Recycled Water User's Guide and all applicable state and local rules and regulations.

- Designation of Site Supervisor. Each customer shall designate a Site Supervisor for each site covered by a Recycled Water Use Permit. The Site Supervisor must serve as a liaison with the City, and must have the authority to carry out the requirements of the Recycled Water User's Guide and Recycled Water Use Permit, including the operations and maintenance of the on-site recycled water system and prevention of potential hazards. In accordance with the Recycled Water User's Guide, the site supervisor is responsible for regular system monitoring and an annual self-inspection report, operating the irrigation system to prevent runoff, overspray, and control of off-site drift. The site supervisor must be available to the City 24 hours a day in case of emergency.
- Operation and maintenance of customer equipment. Each customer shall operate and maintain the on-site recycled water system in accordance with the Recycled Water User's Guide and Recycled Water Use Permit. Notwithstanding compliance with this section, the City reserves the right to take any action necessary with respect to the operation of the customer's recycled water system to safeguard public health.
- Entry upon customer's premises. As a condition of recycled water service for new customers and as a condition of continued recycled water service for existing customers, the customer shall permit the City to enter upon the customer's property during the City's normal working hours, or in case of emergency at any time, to inspect the customer's on-site recycled water system for compliance with the provisions of this chapter.
- Enforcement of recycled water use rules and regulations. Violations related to the use of recycled water shall be subject to notices, penalties, fines, and termination of service. It shall be the policy of the City of Petaluma to remedy a violation as soon as possible through a progressive enforcement policy that affords the user due process and carefully considers the seriousness of the violation before determining the appropriate enforcement actions(s).

### ***Water Efficient Landscape Policy***

- No turf or high-water-use plants shall be allowed on slopes exceeding 10%, or 25% where other project water saving techniques can compensate for the increased runoff, and where need for such slopes is demonstrated.
- No turf shall be allowed in areas eight feet wide or less.
- All planted landscaped areas shall be irrigated with smart irrigation controllers.
- Separate irrigation circuits shall be provided for each hydro zone and micro climate.
- Pressure regulation shall be installed so that all components of the irrigation system operate at the manufacturer's recommended pressure.
- Irrigation delivery systems shall be designed in such a manner that water does not run off or overspray onto adjacent pavement, sidewalks, structures or other non-landscaped areas.
- Rain shut-off devices shall be installed on each irrigation controller.
- Check valves shall be installed where elevation differential may cause low head drainage.
- Sprinkler heads shall have matched precipitation rates on turf.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** Prior to the delivery of recycled water to any parcel.

**Complete:** When the landowner no longer utilizes recycled water.

**Monitoring Agency:**

City of Petaluma

**Validation:**

Monitoring Reports (user and City)

**PD-17 Frac-Out and Undercrossing Contingency Plan (applicable to the Program-Level Improvements only)**

The City shall develop and follow procedures to prevent the bentonite mix from being discharged into the Petaluma River and streams when installing pipelines using microtunnel or horizontal directional drilling. The plan will address how the contractor would manage pressures and the volume of lubricant used to prevent frac-out.

The plan shall also address procedures to follow in the event a frac-out occurs. Drilling activities shall be visually monitored for any sign of lubricant frac-out and should frac-out occur, the contractor shall complete the following:

- Stop pumping lubrication.
- Locate the point and cause of the frac-out.
- Contain the spill to the maximum extent possible.
- Clean up the spill to the maximum extent possible.
- Wait at least two hours before pumping lubrication near the frac-out point to allow the ground to seal.
- Reduce pumping pressure and volume in the area of the frac-out.
- Notify all designated authorities that a frac-out occurred, including but not limited to the California Department of Fish and Game.

**Implementing Agency:** City of Petaluma, Design Engineer, front end requirements

**Timing:** **Start:** Before and during construction under the Petaluma River or other streams or creeks where microtunnel or horizontal directional drilling construction methods are used.

**Complete:** At the completion of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** The City of Petaluma shall monitor compliance on a schedule consistent with the intensity of construction and the presence of creeks.

## PD-18 Protect Creeks from Toxic Discharge

During construction, the City of Petaluma shall follow pertinent paragraphs of the Caltrans Manual, California Standard Specifications (Caltrans 1992), Section 7-1.01G which begins, “The contractor will exercise every reasonable precaution to protect streams from pollution with fuels, oils, bitumens, calcium chloride, and other harmful materials.” Measures shall include:

- Construction byproducts and pollutants such as oil, cement, and washwater shall be prevented from discharging into streams and shall be collected and transported to a landfill authorized to accept hazardous wastes.
- No construction vehicles or equipment may be parked within the upland riparian corridor of any stream channel.
- Mobile equipment shall not be refueled or serviced within the riparian corridor.
- Construction material storage areas containing hazardous or potentially toxic materials shall be bermed to prevent the discharge of pollutants to runoff water. These materials shall be stored under cover.
- Utilize good housekeeping practices, safer alternative products where feasible, and employee training programs to prevent or reduce the discharge of pollutants to runoff water from construction activities.
- Construction vehicles and equipment shall be maintained to prevent contamination of soil (from leaking hydraulic fluid, fuel, oil, and grease). Any restrictions on lubricants shall not include lubricants used for tunnel construction which will be permanently encased or isolated from the stream after construction is complete.
- Concrete washout areas shall be designated. Wash-out of concrete vehicles and equipment shall be restricted to designated areas only.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At the start of construction.

**Complete:** At the completion of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** The City of Petaluma shall monitor compliance on a schedule consistent with the intensity of construction and the presence of creeks.

**PD-19 Construction Noise Control (applicable to the Program-Level Improvements only)**

The City shall implement noise control measures which could include the following as applicable:

- Newer equipment with improved noise muffling shall be used. Equipment items shall have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational.
- Construction equipment shall be inspected weekly to ensure proper maintenance and presence of applicable noise control devices (e.g., mufflers, shrouding, etc.).
- Where possible, hydraulic tools shall be used instead of pneumatic impact tools.
- Sensitive noise receptors shall be specifically identified and notified in advance to keep windows and doors closed during peak construction activity. Sensitive noise receptors shall be notified when blasting will be conducted and instructed as to actions necessary to reduce noise impacts.
- Heavy truck trips shall be routed over streets that will cause the least noise disturbance to residences or businesses in the vicinity of the Project site, when feasible.
- Construction staging areas, maintenance yards, and other construction-oriented operations shall be avoided, if possible, within 500 feet of a sensitive receptor.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Prior to the beginning of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% design plans conform with measure.

## PD-20 Air Quality Protection

The City shall implement air quality protection measures recommended by the BAAQMD to reduce diesel particulate matter and PM<sub>2.5</sub> from construction operations to ensure that short-term health impacts to nearby sensitive receptors are avoided.

- Water all active construction grading areas at least twice daily and more often during windy periods. Active areas adjacent to any residences should be kept damp at all times.
- Cover all hauling trucks or maintain at least two feet of freeboard.
- Pave, apply water at least twice daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas. Sweep streets daily (with water sweepers) if visible soil material is deposited onto adjacent roads.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (i.e., previously-graded areas that are inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles.
- Limit traffic speeds on any unpaved roads to 15 mph.
- Replant vegetation in disturbed areas within 10 days after the completion of construction.
- Suspend construction activities that cause visible dust plumes that extend beyond the construction site.
- Prohibit use of “dirty” equipment. Equipment with noticeably dirty emissions shall be prohibited from operation at the site until proper maintenance has been performed to reduce the visible emissions to acceptable levels. Opacity shall be used to measure “dirty” and as an indicator of exhaust particulate emissions from off-road diesel powered equipment. The project shall ensure that emissions from all construction diesel powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately.
- Reduce combustion emissions during construction as required in the California Air Resources Board Off-Road Diesel Rule. The "no idling" rule for in-use off-road diesel-fueled vehicles limits idling for such vehicles to no more than five minutes. Signs shall be clearly posted at the construction sites for the storage tank and reservoir indicating the idle times for construction-related equipment shall be minimized and noting that no diesel equipment shall idle for more than five minutes. Idling necessary to accomplish work for which a vehicle was designed (such as operating a crane) are exempt from the rule (see rule for additional exemptions).
- Properly tune and maintain equipment in accordance with manufacturer specifications.
- Stage construction equipment away from any sensitive uses.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Prior to the beginning of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% design plans conform with measure.

## **PD-21 Riparian and Sensitive Habitat Protection**

The City shall minimize impacts to all riparian areas, oak woodlands, and drainages within 50 feet of any construction area, construction staging area, or pipeline alignment. Silt fences or other fencing material shall be installed around the perimeter of the construction boundaries when construction activities occur within 50 feet of a wetland, riparian area, or drainage. The City shall install silt fencing or other erosion control material around culvert inlets along pipeline routes to prevent sedimentation and other construction debris from entering the culvert.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Install prior to the start of construction and maintain until construction complete.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% design plans conform with measure.



**PD-22 Fence Foundation Remnants (applicable to the Near-Term Improvements only)**

The location of the foundation remnants identified in the Addendum Cultural Resources Study and California Environmental Quality Act Evaluation for the Petaluma Water Recycling Expansion Project shall be shown on construction plans and drawings. The construction contract(s) would specify that this location is to be protected with exclusion fencing and not entered.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Install prior to the start of construction and maintain until completion of construction on Ielmorini Road.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% design plans conform with measure.

## **MITIGATION MEASURES**

This section contains mitigation measures to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Compliance with these mitigation measures would result in minimizing, rectifying, or reducing adverse environmental impacts.

**AG-1 Purchase Locally Grown or Inspected Plants**

The City of Petaluma shall designate that the purchase of all plants for landscape screening or riparian restoration efforts shall be from locally grown stock or from a nursery that has an approved monitoring program for the glassy-winged sharpshooter.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At onset of project design.

**Complete:** Prior to the start of landscaping or restoration.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% design plans conform with measure.

**LU-1 Replacement of Open Space Easements (applicable to the Program-Level Improvements only)**

The City shall contribute funds to the Sonoma County Agricultural Preservation and Open Space District to compensate for land acquired for a facility on the District's land. The City's monetary contribution shall be equal to the open space and natural resource value of the land acquired for the facility. All monies contributed by the City shall be utilized in accordance with the Sonoma County Open Space Expenditure Plan.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** Upon certification of EIR.

**Complete:** Prior to the beginning of construction on any land with a conservation easement.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** A Memorandum of Agreement shall be signed between the City and the District prior to the beginning of facility construction.

**HWQ-1      Pond Seepage (applicable to the Program-Level Improvements only)**

When the open reservoir is sited, the City shall retain a qualified professional to perform a hydrogeologic study of the site-specific conditions at the open reservoir to determine if seepage from the reservoir would substantially impact water quality. If the study determines that seepage could have a substantial adverse impact on groundwater or surface water quality, the reservoir shall be lined and/or facilities shall be constructed to intercept the seepage and pump it back into the reservoir.

**Implementing Agency:**            City of Petaluma, Design Engineer

**Timing:**                                **Start:** From onset of project design for the open reservoir.

**Complete:** Prior to the completion of construction.

**Monitoring Agency:**            City of Petaluma, Construction Manager

**Validation:**                            Report that 90% design plans conform with measure.

**NOI-1 Pump Station Noise Control (applicable to the Program-Level Improvements only)**

The City shall retain a qualified Noise Control Engineer to assist in the final design of the new pump station. The Noise Control Engineer shall be responsible for designing the following possible noise reduction measures that would reduce operational noise levels to meet City and County standards at residential receptors.

- Enclose the pump station within a pump house.
- Locate the pump station away from existing residential land uses. Design of all facilities such that all openings such as for ventilation and doors shall face away from the nearest sensitive receptors. This provides an approximate 10 to 15 dBA noise reduction.
- Construct exterior doors for the facilities of metal assemblies that are weather stripped to form an airtight seal when closed. Weather stripped steel doors provide approximately 3 to 5 dBA additional noise reduction.
- Caulk the wall-roof intersection to be airtight and treat any ventilation openings in the roof.
- Additional noise controls may be necessary depending upon the final design (when known). The Noise Control Engineer shall consider acoustical louvers, acoustically lined plenums, or other treatments for quiet ventilation of the building.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** During final design of the proposed Project.

**Complete:** At the completion of final design.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% plans conform with measure.

## **BIO-1a Avoid the Loss of Candidate, Sensitive, or Special Status Species and their Habitat**

The City of Petaluma shall, to the extent feasible, avoid take of state and federally listed or proposed species, state candidates for listing, CNPS List 1B species, and occupied or critical habitat for these animal species. If avoidance is not feasible, compensation shall be provided as described below.

Reconnaissance-level surveys shall be performed to determine whether the area potentially affected by the project may contain habitat suitable for such species. If the area does not contain suitable habitat, this shall be documented in a habitat assessment report and no further action is necessary. If the area does contain suitable habitat, protocol-level surveys to determine presence or absence of target species shall be conducted prior to construction wherever habitats for these species will be impacted. Protocol-level surveys shall be conducted by qualified biologists familiar with the fauna and flora of Sonoma County. All protocol-level surveys shall be coordinated with the appropriate responsible agencies, i.e., U.S. Fish and Wildlife Service, National Marine Fisheries Service, and/or California Department of Fish and Game.

If target species are found to be absent from the project area, then the Project shall obtain concurrence from the responsible agencies of that finding. No protocol-level surveys to determine presence or absence or further mitigation for impacts to target species are necessary under this measure if the species is found to be absent from the project area and if the responsible agencies concur with the finding. If federally-listed target species are found to occur within the study area and cannot be avoided, then the City shall obtain the appropriate authorization (a Biological Opinion or Section 10 permit) from the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service authorizing take of the federally-listed species or its occupied or critical habitat. For state-listed species, the City shall obtain the appropriate authorization (Section 2081) from the California Department of Fish and Game authorizing take of the state-listed species or its occupied habitat. As part of this process, the Project shall submit a site-specific mitigation and compensation program for the affected resource acceptable to U.S. Fish and Wildlife Service, the National Marine Fisheries Service, or the California Department of Fish and Game, as applicable. If a species is listed as endangered, rare, or threatened by the state or U.S., and either the habitat or individuals are found to occur within the study area and cannot be avoided, compensatory actions (examples of which are described below) shall be undertaken such that the number of individuals is not reduced and the range of the species is not restricted.

Avoidance and compensatory measures which may be required for specific species are listed below:

### ***California Clapper Rail***

- Construction activity in occupied California Clapper Rail habitat may be limited to occur outside the breeding season for this species during the time frame of September 1 through January 15.
- A minimum 200-foot buffer may be required to be clearly delineated around the boundary of occupied California Clapper Rail habitat that is located adjacent to a construction zone.
- Within occupied habitat, construction may be limited to the minimum width corridor possible and not greater than 15 meter (50 feet) wide. The perimeter of the construction corridors may need to be clearly delineated.
- Staging and materials storage areas may need to be located outside of occupied habitat for California Clapper Rail.

### **California Tiger Salamander**

- The Project may need to avoid construction activities in all breeding ponds occupied by California tiger salamanders.
- The Project may need to avoid construction activities in California tiger salamander terrestrial habitat within 500 meters (1640 feet) of a known breeding pond. Between 500 meters and 2000 meters of a known breeding pond, construction or ground disturbing activities may be limited to occur in suitable terrestrial habitats (i.e., annual grasslands or oak savanna) that are contiguous to the known breeding pond unless the habitat is shown to be unoccupied through protocol-level surveys.
- Construction activities in occupied habitat may need to be limited to the dry season (June through October) when salamanders are not moving between terrestrial habitat and aquatic breeding habitat.
- Compensation for impacts to California tiger salamander habitat may need to include programs that address the various life stages of this species and would include purchase of mitigation credits or creation of habitat equivalent to the loss of habitat value.

### **California Red-legged Frog**

- The Project may need to use tunneling methods to cross creeks occupied by California red-legged frogs. If needed, bore pits may need to be located outside the riparian corridor along occupied frog streams and no vegetation would be removed along the streambank.
- All storage and staging area may need to be located outside of California red-legged frog habitat.
- Preconstruction surveys may need to be conducted in potential habitat areas by qualified biologists at least two weeks before initiation of activities in California red-legged frog habitat. If any life stage of the California red-legged frog is found within the project area, the City would need to contact the U.S. Fish and Wildlife Service for permission to move the animals or larvae. If movement of the animals is approved, a Service-approved biologist may need to move the animals to an appropriate area within the same stream. A Service-approved biologist may need to monitor all work within potential California red-legged frog habitat.
- When work within a creek or pond occupied by California red-legged frogs cannot be avoided, work may need to be completed between April 1 and November 1. The work area may need to be limited to the minimum necessary to complete the project, and creek crossings should not exceed 15 meters (50 feet) in width.
- Streams that are temporarily impacted by construction activities may require stream contours to be returned to their original condition.
- If permanent impacts to California red-legged frog habitat (i.e., ponds and streams) occur, they may need to be mitigated by creation of new habitat. Created ponds would have a hydroperiod sufficient to allow completion of breeding and larval development but be designed to dry completely by the fall to avoid colonization by predators. U.S. Fish and Wildlife Service may establish a buffer up to 300 feet around red-legged frog habitat.
- Severely trimmed or removed riparian vegetation may need to be replaced.



### **California Freshwater Shrimp**

- The Project may need to use tunneling methods to cross creeks where the crossing location is occupied by California freshwater shrimp. If required, bore pits may need to be located outside the riparian corridor along occupied shrimp streams and no vegetation would be removed along the streambank.
- Construction activities may need to be restricted to the dry season (low flow period) to minimize transport of material from the project area downstream.
- Project areas that are adjacent to streams that provide habitat for California freshwater shrimp may need to be surveyed prior to project activities (including removal of streamside vegetation) to insure that California freshwater shrimp are not present within the project area or downstream of the project area.
- Riparian vegetation that extends over or into the water or that has roots extending into the water may need to be preserved in a stream occupied by California freshwater shrimp. Riparian vegetation that does not provide cover or foraging areas for shrimp may be trimmed or removed. The amount disturbed may need to be restricted to the minimum necessary to complete the project. Severely trimmed or removed vegetation would be replaced.

### **Steelhead (Central California Coastal ESU)**

- The Project may need to use tunneling methods to cross creeks with 1) surface flow at the time of construction and 2) occupied at the time of construction by steelhead. If bore pits are required, they may need to be located outside the riparian corridor along occupied streams and no vegetation would be removed along the streambank.
- Riparian vegetation that extends over or into the water or that has roots extending into the water may need to be preserved in streams occupied by steelhead. Vegetation that does not provide shade or shelter for this species may be trimmed or removed, subject to measures stipulated in the Biological Opinion or Section 10 permit for this species. The amount disturbed may need to be the minimum necessary to complete the project. Severely trimmed or removed vegetation shall be replaced.

### **For Aquatic Species (California Tiger Salamander, California Red-legged Frog, California Freshwater Shrimp, Steelhead)**

- Equipment maintenance and fueling areas for mobile equipment may need to be located at least 30 meters (100 feet) away from the creek bank. Fueling would be behind a containment barrier that would prevent any spilled or leaked fuel from running into the creek. Servicing of mobile equipment may need to be limited to within designated areas away from sensitive habitats. Motorized equipment used during construction or demolition activities may need to be checked for oil, fuel, and coolant leaks prior to initiating work. Any equipment found to be leaking fluids would not be used in or within 30 meters of aquatic habitat features to minimize the chances of contaminating the habitat.
- An erosion control plan and emergency response and cleanup plan may need to be prepared prior to beginning work adjacent to streams. The plan would detail the methods to contain sediment runoff into the creek and to contain and cleanup spills of petroleum products or other hazardous materials in the work area.

### **Salt Marsh Harvest Mouse**

- If permanent impacts to salt marsh harvest mouse habitat occur, they shall be mitigated by creation of new habitat equivalent to the habitat value lost.
- Hand removal of salt marsh vegetation that the salt marsh harvest mouse relies upon may be necessary to avoid take of this species.
- Installation of a barrier exclusion fence may be necessary to prevent salt marsh harvest mice from entering the work area.
- The Project may need to use tunneling methods to cross underneath salt marsh harvest mouse habitat.

### **Listed or CNPS List 1B Plants**

- Listed or List 1B plants within the project footprint may need to be transplanted to a mitigation site approved by the California Department of Fish and Game and U.S. Fish and Wildlife Service. Seed from plants unavoidably impacted may need to be collected and preserved for planting on an approved mitigation site.
- Where construction activities unavoidably affect a listed or List 1B plant species, corridor widths may need to be limited to a maximum of 15 meters (50 feet).
- All storage and staging areas may need to be located outside listed or List 1B plant habitat.
- Mitigation projects shall be monitored annually for five years using success criteria developed in coordination with the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** Design measures – During design, reconnaissance missions shall be done by environmental team members to include requirements for species protection in the constraints section of the contract documents.

Construction measures – At the start of construction.

**Complete:** Construction measures – at completion of construction.  
Monitoring – five years after construction.

**Monitoring Agency:** City of Petaluma, Construction Manager, Environmental Manager

**Validation:** Report that 90% plans conform with measure. Mitigation projects shall be monitored annually for five years using success criteria developed in coordination with the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

## BIO-1b Rare, Threatened and Endangered Plant Protection Program

The City of Petaluma shall avoid loss of individuals of a CNPS List 2, 3, or 4 (sensitive) plant species, to the extent feasible. If avoidance is infeasible, compensation shall be provided as described below.

Surveys for sensitive plant species shall be conducted by a qualified botanist during the bloom period. If the impacts from a project to List 2, 3 or 4 plant species exceed 15% of the known occurrences or populations in Sonoma County, then plants shall be relocated or compensatory mitigation shall occur. Measures may include:

- Transplant plants within the permanent project footprint to a mitigation site. Seed from plants unavoidably impacted shall also be collected and preserved for planting. The transplanted plants or seeds should be reestablished on site if possible; otherwise, they shall be established on a mitigation parcel. A monitoring plan shall be developed and implemented to document survival, establish success criteria, and establish remedial actions.
- Replace sensitive plant populations permanently impacted by project activities. Develop and implement a monitoring plan to document survival, establish success criteria, and establish remedial actions.
- Limit corridor widths to a maximum of 15 meters (50 feet) through plant habitat.
- Mitigation projects shall be monitored annually for five years using success criteria developed in coordination with the California Department of Fish and Game.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** Design measures – During design reconnaissance missions shall be done by environmental team members to include requirements for species protection in the constraint section of the contract documents.

Construction measures – At the start of construction.

**Complete:** Construction measures – at completion of construction.  
Monitoring – five years after construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% plans conform to measure. Mitigation projects shall be monitored annually for five years using success criteria developed in coordination with the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

**BIO-2a Avoid Loss of Riparian Habitat or Other Sensitive Natural Communities  
(applicable to the Program-Level Improvements only)**

A qualified biologist shall conduct a census of all riparian woody vegetation from the top-of-bank and/or drip-line of the tree or shrub canopy within the area permanently affected by the project. The census will include identification of riparian tree and shrub species, counts of stems, and diameter at breast height for those stems greater than 24-inches in diameter within the construction footprint. The City shall prepare a Riparian Mitigation and Monitoring Plan to include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. The plan shall be written in sufficient detail for a CDFG 1602 Streambed Alteration Agreement. Mitigation shall be on site, if possible, at a ratio of 2:1, namely 2 acres of riparian forest for every acre impacted by construction. Mitigation sites will be preserved in perpetuity.

Oak woodlands within the proposed construction corridors shall also be avoided to the extent practicable. An arborist report shall be prepared for protected trees in accordance with the requirements of the local ordinance that applies to the project (City of Petaluma or Sonoma County). If permanent impacts to protected trees cannot be avoided, then the City shall develop a site-specific compensatory program that complies with the local tree ordinances regarding mitigation ratio and approaches.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** Design measures – During design, reconnaissance shall be performed by environmental team members to include requirements for habitat restoration in the contract documents.

Construction measures – At the start of construction.

**Complete:** Construction measures – at completion of construction.  
Monitoring – five years after construction.

**Monitoring Agency:** City of Petaluma, Construction Manager, Environmental Manager

**Validation:** Report that 90% plans conform with measure. Mitigation projects shall be monitored annually for five years using success criteria developed in coordination with the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

**BIO-2b Avoid Loss of Aquatic Habitat due to Open Reservoir (applicable to the Program-Level Improvements only)**

The City shall avoid loss of aquatic habitat below the hillside open reservoir, to the extent feasible. Reconnaissance missions shall be conducted to site the reservoir, to the extent possible, at a location that does not directly impact or change the flow of a nearby stream. Where permanent impacts to aquatic habitat may occur, the City shall compensate for these impacts through the implementation of one or more of the following measures:

- Natural streamflow may be diverted around each reservoir.
- New habitat suitable for the species affected may be created or existing, degraded habitat for the species may be enhanced/restored.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** Design measures – During design, reconnaissance mission shall be done by environmental team with design engineer to select location with the least impact to the environment.

Construction measures – At the start of construction.

**Complete:** Construction measures – at completion of construction.  
Monitoring – five years after construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% plans conform with measure. If mitigation projects are necessary, they shall be monitored annually for five years using success criteria developed in coordination with the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

**BIO-3 Avoid Fill and Other Impacts to Jurisdictional Waters and Wetlands (applicable to the Program-Level Improvements only)**

The City of Petaluma shall avoid permanent fill of jurisdictional waters and wetlands, to the extent feasible. Preconstruction surveys shall identify waters and wetlands according to state and federal regulations.

If fill cannot be avoided, the City shall compensate for these impacts by creation, restoration, or preservation of wetlands and waters. The City shall prepare and implement a Waters and Wetlands Mitigation Plan (Plan) acceptable to the Corps, the Regional Water Quality Board, and Department of Fish and Game. The Plan shall be prepared by a biologist or horticulturalist with experience in native plant community and habitat restoration. Measures may include the following as applicable to the impacts and the project site:

- Removal of sediments and foreign materials deposited by construction activities from jurisdictional waters.
- Restoration of disturbed waters, wetlands or stream gradients to original contour and hydrologic condition.
- Bank stabilization prior to the onset of winter using straw, matting, wattles, or other suitable means.
- Reestablishment of riparian woodland and stands of sensitive status wetland plant cover using native seed stock, container plants, and/or cuttings collected from as close to the impact vicinity as possible.
- Protection and conservation of topsoil within riparian woodland and stands of sensitive status wetland plant cover.
- Creation of compensatory wetland acreage to mitigate permanent impacts. Compensatory wetlands shall be in-kind, if practicable and, if feasible, compensatory waters or wetlands shall be located within the same watershed as the impacted waters/wetlands. Mitigation efforts may be consolidated in one or more compensatory waters/wetland mitigation projects. Out-of-kind compensatory wetlands, if constructed, shall provide equal or greater wetland function and value than impacted waters.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** At onset of design.

**Complete:** Construction measures – at completion of construction.  
Monitoring – five years after construction.

**Monitoring Agency:** City of Petaluma, Construction Manager, Environmental Manager

**Validation:** Mitigation and revegetation success shall be monitored annually for five years using success criteria developed in coordination with the California Department of Fish and Game, appropriate Regional Water Quality Control Board(s), and the U.S. Army Corps of Engineers.

### **BIO-4a Native Wildlife Nursery Protection Program**

A qualified biologist shall conduct pre-construction surveys of the project area at least two weeks prior to initiation of construction activities to determine if any active raptor or migratory bird nests occur within proposed construction corridor. A minimum 50-foot fence barrier shall be erected around the nest site of passerine (songbirds), 200-foot for raptor nests, and 500 feet for rookeries and maintained until the young have fledged and have left the nesting site.

During construction, a qualified biologist shall monitor each nest to evaluate potential nesting disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting birds. The monitor shall also monitor the nest to determine when the young have fledged.

In addition, a qualified biologist shall survey pastoral and annual grasslands for dens of native mammals including American badger. If active dens are identified consultation shall be initiated with CDFG and their recommendation implemented.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** Design measures – During component design.

Construction measures – At the start of construction.

**Complete:** Construction measures – at completion of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Birds monitored and protected during construction.

**BIO-4b Avoid Blocking Major Wildlife Migration or Travel Corridors (applicable to the Program-Level Improvements only)**

The City of Petaluma shall avoid blocking major migration or travel corridors, to the extent feasible. Preconstruction surveys conducted by a qualified biologist shall identify major migration routes and travel corridors. Where impacts to migration or travel corridors cannot be avoided, the City shall compensate for these impacts through the implementation of one or more of the following measures:

- Construction and maintenance activities may be timed to avoid seasonal migration or travel routes.
- Mitigation efforts may provide an adequately sized, unobstructed corridor to natural open space that also provides habitat for the target species. These corridors would allow movement between the mitigation area and the occupied habitat.
- Culverts or underpasses in streams occupied by steelhead, may be designed according to guidelines provided in CDFG's California Stream Habitat Restoration Manual.

**Implementing Agency:** City of Petaluma, Design Engineer

**Timing:** **Start:** At the beginning of design.

**Complete:** At completion of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** Report that 90% plans conform with measure.

Report identifying migration/travel corridors, if necessary.



**BIO-5 Avoid Permanent Impacts to Protected Trees (applicable to the Program-Level Improvements only)**

The City of Petaluma shall avoid permanent impacts to protected trees (as defined by local Tree Ordinances or such regulations that are in effect at the time of start of construction), to the extent feasible. If permanent impacts cannot be avoided, sensitive trees and plant communities shall be replaced or restored. Measures may include:

- If permanent impacts to sensitive trees are found to occur in the project area and cannot be avoided, then the City may develop a site-specific compensatory program for the affected resource. The compensatory program must be acceptable to the appropriate agency.
- Trees larger than 6 inches in diameter may be subject to protection and compensation.
- Protected trees, their protected perimeters and whether they are to be retained or removed would need to be clearly shown on all improvement plans.
- Before the start of any work on the site, trees designated for protection on the approved site plan may need to be clearly delineated with a substantial barrier (steel posts and barbed wire or chain link fencing) at the protected perimeter, or limits established during the permit process. The delineation markers would remain in place for the duration of all work. A certified arborist may be needed to inspect trees within or adjacent to project area prior to initiation of construction activities.
- When it is necessary to limb trees, prune branches, or prune roots within the right-of-way, work may need to be conducted by a certified arborist in accordance with accepted arboricultural practices, including the pruning standards published by the California Department of Forestry (Coast Region). This work would occur only as a means of protecting trees from damage or removal.
- Trees to be removed may need to be clearly marked. Where practicable, trees and shrubs would be salvaged for replanting in temporarily disturbed areas. Where proposed facilities or construction activities must encroach upon the protected perimeter of a protected tree, special measures may be needed to avoid compaction and allow the roots to obtain oxygen, water, and nutrients.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** Design measures – During component design.

Construction measures – At the start of construction.

**Complete:** Construction measures – at completion of construction. If a compensatory program is implemented, then monitoring will commence for five years after construction.

**Monitoring Agency:** City of Petaluma

**Validation:** Report that 90% plans conform with measure. Mitigation projects shall be monitored annually for five years using success criteria developed by the City.

**CR-1a Identify and Avoid or Minimize Impacts to Cultural Resources (applicable to the Near-Term Improvements only)**

The City of Petaluma shall avoid impacts to cultural resources, to the extent feasible. The treatment of cultural resources to be affected by the Project shall be addressed under applicable cultural resource laws and regulations. The following measures will be taken to address cultural resources in and around the near-term improvements:

- In coordination with the State Water Resources Control Board (SWRCB), identify the Area of Potential Effect (APE) for the Ielmorini/E. Washington Street improvements and the Browns Lane improvements. Based on the APE and coordination with the SWRCB the following additional tasks may be necessary:
- Conduct additional archaeological survey and either augment the existing Archeological Survey Report or prepare a new expanded report based on the agency consultation;
- Evaluate the significance of any identified resources, in consultation with the State Historic Preservation Officer (SHPO);
- Prepare a Finding of (No) Historic Properties Affected; or a Finding of Adverse Effect; and
- Develop and implement a Treatment Plan to resolve any identified adverse effects.
- Because of the possible presence of subsurface archeological resources in the vicinity of the pipeline route, prior to the start of construction core samples shall be taken along a portion of the Ielmorini pipeline route by a qualified archeologist. A Treatment Plan outlining the procedures to be taken in the event archeological or cultural materials are found will be prepared prior to the core samples being taken. The number and location of the core samples shall be determined in coordination with representatives of the Sacred Sites Protection Committee of the Federated Indians of Graton Rancheria, and SWRCB. Based on the results of the core samples, a construction monitoring plan may be developed. The plan would identify when and where construction monitoring would be necessary and the actions to be taken if archeological resources are discovered.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** At onset of design.

**Complete:** Before and during project construction.

**Monitoring Agency:** City of Petaluma, Construction Manager.

**Validation:** Completion of mitigation as necessary.

**CR-1b Identify and Avoid or Minimize Impacts to Cultural Resources (applicable to the Program-Level Improvements only)**

The City of Petaluma shall avoid impacts to cultural resources, to the extent feasible. The treatment of cultural resources to be affected by the Project shall be addressed under applicable cultural resource laws and regulations. Consultation to address potential adverse effects to cultural resources may involve interested parties, and any additional agencies which assert jurisdiction over the project.

A four-step process shall be implemented to address potential impacts and the requirements of the cultural resource laws and regulations. Once the final Area of Potential Effects (APE) for the project is selected, the first step will be identification of cultural resources within the APE. If cultural resources are identified, the second step will require that these resources be evaluated under appropriate significance criteria, in consultation with the State Historic Preservation Officer (SHPO), if necessary. If the resources are significant, the third step will be to determine whether they will be adversely affected by the project. The fourth step will involve avoidance or mitigation of any adverse effects to significant resources. Measures to minimize impacts may include:

- Designing project actions to conform with the Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings;
- Adhering to the city’s Historic Commercial District Design Guidelines;
- Conducting archaeological data recovery in accordance with a research design approved by the relevant regulatory agencies;
- Consulting with regulatory agencies and associated communities to ensure the appropriate treatment of any Traditional Cultural Properties which may be impacted by the project; and
- Monitoring culturally sensitive areas.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** At onset of design.

**Complete:** Before and during Project construction.

**Monitoring Agency:** City of Petaluma, Construction Manager.

**Validation:** Completion of mitigation as necessary.

## **CR-2 Evaluation and Treatment of Paleontological Resources**

If paleontological resources are encountered during project construction, all work within 25 feet of the find shall be redirected and a qualified paleontologist contacted to evaluate the find and make recommendations. If the fossils are not significant, no further protection is necessary. If such fossils are found to be significant, they shall be avoided by construction activities. If the fossils cannot be feasibly avoided, a mitigation strategy will be developed that conforms to the guidance provided by the Society for Vertebrate Paleontology in Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines (Conformable Impact Mitigation Guidelines Committee 1995). The mitigation strategy may include, but is not limited to, data recovery and analysis, preparation of a data recovery report, accessioning recovered fossil material to an accredited paleontological repository, and public outreach and interpretation.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** During construction.  
**Complete:** Completion of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager.

**Validation:** Completion of mitigation as necessary.

## **VR-1 Landscape Screening**

The City of Petaluma shall plant drought tolerant, non-invasive shrubs and/or trees at facilities as appropriate to screen views from sensitive viewpoints (scenic vistas, designated local or State scenic resources, high volume travelways, recreation use areas, or other public use area) and to reduce visual contrast in off-site foreground views. All visible faces of reservoir berms shall be revegetated with drought tolerant, non-invasive grasses and where appropriate natural groupings of shrubs shall be planted adjacent to the dams or berms to reduce the visual contrast of the exposed face compared to the surrounding landscape.

The area surrounding the exposed face of the storage tank shall be planted with oak trees. Spacing and size of the landscape screening shall be as effective as the visual simulation in the Draft EIR.

**Implementing Agency:** City of Petaluma

**Timing:** **Start:** During project design and construction.

**Complete:** Prior to substantial completion of construction.

**Monitoring Agency:** City of Petaluma, Construction Manager

**Validation:** The City shall verify that landscaping is included in plans, and shall monitor success of landscaping for five years after completing construction of a facility.

## 4 ENVIRONMENTAL ANALYSIS INTRODUCTION

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This Chapter consists of 12 sections, each of which presents the analysis of the near-term improvements and program-level improvements within an environmental discipline. Each section includes the following information:

- A short introduction.
- Impacts Evaluated in Other Sections. A summary of where to find topics associated with the section's analyses that are addressed elsewhere in the EIR.
- Setting. A description of the existing conditions for each environmental discipline. The setting acts as a baseline to which the analysis compares the effects of the near-term and program-level improvements. In general, the baseline is established as the date of the Notice of Preparation in May 2007.
- Evaluation Criteria with Thresholds of Significance. A table presenting the criteria used to determine specific impacts, measurements used to determine whether an impact is "significant," and the threshold at which the impact becomes significant. The source and justification or authority for each criterion is also identified in the table.
- Methodology. Where applicable, a brief description of how the impact analysis was conducted.
- Impacts and Recommended Mitigation. A presentation of the results of the environmental analysis for each discipline, including the identification of impacts, the determination regarding significance, the description of mitigation measures proposed to avoid or lessen impacts, and whether mitigation will reduce the effects to less than significant. These analyses are presented in the following order:
  - Project-Level and Program-Level Impact Analysis. Environmental impacts for each project-level and program-level improvement are assessed for each criterion. For each criterion, an analysis of the expected impacts is presented and, if necessary, mitigation measures for each impact are proposed. The complete text of each mitigation measure is presented in Chapter 3. No mitigation is proposed for impacts of the No Project Alternative, because CEQA requires mitigation only upon approval of a project.
  - Cumulative Impact Analysis. Cumulative impacts are defined as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. These analyses evaluate the impacts from cumulative projects when added to Project impacts. The cumulative projects study area is defined in Chapter 2, Project Description. Cumulative projects considered in this evaluation are identified in the Cumulative Projects List in Appendix B.

## 4.1 LAND USE

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This section discusses the consistency of the program and project with existing and planned land uses and existing zoning within the City of Petaluma and Sonoma County. To provide a basis for this evaluation, the Setting section provides information on regional land use patterns, General Plans of the jurisdictions within the study area, and existing and planned land uses within the vicinity of program and project components.

### IMPACTS EVALUATED IN OTHER SECTIONS

The following subjects are related to the Land Use Section, but are evaluated in other sections of this document:

- Habitat conservation plans are evaluated in Section 4.8, Biological Resources.
- Scenic corridors are evaluated in Section 4.13, Visual Resources.

### SETTING

The WREP project area consists of areas within the Urban Growth Boundary of the City of Petaluma and unincorporated areas of Sonoma County south and east of the City, as shown on Figure 2-2, Concept Plan.

#### Planning Jurisdictions

Both the City of Petaluma and Sonoma County have adopted General Plans, which include land use goals, objectives, and policies as well as a Land Use Plan Map showing land use designations.

##### ***Petaluma***

The *City of Petaluma General Plan 2025* identifies development policies for the City and its planning referral area through 2025, and identifies an Urban Growth Boundary. The Recycled Water Service Area, as shown on Figure 2-2, is coincident with the Petaluma Urban Growth Boundary, except in the southeast where the Service Area extends into the County to serve agricultural uses.

##### ***Petaluma Municipal Airport***

The Petaluma Municipal Airport is owned and operated by the City of Petaluma, Department of Public Works. The surrounding lands within the airport safety zones are within the jurisdiction of the City and Sonoma County. Two documents govern the operations of the Airport and surrounding land uses for the airport: The *Petaluma Municipal Airport Master Plan*, adopted in 1978 and the *Sonoma County Comprehensive Airport Land Use Plan*, adopted in 2001.

##### ***Sonoma County***

The *Sonoma County General Plan* (1989, revised 1991 and 1994) is applicable to the unincorporated areas of Sonoma County and is intended to guide decisions regarding future growth, development, and conservation of resources through 2005. The General Plan divides the

County into nine Planning Areas (also termed Sub-county Planning Regions) each with its own goals, objectives, and policies. The project is located in the Petaluma and Environs Planning Area. The Land Use Element of the General Plan includes County-wide land use policies, as well as policies for each of the Planning Areas. Refer to the cumulative impact analysis at the end of this section regarding the new Draft Sonoma County General Plan being considered by the County.

## **Land Use Patterns and Existing Uses**

### ***Petaluma***

The existing development within the Petaluma area is well established and defined by the urban separator, a visible band of open space, which is continuous on the east side of the City, parallel to Adobe Road. On Petaluma's south side near Lakeview Highway, the urban separator lies at the Urban Growth Boundary. Refer to Figure 4.1-1, City Limit and Urban Growth Boundary Map.

Downtown Petaluma, west of the Petaluma River, is the primary commercial and cultural center, while the higher intensity development including other commercial centers and industrial uses follows the Highway 101 and Lakeville Highway corridors. Development to the east of these corridors is primarily residential, with interspersed public/semi-public uses (such as schools and parks) and a limited number of local retail centers. Along the eastern edge of this urban development, between Washington Street and Casa Grande Road, is the Petaluma Municipal Airport. Along the western side of the City are areas of lower density suburban and rural residential areas.

Planned land uses maintain the existing established pattern of development, with higher intensity uses in the downtown area and along the Highway 101 and Lakeville Highway corridors.

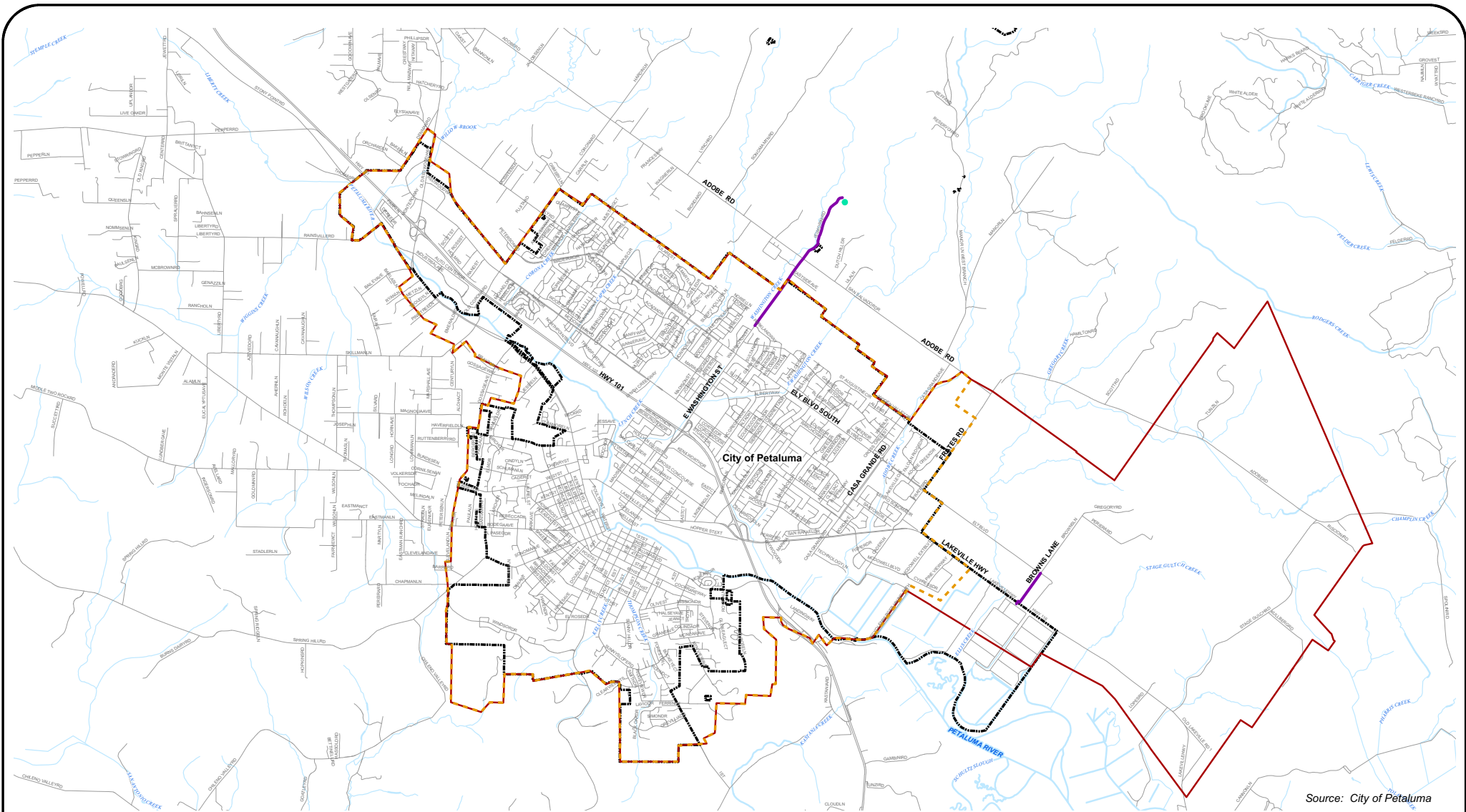
### ***Sonoma County***

Existing land use patterns in Sonoma County are generally characterized by city- and community-centered growth, with areas of agricultural use and other open space separating the cities and communities. Within the city and commercial areas, there exists a wide variety of densities of development, ranging from highly urban to semi-rural, typically with larger lots around the fringe of the incorporated areas and in the unincorporated communities.

Agriculture is an important land use in this area of the County, with a diversity of agricultural operations, including vineyards, dairies, forage crops, and livestock. Other natural resource areas, such as the mining of aggregates, are also important elements of the overall land use patterns in this portion of the County.

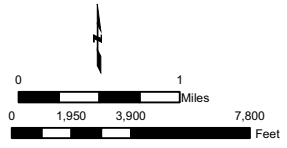
Generally, the planned land use patterns reflect existing development patterns. In Sonoma County, planned land uses are based upon focused growth within relatively compact city and community areas, with community separators to maintain the separate identities of the major cities in the County.





Source: City of Petaluma

- Legend**
- Near-Term Pipelines
  - Urban Growth Boundary
  - Recycled Water Service Boundary
  - City Limits



**Figure 4.1-1**  
**City Limit & Urban Growth**  
**Boundary Map**

WREP EIR  
 Petaluma, California



### ***Project-Level Near-Term Conveyance Improvements***

The proposed site for the tertiary storage tank, and its associated facilities, is located in an unincorporated area of Sonoma County. The area is predominantly grazing land and includes a residence, barns, and access road.

### ***Program-Level Improvements***

The open secondary recycled water reservoir would be located within an area between 300 and 400 feet elevation east of the Lakeville Highway and north of Stage Gulch Road, as shown on Figure 2-2, Concept Plan. This area is used for grazing land, several similar-sized stock ponds are in the area. The Ghilotti Quarry is located between Lakeville Highway and the proposed storage reservoir area.

Because the area in which the remainder of the program-level improvements may be located encompasses the entire City of Petaluma plus County land to the southeast, the general description of land use patterns provided above is applicable.

## **GOALS, OBJECTIVES, AND POLICIES**

### ***Petaluma***

The following policies and programs, which are contained in the Petaluma *General Plan 2025* Land Use, Growth Management and the Built Environment Element, are applicable to the project:

Goal 1-G-3: Maintain a well-defined boundary at the edge of the urban development.

Policy 1-P-28: It is the policy of the City to build within the agreed upon Urban Growth Boundary. No urban development shall be permitted beyond the Urban Growth Boundary...municipal or public services or facilities can be developed beyond the UGB to provide services within the UGB.

Policy 1-P-47B: Initiate design of long-term infrastructure improvements in a timely manner to insure their completeness to coincide with demand.

Policy 1-P-17: Maintain a permanent open space around the City through the continued use of the Urban Separator and the use an Urban Separator Pathway, as designated.

In addition to Policy 1-P-17 above, there are several policies that discuss preservation of the Urban Separator. The urban separator bounds and shapes the urban area, and begins the open space frame that surrounds the city. The City's Urban Separator is a visible band of open space that marks the edge of allowable urban development. It is continuous on the East Side, intermittent on the West Side, and runs adjacent to the Urban Growth Boundary for most of its length. The Urban Separator prevents urban development from extending unchecked into surrounding open space, since private development cannot take place within the separator.

### ***Sonoma County***

Sonoma County, which has jurisdiction over the storage tank parcels, has zoned the land as diverse agriculture (DA) with a combining district of scenic resources and valley oak habitat. The pipeline that would be constructed along Ielmorini Road and the pipeline that would connect the tank to the existing detention basin west of Ielmorini Road would be located on parcels zoned DA as well. The purpose of the DA zone is to implement the provisions of the DA land use

category (Section 2.7.3 of the General Plan) and the policies of the Agricultural Resources Element; and to enhance and protect those land areas where soil, climate, and water conditions support farming, but where it may not be the principal occupation of the farmer. The following Sonoma County goal and objective apply:

*Land Use Element Policy and Objectives*

- Goal LU-5: Identify important open space areas between the county's cities and communities. Maintain them in a largely open or natural character with low intensities of development.
- Objective LU-5.1: Retain low intensities of use in open space "separators" between cities and communities along the Highway 101 corridor and within the central Sonoma County area.

The pipeline in Browns Lane would be located within the public right-of-way and have no zoning or General Plan designation.

**California Surface Mining and Reclamation Act**

Under the California Surface Mining and Reclamation Act of 1975, the State Geologist classifies land in the State for its mineral resource potential according to various Mineral Resource Zone (MRZ) categories that reflect varying degrees of mineral potential. The Sonoma County Aggregate Resources Management (ARM) Plan establishes policies and standards for the management of the County's aggregate resources. The ARM Plan indicates that all designated new quarry sites and potential expansion areas shall be protected from incompatible uses by being considered in the review of all nearby development proposals, and that uses which would be incompatible with future quarry development on designated sites shall not be permitted unless the public benefits of the proposed use outweigh the public benefits of potential quarry development.

According to Special Report 175, entitled Mineral Land Classification of Aggregate Materials in Sonoma County, California, there are no areas classified MRZ-2 for mineral resources within the WREP study area (DOC 2005). Special Report 175 is the most current information provided by the Department of Conservation to identify mineral resources in Sonoma County.

**EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE**

The Governor's Office of Planning and Research has published a guide to developing thresholds of significance to assist in determining whether a project may result in a significant environmental effect (OPR 1994). A "threshold of significance" is the level at which the Lead Agency finds the effects of a project to be significant. It is a qualitative or quantitative standard based on health based standards, service capacity standards, ecological tolerance, or other standards relating to environmental quality issues such as those listed in the Initial Study checklist, agency regulatory standards, consultation with other agencies, and the Lead Agency's specific thresholds of significance.

Potential land use impacts may occur if:

- The project results in a change in land use, or
- The project results in a loss of public open space.

A change in land use is defined as a change from one land use type to another (e.g., from agricultural to industrial use). A loss of open space is defined as the permanent coverage of public land by structures, roadways, parking areas or other impervious surfaces.

Impacts may occur directly as a result of project activities (e.g., conversion of land use on a site due to construction of a project component) or indirectly within a larger geographic area over time as a result of implementing the project (e.g., conversion of land uses within an area resulting from the land use change on the project site).

Based on the above considerations, Table 4.1-1 describes the evaluation criteria and thresholds of significance used for assessing the impacts of the project on land use.

**TABLE 4.1-1  
 Evaluation Criteria with Threshold of Significance – Land Use**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
1. Will the WREP conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project?	Acres of land in conflict.	Greater than 0 acres of land.	Sonoma County General Plan and Zoning Petaluma General Plan 2025 and Zoning
2. Will the WREP be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	a. Acres of MRZ-2 land developed in incompatible uses.	a. Greater than 0 acres of land.	a. General Plan of Sonoma County and the Mineral Land Classification of the Division of Mines and Geology (1989)
	b. Acres of quarry site designated by the ARM plan developed in incompatible uses.	b. Greater than 0 acres of land.	b. Sonoma County Aggregate Resources Management (ARM) Plan (1994)
3. Will the WREP introduce inappropriate uses in a Sonoma County Community Separator or a Petaluma Urban Separator?	Acres of land within Community Separators developed in inappropriate uses.	Greater than 0 acres of land.	Sonoma County General Plan Petaluma General Plan 2025
4. Will the WREP increase potential for conflict as a result of incompatible land uses?	a. Lineal feet of incompatible uses	a. Greater than 0 lineal feet.	Sonoma County General Plan Petaluma General Plan 2025
	b. Number of housing units of incompatible use.	b. Greater than 0 housing units.	
5. Will the WREP convert non-urban land to urban uses for Project facilities?	Acres of land converted	Greater than 0 acres of land.	Sonoma County General Plan Petaluma General Plan 2025
6. Will the WREP convert public open space for Project facilities?	Acres of land converted.	Greater than 0 acres of land.	Sonoma County General Plan Petaluma General Plan 2025

**TABLE 4.1-1**  
**Evaluation Criteria with Threshold of Significance – Land Use**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
7. Will the WREP result in loss of homes or businesses due to construction of facilities?	Number of homes or businesses lost.	Greater than 0 homes or businesses.	Uniform Relocation Assistance and Real Property Acquisition Act

## IMPACTS AND MITIGATION MEASURES

**Impact:** **LU-1 & LU-4: Will the WREP conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project or increase potential for conflict as a result of incompatible land uses?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements – No Impact*

The tank site would be located on land designated Land Extensive Agricultural. Public service uses or facilities are considered permitted uses with a use permit in an agricultural district. The tertiary tank and pipelines would thus be compatible with both the general plan and zoning designations with approval of a use permit. A Use Permit would need to be obtained from the County of Sonoma for the storage tank, and its associated facilities. The pipeline would be located on the existing roadway in Ielmorini Road and within the public right-of-way on East Washington Street and Browns Lane. A pipeline would also connect the tertiary tank to the existing detention basin located west of Ielmorini Road. Although the pipeline in Ielmorini Road and the pipeline that would connect to the existing detention basin would require the City to obtain an easement from the property owner, the pipelines would not change the surface land use, so no land use impacts would occur.

The pipeline in East Washington Street (from Parkland to Adobe Road) and Ielmorini Road are within the Airport Safety Zones of the Petaluma Municipal Airport (Sonoma County 2001). The Sonoma County Comprehensive Airport Land Use Plan (CALUP) describes permitted uses within the Safety Zones and discourages “critical land uses” within the safety zones such as public utilities or facilities which would cause significant public inconvenience or hazard in case they were disabled by an aircraft accident. The pipeline is within the Sideline Safety Zone (SSZ), Runway Protection Zone (RPZ), Inner Turning Zone (ITZ) and the TPZ. Underground facilities, such as pipelines, are permitted uses within these safety zones (Sonoma County 2001). Construction-related impacts would be temporary and would not affect airport operations (pers. com. Bob Patterson, 2007). The project would not be in conflict with either of the Airport Land Use Plans.

*Program-Level Improvements – No Impact*

Approximately one-third of the recycled water would go to agricultural uses. Thus, the project would continue to provide agricultural support and long-term preservation of agricultural use, consistent with the Sonoma County and Petaluma general plan policies to stabilize agricultural use at the urban fringe and maintain agricultural open space. The

use of tertiary water for urban irrigation as opposed to potable water would not conflict with the policies of the Petaluma and Sonoma County General Plans.

Some pipelines associated with the program-level improvements would be located in public rights-of-way. Other pipelines may be constructed within easements that would be acquired as part of the Program. Neither would change the surface land use. If the easement is located in an area used for agriculture, it could result in a change in use as continued agricultural use might not be permitted within the easement. However, maintaining the easement as open space would not be incompatible with Petaluma or Sonoma County General Plan designations and zoning.

Although a specific location has not been designated for the open reservoir, it would be located north of Lakeville Highway between elevation 300 and 400 feet (see Figure 2-2). The open reservoir area is in Sonoma County jurisdiction and is zoned Land Extensive Agriculture (LEA). Reservoirs are considered a permitted use with a Use Permit within the LEA zone.

A new pump station would be located within the City limits in the general vicinity of the Petaluma Golf and Country Club (west of Highway 101). The pump station would require up to 0.5 acre and likely be housed within a structure that blends with the surrounding neighborhood. The area within the vicinity of the Petaluma Golf and Country Club has a land use designation of Suburban (SU) and is within a Planned Unit District and a Residential District. Public services are allowed in all City land use designations, with a use permit. The project, after review for the Use Permit, would be found to be consistent with the zoning and land use designation.

Mitigation: No mitigation is necessary.

**Impact: LU-2: Will the WREP be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

The near-term improvements of the WREP would not be located within areas classified as MRZ-2 for mineral resources (DOC 2005).

A privately owned quarry (Ielmorini Quarry) is located northeast of the proposed water storage tank. However, mining of the quarry is complete; the land has been restored and is currently in the process of being declared officially reclaimed.

*Program-Level Improvements – Less than Significant*

The program-level improvements of the WREP would not be located within areas classified as MRZ-2 for mineral resources (DOC, 2005).

A privately owned quarry (Ghilotti Quarry) is located north of the intersection of Lakeville Highway and Stage Gulch Road, on land adjacent to the area within which the open reservoir would be located. Measure PD-1, Site and Design Facilities to Achieve Compatible Land Use, is adopted as part of this project. This measure would require siting of facilities to avoid creating land use conflicts due to incompatibility with adjacent uses or loss of natural resources, to the extent feasible. With implementation of Measure PD-1, incompatibility of land use types relative to the Ghilotti quarry or other nearby agricultural uses is found to be less than significant.

Mitigation: No mitigation is necessary.

**Impact: LU-3: Will the WREP introduce inappropriate uses in a Sonoma County Community Separator or Petaluma Urban Separator?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

The near-term improvements would not be located within a Sonoma County Community Separator, and therefore do not have any impact upon the implementation of the Sonoma County General Plan policies regarding Community Separators.

The improvements are not located within a City-designated Urban Separator, with the exception of the pipeline along East Washington Street which crosses through an Urban Separator at the City limits. Although public service facilities are not expressly allowed in an Urban Separator designation, pipelines are below-ground facilities and would not be considered an urban use. Therefore this impact is considered less-than-significant.

*Program-Level Improvements – Less than Significant*

Pipelines would be below-ground facilities and would not be an urban use. The use of recycled water for irrigation would provide agricultural support and long-term preservation of agricultural use. They would be appropriate uses within a Community Separator and Urban Separator and are considered a less-than-significant impact.

Neither the open reservoir nor the pump station would be located within a Community Separator or an Urban Separator.

Mitigation: No mitigation is necessary.

**Impact: LU-5: Will the WREP convert non-urban land to urban uses for Project facilities?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

The tank and pipelines are considered public services facilities, and not urban uses. They would not convert land to urban use.

*Program-Level Improvements – No Impact*

The use of recycled water will be used within the UGB or for agricultural crops. Use of recycled water within the UGB would mostly be used to irrigate existing or new parks and playing fields. It will not convert agricultural land to urban uses. The application of recycled water to serve local agriculture would encourage continued agricultural uses in the Program area.

The change in land use due to construction of the small open reservoir on agricultural land would not result in a change of use from rural to urban. Water areas are considered to be open space according to the Open Space Element of the Sonoma County General Plan. Thus, this change in land use would be consistent with the Open Space Element of the Plan.

Pipelines and the pump station are public services facilities and not urban uses. They would not convert land to urban use.

Mitigation: No mitigation is necessary.

**Impact: LU-6: Will the WREP convert public open space for project facilities?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

No public open space would be used for near-term improvements. There would be no impact to public open space.

*Program-Level Improvements: Application of Recycled Water and Pipelines – No Impact; Open Reservoir and Pump Station - Significant*

The application of recycled water for irrigation would not convert public open space to a non-open space use. There would be no impact.

The potential reservoir site may, in the future, include lands for which the Sonoma County Agricultural Preservation and Open Space District holds conservation easements. This could result in a use which is inconsistent, depending on the terms and conditions of the individual easement. If so, this would create a significant impact.

The site for the pump station has not yet been determined. If the facility were to be located on a property that is public open space, the conversion to non-open space use would be a significant impact. Also, sites could be located on private property in which the Sonoma County Agricultural Preservation and Open Space District holds easements. The construction of the facilities could potentially conflict with the status of the affected property as open space under the conservation easements and therefore could result in a loss of open space. This would be a significant impact.

Pipelines are underground facilities and would not convert public open space to a non-open space use.

Mitigation: **LU-1 Replacement of Open Space Easements**

The City shall contribute funds to the Sonoma County Agricultural Preservation and Open Space District to compensate for land acquired for a facility on the District's land. The City's monetary contribution shall be equal to the open space and natural resource value of the land acquired for the facility. All monies contributed by the City shall be utilized in accordance with the Sonoma County Open Space Expenditure Plan.

After

Mitigation: *Program-Level Improvements: Open Reservoir and Pump Station – Less than Significant*

Mitigation Measure LU-1 reduces this impact to a level below significance by providing funding to the Open Space District for the replacement on a one-to-one basis of existing acreage in open space easements. This would allow purchase of easements on new acreage in areas of comparable open space character and open space value identified by the Open Space District as a priority acquisition area.

The conveyance of funds to the District for the purchase of open space easements would ensure preservation of land as open space which is not now covered by open space easements and otherwise would not be assured of preservation as open space. Replacing existing acreage in conservation easements on a one-for-one basis would mitigate the impact of storage reservoirs on open space to less than significant.



**Impact:** **LU-7: Will the WREP result in loss of homes or businesses due to construction of facilities?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements – No Impact*

The tertiary storage tank, and associated facilities, would not displace a home. The pipeline would be constructed within existing roadways (private and public). The project would not result in loss of homes or businesses due to construction of facilities.

*Program-Level Improvements – No Impact*

The application of recycled water for irrigation would not result in loss of homes. The City commits to locate the open reservoir and pump station in a location that would not displace occupied businesses or buildings. Pipelines are underground facilities and would be constructed within the public right-of-way. Construction of pipelines would not result in a loss of homes.

**Mitigation:** No mitigation is necessary.

## **CUMULATIVE IMPACTS**

**Impact:** **LU-C1 and C4: Will the WREP plus cumulative projects conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project, or increase potential for conflict as a result of incompatible land?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements – No Impact*

The project has no impacts, so it does not contribute to cumulative impacts.

**Mitigation:** No mitigation is necessary.

**Impact:** **LU-C2: Will the WREP plus cumulative projects be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements – No Impact*

The near-term improvements have no impacts, so it does not contribute to cumulative impacts.

*Program-Level Improvements – Less than Significant*

No other reasonably foreseeable impacts upon quarries in the area have been identified, and therefore, the cumulative impact of the project upon quarries remains less than significant.

**Mitigation:** No mitigation is necessary.

**Impact: LU-C3. Will the WREP plus cumulative projects introduce inappropriate uses in a Sonoma County Community Separator or Petaluma Urban Separator?**

Analysis: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements – Less than Significant*

Pipelines would be below-ground facilities and would not be an urban use. The use of recycled water for irrigation would provide agricultural support and long-term preservation of agricultural use. They would be appropriate uses within a Community Separator and Urban Separator and are considered a less-than-significant impact. No other WREP facilities would be located within a community or urban separator.

Mitigation: No mitigation is necessary.

**Impact: LU-C5: Will the WREP plus cumulative projects convert non-urban land to urban uses for Project facilities?**

Analysis: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements – No Impact*

The project has no impacts, so it does not contribute to cumulative impacts.

Mitigation: No mitigation is necessary.

**Impact: LU-C6: Will the WREP plus cumulative projects convert public open space for project facilities?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

The project has no impacts, so it does not contribute to cumulative impacts.

*Program-Level Improvements – Less than Significant*

For any improvements which may need to be located on public open space land, the City would implement LU-1, Replacement of Open Space Easements, to reduce the impact to less than significant. No cumulative projects have been identified that would contribute to this same impact, but if, over the course of implementation of the program, other projects occur which convert open space lands, they would be subject to the same type of mitigation as this project, and cumulative impacts would remain less than significant.

Mitigation: No mitigation is necessary.

**Impact: LU-C7: Will the WREP plus cumulative projects result in loss of homes or businesses due to construction of facilities?**

Analysis: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements – No Impact*

The project has no impacts, so it does not contribute to cumulative impacts.

Mitigation: No mitigation is necessary.

## REFERENCES

- City of Petaluma. 1973. *Petaluma Zoning Ordinance*. January 17.
- City of Petaluma. 2008. *Final General Plan 2025*. May.
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## 4.2 AGRICULTURE AND SOIL QUALITY

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This section evaluates the potential impacts of the proposed project on agriculture, including the loss of designated agricultural lands, conflicts with Williamson Act contracts, reduction of soil productivity due to erosion, the build-up of trace elements in soils, and the potential for damage to adjacent vineyards by increased glassy-winged sharpshooter populations. To provide a context for this evaluation, the setting section provides information on the existing agriculture in the Water Recycling Expansion Program (WREP) study area, a summary of general plan policies regarding agricultural resources, the classification of farmlands and soil types, and Williamson Act contracts.

### IMPACTS EVALUATED IN OTHER SECTIONS

The following items are related to the Agriculture Section but are evaluated in other sections of this document.

- **Agricultural Zoning.** The potential for conflicts with agricultural zoning is addressed in Section 4.1, Land Use.
- **Soil Erosion.** Erosion from construction activities is discussed in Section 4.3, Geology, Soils, and Seismicity. Sedimentation in waterways is evaluated in Section 4.4, Hydrology and Water Quality.

### SETTING

#### Existing Agricultural Use

##### *Project-Level Near-Term Conveyance Improvements*

The proposed tertiary storage tank, and its associated facilities, would be located in foothill grazing land in the northeast portion of the WREP study area in unincorporated Sonoma County. The tertiary pipeline and secondary pipeline would follow existing public right-of-ways within the City of Petaluma.

##### *Program-Level Improvements*

The majority of tertiary recycled water would be utilized within the urbanized areas of Petaluma for such uses as golf courses, playing fields, parks, business parks, schools, industrial purposes, and at the Ellis Creek Water Recycling Facility. Two existing agricultural customers will be converted to tertiary recycled water. The secondary recycled water would continue to go to rural agricultural users along Lakeville Highway and Browns Lane. Agricultural uses include forage crops, pasture, and vineyards. There are two types of improvements that would occur over time as demand for recycled water increases. The first is transition from use of potable water for irrigation to application of tertiary recycled water for irrigation or other allowable uses. The second type of improvement is removal of some lands from secondary recycled water use as demand for tertiary water increases. The WREP may include the purchase or long-term lease of land to be used by the City as contingent irrigation areas when needed to provide for operational flexibility for the management of recycled water in drought and wet years.

**Local Jurisdictions**

Agriculture in the WREP study area is confined to areas in unincorporated Sonoma County and outside the Urban Growth Boundary (UGB) of the City of Petaluma.

***Petaluma***

Although the economic emphasis of the City of Petaluma has changed from poultry and dairy production to communication and information technology, agricultural products continue to be economically important to the City. The General Plan 2025 Land Use map shows the area northwest of Willow Brook Creek and west of Old Redwood Highway as being the only area designated for agriculture within Petaluma’s city limits.

***Sonoma County***

Agriculture in the unincorporated Sonoma County portion of the WREP study area consists predominantly of grazing land with large parcels devoted to dairy production, vineyards, and seasonal row crops. Table 4.2-1, Sonoma County Agricultural Summary, shows livestock and poultry products continue to be leading agricultural commodities for Sonoma County.

Table 4.2-1 presents the approximate bearing acreage and cash value of the most important crops in Sonoma County for the year 2005. Available records from the Sonoma County Agricultural Commissioner show wine grapes to have the most land acreage and cash value.

**TABLE 4.2-1  
 Sonoma County Agricultural Summary**

<b>Crop</b>	<b>Acreage</b>	<b>Cash Value</b>
Wine Grapes	57,050	\$430,563,500
All Apples	2,987	\$6,929,100
Fruits and Nuts	583	\$368,800
Vegetable Crops	273	\$6,680,300
Livestock and Poultry	NA	\$54,139,700
Livestock and Poultry Products (including milk)	NA	\$100,329,800
Field Crops	38,1089	\$7,180,279
Timber Products	NA	\$4,984,256

Source: Sonoma County Agricultural Commission, Crop Report 2005

In 2001, California’s crop irrigation constituted the major use of recycled water amounting to approximately 47 percent of the statewide total with landscape irrigation accounting for approximately 21 percent of the statewide total (State Water Resources Control Board, Water Recycling Funding Program Strategic Plan 2007-2008). Recycled water from the City of Petaluma would continue to serve some of the existing irrigated agricultural lands found within the northeast and southeast of the study area as shown in Figure 2-2 as Existing Recycled Water Users. Agricultural parcels in use for recycled water irrigation are used for pasture, vineyard, and hay and silage production.

## GOALS, OBJECTIVES, AND POLICIES

The City of Petaluma (City) and Sonoma County (County) have adopted General Plans, which includes goals, objectives and policies to enhance and protect agricultural resources. Table 4.2-2 identifies goals, objectives, and policies from the most current City of Petaluma and Sonoma County general plans for preserving, protecting and maintaining agricultural land and uses. Both jurisdictions are undergoing general plan updates but only the County has created new goals, objectives and policies for agriculture. The table also indicates which evaluation criteria in Table 4.2-3 are responsive to each set of policies.

**TABLE 4.2-2**

**Goals, Objectives, and Policies – Agriculture and Soil Quality**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Petaluma General Plan 2025	Community Design, Character, and Green Building	Goal 2-G-1	Preserve Petaluma’s setting as an urban place surrounded largely by rural land uses and densities, agriculture and open space.	1
Petaluma General Plan 2025	Water Resources	Policy 8-P-11	The City may continue to work with agricultural users to reuse secondary recycled water. In addition, the City may purchase land as a backup reuse site.	1
Petaluma General Plan 2025	Water Resources	Policy 8-P-9B	Operate and maintain the Ellis Creek Water Recycling Facility to produce recycled water to meet or exceed current regulatory standards.	4
Petaluma General Plan 2025	The Natural Environment	Policy 4-P-4	Continue to support rural land use designations and Agricultural Best Management Practices within the Sonoma County General Plan.	4
Sonoma County General Plan	Agricultural Resources Element	Goal AR-3 Objective AR-3.2 Policy AR-3a	Maintain agricultural land in parcel sizes that are suitable for agricultural purposes.	2
Sonoma County General Plan	Agricultural Resources Element	Objective AR-8.1 Policy AR-8c	Continue Participation in the Williamson Act.	2
Sonoma County General Plan	Agricultural Resources Element	Objective AR-8.2 Policy AR-8f	Encourage participation in programs for reuse of treated wastewater which are beneficial for agriculture.	1, 3, 4

**TABLE 4.2-2**  
**Goals, Objectives, and Policies – Agriculture and Soil Quality**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Sonoma County General Plan	Resource Conservation Element	Goal RC-1 Objective RC-1.1	Conserve soil resources to protect long-term productivity and preserve prime agricultural lands.	1, 3, 4

Source: Petaluma General Plan 2025 and Sonoma County General Plan 1989

Notes:

1. Evaluation criteria are identified in Table 4.2-3.

**Federal and State Soil Classification**

The suitability of land for agriculture is relative to soil composition. There are two systems used by the United States Soil Conservation Service (SCS) to determine a soil’s agricultural productivity. The two systems are the Soil Capability Classification and the Storie Index Rating System. The Soil Capability Grouping determines a soil's productive capacity using Roman numerals I through VIII to indicate progressively greater limitations and narrower choices for practical use. This system takes into consideration soil limitations and the way in which soils respond to treatment. Lands in Classes I to IV inclusive are considered capable of sustained production of common cultivated field crops. Class V lands are capable of use only for producing perennial forage crops or specially adapted crops while Class VIII lands are incapable of use for either arable culture or grazing. The second rating system, Storie Index Rating provides an additional index showing the relative degree of suitability, or value, of a soil for general intensive agriculture. The system ranks soil characteristics according to their suitability for agriculture from Grade 1 soils (80 to 100 rating), which have few or no limitations for agricultural production, to Grade 6 soils (less than 10 rating), which are not suitable for agriculture. Under this system, soils deemed less than prime can operate as prime soils when limitations, such as poor drainage, slopes, or soil nutrient deficiencies, are partially or entirely removed.

Soils in the WREP study area can generally be classified into the Clearlake-Reyes association and the Haire-Diablo association (SCS, Soil Survey, Sonoma County 1972). The Clearlake-Reyes association is located on nearly level to gently sloping basins and tidal flats. The association extends from Sebastopol to San Pablo Bay and occupies approximately 6 percent of Sonoma County. Slopes range from 0 to 5 percent. Clearlake soils make up about 50 percent of the association, Reyes soils about 40 percent. The remaining 10 percent is made up of the Wright and Yolo soils. The Clearlake-Reyes soils have a soil capability grouping of II, III and IV. The Storie Index rating is numerically 41 to 61. These soils are used mainly to grow oats for hay and grain; some areas are used for family orchards, irrigated pastures, and for field corn for silage. The Haire-Diablo association is located mainly in the southeast and south central portion of the County on sloping terraces and rolling uplands. The association is usually covered by grassy rolling hills with oak trees. The Haire-Diablo association occupies 4 percent of the County with each soil classification occupying about 45 percent. The remaining 10 percent is made up of Arbuckle, Clearlake, Raynor, and Zamora soils. The Haire-Diablo soils have a soil capability grouping of II, III, IV and VI. The Storie Index rating is numerically 18 to 44. Soils of this classification are mainly used for dryland pasture and range.

## **State of California Department of Conservation**

The California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program (FMMP) produces maps and statistical data used for analyzing trends on California's agricultural lands (California Department of Conservation 1992). The FMMP was established in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). The intent of the NRCS was to produce agricultural resource maps based on soil quality and land use across the nation. As part of this nationwide mapping effort, NRCS developed a series of definitions known as the Land Inventory and Monitoring (LIM) criteria. The LIM criteria classified the land's suitability for agricultural production, which included physical and chemical characteristics of soils, as well as specified land use characteristics. The FMMP's Important Farmland Series Maps are derived from NRCS LIM criteria.

The FMMP uses soil surveys for determining the classification of agricultural land within each county and monitors the conversion of the state's farmland to and from agricultural use. These surveys are mapped and identify eight classifications of land capability and use a minimum mapping unit of 10 acres. The program also produces a biannual report on the amount of land converted from agricultural to nonagricultural use. The program maintains an inventory of state agricultural land and updates its "Important Farmland Series Map" every two years. The FMMP is an informational service that does not constitute state regulation of local land use decisions.

### **Important Farmland Series Maps**

The California Department of Conservation has modified the NRCS maps to show farmland and urban areas in California. These Important Farmland Series Maps for Sonoma County (California Department of Conservation 2004) classify the farmlands of the state as:

- **Prime Farmland.** This category of land has the best combination of physical and chemical characteristics to sustain long term agricultural production. The land has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops. Prime Farmland must have been used for irrigated agricultural production some time during the four years prior to the mapping date.
- **Farmland of Statewide Importance.** Although similar to Prime Farmland, this category of land has minor shortcomings, such as greater slopes or less ability to store soil moisture. This land must have been used for the production of irrigated crops at some time during the four years prior to the mapping date.
- **Unique Farmland.** This land has lesser quality soils and is used for the production of the states leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Lands must have been cropped sometime during the four years prior to the mapping date.
- **Farmland of Local Importance.** This land is of importance to the local agricultural economy, determined by each county's board of supervisors and local advisory committees. Examples include the hay producing areas of the Santa Rosa Plains, Petaluma Valley and Sonoma Valley. Additional areas include those lands which are classified as having the capability for producing locally important crops such as grapes, corn, etc., but may not be planted at the present time. These areas include coastal lands from Fort Ross to Stewart's Point, areas surrounding Bloomfield, Two Rock, Chileno Valley, and areas of Sonoma Valley in the vicinity of Big Bend, Vineburg, and Schellville.



Throughout this section these categories of farmlands: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, are referred to collectively as Farmland, or status farmlands. The lands that comprise status farmlands do not include other mapping classifications such as Grazing land, Other land or Urban land. These are separate classifications not designated as status farmland by the California Department of Conservation.

**Williamson Act (Land Conservation Act of 1965)**

Another classification of agricultural lands of concern is Williamson Act (Government Code §51200 et seq.) Contract lands as defined in the California Land Conservation Act of 1965. The law was enacted to protect agriculture and open space land and to adjust imbalanced tax practices. Williamson Act Contracts, also known as Agricultural Preserves, offer tax incentives for agricultural land preservation by ensuring that land will be assessed for its agricultural productivity rather than its highest and best uses. Williamson Act Contracts are authorized from State policy administered by local governments. Local governments are not mandated to administer the Williamson Act Contracts, but those that do have some latitude to tailor the program to suit local goals and objectives. Parcel records for Williamson Act Contracts are recorded at the Sonoma County Assessor's Office located at 585 Fiscal Drive, Suite 103F, Santa Rosa, CA, 95403.

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

**TABLE 4.2-3**

**Evaluation Criteria with Threshold of Significance – Agriculture and Soil Quality**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Point of Significance</b>	<b>Justification</b>
1. Will the WREP cause loss of status farmland?	Acres of status farmland <sup>1</sup> lost.	Greater than 0 acres.	CEQA Guidelines, Appendix G, Checklist, Item II(a) CA Department of Conservation Farmlands Mapping Unit Petaluma General Plan 2025 Sonoma County General Plan
2. Will the WREP cause Williamson Act contracts to be canceled?	Acres of land that would be removed from Williamson Act contracts as a result of the WREP.	Greater than 0 acres.	CEQA Guidelines Appendix G, Checklist Item II(b) <sup>2</sup> California Land Conservation Act of 1965 Sonoma County General Plan
3. Will the WREP reduce agricultural soil and non-agricultural soil productivity due to erosion of topsoil from application of recycled water?	Acres of erodible soils irrigated by recycled water and not subject to erosion control plans under the Sonoma County Vineyard Erosion and Sediment Control Ordinance or the California Forest Practice Rules.	Greater than 0 acres.	CEQA Guidelines Appendix G, Checklist Item II (c) Sonoma County Vineyard Erosion and Sediment Control Ordinance California Forest Practice Rules (California Department of Forestry and Fire Protection 2003)
4. Will the WREP reduce agricultural soil and non-agricultural soil productivity due to build-up of trace elements and salinity?	a. Suitability of recycled water for irrigation (pH units, mg/l, or mmhos/cm).	Exceedence of FAO Guidelines.	CEQA Guidelines Appendix G, Checklist Item II (c) <sup>3</sup> United Nations Food and Agricultural Organization (FAO) Irrigation Water Guidelines (FAO 1994) Government of Canada, Prairie Farm Rehabilitation Administration, Irrigation and Salinity (Canada 2000) Petaluma General Plan 2025
	b. Metals loading (kilograms/hectare) in soils from application of recycled water and fertilizer/manure.	Exceedence of state guidelines or federal rules.	CEQA Guidelines Appendix G, Checklist Item II (c) <sup>3</sup> State Water Resources Control Board Report #84-1 (Pettygrove G.S. and Asano, T. 1996) EPA 503 Rules for applications of sludge

**TABLE 4.2-3**  
**Evaluation Criteria with Threshold of Significance – Agriculture and Soil Quality**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Point of Significance</b>	<b>Justification</b>
5. Will the WREP cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	The number of plants not locally grown or purchased from nurseries with approved inspection programs.	Greater than 0 plants.	CEQA Guidelines Appendix G, Checklist Item II (c) <sup>5</sup> Sonoma County Agricultural Commissioner Sonoma County Viticulture Advisor

Notes:

1. For the purposes of this document, Farmland or status farmland includes the following categories defined by the California Department of Conservation: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance.
2. Conflicts with agricultural zoning which are included in CEQA Guidelines, Appendix G, Checklist, Item II (b) are addressed in Criteria 1 of Table 4.1-2 (Section 4.1, Land Use) in this EIR.
3. Criteria 3 and 4 address the potential for loss of productivity of agricultural soils resulting from the application of recycled water under the WREP. These criteria would correspond to the CEQA Guidelines Appendix G, Checklist Item II (c), as they address other changes in the existing environment that could result in the conversion of Farmland to non-agricultural use.

**METHODOLOGY**

**Loss of Farmland**

Loss of farmland refers to the conversion of status farmland into non-agricultural uses. In the context of this discussion, this conversion would be primarily from farmland to recycled water treatment and disposal facilities and uses.

The *2004 Important Farmland Series Maps for Sonoma County* (mapped at a scale of 1:100,000) printed in 2006 by the Department of Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program (Department of Conservation 2004) were used to evaluate the potential for impacts to status farmland by WREP implementation. The FMMP GIS Data (2004) Service was also used.

**Conflict with Williamson Act Contracts**

Farmlands with Williamson Act contracts that are acquired by the City of Petaluma and converted to public facility uses under the WREP would potentially result in the cancellation of contracts under Section 6 of the Act, and therefore would represent a conflict with a Williamson Act contract. In addition, acquisition of land under Williamson Act contracts may create remainder parcels that may not qualify for the minimum parcel size under Williamson Act requirements. Such unqualified and uncontracted land may be vulnerable to future conversion pressures and therefore creation of remainder parcels not qualifying for Williamson Act contracts would also represent a conflict.

**Reduction of Soil Productivity**

There are two potential causes of reduced soil productivity: erosion and trace element loading (chemical toxicity). Therefore, two sets of evaluation criteria were utilized as discussed in the following sections:

### **Soil Erosion**

Soil erosion due to WREP implementation is based on the information presented in the Soil Survey for Sonoma County (1972) and the Sonoma County Vineyard Erosion and Sediment Control Ordinance. Soils with high and very high erosion hazard were identified within the WREP study area. The analysis focused on agricultural land and non-agricultural land that would use recycled water from the WREP for irrigation purposes.

### **Trace Element Loading**

For this analysis, an assumed annual irrigation rate of 3.069 acre-feet per acre was used (this is the highest application rate identified for various uses in the Water Supply and Demand Analysis Report, 2006). The WREP recycled water quality specifications are based on Department of Health Services (DHS) Title 22 requirements and the Regional Water Quality Control Board (RWQCB) General Water Reuse Order 96-011). Numerical values for tertiary recycled water are not included but are shown for secondary recycled water (See Hydrology and Water Quality Section). Two additional sources of information were used for this analysis. The Napa Sanitation District (NSD) conducted a suitability study of the NSD's recycled water for vineyard irrigation to explore options to maximize water recycling (NSD March 2006). NSD and the University of California determined water quality parameters relative to vineyard irrigation. The Redwood City Recycled Water Project represents a pilot recycled water program initiated in spring 2000 by the City of Redwood City and the South Bayside System Authority. The Redwood City project is currently in operation, and consists of temporary treatment facilities and permanent underground pipelines that deliver recycled water to landscape customers. The intent of the Redwood City project has been to demonstrate the feasibility of producing recycled water that meets California's Title 22 environmental health requirements for disinfected tertiary recycled water established by the DHS, while using it successfully in the community, primarily for landscape irrigation. The United Nations Food and Agriculture Organization (FAO) publication *Water Quality for Agriculture, FAO Irrigation and Drainage Paper 29 Revision 1*, (United Nations 1994) was also utilized for guidelines on interpreting the effects of irrigation water on agriculture. These sources were used to draw conclusions regarding impacts.

### **Sharpshooter Threat to Vineyards**

Over the past decade, the insect family of leafhoppers known as the glassy-winged sharpshooter (*Homalodisca coagulata*) have become a threat to California vineyards due to its ability to spread Pierce's disease (*Xylella fastidiosa*), a disease that kills grapevines in one or two years after infection by clogging the vine's nutrient transporting vessels with growing bacterium. Because there is no practical cure for Pierce's disease, aggressive approaches have been taken to address and research the disease. Sonoma County expects to increase seasonal inspection staff for inspection of the glassy-winged sharpshooter for the 2007 shipment season. The insect may be common along stream banks or in ravines or canyons that have dense growth of trees, vines, and shrubs. Because it feeds on succulent new growth in areas of abundant soil moisture and shade, it can sometimes be found in ornamental landscaping and gardens around homes.

For the purpose of analysis in this EIR, it was assumed that the greatest risk for introduction of the glassy-winged sharpshooter would be from the introduction of vegetation from outside the area that could harbor insect eggs. Therefore the analysis addresses the risk of introduction of such vegetation through WREP activities.

## IMPACTS AND MITIGATION MEASURES

**Impact: AG-1: Will the WREP cause loss of status farmland?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

None of the near-term improvements would be located on status farmlands as designated by the FMMP Important Farmland Series Map within the WREP boundary. Therefore the near-term improvements would not cause loss of status farmland.

*Program-Level Improvements – No Impact*

Over the life of the project existing agricultural users of secondary recycled water would be removed from the existing distribution system. This could result in farmlands being less productive as summer crops would no longer be feasible if there was not an alternative source of irrigation water. However, there are no status farmlands as designated by the FMMP Important Farmland Series Map within the WREP boundary. Therefore, program-level improvements would not cause a loss of status farmland.

Mitigation: No mitigation is necessary.

**Impact: AG-2: Will the WREP cause Williamson Act contracts to be canceled?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

Records at the Sonoma County Tax Assessor's office for the subject parcels APN 136-130-007 and APN 136-060-056 found that the proposed storage tank, and its associated facilities including the overflow pipe, would not be located on lands under Williamson Act contract. The buried pipelines along East Washington and Browns Lane would be located within the public right-of-way under asphalted roadways and not on lands under Williamson Act contract. Therefore, no conflict with Williamson Act contracts is expected to occur.

*Program-Level Improvements – No Impact*

Irrigation of agricultural lands with recycled water would not be considered a conflict with a Williamson Act contract. The pipelines and open reservoir would not cause the cancellation of a Williamson Act contract because the reservoir and pipelines, which would convey and store water for agricultural irrigation, would be considered a compatible use. It is unlikely that there are any Williamson Act contracts within the urbanized area of Petaluma where program-level improvements will occur, such as irrigation of parks or pipelines along roadways. No conflict with Williamson Act contracts is expected to occur.

Mitigation: No mitigation is necessary.

**Impact:** **AG-3: Will the WREP reduce agricultural soil and non-agricultural soil productivity due to erosion of topsoil from application of recycled water?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements - No Impact*

The near-term improvements do not include the application of recycled water. Therefore, there would be no reduction of soil or soil productivity from recycled water application.

*Program-Level Improvements: Pipelines, Open Reservoir and Pump Station - No Impact; Use of Recycled Water - Less than Significant*

Application of recycled water by irrigation to previously non-irrigated lands, including lands that may be purchased or leased by the City for use as contingent irrigation areas has the potential to increase soil erosion. Such erosion generally results from poor irrigation practices used on soils with high and very high erosion hazard ratings. Soil erosion is also typically associated with poorly controlled irrigation or over-irrigation, in which water is applied at rates that exceed soil infiltration capacity or the water needs of the vegetative land cover. The result is the loss of topsoil that may adversely affect agricultural productivity of the land.

Some portions of the WREP study area have soil erosion hazards. These hazards vary by soil characteristics such as permeability and slope. Soils that have moderate to high potential for erosion are the Haire-Diablo association which occurs in areas with some slope. Soils of the Clearlake-Reyes association have moderate to no potential for erosion. These soils are found on lands with little or no slope. Implementation of Project Measure PD-16 Implement BMPs for Runoff, Erosion, and Agricultural Chemical Use, requires the City use irrigation methods suitable to the site and to comply with Water Reuse Order 96-011 which allows the City to use recycled water. In addition under this measure, agreements with recycled water users shall be established such that the City of Petaluma may obtain information as needed to verify adherence with best management practices to control soil erosion.

For non-agricultural irrigation in an urban setting such as for golf courses, playing fields, parks, and landscaping in business parks best management practices (BMP) and water conservation efforts would reduce the potential for erosion.

Implementation of Project Measure PD-16 Implement BMPs for Runoff, Erosion, and Agricultural Chemical Use would reduce the potential for soil erosion from use of recycled water for irrigation or other uses to less than significant.

**Mitigation:** No mitigation is necessary.

**Impact:** **AG-4: Will the WREP reduce agricultural soil and non-agricultural soil productivity due to build-up of trace elements and salinity?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements - No Impact*

The near-term improvements do not include the application of recycled water or other practices that could cause build-up of trace elements and salinity.

*Program-Level Improvements: Pipelines, Open Reservoir and Pump Station -No Impact;  
Use of Recycled Water - Less than Significant*

The pipelines, reservoir and pump station would not cause a build-up of trace elements and salinity in soils.

The application of recycled water to land could increase the build-up of these substances in soils. However, trace elements are required by vegetation in low concentrations. Also, the tertiary and secondary recycled water that will be produced by the Ellis Creek WRF is anticipated to meet FAO Irrigation Water Guidelines established by the United Nations and Title 22. In addition, according to the Napa Sanitation District's Suitability Study (March 2006) an eight year application of recycled water in Napa showed no evidence of trace-element or salinity buildup which would affect soil productivity. Therefore this impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: AG-5: Will the WREP cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Significant*

The tertiary storage tank site would require site revegetation to return areas of temporary disturbance to preconstruction appearance and reduce erosion potential. The proposed site is grazing land and would require site revegetation with grass seeds to restore the area to preconstruction appearance. Ielmorini Road is a private partially paved road adjacent to grasslands. The pipeline route along Ielmorini Road, as well as the pipeline connecting the tertiary tank to the existing detention basin west of Ielmorini Road, may require reseeded after construction for that portion of the construction area that leaves the existing roadway. The application of native grass seeds to disturbed areas would not introduce pests such as glassy-winged sharpshooter. However, shrubs or trees may be used for landscape screening. Such plants may introduce glassy-winged sharpshooter. This impact is considered significant.

*Program-Level Improvements – Significant*

Construction of the WREP may require site revegetation to return areas of temporary disturbance to preconstruction appearance. The area proposed for the program-level improvements is predominantly urban in character but areas in unincorporated Sonoma County contain grazing lands which may require revegetation from temporary construction disturbances. Revegetation of temporary disturbances could result in the introduction of plants which could potentially harbor insect species or diseases deleterious to agricultural production including vineyards. This impact is considered significant.

Mitigation: **AG-1 Purchase Locally Grown or Inspected Plants**

After

Mitigation: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements - Less than significant*

Mitigation Measure AG-1, Purchase Locally Grown or Inspected Plants, requires that the City shall purchase all landscaping plants from locally grown stock or from a nursery that

has an approved monitoring program for the glassy-winged sharpshooter. This measure would prevent an increase in the risk of sharpshooter populations, and therefore the impact is considered less than significant after mitigation.

## CUMULATIVE IMPACTS

**Impact:** AG-C1 through C5: Will the WREP plus cumulative projects create impacts to agricultural resources based on evaluation criteria 1 through 5?

**Analysis:** *Less than Significant*

As discussed above, the near-term improvements do not have any impact under AG-1 through AG-4. Therefore the improvements cannot contribute to cumulative impacts.

The program-level improvements would not have any impact under AG-1 and AG-2, and therefore cannot contribute to cumulative impacts. The program-level improvements would have a less than significant impact under AG-3 and AG-4. These impacts occur on a localized basis and there would be no interaction or overlapping of impacts such that the standard used as the significance threshold would be exceeded.

For both near-term and program-level improvements Impact AG-5 is mitigated with AG-1 Purchase Locally Grown or Inspected Plants and therefore would not contribute to cumulative impacts. This impact is considered less than significant.

**Mitigation:** No mitigation is necessary.



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## 4.3 GEOLOGY, SOILS AND SEISMICITY

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This chapter provides information on the potential geologic and seismic hazards that could have an impact on the WREP. Impacts may include damage from unstable slopes and landslides, expansive and corrosive soils, subsidence and settlement, earthquake-induced ground shaking, liquefaction, off-site water-related erosion, and surface rupture. To provide a basis for this evaluation, the setting section describes the basic geologic and seismic hazards in the area of the WREP.

### IMPACTS EVALUATED IN OTHER SECTIONS

The following subject is related to Geology, Soils and Seismicity, but is evaluated in other sections of this document:

- Land use compatibility with MRZ-2 zones is evaluated in Section 4.1, Land Use.

### SETTING

#### Regional Geology

The WREP study area includes the Urban Growth Boundary of Petaluma and a small portion located in unincorporated Sonoma County to the northeast and southeast of the City. The City is located in the Petaluma Valley, which lies within the Coast Ranges physiographic province of California, between Burdell Mountain to the west and the Sonoma Mountains to the east. At its southern edge, Petaluma Valley extends to northern San Pablo Bay. To the north, Petaluma Valley extends into Cotati Valley. The two valleys are separated by a slight topographic rise on the west flank of Sonoma Mountain. The ground surface elevations in the Petaluma Valley are at sea level on the north side of San Pablo Bay and reach a maximum of several hundred feet above sea level on various small hills.

The Coast Ranges Province is the result of the collision of the Farallon and North American tectonic plates, which occurred 100 to 65 million years ago. More recently, right-lateral shear along the San Andreas fault system has defined the Coast Ranges topography. This strike-slip movement occurs along the San Andreas fault system and has been ongoing during the last 60 million years. Quaternary geologic activity near the City consists of the motion of several fault systems, most importantly the San Andreas and the Rodgers Creek fault systems. Additionally, sea level fluctuations have impacted the San Pablo Bay and subsequently Petaluma Valley, resulting in the deposition and erosion of sedimentary layers in the valley.

The geologic units that underlie the region are depicted on U.S. Geological Survey (USGS) and California Division of Mines and Geology (CDMG) geologic maps (Blake et al. 2000; Wagner and Bortugno 1982). The maps also include descriptions of the strata. The oldest geologic units in the vicinity of the City are the Jurassic to early-Cretaceous Franciscan Complex and the early-Cretaceous Great Valley Group. The Franciscan Complex consists of folded and faulted sandstones, shale, conglomerate, chert, greenstone, and serpentine rocks. The Great Valley Group consists of marine mudstones, sandstones, and conglomerates. Younger Miocene to Pliocene sedimentary rocks, including the Wilson Grove Formation (marine sandstone, conglomerate, and tuff) and the Petaluma Formation (mostly non-marine claystone, mudstone, and siltstone) were deposited on top of the Franciscan Complex. Also during the Pliocene,

- Plan checks;
- Assure follow-up and response to citizen inquiries and complaints;
- Develop, maintain, and compile Verification Report form(s);
- Maintain the Mitigation Monitoring Checklist or other suitable mitigation compliance summary; and
- Coordinate and assure implementation of corrective actions or enforcement measures, as needed.

### **Measures Included in the Project**

This section presents a listing and description of measures and standards which have been incorporated into the project design. These measures are denoted by the “PD” in the measure name. The City has adopted these measures and incorporated them as part of the project in order to avoid or minimize potential environmental impacts. These measures represent standard engineering, design, construction, and maintenance practices. The process for the development of these measures began during the scoping and early planning phase of the project. Measures were developed to change the project and avoid potential impacts identified by the public and federal, state, and local agencies. Other measures were developed as a result of air quality, noise, geotechnical, biological, cultural, and hydrological analysis in order to avoid or minimize potential impacts.

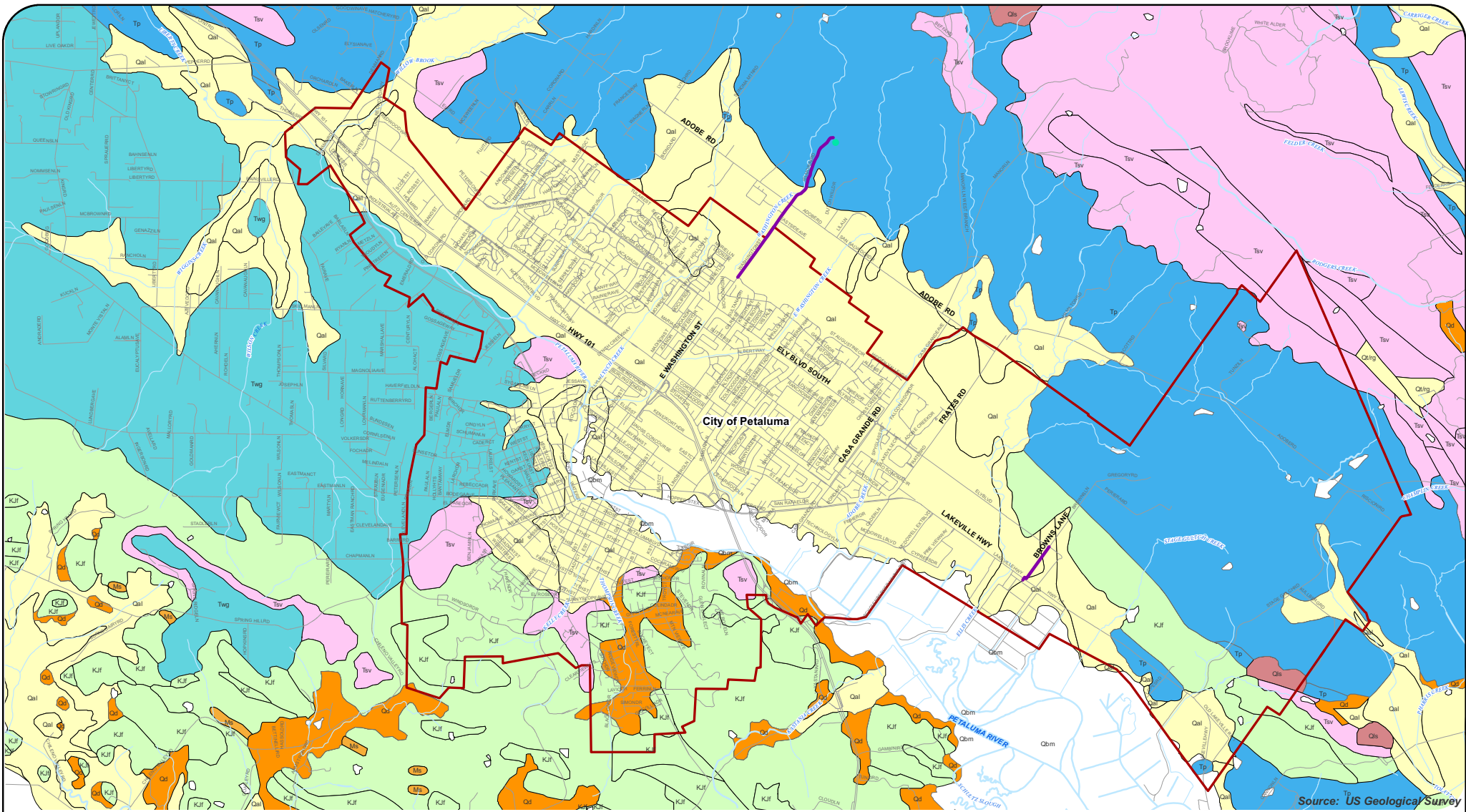
Because these measures are part of the project, they do not qualify under the normal definition of mitigation. However, these measures have been included in this chapter to provide a mechanism to ensure that these measures are implemented and monitored, and to assist the reader in understanding the commitments made by the City of Petaluma.

This section includes measures to be implemented in all phases of the project, including planning and design, construction, operation, and maintenance. Compliance with these measures will result in avoidance and/or minimization of adverse environmental impacts.

### **Mitigation Measures**

This section contains a listing and description of mitigation measures recommended in Chapter 4 Environmental Analysis. The mitigation measures listed in this section are recommended by the consultant team to avoid or reduce environmental impacts. As described above under Background, the City is required to mitigate impacts whenever it is feasible. Mitigation measures will be adopted by the City at the time of project approval. At that time, the City has the option of approving alternate mitigation measures, if they can be shown to be effective and feasible.

Some of the mitigation measures will only be implemented during the final planning and detailed design of the project. They often require the refinement of the final project design to accommodate particular environmental constraints. Other mitigation measures are intended to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Finally, there are mitigation measures to be implemented during operation of the project. These measures generally require monitoring of operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with all of these measures would result in the reduction of adverse environmental impacts.

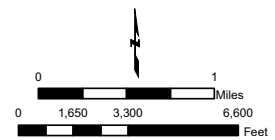


Source: US Geological Survey

**Legend**

- Near-Term Pipelines
- Recycled Water Service Boundary
- Proposed Tertiary Storage Tank

Geology	
KJf	Franciscan Assemblage
Ms	Sheared Serpentinite
Qal	Alluvium
Qd	Quaternary Deposits-undiv.
Qls	Landslide Deposits
Qt/rg	Tuff/Rhyolitic gravel
Tp	Petaluma Formation
Tsv	Sonoma Volcanics
Twg	Wilson Grove Formation
Qbm	Holocene Bay Mud



**Figure 4.3-1  
Geology Map**

WREP EIR  
Petaluma, California



## Study Area Soils

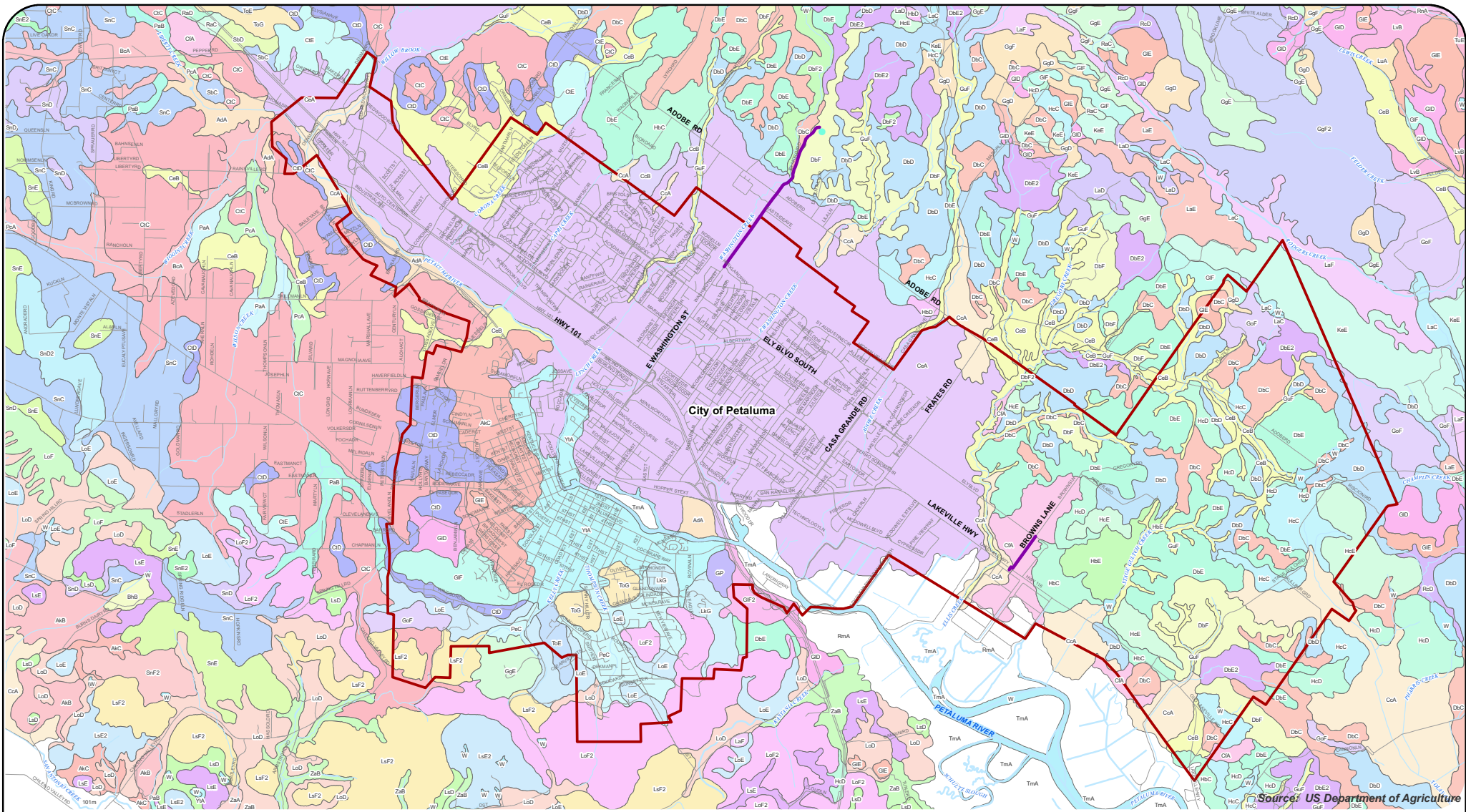
The following description of soils in the WREP study area is based on the Soil Survey of Sonoma County prepared by the United States Department of Agriculture (USDA 1972). The soils in the WREP study area belong to several different series (See Table 4.3-1 and Figure 4.3-2). The majority of the soils in the WREP study area are in basins and on tidal flats, flood plains, terraces, and alluvial fans. These soils consist of gravelly sandy loams to clays that formed in alluvium from sedimentary volcanic material.

**TABLE 4.3-1**

**Soil Series**

Soil Association	Description
Clear Lake Series	Principally occurs within Petaluma Urban Growth Boundary on the east side of the Petaluma River. The most common soil phase within this association is Clear Lake clay, 0 to 2 percent slopes (CeA). According to the Soil Survey, this soil has a high shrink-swell potential and a high corrosivity on uncoated steel. The soil also has a slow permeability and runoff rate, and a slight erosion hazard. A second phase, Clear Lake clay, ponded, 0 to 2 percent slopes, is present along Browns Lane. This soil also has a high shrink-swell potential and a high corrosivity on uncoated steel.
Diablo Series	Principally occurs within the portion of the WREP study area located in unincorporated Sonoma County to the northeast and southeast. Soil phases present include Diablo clay, 30 to 50 percent slopes (DbF), 15 to 30% slopes (DbE), 9 to 15% slopes (DbD), and 2 to 9% slopes (DbC). According to the Soil Survey, these soils have a high shrink-swell potential and a high corrosivity on uncoated steel. They also have a moderate to high erosion hazard.
Haire Series	Occurs within the portion of the WREP study located in unincorporated Sonoma County to the southeast. Soil phases present include Haire clay loam, 0 to 9 percent slopes (HcC) and 15 to 30% slopes (HcE). According to the Soil Survey, these soils have a moderate to high shrink-swell potential and a moderate to high corrosivity on uncoated steel. These soils also have a moderate to high erosion hazard.
Yolo Series	Principally occurs in the heart of Petaluma's old town on the west side of the Petaluma River. The major soil phase is Yolo Clay loam, 0 to 2% slopes (YtA). According to the Soil Survey, this soil has a low to moderate shrink-swell potential and a low corrosivity on uncoated steel.
Arbuckle Series	Occurs in western portion of the City west of the Yolo Series. The major soil phase is Arbuckle gravelly loam, 5 to 9% slopes (AkC). According to the Soil Survey, this soil has a low to moderate shrink-swell potential and a moderate corrosivity on uncoated steel. The hazard of erosion is slight to moderate.
Cotati Series	Occurs in western portion of the City west of the Arbuckle Series. The major soil phase is Cotati fine sandy loam, 9 to 15 percent slopes (CtD). According to the Soil Survey, the shrink-swell potential and the corrosivity on uncoated steel is high. The hazard of erosion is also high.
Goulding Series	Occurs in southwest portion of the City, as well as in the vicinity of the Petaluma Golf and Country Club. The major soil phases include Goulding cobbly clay loam, 30 to 50% slopes (GIF), and 30 to 50% slopes, eroded (GIF2). According to the Soil Survey, these soils have a low to moderate shrink-swell potential and corrosivity on uncoated steel. Runoff is rapid, and the hazard of erosion is high.
Los Gatos Series	Occurs in southern portion of Urban Growth Boundary in the vicinity of the Petaluma Golf and Country Club. The major soil phase is Los Gatos loam, 30 to 75% slopes (LkG). According to the Soil Survey, this soil has a low to moderate shrink-swell potential and corrosivity on uncoated steel. Runoff is rapid to very rapid, and the hazard of erosion is high to very high.

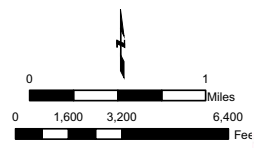
Source: Sonoma County Soil Survey, 1972



Source: US Department of Agriculture

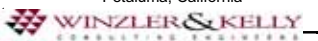
- Legend**
- Near-Term Pipelines
  - Recycled Water Service Boundary
  - Proposed Tertiary Storage Tank

See Table 4.3-2 for soil designations



**Figure 4.3-2  
Soils Map**

WREP EIR  
Petaluma, California



**TABLE 4.3-2**  
**List of Soils within Project Area**

AdA	Alluvial land, sandy
AkC	Arbuckle gravelly loam, 5-9% slopes
CcA	Clear Lake clay loam, 0-2% slopes
CeA	Clear Lake clay, 0-2% slopes
CeB	Clear Lake clay, 2-5% slopes
CfA	Clear Lake clay, ponded, 0-2% slopes
CtC	Cotati fine sandy loam, 2-9% slopes
CtD	Cotati fine sandy loam, 9-15% slopes
CtE	Cotati fine sandy loam, 15-30% slopes
DbC	Diablo clay, 2-9% slopes
DbD	Diablo clay, 9-15% slopes
DbE	Diablo clay, 15-30% slopes
DbE2	Diablo clay, 15-30% slopes, eroded
DbF	Diablo clay, 30-50% slopes
DbF2	Diablo clay, 30-50% slopes, eroded
GgE	Goulding clay loam, 15-30% slopes
GIF2	Goulding cobbly clay loam, 30-50% slopes, eroded
GlD	Goulding cobbly clay loam, 5-15% slopes
GlE	Goulding cobbly clay loam, 15-30% slopes
GlF	Goulding cobbly clay loam, 30-50% slopes
GoF	Goulding-Toomes complex, 9-50% slopes
GuF	Gullied land
HbC	Haire gravelly loam, 0-9% slopes
HbE	Haire gravelly loam, 15-30% slopes
HcC	Haire clay loam, 0-9% slopes
HcD	Haire clay loam, 9-15% slopes
HcE	Haire clay loam, 15-30% slopes
KeE	Kidd stony loam, 2-30% slopes
LaC	Laniger loam, 5-9% slopes
LkG	Los Gatos loam, 30-75% slopes
LoD	Los Osos clay loam, 2-15% slopes
LoE	Los Osos clay loam, 15-30% slopes
LoF2	Los Osos clay loam, 30-50% slopes, eroded

**TABLE 4.3-2**  
**List of Soils within Project Area**

LsF2	Los Osos clay loam, thin solum, 30-50% slopes, eroded
PeC	Pleasanton loam, 2-9% slopes
TmA	Tidal marsh
ToE	Toomes rocky loam, 2-30% slopes
ToG	Toomes rocky loam, 30-75% slopes
YtA	Yolo clay loam, 0-2% slopes

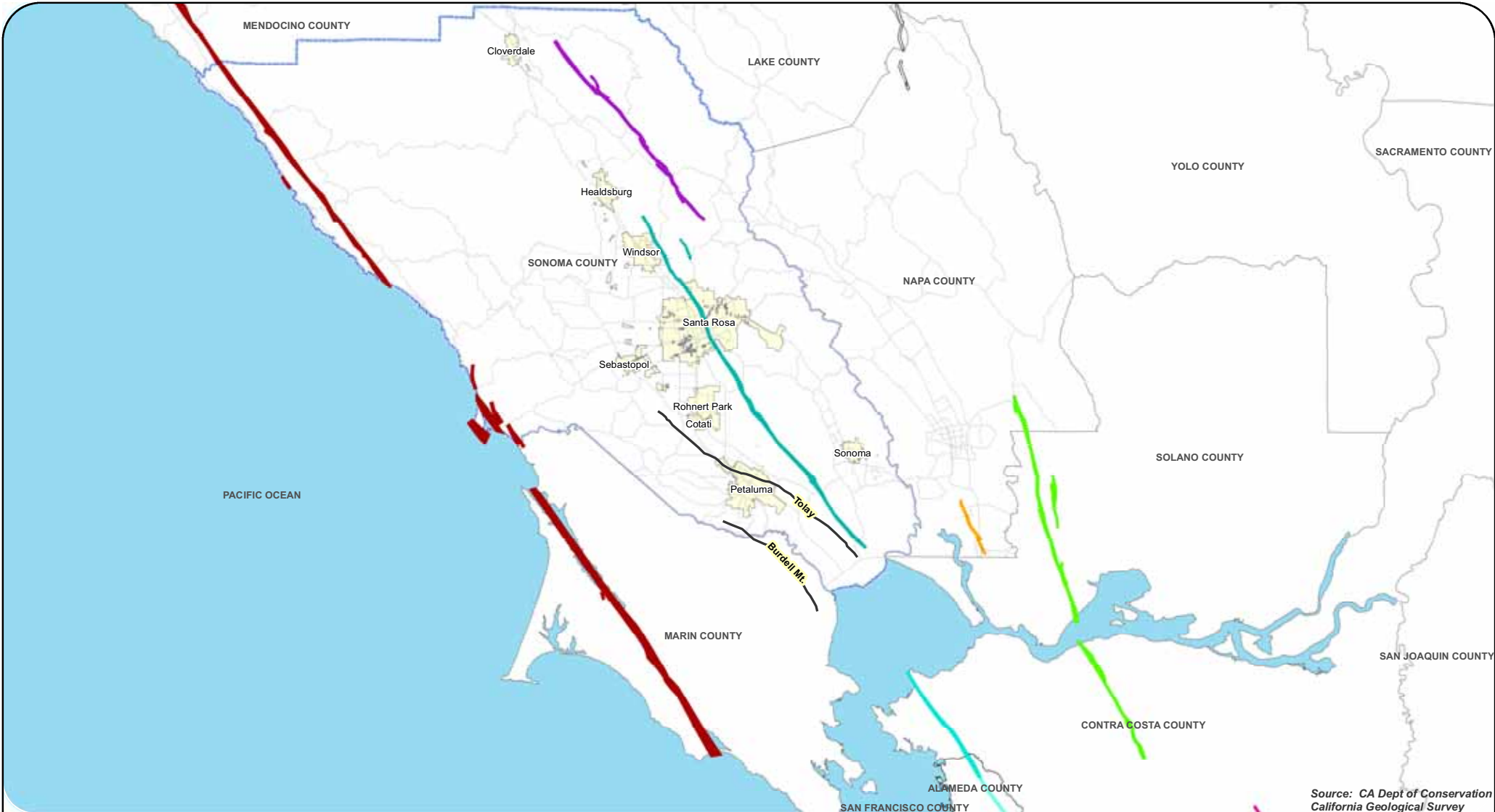
Source: Sonoma County Soil Survey, USDA. May 1972

**Regional Faults**

In Petaluma, as in much of California, earthquakes are a constant threat to life and property. Two active faults – the San Andreas Fault and the Rodgers Creek Fault – can be expected to affect the Petaluma Planning Area (Petaluma Draft GP 2007). The San Andreas fault is the master fault of the San Francisco Bay Region – and all of California – carrying about half of the 36-43 mm/yr plate-motion velocity across the region (Working Group 2002). It is the only regional fault system capable of hosting the largest earthquakes, such as the four-segment rupture that occurred in 1906 (Working Group 2002). The Rodgers Creek fault is the nearest fault to the City, located approximately two miles northeast of both the proposed water storage tank on Ielmorini Road and the water reservoir east of the City near Lakeville Highway and Stage Gulch Road. This fault is considered by many experts to be an extension of the Hayward Fault Zone. The Rodgers Creek fault system has the highest probability of regional faults of producing a magnitude 6.7 or greater earthquake within the next 30 years (Working Group 2002). Both the San Andreas and the Rodgers Creek faults are delineated as known Alquist-Priolo earthquake fault zones in compliance with Chapter 7.5, Division 2 of the California Public Resources Code (Alquist-Priolo Special Studies Zones Act).

In addition to the San Andreas and Rodgers Creek faults, several other faults within 25 miles of the City contribute to the City’s seismic exposure (Figure 4.3-3). Although these faults have longer recurrence intervals, they are capable of producing moderate to large earthquakes. The West Napa fault zone lies approximately 18 miles east of the City and the Maacama fault zone lies approximately 24 miles to the north. Both of these faults have been active in the Holocene (past 10,000 years) and the West Napa fault was responsible for a magnitude 5.2 earthquake on September 3, 2000. The Concord-Green Valley fault system extends to within approximately 23 miles of the eastern City limits. Large earthquakes have not occurred on either the Concord or the Green Valley faults during the historical period, although a magnitude 5.4 earthquake occurred on the central part of the Concord fault in 1955 (Working Group 2002). All three of these faults are delineated as known Alquist-Priolo earthquake fault zones in compliance with the Alquist-Priolo Special Studies Zones Act.

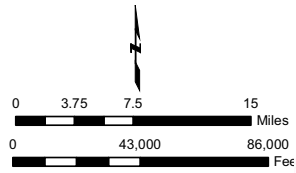




- Legend**
- Minor Highways
  - Faults Approx
  - City Limits
- Fault\_Zones**
- San Andreas-North Golden Gate
  - Rodgers Creek
  - North Hayward
  - Maacama
  - West Napa
  - Concord/Green Valley

Source: CA Dept of Conservation  
California Geological Survey

**Figure 4.3-3**  
**Faults- Regional View**



WREP EIR  
Petaluma, California  
**WINZLER & KELLY**  
CONSULTING ENGINEERS

There are also several inactive Quaternary faults in close proximity to the City. The closest of these is the Tolay fault, which trends northwest from Sears Point to Petaluma and passes through the eastern half of Petaluma. Although this fault had significant movement within the last two million years, it is not considered active (CDMG 1996). It was removed as an Alquist-Priolo earthquake fault zone in 1982 (Wesnousky 1986).

### Earthquake Probabilities

Earthquakes in Petaluma and the entire San Francisco Bay Region result from strain energy constantly accumulating across the region because of the northwestward motion of the Pacific Plate relative to the North American Plate. The region experienced large and destructive earthquakes in 1838, 1868, 1906, and 1989, and future large earthquakes to relieve this continually accumulating strain are a certainty (Working Group 2002).

To evaluate the probability of future large earthquakes in the San Francisco Bay Region, the USGS has established a series of Working Groups on California Earthquake Probabilities. Each of these Working Groups has expanded on the work of its predecessors, applying, in turn, the data and methodology available at the time and drawing on input from broad cross-sections of the earth science community (Working Group 2002). For their study, they define the San Francisco Bay Region as extending from Healdsburg on the northwest to Salinas on the southeast. It encloses the entire metropolitan area, including its most rapidly expanding urban and suburban areas.

The 2002 Working Group concluded that there is a 62 percent probability of a strong earthquake (magnitude 6.7 or greater) striking the San Francisco Bay region within the 30-year period between 2003 and 2032 (Working Group 2002). During this time frame, the probability of having an earthquake of magnitude 6.7 or greater generated from the Rodgers Creek fault is estimated at about 27 percent, while the probability of having a large earthquake generated from the San Andreas fault is estimated at about 21 percent. Table 4.3-3 presents the probabilities in 2002-2031 of one or more earthquakes with magnitude 6.7 and above, 7.0 and above, and 7.5 and above for the characterized fault systems (Working Group 2002).

**TABLE 4.3-3**  
**30-Year Probabilities of Large Earthquakes**

<b>Fault</b>	<b>Distance (miles)</b>	<b>M&gt;6.7</b>	<b>M&gt;7.0</b>	<b>M&gt;7.5</b>
Rodgers Creek	2 <sup>a</sup>	27%	11%	0%
San Andreas	13 <sup>b</sup>	21%	17%	9%
West Napa <sup>c</sup>	16 <sup>b</sup>	NA	NA	NA
Maacama <sup>c</sup>	22 <sup>b</sup>	NA	NA	NA
Green Valley / Concord	23 <sup>b</sup>	4%	0%	0%

Source: USGS Open File Report 03-214, Working Group 2002

- a. Approximate distance from proposed water tank on Ielmorini Drive and water reservoir on Stage Gulch Road.
- b. Approximate distance from nearest portion of City limits.
- c. Probability not yet reported for West Napa and Maacama Faults

## Ground Shaking

The severity of ground shaking due to an earthquake is determined by several factors, including the size of the earthquake, fault rupture characteristics, and proximity of the earthquake to the site of interest. Additionally, the type of soil or bedrock beneath the site will determine the strength of ground shaking. Maps depicting the potential for intensity of earthquake shaking have been generated by the Association of Bay Area Governments (ABAG). The current maps utilize Modified Mercalli Intensity (MMI) on a scale that relates to human perception and amount of damage (Figure 4.3-4). Table 4.3-4 summarizes the MMI scale.

**TABLE 4.3-4**  
**Modified Mercalli Intensity (MMI) Scale**

<b>I.</b>	Not felt. Marginal and long period effects of large earthquakes.
<b>II.</b>	Felt by persons at rest, on upper floors, or favorably placed.
<b>III.</b>	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
<b>IV.</b>	Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV, wooden walls and frame creak.
<b>V.</b>	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
<b>VI.</b>	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle).
<b>VII.</b>	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
<b>VIII.</b>	Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
<b>IX.</b>	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations.) Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluvial areas sand and mud ejected, earthquake fountains, sand craters.
<b>X.</b>	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
<b>XI.</b>	Rails bent greatly. Underground pipelines completely out of service.
<b>XII.</b>	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects

**TABLE 4.3-4**  
**Modified Mercalli Intensity (MMI) Scale**

	thrown into the air.
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Source: Association of Bay Area Governments

**Geologic Hazards**

According to the City’s General Plan, the most significant geologic hazards associated with any construction in the City include slopes and landslide potential in the foothills, and expansive soils along the River valley (Petaluma Draft GP 2007). Other geologic hazards include soil erosion, subsidence, and settlement. A summary of each of these hazards as presented in the City’s Draft 2007 General Plan is provided below.

***Slopes and Landslides***

The most common type of ground failure in Sonoma County is landslides, the downslope movement of soil and rock debris (Sonoma County Draft GP 2020). Landslide susceptibility is a function of several factors, including earthquake-induced ground shaking, rainfall conditions, rock and soil types, steepness and orientation of slope, bedrock orientation, vegetation, and human disturbance (i.e., road cuts, grading, construction, removal of vegetation, and changes in drainage). General slope instability determinants can be based on the fact that landslides occur most often on slopes steeper than 15 percent in Petaluma’s hillsides, in areas with a history of land sliding, and in areas underlain by geologic units that have demonstrated stability problems in the past (Petaluma Draft GP 2007). A distribution of slides and earth flows in the WREP study area is shown on Figure 4.3-5.

***Expansive and Corrosive Soils***

Soils within the Petaluma Planning Area are primarily clayey and sandy loams and loams with high shrink-swell (expansive) potential and low strength (USDA 1972). Expansive soils have the potential to significantly shrink or swell with changes in moisture content, depending on the type and amount of silt and clay content in the soil. Expansive soils are most likely to be found in basins and basin rims, and any structure (e.g. buildings, utilities, and roads) located on expansive soils can be significantly damaged should the soil suddenly shrink or swell. Found throughout the WREP study area, Clear Lake-Reyes and Haire-Diablo clays have also been rated as having a high potential to corrode uncoated steel and concrete (USDA 1972).

**Legend**

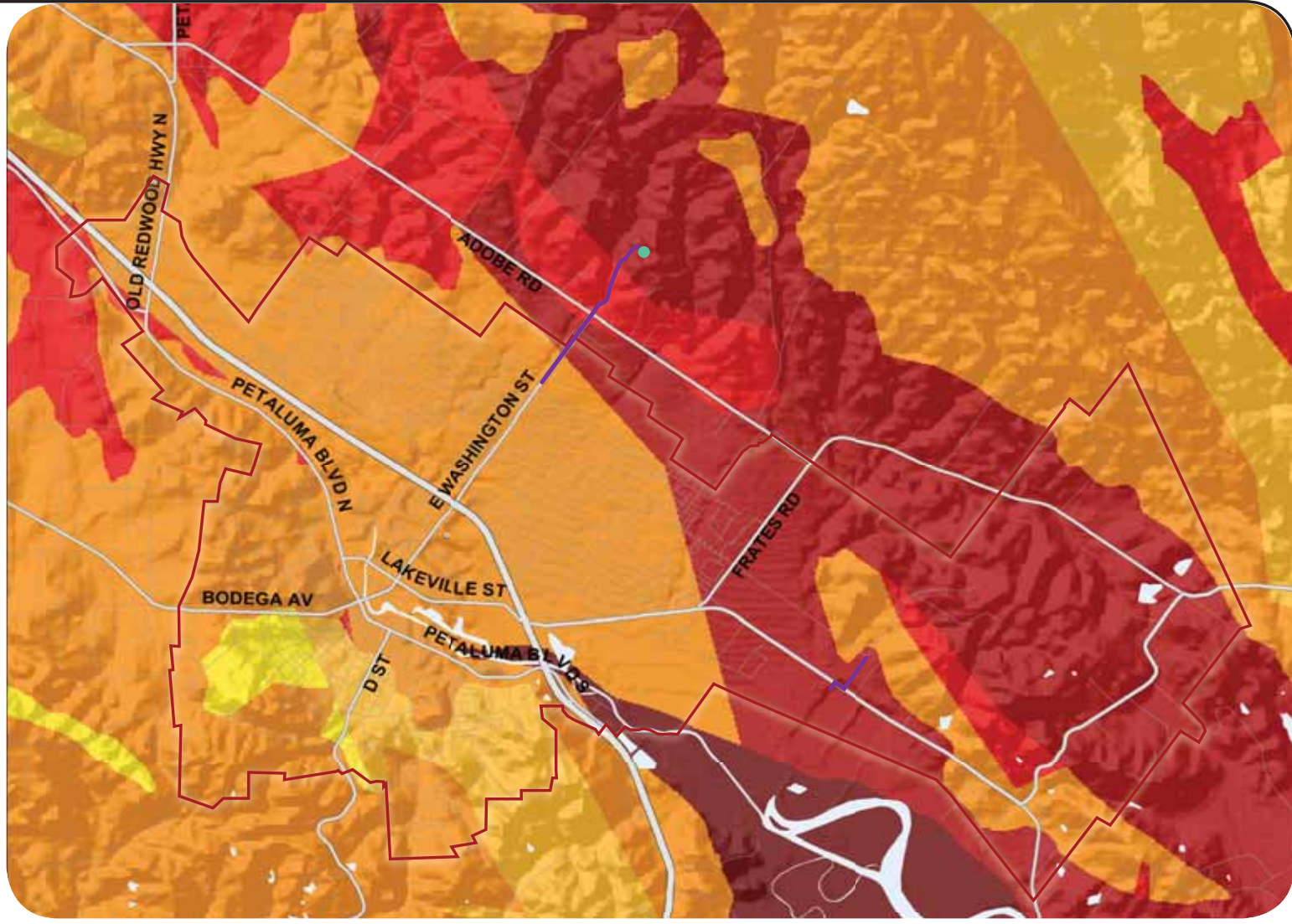
**Level of Earthquake Hazard**

These regions are near major, active faults and will on average experience stronger earthquake shaking more frequently. This intense shaking can damage even strong, modern buildings



These regions are distant from known active faults and will experience lower levels of shaking less frequently. In most earthquakes, only weaker, masonry buildings would be damaged. However, very infrequent earthquakes could still cause strong shaking here.

- Major Roads
- Local Roads
- Water
- Near-Term Pipelines
- Recycled Water Service Boundary
- Proposed Tertiary Storage Tank



Not To Scale

**Figure 4.3-4  
Shaking Amplification**

WREP EIR  
Petaluma, California



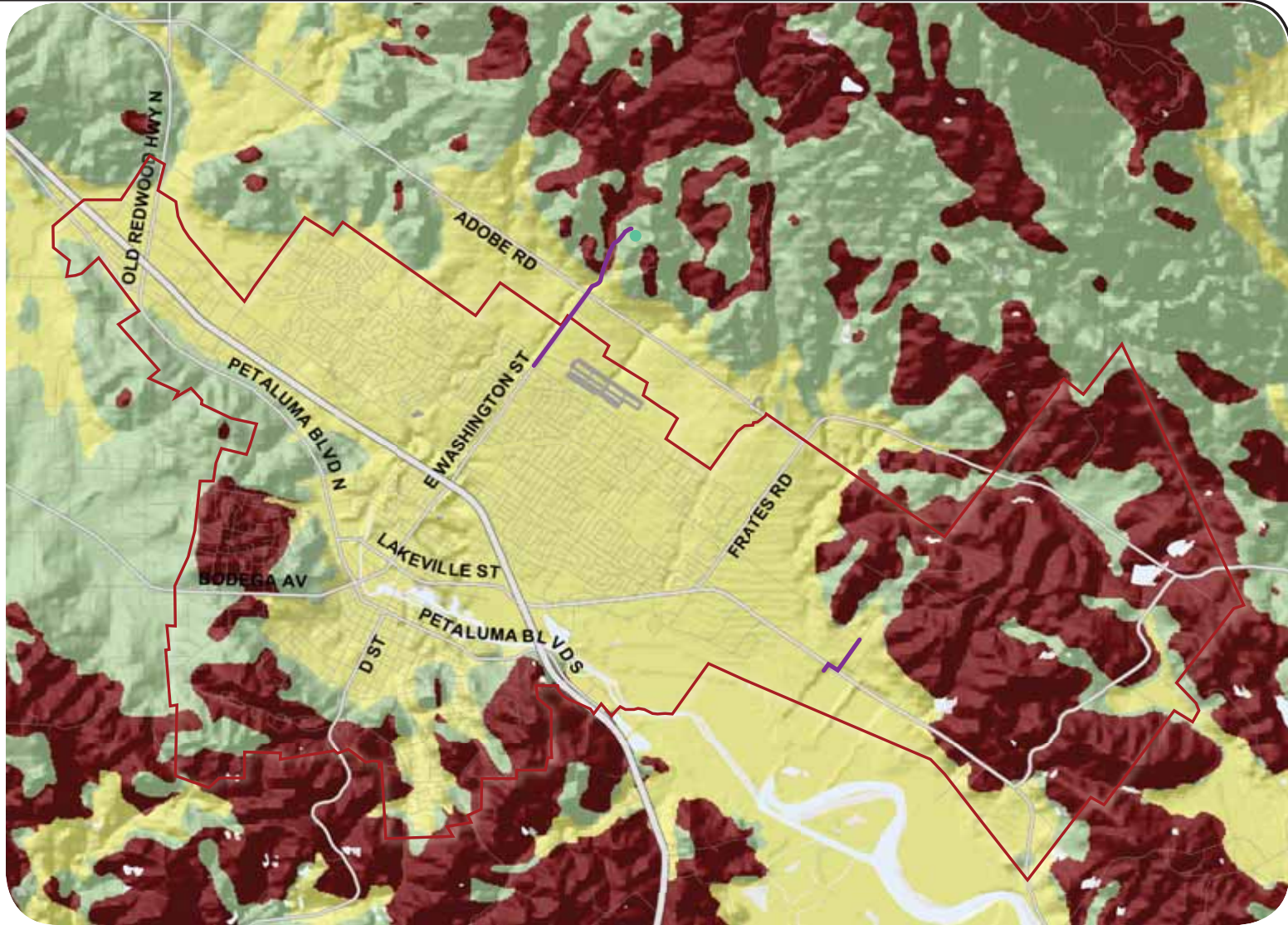
Source: ABAG Geographic Information Systems

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**Legend**

**Distribution of Slides and Earth Flows**

- Mostly Landslides
- Many Landslides
- Flatland
- Few Landslides
- Very Few Landslides
- Near-Term Pipelines
- Recycled Water Service Boundary
- Proposed Tertiary Storage Tank



**Figure 4.3-5  
Landslides**

WREP EIR  
Petaluma, California

Not To Scale



### ***Subsidence and Settlement***

Land subsidence, the vertical displacement of the ground surface, is common in California in areas where the subsurface consists of compressible silt and clay, and mostly due to the withdrawal of groundwater or natural gas. For the most part, these activities are not conducted within the Urban Growth Boundary of the City and therefore are not significant in Petaluma. There are lands within the Urban Growth Boundary, however, that currently rely on wells for water. In addition, the City maintains a network of wells currently used only for emergencies. The damaging effects of subsidence can include gradient changes in transportation, utility, and flood control facilities.

Settlement, on the other hand, is the gradual downward movement of an engineered structure (e.g., a building or road) due to the compaction of the unconsolidated material below the foundation. Because of the gradual, long-term nature of subsidence and settlement, these phenomena do not pose a life-safety hazard but do result in property losses.

### **Seismic Hazards**

Petaluma is located in a seismically active region with earthquakes a common occurrence. Since the mid-nineteenth century, hundreds of earthquakes have been felt in Sonoma County and several of these events are known to have caused significant ground shaking. One of the worst was the San Francisco earthquake on April 18, 1906. This earthquake on the San Andreas fault had an estimated magnitude of 7.9. In Petaluma, structural damage from this earthquake was indicative of ground shaking intensity VIII on the Modified Mercalli Scale (considerable damage in ordinary structures with partial collapse; great damage to poorly built structures). In October 1969, two earthquakes (M5.6 and M5.7) on the Rodgers Creek fault caused several million dollars worth of damage in the Santa Rosa area.

According to the City's Draft 2007 General Plan, the most significant seismic hazards associated with any construction in the City include ground shaking, surface rupture along a fault zone, and related secondary ground failures. Typical seismically-induced ground failures include liquefaction, lateral spreading, landslides, and settlement (Petaluma Draft GP 2007). A summary of each of these hazards as presented in the City's Draft General Plan is provided below.

#### ***Ground Shaking***

Ground shaking is the most noticeable phenomenon of seismic activity and the one people associate most closely with earthquakes. Using the Modified Mercalli Scale, ABAG has developed maps presenting the ground shaking intensities for cities based on the proximity to faults and soil characteristics. Maps for Petaluma for earthquakes from different active faults in the region illustrate that ground shaking intensities in the City can be light, moderate, strong, or very strong (Figure 4.3-4). In the event of a magnitude 7.1 earthquake on the Rodgers Creek fault, for example, most of the eastern half of the city would experience an intensity level VIII (very strong), while the western half is projected to experience ground shaking of intensity VII (strong) (Petaluma Draft GP 2007).

### ***Surface Rupture***

Surface rupture occurs when movement on a fault deep within the earth breaks through to the surface. Rupture almost always occurs along preexisting faults, which are zones of weakness. No known active faults, however, lie within the City of Petaluma or the Planning Area. Consequently, neither surface rupture nor fault creep should pose a hazard in Petaluma.

### ***Liquefaction and Lateral Spreading***

Liquefaction is the rapid transformation of saturated, loose, fine-grained sediment to a fluid-like state because of earthquake ground shaking. Liquefaction has resulted in substantial loss of life, injury, and damage to property. Most of the lowland areas of Petaluma, particularly along the Petaluma River, have potentially high liquefaction hazards (Figure 4.3-6).

Lateral spreading, or lurching, is another problem often caused by liquefaction. Lateral spreading is the horizontal movement of loose, unconsolidated sedimentary deposits and imported fill material. It may be present where open banks and unsupported cut slopes provide a free face, or in areas of artificial fill. The liquefaction of a soil increases the horizontal force on a structure such as a retaining wall. While this may be more prevalent when liquefied, such a state is not absolutely necessary and lateral spreading can occur solely due to the increased horizontal forces brought about by the ground shaking.

### ***Landslides***

Landslides can result from ground shaking and may occur in areas of gentle slopes because of liquefaction of subsurface materials (see previous section on Geologic Hazards).

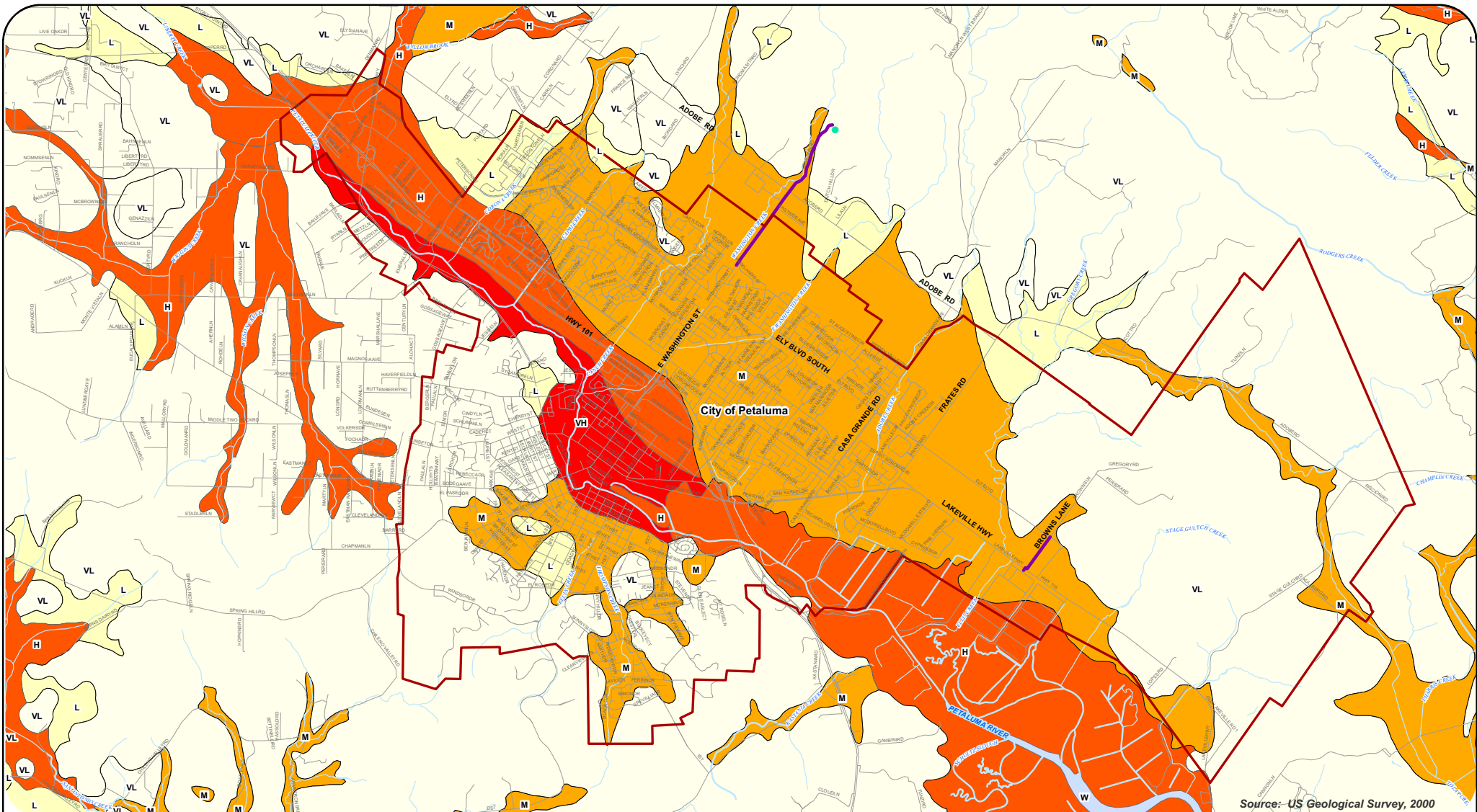
## **Regulatory Framework**

This section summarizes State and local laws and regulations related to geology, soils, or seismicity in the WREP study area.

### ***Alquist-Priolo Earthquake Fault Zoning Act***

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This state law was a direct result of the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures.

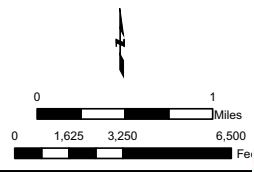




Source: US Geological Survey, 2000

**Legend**

Near-Term Pipelines	Very High	Low
Recycled Water Service Boundary	High	Very Low
Proposed Tertiary Storage Tank	Moderate	Water



**Figure 4.3-6**  
Liquefaction Map

WREP EIR  
Petaluma, California



The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones) around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning and controlling new or renewed construction. Local agencies must regulate most development projects within the zones. Projects include all land divisions and most structures for human occupancy. Single family wood-frame and steel-frame dwellings up to two stories not part of a development of four units or more are exempt. However, local agencies can be more restrictive than state law requires.

Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that proposed buildings will not be constructed across active faults. An evaluation and written report of a specific site must be prepared by a licensed geologist. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back from the fault (generally 50 feet).

### ***Seismic Hazards Mapping Act***

The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Section 2690-2699.6) directs the Department of Conservation, California Geological Survey to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides and amplified ground shaking. The purpose of the Act is to reduce the threat to public safety and to minimize the loss of life and property by identifying and mitigating these seismic hazards. The Act was passed by the legislature following the 1989 Loma Prieta earthquake.

Staff geologists in the Seismic Hazard Mapping Program gather existing geological, geophysical and geotechnical data from numerous sources to compile the Seismic Hazard Zone Maps. They integrate and interpret these data regionally in order to evaluate the severity of the seismic hazards and designate Zones of Required Investigation for areas prone to liquefaction and earthquake-induced landslides. Cities and counties are then required to use the Seismic Hazard Zone Maps in their land use planning and building permit processes. The Act also requires site-specific geotechnical investigations be conducted identifying the seismic hazard and formulating mitigation measures prior to permitting most developments designed for human occupancy within the Zones of Required Investigation.

### ***Building Permits***

WREP structures would be constructed in the City of Petaluma and Sonoma County jurisdictions. The City of Petaluma and Sonoma County have adopted building codes, typically based on the Uniform Building Code, that specify design and construction standards and require that an approved building permit be obtained prior to construction. These codes include earthquake-protection standards. They also require that a building inspector review plans and inspect the construction site and grant final approval upon completion of construction.

### ***Grading Ordinance***

Construction or installation of WREP facilities would require grading of land located in Petaluma and Sonoma County jurisdictions. Petaluma and Sonoma County have adopted grading ordinances to regulate grading and to minimize environmental impacts associated with grading and erosion. Grading ordinances typically require setbacks from property lines, erosion and sediment control, soil stockpile management methods, and inspection procedures.

### ***Division of Safety of Dams***

The State Water Code (Division 3) stipulates that the supervision of non-federal dams in California is generally under the jurisdiction of the Department of Water Resources, Division of Safety of Dams (DSOD). The DSOD supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. The DSOD has jurisdiction over all non-federal dams in the State that are 25 feet or higher (regardless of storage capacity) and dams with a storage capacity of 50 acre-feet of water or greater (regardless of height).

An exception exists in the Water Code for certain water impoundments that are part of wastewater control facilities. Specifically, a wastewater impoundment that is less than 1,500 acre-feet in volume, and with a maximum depth less than 15 feet, may qualify as non-jurisdictional. For purposes of determining jurisdictional authority the maximum depth is defined as the vertical distance between the maximum possible water surface and the lowest elevation of the outboard toe of the embankment.

### ***Federal Clean Water Act***

The federal Clean Water Act (Federal Water Pollution Control Act (33 United States Code 1251 - 1376; Chapter 758; P.L. 845, June 30, 1948; 62 Stat. 1155) regulates the discharge of stormwater from construction sites. Construction activities include clearing, grading, or excavation that results in soil disturbance of at least one acre of land. Construction activities that result in soil disturbance of less than one acre require a permit if the construction activity is part of a larger common plan of development. The owner of the land where construction would occur is responsible for obtaining coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit) prior to commencement of construction. The Construction General Permit requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) and identification of a monitoring Program and reporting requirements.

## **GOALS, OBJECTIVES, AND POLICIES**

Table 4.3-5 identifies goals, objectives, and policies for geology, soils, and seismicity that relate to the WREP. The table also indicates which evaluation criteria in the Geology, Soils, and Seismicity Section are responsive to each set of policies.

**TABLE 4.3-5**  
**Goals, Objectives, and Policies – Geology, Soils, and Seismicity**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Petaluma General Plan 2025	Health and Safety	Policy 10-P-1	Minimize risks of property damage and personal injury posed by natural hazards.	1-7
Petaluma General Plan 2025	Health and Safety	Policy 10-P-1-A	Require geotechnical studies prior to development approval in geologic and/or seismic hazard areas. Require or undertake comprehensive geologic and engineering studies for critical structures regardless of location.	1-7
Petaluma General Plan 2025	Health and Safety	Policy 10-P-1-C	Regulate the grading and development of hillside areas for new urban land uses, by instituting a Hillside Overlay or other similar mechanism in the Development Code. Ensure that new development on hillsides is constructed to reduce erosion and landslide hazards and in compliance with any City hillside regulations ...	1,6
Petaluma General Plan 2025	Health and Safety	Policy 10-P-1-D	Adopt and amend as needed updated versions of the California Building Code (CBC) so that optimal earthquake-protection standards are used in construction and renovation projects.	5
Petaluma General Plan 2025	Health and Safety	Policy 10-P-2	Protect the community from risks associated with seismically induced surface ruptures, ground-shaking, ground failure, slope instability leading to mudslides and landslides, subsidence, liquefaction, and other seismic, geologic, and fire hazards.	1-7

Source: Petaluma General Plan 2025

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

**TABLE 4.3-6**

**Evaluation Criteria with Threshold of Significance-Geology, Soils and Seismicity**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
1. Will the WREP be located on a geologic unit or an unstable area that could potentially result in on- or off-site landslides?	Distribution of landslides and earth flows within the WREP study area.	Location of WREP study area in areas mapped as Mostly Landslide or Many Landslides.	The rating takes into consideration slope angles, existing slope instability, rock types and geologic structure. Petaluma General Plan 2025
2. Will the WREP be located on a geologic unit or soil that is susceptible to liquefaction or lateral spreading during an earthquake?	Distribution of soils within the WREP study area susceptible to liquefaction during an earthquake.	Location of WREP study area in areas mapped as having a High or Very High liquefaction potential.	Certain soil types, especially fine, sandy soils underlain by shallow groundwater are prone to liquefaction. Petaluma General Plan 2025
3. Will the WREP be located on expansive soil, as defined in the Sonoma County soil survey?	Distribution of soils within the WREP study area with an elevated shrink-swell potential rating in Sonoma County Soil Survey (USDA 1972).	Location of WREP study area in areas mapped as having a Moderate to Very High shrink-swell potential.	The Sonoma County soil survey indicates that shrink-swell potential rated moderate to very high shrinking and swelling can damage buildings, roads, and other structures. Petaluma General Plan 2025
4. Will the WREP be located on corrosive soil, as defined in the Sonoma County soil survey?	Distribution of soils within the WREP study area with an elevated corrosion potential as rated in Sonoma County Soil Survey (SCS 1972).	Location of WREP study area mapped as having a High corrosion potential.	The Sonoma County soil survey indicates that soils with High corrosion can damage uncoated steel and concrete by chemical actions that dissolve and weaken the material. Petaluma General Plan 2025

**TABLE 4.3-6**

**Evaluation Criteria with Threshold of Significance-Geology, Soils and Seismicity**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
5. Will earthquake-induced strong ground shaking damage WREP facilities?	Distribution of shaking amplification within the WREP study area.	Construction not in conformance with requirements of applicable building codes and geotechnical design practice.	Shaking hazard maps quantify the expected shaking in terms of MMI, a scale that is related to damage expectations; Structural and Uniform Building Code (UBC 1997) as amended locally. Petaluma General Plan 2025
6. Will construction of the WREP cause off-site water-related erosion?	Compliance with requirements of the General Construction Permit or County and City grading and erosion control ordinances.	Construction not in compliance with General Construction Permit or County and City grading and erosion control ordinances.	Clean Water Act regulations and County and City grading and erosion control ordinances. Petaluma General Plan 2025
7. Will the WREP be subject to ground rupture due to location near a surface trace of an active fault?	Distribution of Alquist-Priolo Earthquake Fault Zones within the WREP study area.	Location of WREP study area crossing a mapped Alquist-Priolo Fault Zone.	Earthquake fault zones are established under the Alquist-Priolo Earthquake Fault Zone Act by the California CDMG to regulate development near active faults to mitigate the hazard of surface rupture. Petaluma General Plan 2025

## IMPACTS AND MITIGATION MEASURES

**Impact:** **GS-1: Will the WREP be located on a geologic unit or an unstable area that could potentially result in on- or off-site landslides?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements – Less Than Significant*

The underlying geology and soil in the vicinity of the pipelines along East Washington Street, Browns Lane, and the southernmost portion of the pipeline along Ielmorini Road is Quarternary alluvium and Clear Lake clay. Quarternary alluvium is composed of sand, gravel, silt, and clay. The material is loose to soft and friable. Clear Lake clay has a slow permeability and runoff rate, and a slight

erosion hazard. A map showing the distribution of slides and earth flows in the vicinity of the pipelines along East Washington Street, Browns Lane, and the southernmost portion of the pipeline along Ielmorini Road to Adobe Road depict these areas as flatland (Figure 4.3-5). Landslides are not a concern along these pipeline alignments.

The underlying geology and soil in the vicinity of the northern portion of the pipeline along Ielmorini Road is the Petaluma Formation and Diablo clay. The Petaluma Formation is primarily composed of claystone, siltstone, and pebble conglomerate from river deposits. Diablo clay has a moderate to high erosion hazard and landslips are a concern to management (USDA 1972). The landslide distribution map indicates that this portion of the pipeline along Ielmorini Road will cross land mapped as *many landslides* and *mostly landslides* (Figure 4.3-5).

Near-term improvements would also include a tertiary treated water storage tank on Ielmorini Road and a pipeline to an existing detention basin located west of Ielmorini Road. The underlying geology and soil in the vicinity of the pipeline to the detention basin is the Petaluma Formation and Diablo clay. The landslide hazard map indicates that this area is located in an area having *few landslides*. The proposed tertiary tank adjacent to Ielmorini Road is located on southwestwardly downsloping ground. The underlying geology and soil in the vicinity of the storage tank is the Petaluma Formation and Diablo clay. The landslide hazard map indicates that the site is located in an area having *few landslides*. However, the Geotechnical Evaluation conducted for the storage tank site noted that the site is located near active erosion and landsliding visible in a nearby drainageway (DCM 2007).

Measure PD-4, Slope Stabilization, is adopted as part of this project. This measure would prevent siting of facilities on unstable slopes, to the extent feasible. The City would utilize a licensed geotechnical engineer and, when appropriate, a structural engineer to conduct construction-level geotechnical investigation for facilities on any unstable slopes. If the geotechnical investigations identify hazards due to unstable slopes, the engineer will identify slope stability risk areas and provide engineering design and construction recommendations to stabilize slopes near facilities. With implementation of Measure PD-4, the impact of landslides is less than significant.

#### *Program-Level Improvements – Less Than Significant*

Program-level improvements include construction of transmission and distribution pipelines throughout Petaluma. The transmission and distribution pipelines will traverse a variety of geologic and soil conditions. A map showing the distribution of slides and earth flows depicts the majority of the City as flatland (Figure 4.3-5). However, certain areas in the southern portion of the City are mapped as *many landslides* and *mostly landslides*.

Program-level improvements also include a pump station near the Petaluma Golf and Country Club and an open reservoir southeast of the City near Lakeville Highway and Stage Gulch Road. The distribution of slides and earth flows near the Petaluma Golf and Country club and near the recycled water reservoir indicate that these sites are located in areas having *many landslides* and *mostly landslides*.

Measure PD-4, Slope Stabilization, is adopted as part of this project. With implementation of Measure PD-4, as described above, the impact of landslides is less than significant.

Mitigation: No mitigation is necessary.

**Impact: GS-2: Will the WREP be located on a geologic unit or soil that is susceptible to liquefaction or lateral spreading during an earthquake?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less Than Significant*

The liquefaction hazard map for the near-term pipelines indicates that they are primarily located in a zone of moderate liquefaction potential (Figure 4.3-6). The northernmost portion of the pipeline along Ielmorini Road is located in a zone of very low liquefaction potential.

In addition to Figure 4.3-6, a review of ABAG liquefaction hazard maps was conducted. The ABAG hazard maps show areas where the ground is susceptible to liquefaction and that are likely to be shaken hard enough in a particular earthquake to trigger liquefaction. According to the ABAG Hazard Maps for Individual Earthquake Scenarios, a Magnitude 7.0 earthquake on the Rodgers Creek fault could result in high liquefaction levels for the pipelines along East Washington Street, Browns Lane, and the southern portion of Ielmorini Road.

Near-term improvements would also include a tertiary treated water storage tank on Ielmorini Road and a pipeline connecting the tank to an existing detention basin located west of Ielmorini Road. Figure 4.3-6 indicates that the water storage tank on Ielmorini Road would be located in a zone of very low liquefaction potential, while the pipeline to the existing detention basin would cross zones of very low to moderate liquefaction potential. The ABAG Hazard Map for a Magnitude 7.0 earthquake on the Rodgers Creek fault also indicates that the tank would be in a zone of very low liquefaction potential while the pipeline to the detention basin would cross zones of very low to moderate potential.

Measure PD-5, Reduce Risk of Damage due to Liquefaction, is adopted as part of this project. This measure requires the City to utilize a registered geotechnical engineer to conduct a detailed soil analysis in areas with moderate to very high liquefaction potential. If the geotechnical investigations identify hazards due to liquefaction, the engineer shall identify risk areas and provide engineering design and construction recommendations to minimize damage.

With implementation of Measure PD-5, adopted as part of the project, the impact of liquefaction is considered to be less than significant.

*Program-Level Improvements – Less Than Significant*

Program-level improvements include a pump station near the Petaluma Golf and Country Club and an open reservoir southeast of the City near Lakeville Highway and Stage Gulch Road. The liquefaction hazard map indicates that both of these areas are located in a zone of very low liquefaction potential (Figure 4.3-6).

Program-level improvements also include construction of transmission and distribution pipelines throughout Petaluma. The liquefaction hazard map shows



that the pipelines will traverse a variety of liquefaction potential zones ranging from very low to very high (Figure 4.3-6). As shown on the map, the lowland areas along the Petaluma River have the highest potential liquefaction hazards.

Measure PD-5, Reduce Risk of Damage due to Liquefaction, is adopted as part of this project. This measure requires the City to utilize a registered geotechnical engineer to conduct a detailed soil analysis in areas with high or very high liquefaction potential. If the geotechnical investigations identify hazards due to liquefaction, the engineer shall identify risk areas and provide engineering design and construction recommendations to minimize damage.

With implementation of Measure PD-5, adopted as part of the project, the impact of liquefaction is considered to be less than significant.

Mitigation: No mitigation is necessary.

**Impact: GS-3: Will the WREP be located on expansive soil, as defined in the Sonoma County soil survey?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less Than Significant*

The underlying soil in the vicinity of the pipelines along East Washington Street, Browns Lane, and the southernmost portion of the pipeline along Ielmorini Road is Clear Lake clay, which has a high shrink-swell potential (USDA 1972). The underlying soil in the vicinity of the northern portion of the pipeline along Ielmorini Road is Diablo clay, which also has a high shrink-swell potential (USDA 1972).

Near-term improvements would also include a tertiary treated water storage tank and a pipeline connecting the tank to an existing detention basin located west of Ielmorini Road. The underlying soil in the vicinity of the water tank and the pipeline connecting the tank to the existing detention basin is Diablo clay, which has a high shrink-swell potential (USDA 1972). According to the Geotechnical Evaluation conducted for the storage tank site, the tank should be uniformly founded on stable, native, non-expansive Petaluma Formation baserock, which is the geologic unit underlying the site (DCM 2007).

Measure PD-6, Standard Engineering Methods for Expansive Soils, is adopted as part of this project. This measure would use standard engineering methods to substantially lessen or avoid potential impacts from expansive soils. Measures would include removal of native soil and replacement with engineered fill, soil stabilization to alter soil properties, or deepening footings or other support structures to a depth where soil moisture fluctuation is minimized. With implementation of Measure PD-6, damage due to expansive soils is found to be less than significant.

*Program-Level Improvements – Less Than Significant*

Program-level improvements include construction of transmission and distribution pipelines throughout Petaluma, a pump station near the Petaluma Golf and Country Club, and an open reservoir southeast of the City near Lakeville Highway and Stage Gulch Road. As described in the Settings Section, these improvements will traverse a variety of soil conditions with shrink-swell potentials ranging from low to high.

Measure PD-6, as described above, is adopted as part of the project and therefore this impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: GS-4: Will the WREP be located on corrosive soil, as defined in the Sonoma County soil survey?**

*Analysis: Project-Level Near-Term Conveyance Improvements – Less Than Significant*

The underlying soil in the vicinity of the pipelines along East Washington Street, Browns Lane, and the southernmost portion of the pipeline along Ielmorini Road is Clear Lake clay, which has a high corrosivity on uncoated steel (USDA 1972). The underlying soil in the vicinity of the northern portion of the pipeline along Ielmorini Road is Diablo clay, which also has a high corrosivity on uncoated steel (USDA 1972).

Near-term improvements would also include a tertiary treated water storage tank and a pipeline connecting the tank to an existing detention basin located west of Ielmorini Road. The underlying soil in the vicinity of the water tank and the pipeline connecting the tank to the existing detention basin is Diablo clay, which also has a high corrosivity on uncoated steel (USDA 1972).

Measure PD-7, Standard Engineering Methods for Corrosive Soils, is adopted as part of this project. This measure would construct facilities that traverse highly corrosive soils with non-corrodible materials or implementation of other effective corrosion avoidance and/or protection methods. With implementation of Measure PD-7, damage due to corrosive soils is found to be less than significant.

*Program-Level Improvements – Less Than Significant*

Program-level improvements include construction of transmission and distribution pipelines throughout Petaluma, a pump station near the Petaluma Golf and Country Club, and an open reservoir south of the City near Lakeville Highway and Stage Gulch Road. As described in the Settings Section, these improvements will traverse a variety of soil conditions with corrosivity potentials ranging from low to high.

Measure PD-7, as described above, is adopted as part of the project and therefore this impact is considered less than significant level.

Mitigation: No mitigation is necessary.

**Impact: GS-5: Will earthquake-induced strong ground shaking damage WREP facilities?**

*Analysis: Project-Level Near-Term Conveyance Improvements – Less Than Significant*

Maps depicting the potential for intensity of earthquake shaking have been generated by ABAG and indicate that the near-term improvements would be located in strong ground shaking areas due to the proximity of the Rodgers Creek and San Andreas fault systems (Figure 4.3-4).

Measure PD-8, Seismic Design to Resist Ground Shaking, is adopted as part of this project. This measure would take into account the high probability of strong seismic ground shaking by incorporating design features that accommodate lateral movements and flexibility. Construction of all facilities would meet the most updated versions of the adopted building codes. Earthquake-resistant design and materials would meet or exceed the current seismic engineering standards of the California Building Code Seismic Zone 4 requirements.

Building codes are not intended to be applicable to some types of pipelines, pump station equipment that are not enclosed, and other types of non-building structures. However, there are generally accepted “consensus” standards that can be applied in a similar manner to adopted building code performance objectives. For all non-building structures, “consensus” standards will be used, when available, to set minimum performance objectives that allow for some damage to occur to a pipeline or equipment during a seismic event. With implementation of Measure PD-8, damage due to strong ground shaking is found to be less than significant.

*Program-Level Improvements - Less Than Significant*

Maps depicting the potential for intensity of earthquake shaking indicate that the program-level improvements would be located in strong ground shaking areas due to the proximity of the Rodgers Creek and San Andreas fault systems (Figure 4.3-4).

Measure PD-8, Seismic Design to Resist Ground Shaking, is adopted as part of this project. This measure, as described above, would reduce damage from strong ground shaking to a level that is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: GS-6: Will construction of the WREP cause off-site water-related erosion?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less Than Significant*

Construction of the near-term improvements would be in compliance with the Construction General Permit. Measure PD-3, adopted as part of the project, would require compliance with the Construction General Permit, including preparation of a SWPPP for each construction area. With implementation of Measure PD-3, damage due to off-site water related erosion is found to be less than significant.

*Program-Level Improvements – Less Than Significant*

Construction of the program-level improvements would also be in compliance with the Construction General Permit. Measure PD-3, as described above, would reduce damage due to off-site water related erosion to a level considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: GS-7: Will the WREP be subject to ground rupture due to location near a surface trace of an active fault?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less Than Significant*

The near-term improvements of the WREP would not be located within or across a known Alquist-Priolo earthquake fault zone. The closest Alquist-Priolo earthquake fault zone is Rodgers Creek, located approximately two miles northeast of the proposed water storage tank on Ielmorini Road. A major earthquake on the Rodgers Creek fault zone would generate strong seismic ground shaking, but would not likely cause ground rupture. Thus, displacement caused by fault rupture or creep is considered less than significant.

*Program-Level Improvements – Less Than Significant*

The program-level improvements of the WREP would not be located within or across a known Alquist-Priolo earthquake fault zone. The closest Alquist-Priolo earthquake fault zone is Rodgers Creek, located approximately two miles northeast of the proposed water storage reservoir near Lakeville Highway and Stage Gulch Road. A major earthquake on the Rodgers Creek fault zone would generate strong seismic ground shaking, but would not likely cause ground rupture. Thus, displacement caused by fault rupture or creep is considered less than significant.

Mitigation: No mitigation is necessary.

## **CUMULATIVE IMPACTS**

**Impact: GS-C1 through C7: Will the WREP plus cumulative projects create geologic or seismic impacts based on evaluation criteria 1 through 7?**

Analysis: *Near-Term Project-Level Conveyance Improvements and Program-Level Improvements – Less Than Significant*

There are no identified significant impacts that could not be fully mitigated with appropriate engineering and design measures. Although the project would contribute to cumulative development of facilities in the region, these impacts are site specific, and with incorporation of standard engineering and design measures would be less than significant. No significant cumulative impacts would occur.

Mitigation: No mitigation is necessary.

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## 4.4 HYDROLOGY AND WATER QUALITY

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This section of the EIR describes potential environmental impacts of the project on hydrology and water quality. The section includes a description of the regulatory framework, and hydrologic and surface water characteristics of the Water Recycling Expansion Program (WREP) study area. Potential environmental impacts regarding hydrology and water quality are evaluated for the near-term improvements and program-level improvements. Appropriate mitigation measures are identified for potentially significant environmental impacts.

### IMPACTS EVALUATED IN OTHER SECTIONS

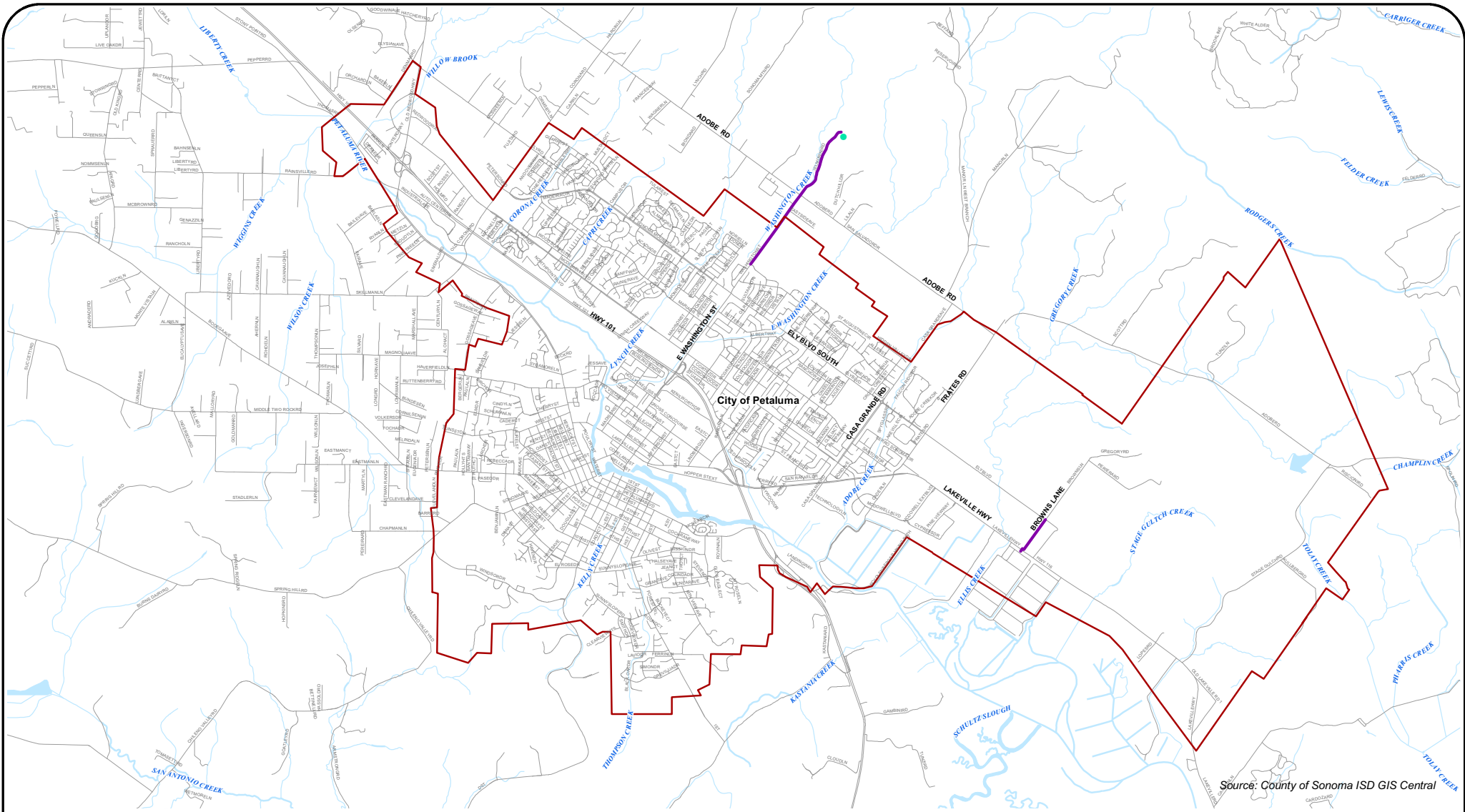
The following items are related to the Hydrology and Water Quality Section but are evaluated in other sections of this document:

- Erosion due to construction. Erosion caused by construction within designated construction zones and outside of the aquatic environment (i.e., not in or adjacent to waterways) is addressed in Section 4.3, Geology, Soils, and Seismicity.
- Human Health issues are addressed in Section 4.7, Public Health and Safety.

### SETTING

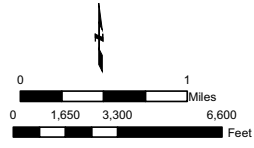
#### Watershed

The WREP study area is located within the Petaluma River watershed. The watershed is located in southern Sonoma and northern Marin Counties, and encompasses approximately 146 square miles; it is approximately 19 miles long by 13 miles wide with the City of Petaluma near its center. The headwaters and tributaries of the Petaluma River begin on the southwest slopes of Sonoma Mountain (elev. 2,295 feet), the highest point in the watershed. Tributaries to the Petaluma River within the study area include Adobe Creek, East Washington and Washington Creeks, Lynch Creek, Capri Creek, Corona Creek, Kelly Creek, Willow Brook Creek and Thompson Creek. The San Francisco Bay Regional Water Quality Control Board (RWQCB) Basin Plan for the San Pablo Basin classifies the Petaluma River, Adobe Creek, and Willow Brook Creek as major surface waters. Figure 4.4-1 illustrates the location of the Petaluma River and the creeks within the study area.



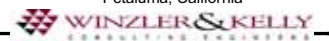
Source: County of Sonoma ISD GIS Central

- Legend**
- Near-Term Pipelines
  - Rivers and Creeks
  - Recycled Water Service Boundary
  - Proposed Tertiary Storage Tank



**Figure 4.4-1**  
Streams and Rivers

WREP EIR  
Petaluma, California



## **Flooding**

Several areas within the City of Petaluma have historically experienced flooding, such as the Payran Street neighborhood and the areas adjacent to the Petaluma River and Willow Brook Creek upstream of Corona Road. The U.S. Army Corps of Engineers (Corps) constructed the Payran Flood Control Project in an attempt to alleviate flooding in the Payran Street area. Willow Brook Creek flooded from Ely Road to Old Redwood Highway in December 2005.

Flooding occurs in the Petaluma watershed when the rain falls on saturated soils that have high clay content. Rainfall under these circumstances runs off with very little infiltration. The upper watershed feeding Petaluma Creek and Willow Brook Creek was especially saturated during the December 2005 New Year's Flood. The rainfall and saturated soils resulted in flooding upstream of Corona Road.

Peak flood contribution of tributaries to the Petaluma River depends on the size and shape of each contributing watershed as well as the amount of storage provided in the tributary subbasin. Floodplain storage areas are usually flat areas adjacent to the channel where the velocity of the flow is much slower than the flow in the channel. Storage areas become inundated during peak flow periods with flow receding back to the channel after the peak has passed.

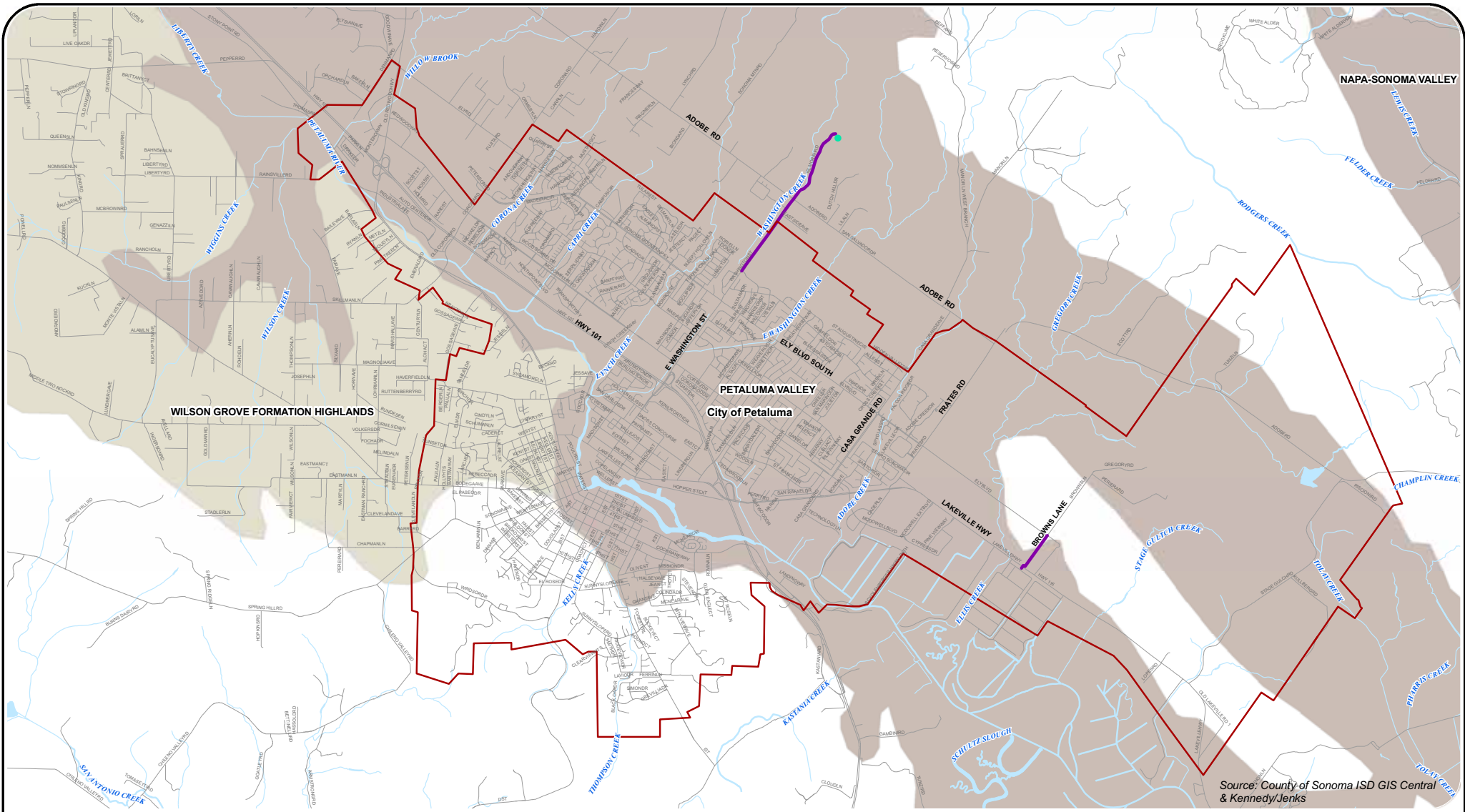
## **Regional and Local Groundwater**

The City of Petaluma is located in the Petaluma Valley groundwater basin, which is part of the San Francisco Bay Hydrologic Region (DWR 2003). Figure 4.4-2 illustrates the groundwater basins in the Petaluma area. The Petaluma Valley basin is 46,000 acres with a maximum well yield of 100 gallons per minute (gpm). Groundwater budget is defined as numerical accounting of the recharge, discharge, and changes in storage of all or part of an aquifer or a system of aquifers. According to Bulletin 118 (DWR 2003), inadequate information is available to evaluate the groundwater budget in the Petaluma Valley groundwater basin. The total annual natural recharge volume (and corresponding safe yield) for the northern Petaluma groundwater basin was estimated to be around 40,000 acre-feet (approximately 25,000 gpm) by the Department of Water Resources in June 1982.

Groundwater recharge in the study area generally occurs along rivers and stream corridors and in upland areas adjacent to groundwater basins. The primary sources of recharge are precipitation and stream seepage. Recharge occurs wherever permeable materials are near the surface and connect with the principal groundwater body, and surface slopes are gentle enough to limit the amount of precipitation that becomes surface runoff.

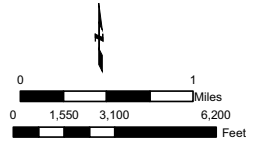
The City of Petaluma uses groundwater as an emergency drinking water supply and for meeting peak demands. The water is naturally filtered by the sand and gravel it passes through in the aquifers. Chlorine is added for disinfection. The City of Petaluma's Water Demand and Supply Analysis Report (City of Petaluma 2006) indicates that the City currently has 17 active groundwater wells. The City recently constructed four more wells; however, these remain inactive because of low yields and water quality issues. The wells are predominately on the east side of the City. Well depths range from 229 to 680 feet, with most wells being around 500 feet deep. City wells have been used to meet peak summer demands.





Source: County of Sonoma ISD GIS Central & Kennedy/Jenks

- Legend**
- Near-Term Pipelines
  - Rivers and Creeks
  - Recycled Water Service Boundary
  - Proposed Tertiary Storage Tank



**Figure 4.4-2**  
**Groundwater Basins**

WREP EIR  
Petaluma, California  
**WINZLER & KELLY**  
CONSULTING ENGINEERS

## Surface Water Quality

The Petaluma River is considered an impaired water body due to sedimentation/siltation and high levels of nutrients and pathogens. The Clean Water Act Section 303(d) list includes nutrients, pathogens and sediment as “medium priority” pollutants while diazinon is listed as a “low priority” pollutant for the Petaluma River. According to the 2006 Clean Water Act Section 303(d) list of impaired waterbodies, high nutrient levels could be attributed to dairy farms and livestock facilities. Sediment problems in tributaries are generally associated with new development and agricultural practices. Pathogen problems are generally attributed to agriculture and urban runoff. Diazinon levels are attributed to urban and agricultural runoff, and a TMDL was established for diazinon and related pesticides in 2005. The State Water Resources Control Board expects to establish TMDLs for nutrients, pathogens, and sediment by 2019.

The California Environmental Protection Agency (Cal EPA) and the San Francisco Bay Regional Water Quality Control Plan list the current beneficial uses for the Petaluma River as cold water fisheries habitat, marine habitat, fish migration, navigation, preservation of rare and endangered species, water contact recreation, noncontact water recreation, fish spawning, warm water freshwater habitat, and wildlife habitat. Although no beneficial uses are listed for Willow Brook Creek or Adobe Creek in the Basin Plan, the City of Petaluma considers anadromous fish spawning as a beneficial use for Adobe Creek.

## Recycled Water Quality

In 2008, the City will decommission the existing wastewater treatment plant and start up operation of the Ellis Creek WRF on Lakeville Highway. The recycled water from the new facility will replace the recycled water from the existing plant. The new plant will produce both secondary and tertiary effluent to meet the Water Recycling Criteria contained in the California Code of Regulations, Title 22. Once the WRF is operational, the City will operate two independent recycled water distribution systems. The City will distribute secondary effluent to various users for irrigation of agricultural lands. The City will distribute tertiary effluent to various users of irrigation acceptable to receive Title 22 unrestricted use recycled water such as parks, golf courses, schools, and business parks as well as industrial sites. Because the Ellis Creek WRF is not yet operational, water quality data are not available for the tertiary treated effluent that will come from the new facility. However, the facility has been designed so that both the secondary and tertiary recycled water will be of sufficient quality to meet the requirements under Title 22.

The City’s National Pollutant Discharge Elimination System (NPDES) permit (No. CA0037810) was adopted in July 1998 by the RWQCB. The City applied to the RWQCB for reissuance of waste discharge requirements and received a revised NPDES permit in 2005 (SFRWQCB Order No. R2-2005-0058). The permit covers discharge of treated wastewater to the Petaluma River from October 21 through April 30 through two submerged pipes located near the river bank. If the new wastewater treatment plant becomes operational before Order R2-2005-0058 expires, then the effluent limitations contained in the order will apply to the discharge from the new WRF.

Treated wastewater is reused for agricultural irrigation from May 1 through October 20 as part of a continuing program the City initiated in the 1980s. Treated wastewater is also applied to two golf courses on a year-round basis. The City received approval to cover the land application of recycled water under the General Water Reuse Order No. 96-011 from the RWQCB and the California Department of Public Health (DPH) in 2005. Order No. 96-011 replaces original RWQCB Order No. 88-036. Order 96-011 includes requirements for land application of recycled tertiary and secondary recycled water.

## **Regulatory Setting**

This section describes the regulatory framework for hydrology and water quality, starting with the federal level, followed by state and local regulations.

Surface waters could be affected by stormwater runoff during construction, stormwater runoff from new facilities, potentially by incidental runoff from urban irrigation, or accidentally from pipeline rupture, overflow from the recycled water storage tank or overtopping of the detention basin or open reservoir.

Regulations and requirements for waste recycling are established in Title 22 of the California Code of Regulations. These regulations and water quality impacts relative to Title 22 requirements are addressed in Section 4.5, Public Health and Safety. The Hopper Street wastewater treatment plant and oxidation treatment ponds have been supplying secondary treated recycled water for urban and agricultural irrigation since the 1980s. In general, water recycling causes only land-based use of recycled water and does not discharge recycled water to surface waters such as creeks, and so does not need to comply with discharge-related water quality requirements. However, recycled water from irrigation could reach surface waters either through incidental runoff or through an accidental break in the irrigation system or accidental overflow of a tank, detention basin, or open reservoir. Incidental runoff is considered that water that leaves the intended irrigation after appropriate best management practices have been implemented in the design, operation and inspection phases of irrigation site development. An accidental break in irrigation pipelines is considered unlikely because pipelines are engineered to withstand groundshaking. Accidental overflow of the tank is directed to a detention basin of sufficient size to prevent runoff to surface waters. The reservoir would be designed to hold the “design” storm of a 100-year return frequency, so it would not be expected to overtop its banks. Therefore, the water quality impacts of pipeline ruptures, tank overflow, and detention basin or reservoir overtopping are considered very unlikely and not analyzed further in this document.

## **Federal and State Surface Water Quality Regulations**

Surface water quality is regulated to protect aquatic life and human health according to the provisions of the Federal Clean Water Act (and associated federal regulations) and the California Porter-Cologne Water Quality Control Act, referred to respectively as the Federal and State Acts. The State Act established the State Water Resources Control Board (State Board) and the nine Regional Water Quality Control Boards (Regional Boards). The City of Petaluma, including the Petaluma River, is located within the San Francisco Bay RWQCB. In California, the discharge-permitting provisions of the Federal Act have been delegated by the U.S. Environmental Protection Agency (USEPA) to the State and Regional Boards. The Regional Boards have the authority to implement water quality protection standards through issuance of permits for discharges to waters at locations within their jurisdiction. The Federal Act has led to the development of aquatic life water quality criteria; the State Act has led to water quality objectives to protect aquatic life from adverse impacts for numerous water quality constituents. The criteria and objectives are hereinafter referred to collectively as criteria.

Water quality standards have also been developed to protect human health. Drinking water standards are established in federal regulations and in Title 22 of the California Code of Regulations, and requirements for wastewater reuse are established in Title 22. These regulations and impacts related to public health are addressed in Section 4.7, Public Health and Safety.

## **Federal Clean Water Act**

The federal Water Pollution Control Act Amendments of 1972 and 1987, collectively known as the Clean Water Act (33 United States Code [USC] §1251 et seq.), establish the principal Federal statutes for water

quality protection. The Clean Water Act (CWA) was established with the intent “to restore and maintain the chemical, physical, and biological integrity of the nation’s water, to achieve a level of water quality which provides for recreation in and on the water, and for the propagation of fish and wildlife.” There are several key sections of the CWA that guide the regulation of water pollution in the United States. These are discussed in the following sections.

### ***Section 303(d), Water Quality Standards and Implementation Plans***

This section applies to discharge to surface waters. Section 303(d) of the CWA requires states to identify waters where the permit standards, any other enforceable limits, or adopted water quality standards are still not attained. Lists of prioritized impaired water bodies are known as the “303(d)” lists and must be submitted to the USEPA every two years. Section 303 also establishes the Total Maximum Daily Load (TMDL) Program, which determines the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and provides an allocation of that amount to the pollutant’s sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources. The Petaluma River is currently listed as impaired for sedimentation/siltation, diazanon, nutrients and pathogens. A TMDL for diazinon and related pesticides was adopted in 2005. TMDLs have not yet been established for sedimentation/siltation, nutrients, or pathogens; these TMDLs are not scheduled for completion until 2019.

### ***Section 402, National Pollutant Discharge Elimination System (NPDES)***

This section applies to discharge to surface waters, stormwater runoff to surface waters, and runoff from construction that reaches surface waters. Section 402 of the CWA requires permits for pollution discharges into water bodies such that the permitted discharge does not cause a violation of federal and State water quality standards. NPDES permits define quantitative and/or qualitative pollutant limitations for the permitted source, and control measures that must be implemented to achieve the pollutant limitations. Pollution control measures are often referred to as Best Management Practices, or BMPs. BMPs reduce contributions to water pollution, and include such measures as the installation of filtration equipment to remove pollutants from industrial wastewater. Other types of BMPs include periodically cleaning out urban storm drains to reduce pollutant loads (e.g., debris, sediments, etc.) in urban stormwater runoff, and installing soil containment devices (e.g., silt fencing) around construction sites to reduce erosion of sediments into surface waters. Section 402 identifies the types of dischargers that are required to obtain NPDES permits, and establishes a timetable for NPDES program implementation, which is being carried out in two major phases: Phases I and II. Since 1990, Phase I NPDES regulations have required permits for stormwater discharges from the following types of sources:

- Major industrial point sources such as wastewater treatment plants, electricity generating stations, industrial factories, mining operations, etc.;
- Construction activities disturbing five or more acres of land; and
- Municipal stormwater systems serving populations of 100,000 persons or more.

In 1999, USEPA established Phase II NPDES regulations, which expanded the existing NPDES program to include the following categories of pollution sources:

- All municipalities within designated urbanized areas, and small municipalities outside of designated urbanized areas with a population of at least 10,000 and/or a population density of at least 1,000 persons per square mile; and

- Construction activities that disturb between one and five acres of land.

### **Federal Emergency Management Agency**

The Federal Emergency Management Agency (FEMA) requires flood-prone communities to implement comprehensive floodplain management measures in order to qualify for federal flood insurance coverage. FEMA has two main designations for lands that are subject to flooding: the 100-year floodplain and the regulatory floodway. The 100-year floodplain is the area that has a statistical probability of being flooded once in every 100 years. The regulatory floodway is the portion of the floodplain that is capable of conveying the 100-year flood with no more than a 1-foot rise in water surface from the original unencroached river channel and floodplain. Within certain constraints, development is typically allowed to encroach in the portion of the floodplain that is located outside the floodway. FEMA also recognizes a 500-year floodplain.

The intent in designating the floodway is to limit construction adjacent to the river to activities that will not significantly affect the flow of water. FEMA has produced a Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM 1989) that delineate a 100-year and a 500-year floodplain and a regulatory floodway for the Petaluma area.

### **California Porter-Cologne Act**

This applies to discharge to surface waters. The Porter-Cologne Act (California Water Code Section 13000) is the principal law governing water quality regulation in California. It establishes a comprehensive program to protect water quality and the beneficial uses of water. The Porter-Cologne Act applies to surface waters, wetlands, and groundwater, and to both point and non-point sources of pollution. The following State policies are pursuant to the Porter-Cologne Act:

- The quality of all the waters of the State shall be protected;
- All activities and factors affecting the quality of water shall be regulated to attain the highest water quality within reason; and
- The State must be prepared to exercise its full power and jurisdiction to protect the quality of water in the State from degradation.

The responsibility for protection of water quality in California rests with the SWRCB, pursuant to the Porter-Cologne Act. The SWRCB administers Federal and State water quality regulations for California's ocean waters, and also oversees and funds the State's nine Regional Boards. The Regional Boards prepare water quality control plans, establish water quality objectives, and carry out Federal and State water quality regulations and permitting duties for inland water bodies, enclosed bays, and estuaries within their respective regions. The Porter-Cologne Act gives the SWRCB and Regional Boards broad powers to protect water quality by regulating waste dischargers to water and land, and requiring clean-up of hazardous wastes.

The Regional Boards regulate discharges under the Porter-Cologne Act primarily through issuance of NPDES permits and waste discharge requirements. Anyone discharging or proposing to discharge materials that could affect water quality (other than to a community sanitary sewer system regulated by an NPDES permit) must file a report of waste discharge. The Porter-Cologne Act provides Regional Boards with several options for enforcing regulations, including cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecutions.

## California Toxics Rule

This regulation applies to discharge into surface waters. The California Toxics Rule (CTR) was promulgated by the USEPA on May 18, 2000. The CTR provides water quality criteria through which impacts to surface waters can be evaluated. The criteria largely reflect the existing criteria contained in the USEPA's 304(a) Gold Book (Water Quality Criteria 1986) and its National Toxics Rule adopted in December 1992 (57 Federal Register 60848) and revised in December 1998, and those of earlier state plans (the Inland Surface Waters Plan and the Enclosed Bays and Estuaries Plan of April 1991, since rescinded). With promulgation of the CTR, these federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA. The State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) became effective on May 22, 2000. The goal of the SIP is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency. As such, the SIP is considered to be a tool to be used in conjunction with watershed management approaches and, where appropriate, the development of TMDLs to ensure achievement of water quality standards.

## Water Quality Control Plans (Basin Plans)

The Regional Boards are responsible for the protection of beneficial uses of water resources within their respective regions. They use planning, permitting, and enforcement authorities to meet this responsibility, and have adopted Water Quality Control Plans (called Basin Plans) to implement plans, policies, and provisions for water quality management. Beneficial uses of surface waters are described in the Basin Plans and are designated for major surface waters and their tributaries. The Basin Plans also establish numeric and narrative objectives for protection of beneficial uses, and set forth policies to guide the implementation of programs to attain the objectives. The following are the beneficial uses listed in the San Francisco Bay Basin Plan (2006) for the Petaluma River:

- Navigation (NAV)
- Water Contact Recreation (REC-1)
- Non-Contact Recreation (REC-2)
- Warm Freshwater Habitat (WARM)
- Cold Freshwater Habitat (COLD)
- Wildlife Habitat (WILD)
- Migration of Aquatic Organisms (MIGR)
- Spawning, Reproduction, and/or Early Development (SPWN)
- Marine Habitat (MAR)
- Preservation of Rare and Endangered Species (RARE)

## Construction Storm Water Program

Dischargers whose projects disturb 1 or more acres of soil are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling or excavation.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must list BMPs the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual

monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan.

### **Construction Dewatering Permit**

Construction activities, such as excavation and trenching in areas with shallow groundwater, would require dewatering, which would be subject to the RWQCB construction dewatering permit requirements (Water Quality Order 99-08-DWQ). Dewatering operations are regulated under state requirements for stormwater pollution prevention and control. Discharge of non-stormwater from a trench or excavation that contains sediments or other pollutants to sanitary sewer, storm drain systems, creek bed (even if dry), or receiving waters is prohibited. Discharge of uncontaminated groundwater from dewatering is a conditionally exempted discharge by the RWQCB. However, the removed water could potentially be contaminated with chemicals released from construction equipment or sediments from excavation. Therefore, disposal of dewatering discharge would require permits either from the RWQCB for discharge to surface creeks and groundwater or from local agencies for discharge to storm or sanitary sewers. The RWQCB lists non-stormwater discharge controls specifically for dewatering operations. Discharge of water resulting from dewatering operations would require an NPDES Permit, or a waiver (exemption) from the RWQCB, which would establish discharge limitations for specific chemicals (if they occur in the dewatering flows).

### **Sonoma County Standard Urban Storm Water Mitigation Plan (SUSMP)**

The SUSMP has been developed as part of the County's Storm Water Management Program to address post-development storm water pollution and peak flows from new projects. Implementation of this plan constitutes the management of storm water to the maximum extent practicable to reduce storm water volume, velocity and pollutant load. The SUSMP boundary includes the City of Santa Rosa and unincorporated areas near the cities of Petaluma, Healdsburg, Windsor, Santa Rosa, Rohnert Park, Cotati, Sebastopol, and Sonoma.

### **City of Petaluma NPDES Municipal Stormwater Permit**

For facilities built within the City of Petaluma, compliance with the City's Stormwater Management Plan (SWMP) will be required. The City of Petaluma has developed a SWMP for its Phase II General MS4 Permit to reduce discharge of pollutants to the maximum extent practicable and to protect water quality (City of Petaluma 2003). The SWMP specifies BMPs to address certain program areas. The program areas include public education and outreach, illicit discharge detection and elimination, construction activities, post-construction stormwater management, and good housekeeping for municipal operations.

### **City of Petaluma Grading and Erosion Control Ordinance**

Petaluma has adopted a Grading and Erosion Control Ordinance, Chapter 17.31 of the City Code, that requires an erosion control plan prepared by a licensed civil engineer for projects where the site is more than one acre in area, more than one thousand cubic yards of excavation or fill, or the average slope of the site before grading is more than fifteen percent.

The purpose of the plan is to identify sources of sediment and other pollutants that affect the quality of stormwater discharges and to describe and ensure the implementation of best management practices to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges. The final erosion and sediment control plan must effectively minimize soil erosion and sedimentation from the completed project site and must also provide for the control of runoff from the site.

### **City of Petaluma Stormwater Management and Pollution Control Ordinance**

The Stormwater Management and Pollution Control Ordinance, Chapter 15.80 of the City Code, establishes requirements to help the City comply with the federal CWA and the State Porter-Cologne Act by reducing pollutants in stormwater discharges to the maximum extent practicable and by prohibiting non-stormwater discharges to the City's municipal separate storm system. The Ordinance enables the City to adopt requirements identifying appropriate BMPs including, but not limited to, source control and post construction treatment control measures to control the volume, rate, and potential pollutant load of stormwater runoff from new development and redevelopment projects as may be appropriate to minimize the generation, transport and discharge of pollutants. The Ordinance further directs the City to incorporate such requirements in any land use entitlement and construction or building-related permit issued. The selection and the design of the BMPs, including post-construction treatment control measures, shall be per the City's stormwater policy and design standards and per the applicable NPDES permit issued to the City and other available guidance documents. Final occupancy will not be authorized until the BMPs and post-construction treatment measures are properly installed and provisions for long-term maintenance of these BMPs and treatment measures are accepted by the City.

### **City of Petaluma Floodway and Flood Plain Districts**

The Floodway and Flood Plain Ordinance, Chapter 16 of the City Code, establishes regulations for properties within the floodway or floodplain. The provisions would not apply to pipelines, but could apply to above ground facilities within the city limits that are in the 100-year floodplain.



## GOALS, OBJECTIVES, AND POLICIES

In addition to the objectives described in the Regulations section above, City and County general plans identify groundwater and surface water quality goals, objectives, and policies that relate to the project. These plans and policies are shown in Table 4.4-1. The table also indicates which criteria in the Surface Water Quality Section are responsive to each set of policies.

**TABLE 4.4-1**  
**Goals, Objectives, and Policies – Hydrology and Water Quality**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Sonoma County General Plan	Resource Conservation Element	Objective RC-3.1	Preserve watersheds and groundwater recharge areas by avoiding the placement of potential pollution sources in areas with high percolation rates.	1, 2, 3, and 4
		Objective RC-3.3	Preserve and enhance the quality of surface and groundwater resources.	
		Policy RC-3a	Grading, filling and construction should not substantially reduce or divert any stream flow that would affect groundwater recharge.	
		Policy RC-3d	Encourage the construction of wastewater disposal systems designed to reclaim and reuse treated wastewater on agricultural crops, and which minimize discharges into natural waterways to protect water quality.	
		Policy RC-3e	... maximize reclamation, conservation and reuse programs to minimize discharges and protect water quality and aquifer recharge areas.	
Petaluma General Plan 2025	Water Resources	Policy 4-P-1	Protect and enhance the Petaluma River and its tributaries through a comprehensive river management strategy ...	1,2,3
Petaluma General Plan 2025	Water Resources	Goal 8-G-10	Reduce pollutant load in surface water runoff, thereby improving water quality within the Petaluma River and its tributaries.	1,2,3
Petaluma General Plan 2025	Water Resources	Policy 8-P-38	All development activities shall be constructed and maintained in accordance with Phase 2 National Pollutant Discharge Elimination System (NPDES) permit	1,2,3

**TABLE 4.4-1**  
**Goals, Objectives, and Policies – Hydrology and Water Quality**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
			requirements.	
Petaluma General Plan 2025	Water Resources	Policy 8-P-39	Consider, to the extent practicable, requiring sustainable site design practices as outlined in the ‘Sustainable Site Planning’ text box contained [on page 8-20 of the General Plan]..	3
Petaluma General Plan 2025	Water Resources	Policy 8-P-32	Areas within the Petaluma watershed, outside of the City of Petaluma, which are subject to periodic surface water inundation and containment, should not be modified in any manner to reduce the historic storage characteristics and capacity.	4
Petaluma General Plan 2025	Water Resources	Policy 8-P-33	The City shall continue to implement zero-net fill and when appropriate, zero-net runoff, to assess site-specific impacts and identification of mitigations.	4
Petaluma General Plan 2025	Water Resources	Policy 8-P-20	Manage groundwater as a valuable and limited shared resource by protecting potential groundwater recharge areas and stream sides from urban encroachment within the Petaluma watershed.	7

Source: Sonoma County General Plan 1989; Petaluma General Plan 2025

Notes:

1. Evaluation criteria are identified in Table 4.4-2.

**EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE**

**TABLE 4.4-2**

**Evaluation Criteria with Threshold of Significance-Hydrology and Water Quality**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Point of Significance</b>	<b>Justification</b>
HWQ-1. Will operation of the WREP result in a violation of any narrative or numeric water quality standard or result in non-attainment of established TMDLs?	Varies.	Varies.	California Department of Health Services Title 22 standards San Francisco Bay Regional Basin Plan criteria CEQA checklist questions VIII.a) and VIII.f) <sup>a,b</sup> Petaluma General Plan 2025
HWQ-2. Will the construction or operation of facilities for the WREP result in a substantial degradation of surface water runoff quality?	Compliance with local and state storm water quality regulations requiring implementation of effective best management practices.	Failure to implement effective, reasonable and appropriate measures.	State of California General NPDES Permits for Discharges of Storm Water Associated with Construction and Industrial Activities California Storm Water Best Management Practice – Construction handbook CEQA checklist questions VIII.c and VIII.e,c,d Petaluma General Plan 2025
HWQ-3. Will the WREP alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation?	Construction activities not in compliance with requirements of the project National Pollutant Discharge Elimination System Permit (NPDES), or building and grading codes.	Construction not in compliance with NPDES, or building and grading codes.	Clean Water Act regulations and local building or grading ordinances (refer to text). Petaluma General Plan 2025
HWQ-4. Will operation of the WREP cause flooding?	Increase in the 100-year flood elevation.	Greater than 0.1-foot increase.	FEMA uses 1 foot as a guideline for significance. CEQA Checklist Item VIII.d through VIII.j) <sup>b</sup> Petaluma General Plan 2025

**TABLE 4.4-2**

**Evaluation Criteria with Threshold of Significance-Hydrology and Water Quality**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Point of Significance</b>	<b>Justification</b>
HWQ-5. Will the WREP degrade groundwater quality at existing or future drinking water wells, resulting in a public health hazard?	Cumulative Recycled Water contributions to groundwater drinking sources.	5% or more, over short durations (monthly averages at groundwater source) for pathogenic microorganism control; 10% or more, as an average over long periods of time (yearly averages at groundwater source), for chemical contaminant control.	CEQA Guidelines Appendix G, Checklist Item VIII (f); State and federal water quality regulations California Department of Health Services (2007)
HWQ-6. Will the WREP cause groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment?	Increase in groundwater levels.	Groundwater that is raised to within 6 feet of the surface.	CEQA Guidelines Appendix G, Checklist Item VIII (d) 1
HWQ-7. Will the WREP substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?	Wells be subject to lower groundwater levels.	Interaction with groundwater during construction related excavation.	CEQA Checklist Item VIII.a and b Petaluma General Plan 2025

## METHODOLOGY

### Groundwater

The level of significance of the groundwater impacts for near-term improvements and the program-level improvements was determined based on estimates regarding the range of hydrogeological conditions in the areas designated for facilities. The program-level improvements such as the uses of recycled water, the pipelines, pump stations and open reservoir would be sited at a later time and thus site-specific hydrogeological information is not now available. Estimates regarding the probable permeability of the native soil, probable susceptibility to infiltration of recycled water (e.g., reservoir leakage), probable availability of groundwater (probability of a shallow water table and susceptibility to groundwater mounding), probable density of domestic water wells (probability of wells occurring less than 200 feet from reservoir), probable travel time to nearby wells, were based on information contained in the Petaluma General Plan 2025, the Sonoma County Planning Department groundwater availability classifications identified in Schematic Map of Areas Subject to Resource Conservation Policy

Requirements (Sonoma County General Plan), and available geologic maps from the California Division of Mines and Geology (Geologic Map of the Santa Rosa Quadrangle 1982).

## IMPACTS AND MITIGATION MEASURES

**Impact:**        **HWQ-1: Will operation of the WREP cause a violation of any narrative or numeric water quality standard or result in non-attainment of established TMDLs?**

**Analysis:**        *Project-Level Near-Term Conveyance Improvements - No Impact*

Tank and Associated Facilities. The storage tank would hold tertiary treated recycled water. The pump system includes several redundant alarms which would alert system operators 30 minutes before the main tank reaches capacity. However, if the capacity of the tertiary tank were exceeded, recycled water from the storage tank would flow via a pipeline to a series of detention basins located west of Ielmorini Road. As a result, the recycled water storage tank and the detention basin would prevent direct or indirect discharge to surface waters with the designed features described above, so operation of the tank would not be subject to surface water quality standards.

Pipelines. Operation of pipelines would have no water quality impact because the recycled water is contained within the pipeline, pipeline rupture is very unlikely, and no discharge to the environment would occur.

*Program-Level Improvements: Use of Recycled Water, Pipelines, Pump Station – Less than Significant; Open Reservoir – Significant*

Use of Recycled Water. The City of Petaluma would increase its delivery of secondary and tertiary treated recycled water for agricultural and urban irrigation uses from approximately 800 MG per year (use in 2007, actual use each year varies with weather conditions) to up to 1,070 MG per year. Approximately 375 to 420 million gallons (MG) per year of secondary treated recycled water would go to rural agricultural users primarily located along Lakeville Highway and Browns Lane. Approximately 650 MG per year of tertiary treated recycled water would be delivered for urban irrigation purposes at parks, business parks, golf courses, playing fields, and industrial purposes.

Recycled water produced by the City of Petaluma would comply with current Title 22 regulations for restricted and unrestricted use of recycled water; the City would comply with California Department of Public Health (CDPH) and RWQCB Order 96-011, which designates suitable uses of recycled water. Refer to Section 4.5 Public Health and Safety for further analysis of compliance with Title 22.

To protect against the runoff of recycled water to surface water, the City has adopted Measure PD-16 Implement BMPs to Prevent Runoff, Erosion, and Agricultural Chemical Use, as part of the Project Description. Measure PD-16 requires the City to perform a series of BMPs to minimize runoff, e.g., application of irrigation water should be consistently equivalent to landscaping demand as required in the California Water Recycling Criteria (Title 22). In addition, Measure PD-16 also states that small scale drainage improvements (ditches and the drain systems) may be considered for portions of fields where the other BMPs are insufficient to preclude localized development of drainage problems. The measure describes the provisions of a water recycling program necessary to achieve CDPH and RWQCB requirements to protect water quality and reduce the potential impact to a less-than-significant level.

Runoff of recycled water from both agricultural and urban irrigation sites may occur even after measures described in Measure PD-16 are implemented, and such runoff would be considered, by definition, to be incidental. The amount of incidental runoff that would leave the irrigation site and enter the storm drain and eventually enter surface waters would be managed by the City and regulated by the RWQCB under the City's Phase II NPDES Storm Water Management Plan (2003). The quality and amount of water that might incidentally enter surface waters would have a less-than-significant impact on water quality and would not result in exceedence of numeric or narrative water quality criteria<sup>1</sup>. Incidental runoff would not impact TMDL attainment for diazinon. The San Francisco Bay RWQCB considers compliance with Title 22 to be protective of receiving water, when recycled water is applied at rates consistent with those assured by Measure PD-16.

Pipelines. Operation of pipelines would have no water quality impact, because the recycled water is contained within the pipeline, and no discharge to the environment would occur.

Pump Station. Operation of the pump stations would not result in direct or indirect discharge to surface waters, so numerical or narrative criteria or TMDLs do not apply.

Open Reservoir. Depending on the soil or rock that the reservoir is built upon, the facility would experience some seepage into the underlying strata. The maximum estimated seepage from a pond of this size would be less than 1 cfs (cubic feet per second), without considering losses due to evaporation. Of the estimated seepage, a portion would percolate into groundwater and a portion may surface at the downgradient base of the berm. However, downstream hydrology and water quality is unknown at this time because the location of the reservoir has not been determined. Thus, the impact of the open reservoir on surface water quality is considered to be potentially significant.

Mitigation: **HWQ-1 Pond Seepage**

After

Mitigation: *Less than Significant - Open Reservoir*

Mitigation Measure HWQ-1 requires the City to perform hydrogeologic studies to determine the extent of seepage to be expected, given the location of the pond which is eventually selected. Seepage of the pond is site dependent and mitigation for the estimated amount of seepage could range from requiring no mitigation, to requiring natural clay liners, and to requiring synthetic liners. Also, an option to pond lining is to construct a system of nearby wells designed to pump seepage to the surface and return it to the reservoir. This system of wells would not likely be required, but has been included as an optional component in the project description so that the impacts of the wells can be evaluated in this document as part of the program-level environmental review. Because the nature of the future pond site cannot be reasonably determined at this time, it is appropriate to conduct the study at a later time, so long as the City commits to providing

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<sup>1</sup> If incidental runoff did reach surface waters, it would flow into creeks tributary to the Petaluma River where the City is permitted to discharge. Refer to the Petaluma Water Recycling Facility and River Access Improvements EIR (Petaluma 2002), which concludes that discharge from the Ellis Creek Water Recycling Facility will meet all numeric and narrative discharge requirements.

a system to prevent seepage from adversely affecting groundwater or surface water quality. Mitigation Measure HWQ-1 requires this commitment to reducing impacts, and therefore the impact is found to be less than significant after mitigation.

**Impact: HWQ-2: Will the construction and operation of the WREP result in a substantial degradation of surface water runoff quality?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Less than Significant*

Tank and Associated Facilities. Construction of the tank, and its associated facilities, could degrade the quality of stormwater runoff. However, measures adopted by the City as part of the Project would ensure that construction and operation of these facilities would occur such that impacts are less than significant. Measure PD-3, adopted as part of the Project, would require development of a SWPPP, as applicable, for each construction area. The SWPPP would be developed and implemented in accordance with Section A of the Construction General Permit, and would include the BMPs that would be used to protect storm water runoff and the placement of those BMPs. Regular inspection of the BMPs would be required to ensure that they are operating properly, and corrective actions would be implemented as needed to protect water quality. In addition, Project Description Measure PD-2, Revegetate Temporarily Disturbed Sites, would require sites to be revegetated prior to the rainy season. The revegetation of temporarily disturbed areas would reduce stormwater flow volumes, velocity and pollutant loads.

During operation, the only near-term facilities that would be located within the city limits would be the pipelines along East Washington Street. Operation of these pipelines would not discharge recycled water to surface water, and thus would not degrade surface water. The remaining near-term improvements would include a tank adjacent to Ielmorini Road, as well as pipelines along Iemorini Road and Browns Lane. These near term improvements are located outside of the City limits on unincorporated land. In addition, these near-term improvements would be located outside of the County's SUSMP boundary, and thus the County's SUSMP guidelines would not apply.

With implementation of the project measures described above, the potential for construction and operational impacts to substantially degrade surface water runoff quality would be reduced to less than significant.

Pipelines. Construction of near-term pipelines would have the potential to degrade surface water runoff quality during construction. However, Measure PD-3, adopted by the City as part of the Project, would ensure that construction of these facilities would occur such that impacts are less than significant, as described above. Project Measure PD-18, Protect Creeks from Toxic Discharge, would also ensure that the project as proposed would not damage the water quality of local surface waters.

Operation of pipelines would not release recycled water to the environment and would not degrade water quality.

*Program-Level Improvements – Less than Significant*

Use of Recycled Water. Refer to the discussion under Impact HWQ-1 above.

Pipelines. Construction of the pipelines would have the potential to disturb soil in waterways during creek crossings and to degrade surface water runoff quality. However, measures adopted by the City as part of the Project would ensure that construction

activities would occur such that impacts are less than significant. These measures are described under the discussion of the near-term facilities above. Operation of these facilities would not disturb soils, and therefore would not affect surface runoff quality.

Construction of pipelines throughout the City for delivery of recycled water would have the same impacts as described for the project-level pipelines. However, program-level pipelines may be constructed under the Petaluma River and under smaller streams in the project area. Trenchless construction methods may be used to install pipelines in these areas. The trenchless construction process may use a mixture of bentonite, a fine clay material, as a lubricant. Drilling near the ground surface or close to the bed of a surface water body introduces the potential for frac-out (where the bentonite surfaces in the stream or river bed) in which the pressure of the bentonite or other drilling lubricants generates a surface rupture. The bentonite is non-toxic, but it can increase turbidity and suspended sediments in the surface water. Project Description Measure PD-17, Frac-Out and Undercrossing Contingency Plan, would be developed as part of the project to ensure that preventative and responsive measures are identified to protect water quality. The purpose of the Undercrossing Contingency Plan would be to minimize the potential for frac-outs should they occur; to ensure an organized, timely, and minimum-impact response in the event of frac-out; and to ensure all appropriate notifications of regulatory agencies are made in the event of a frac-out. The Undercrossing Contingency Plan would also identify remediation measures necessary to protect water quality. Implementation of the measures identified in the Undercrossing Contingency Plan would prevent significant water quality impacts.

Operation of pipelines would not degrade water quality.

Pump Station. Construction of the pump station could impact surface waters due to sedimentation and pollution of surface runoff during precipitation events. Measure PD-3, adopted as part of the Project, would require development of a SWPPP, as applicable, for the Pump Station.

During operation, facilities within the city limits must comply with the City's Storm Water Management Plan requirements. For facilities located in unincorporated areas of the county as well as within the County's SUSMP boundary, the City must comply with the County's SUSMP requirements. Both requirements ensure that stormwater runoff does not cause flooding, erosion, or water quality degradation after leaving the site of the pump station. Measure PD-3, adopted as part of the Project, would require development of a Storm Water Mitigation Plan, as applicable, for the Pump Station.

With implementation of Measure PD-3 Stormwater Pollution Prevention and Mitigation Plans, the potential for construction and operational impacts to substantially degrade surface water runoff quality would be reduced to less than significant.

Reservoir. Construction of the reservoir could impact surface waters due to sedimentation and pollution of surface runoff during precipitation events. However, Measure PD-3 is included as part of the project and would reduce construction-phase impacts to less than significant.

The currently proposed location of the reservoir would be located outside of the City limits on unincorporated land. In addition, the location of currently proposed reservoir would be outside of the County's SUSMP boundary, and thus the County's SUSMP guidelines would not apply. The operational impact would be less than significant.

Mitigation: No mitigation is necessary.



**Impact: HWQ-3: Will the WREP alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Tank and Pipelines. Construction activities associated with the tank, its associated facilities, and pipelines could temporarily alter drainage and increase stormwater flows and, thus, cause localized erosion. However, the City has adopted Measure PD-3 as part of the Project Description. The site-specific SWPPP would provide for stormwater controls during construction and if special measures are necessary for a site, these measures would be incorporated into the SWPPP. The plan includes implementing BMPs as needed to prevent increases in downstream runoff volume during construction. In addition, PD-2, Revegetate Temporarily Disturbed Sites, requires that contours and drainage patterns be returned to pre-project conditions. After construction, ground surfaces in construction areas would be restored to their pre-construction condition and thus the net effect on post-construction drainage patterns would be less than significant.

*Program-Level Improvements – Less than Significant*

Use of Recycled Water. The use of recycled water would not change the drainage patterns of the site and would not increase erosion or sedimentation compared to the use of potable water.

Pipelines, Pump Station, and Open Reservoir. Construction activities associated with pipelines, the pump station, or the reservoir could temporarily alter drainage and increase stormwater flows and thus cause localized erosion. However, adoption of Measures PD-2 and PD-3 would prevent substantial changes in drainage patterns or erosion.

Mitigation: No mitigation is necessary.

**Impact: HWQ-4: Will operation of the WREP cause flooding?**

Analysis: *Project-Level Near-Term Conveyance Improvements: Tank - Less than Significant; Pipelines - No Impact*

Tank and Associated Facilities. The tank, and its associated facilities, would not be located within a 100-year floodplain. If the capacity of the tertiary tank were exceeded, recycled water from the storage tank would flow via a pipeline to a detention basin located west of Ielmorini Road. The tank and its associated facilities are currently in the County, but may at some point be annexed to the City. The tank is located outside of the County's current SUSMP boundary, and thus the County's SUSMP guidelines would not apply to the facility. The potential for operation of the tank to cause flooding is considered less than significant.

Pipelines. The pipelines are not located with a 100-year floodplain and would not cause flooding.

*Program-Level Improvements: Use of Recycled Water – No Impact; Pipelines, Open Reservoir, and Pump Station – Less than Significant*

Use of Recycled Water. The project would replace irrigation water sources, such as City-supplied water or well water, with recycled water. Water application rates would tend to

decrease compared with pre-project potable water application, because of water efficient landscaping practices required by Project Description Measure PD-16. Also, Measure PD-16 prohibits recycled water irrigation within the 100-year floodplain. Hence no impact on flooding would occur.

Pipelines. Some pipelines would be located within the 100-year floodplain along the Petaluma River or tributaries. The pipelines, however, are underground and do not displace flood storage capacity, so they do not increase flooding potential.

Pump Station. The pump station would not be located within the 100-year floodplain, and would not displace flood capacity. The pump station would cover less than half an acre, and would not substantially increase runoff. This impact is less than significant.

Open Reservoir. The reservoir would not be located within the 100-year floodplain, and thus would not displace flood capacity. The reservoir would detain rainfall and potentially some runoff from the surrounding watershed, thus decreasing peak runoff below the reservoir.

Impacts from berm failures are evaluated in Section 4.7, Public Health and Safety.

Mitigation: No mitigation is necessary.

**Impact: HWQ-5: Will the WREP degrade groundwater quality at existing or future drinking water wells, resulting in a public health hazard?**

Analysis: *Project-Level Near-Term Conveyance Improvements: Tank - Less than Significant; Pipelines - No Impact*

Tank and Associated Facilities. Construction of the tank could involve excavation for foundations where, although unlikely, shallow groundwater could be encountered. This interaction with shallow groundwater levels would not cause changes in recycled water and would not degrade groundwater quality near the site. Operation of the tank would not release recycled water into the groundwater and would not affect groundwater quality.

If the capacity of the tertiary tank were exceeded, recycled water from the storage tank would flow via a pipeline to a series of detention basins located west of Ielmorini Road. The detention basins would serve as secondary containment for the tertiary tank and would not permanently store recycled water. The quality of the tertiary recycled water that could be temporarily stored in the detention basin and that could infiltrate to groundwater would meet or exceed criteria adopted by the CDPH to be protective of human health. There are no known municipal groundwater supply wells in the vicinity of the detention basin, and the nearest domestic well is located several hundred feet away. Therefore, the potential for the detention basin to degrade groundwater quality at existing or future drinking water wells is considered less than significant.

Pipelines. During the construction phase, trenching that encounters groundwater could locally increase turbidity in groundwater; however, these effects would be temporary and localized. Normal operation and maintenance of the pipelines would not release recycled water into the groundwater. Therefore, no impact would occur.

*Program-Level Improvements – Use of Recycled Water, Pipelines, Pump Station - Less than Significant; Open Reservoir - Significant*

Use of Recycled Water. Recent scientific studies show that groundwater would not be contaminated by irrigation with recycled water (Hudson and Beller 2005, Crites et.al. 2006, Kennedy 2007, and Debroux 2007).

Nitrate levels in recycled water, applied in accordance with accepted irrigation practices, are generally below the nitrogen requirements of crops or landscaping. Therefore, nitrate in recycled water would be almost entirely taken up by the plants and would not migrate beyond the root zone.

In addition, Project Description Measure PD-14, Adjust Facility Design to Avoid Wells and Septic Systems, requires that the Project comply with Title 22 separation guidelines, including that recycled water irrigation areas and pipelines be separated from domestic wells by no less than 50 feet and 100 feet, respectively. With these protections in place, impacts on groundwater quality would be less than significant.

Pipelines. During the construction phase, trenching that encounters groundwater could locally increase turbidity in groundwater; however, these effects would be temporary and localized. Normal operation and maintenance of the pipelines would not release recycled water into the groundwater. Therefore, no impact would occur.

Pump Station. Construction of the pump station could involve excavation for foundations where shallow groundwater could occasionally be encountered. Construction activities could locally increase turbidity in groundwater if shallow groundwater or locally perched zones are encountered; however, these effects would be temporary and localized. The pump station would not interact with groundwater during operation. Therefore, the impact would be less than significant.

Open Reservoir. During the construction phase of the open reservoir, excavation that encounters groundwater could locally increase turbidity in groundwater; however, these effects would be temporary and localized.

After the reservoir is built, seepage of recycled water could affect groundwater quality. This impact is considered significant.

Mitigation: **HWQ-1. Pond Seepage**

After

Mitigation: *Less than Significant*

Mitigation Measure HWQ-1 requires the City to perform hydrogeologic studies to determine the extent of seepage to be expected, given the location of the pond which is eventually selected. Seepage of the pond is site dependent and could range from requiring no mitigation, to requiring natural clay liners, and to requiring synthetic liners. Also, an option to pond lining is to construct a system of nearby wells designed to pump seepage to the surface and return it to the reservoir. This system of wells has been included as an optional component in the project description so that the impacts of the wells can be evaluated in this document as part of the program-level environmental review. Because the nature of the future pond site cannot be reasonably determined at

this time, it is appropriate to conduct the study at a later time, so long as the City commits to providing a system to prevent seepage from substantially affecting groundwater or surface water quality. Mitigation Measure HWQ-1 requires this commitment to reducing impacts, and therefore the impact is found to be less than significant after mitigation.

**Impact: HWQ-6: Will the WREP cause groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements: Tank - No Impact; Pipelines - Less than Significant*

Tank. Construction of the tank, and its associated facilities, could involve excavation for foundations where shallow groundwater could be encountered, but discharge to groundwater would not occur either during construction or operation, so mounding would not occur.

If the capacity of the tertiary tank were exceeded, recycled water from the storage tank would flow via a pipeline to a detention basin located west of Ielmorini Road. The detention basin would serve as secondary containment for the tertiary tank and would not permanently store recycled water. The depth to the water table beneath the detention basin is not currently known. According to the Natural Resources Conservation Service Web Soil Survey, the high water table assigned for the area is greater than 200 centimeters (approximately 6.5 feet). Because the detention basin would only contain water during an overflow event of the tank, the potential to cause groundwater mounding or increase groundwater levels that cause surface water discharge is considered less than significant.

Pipelines. Groundwater may be present at shallow depths in certain portions of the pipeline alignments, but neither construction nor operation of the pipelines would contribute recycled water to the groundwater to cause mounding or surface discharge.

*Program-Level Improvements – Less than Significant*

Use of Recycled Water. Measure 17, Implement BMPs for Runoff, Erosion and Agricultural Chemical Use, which is adopted as part of the project, requires that irrigation consistently match crop and landscaping needs. These BMPs would ensure that excessive irrigation does not occur, and therefore, that groundwater mounding or surface discharge would not occur.

Groundwater levels may rise in areas where pumping from wells for agricultural or urban irrigation is reduced or eliminated because recycled water has been substituted for groundwater. However, the probability is low that impacts would result in mounding; rather, groundwater levels may return to previous levels.

Pipelines. Groundwater may be present at shallow depths in certain portions of the pipeline alignments, but neither construction nor operation of the pipelines would contribute recycled water to the groundwater to cause mounding or surface discharge.

Pump Station. Construction of the pump station could involve excavation for foundations where shallow groundwater could be encountered, but neither construction nor operation of the pump station would contribute recycled water to the aquifer to cause mounding or surface water discharge.

Open Reservoir. Construction of the reservoir would not discharge recycled water to the groundwater, and therefore no mounding or surface discharge would occur during the construction phase.

Given the location of the study area indicated for the reservoir, which is hilly with few streams, it is unlikely that a high groundwater table exists in the area. However, seepage from the reservoir could cause some mounding downgradient of the pond. Many small agricultural ponds exist in the hills east of Lakeville Highway, and they do not appear (based on aerial photographs) to cause sufficient mounding to create surface discharge. Mounding would not be expected beyond 100 to 200 feet from the reservoir site. From aerial photographs, it appears that the reservoir study area has few if any residences or septic systems, and so the reservoir would be able to be sited in a suitable location. The impact is found to be less than significant.

Mitigation: No mitigation is necessary.

**Impact: HWQ-7: Will the WREP substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?**

Analysis: *Project-Level Near-term Conveyance Improvements - Less than Significant*

Tank and Associated Facilities. Tank construction may encounter groundwater and dewatering may be required. Construction dewatering is a temporary operation and would not cause a long-term impact on groundwater levels. The tank is not located in a valuable groundwater recharge zone (Sonoma County 2007) and would take up approximately 1 acre. The impact of the tank, and its associated facilities, on long-term groundwater recharge is found to be less than significant.

Pipelines. Pipeline construction may intersect groundwater and dewatering of the trenches or tunneling pits may be required. Construction dewatering is a temporary operation and would not cause a long-term impact on groundwater levels. The pipelines are below grade and would not substantially affect groundwater recharge.

*Program-Level Improvements: Use of Recycled Water and Pipelines – No Impact; Pump Station and Open Reservoir – Less than Significant*

Use of Recycled Water. Areas that are currently irrigated with groundwater could experience an increase in groundwater levels as irrigation pumping declines and groundwater levels return to pre-pumping levels or rise above current pumping levels. Groundwater levels would not decline.

Pipelines. The effects of construction are temporary and would have no long-term impact on the future groundwater levels or groundwater supply. No impacts are expected from pipelines once they are installed.

Pump Station. The pump station would cover less than half an acre, and would not substantially decrease aquifer recharge. This impact is less than significant.

Open Reservoir. Rainfall that would fall onto the 2-acre pond and that would otherwise recharge the groundwater would no longer percolate into the groundwater, but rather be

intercepted by the proposed reservoir. Recharge from the surrounding watershed would continue to recharge groundwater, because the reservoir would be built to include grading and drainage that would prevent runoff from the surrounding watershed to enter the pond. The area where the pond would be built is not considered an important aquifer recharge area, and the impact is considered less than significant.

Mitigation: No mitigation is necessary.

## CUMULATIVE IMPACTS

**Impact: HWQ-C1 - C7: Will the WREP plus cumulative projects result in a hydrologic or water quality impacts based on criteria 1 through 7?**

Analysis: *Project-level Near-term Conveyance Improvements - Less than Significant*

Increased Residential and Commercial Development. Construction and occupancy of development projects can increase the concentration of water quality constituents in storm water runoff from the site. Storm water runoff from some of the cumulative projects could, in turn, affect the water quality in the Petaluma River and other waterways. The City of Petaluma Storm Water Management Plan is designed to reduce pollutants in storm water runoff. Storm water discharge from urban sources would not cause significant cumulative impacts.

### *Program-level Improvements – Less than Significant*

Neither construction of facilities nor use of recycled water for irrigation purposes would contribute to flooding, so the Program's contribution to cumulative flooding impacts would not be considerable.

Local wells would be protected during construction and irrigation activities by meeting protection measures detailed in the project description measures. Therefore, the improvements would not contribute to cumulative impacts on wells.

Groundwater mounding is a localized impact, and other projects are not expected to contribute to groundwater mounding. Drawdown of groundwater due to interception of baseflow by the pond is a localized impact, and would occur only in the immediate area where the pond is constructed. Trends in the Sonoma County area indicate a reduction in groundwater tables for a variety of reasons. The program-level impacts are localized, and impacts to wells would be fully mitigated. The Program does not have a considerable contribution to cumulative impacts on groundwater levels.

Mitigation: No mitigation is necessary.

## REFERENCES

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## 4.5 AIR QUALITY

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This section describes potential air quality impacts from construction and operation of the project.

### SETTING

#### Climate Factors

Petaluma is located in the climatological subregion referred to as the Petaluma Valley. The Petaluma Valley is bordered by coastal mountains to the southwest, Sonoma Mountain to the east and a series of low hills to the west called the Estero Lowlands, which open to the Pacific Ocean. The region from the Estero Lowlands to the San Pablo Bay is known as the Petaluma Gap. This low-terrain area, including the Petaluma Valley, allows marine air to flow into the Bay Area.

#### Regulatory Setting

The Federal Clean Air Act (CAA) governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the federal level, the United States Environmental Protection Agency (USEPA) administers the Federal CAA. The California Clean Air Act is administered by the California Air Resources Board (CARB) at the state level and by the Air Quality Management Districts at the regional and local levels. The Bay Area Air Quality Management District (BAAQMD) regulates air quality at the regional level, which includes Petaluma and the nine-county Bay Area.

#### ***United States Environmental Protection Agency***

USEPA is responsible for enforcing the 1977 Federal CAA, as amended, and the National Ambient Air Quality Standards (NAAQS) set forth therein. USEPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by the CARB.

#### ***California Air Resources Board***

As part of the California Environmental Protection Agency, the CARB is responsible for meeting the state requirements of the Federal CAA, administering the California Clean Air Act, and establishing California Ambient Air Quality Standards (CAAQS). The California Clean Air Act requires all air districts in the State to endeavor to achieve and maintain the CAAQS. CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB has established fuel specifications for both on- and off-road vehicles. CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

**Bay Area Air Quality Management District (BAAQMD)**

The BAAQMD is primarily responsible for assuring that the National and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, as well as many other activities. The BAAQMD has jurisdiction over much of the nine-county Bay Area, which includes Petaluma.

**National and State Ambient Air Quality Standards**

As required by the Federal CAA, the NAAQS have been established for six major air pollutants: carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), ozone (O<sub>3</sub>), respirable particulate matter (PM<sub>10</sub>), fine particulate matter (PM<sub>2.5</sub>), sulfur oxides, and lead. Pursuant to the California Clean Air Act, the State of California has also established ambient air quality standards. These standards are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles.

Both State and Federal standards are summarized in Table 4.5-1. The “primary” standards have been established to protect the public health. The “secondary” standards are intended to protect the nation’s welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation and other aspects of the general welfare. The CAAQS are more stringent than the NAAQS. Thus, the CAAQS are used as the comparative standard in this analysis.

**TABLE 4.5-1  
Relevant California and National Ambient Air Quality Standards**

<b>Pollutant</b>	<b>Averaging Time</b>	<b>California Standards</b>	<b>Primary National Standards<sup>b</sup></b>	<b>Secondary National Standards<sup>c</sup></b>
Ozone	8-hour	0.07 ppm	0.08 ppm	—
	1-hour	0.09 ppm	— <sup>d</sup>	Same as primary
Carbon monoxide	8-hour	9.0 ppm	9 ppm	—
	1-hour	20 ppm	35 ppm	—
Nitrogen dioxide	Annual	0.03 ppm	0.053 ppm	Same as primary
	1-hour	0.18 ppm	0.030 ppm	—
Sulfur dioxide	Annual	—	0.03 ppm	—
	24-hour	0.04 ppm	0.14 ppm	—
	3-hour	—	—	0.5 ppm
PM10	Annual	20 µg/m <sup>3</sup>	—	Same as primary
	24-hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	Same as primary
PM2.5	Annual	12 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	
	24-hour	—	35 µg/m <sup>3</sup>	

**TABLE 4.5-1**  
**Relevant California and National Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards	Primary National Standards <sup>b</sup>	Secondary National Standards <sup>c</sup>
Lead	Calendar quarter	—	1.5 µg/m <sup>3</sup>	Same as primary
	30-day average	1.5 µg/m <sup>3</sup>	—	—

Source: Illingworth & Rodkin 2002

Notes:

- a. Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
- b. Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the USEPA.
- c. Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- d. The national 1-hour ozone standard was revoked by USEPA on June 15, 2005.

### Criteria Air Pollutants & Effect

Air quality studies generally focus on five pollutants that are most commonly measured and regulated: Carbon Monoxide, Ozone, Nitrogen Oxide, Sulfur Oxides, and suspended particulate matter (i.e., PM<sub>10</sub> and PM<sub>2.5</sub>). In Sonoma County, ozone and particulate matter are the pollutants of greatest concern since measured air pollutant levels exceed these concentrations at times.

#### **Carbon Monoxide**

Carbon Monoxide, a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue, and can impair central nervous system functions. Carbon monoxide is emitted almost exclusively from the incomplete combustion of fossil fuels. Automobile exhausts release approximately 70 percent of the carbon monoxide in the Bay Area. A substantial amount also comes from burning wood in fireplaces and wood stoves. Carbon monoxide is a non-reactive air pollutant that dissipates relatively quickly, so ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic. The highest carbon monoxide concentrations measured in the Bay Area are typically recorded during the winter.

#### **Ozone**

Ozone, a colorless toxic gas, is the chief component of urban smog. Ozone enters the blood stream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. Although ozone is not directly emitted, it forms in the atmosphere through a chemical reaction between reactive organic gas (ROG) and nitrogen oxides (NO<sub>x</sub>) under sunlight.<sup>1</sup> ROG

<sup>1</sup> ROG and NO<sub>x</sub> are emitted from automobiles and industrial sources.

and nitrogen oxides are primarily emitted from automobiles and industrial sources. Ozone is present in relatively high concentrations within the Bay Area, and the damaging effects of photochemical smog are generally related to the concentration of ozone. Highest ozone concentrations occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies.

### ***Nitrogen Dioxide***

Nitrogen Dioxide, a reddish-brown gas, irritates the lungs. It can cause breathing difficulties at high concentrations. Like ozone, nitrogen dioxide is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. Nitric oxide and nitrogen dioxide are collectively referred to as nitrogen oxides (NO<sub>x</sub>) and are major contributors to ozone formation. Nitrogen oxides also contribute to the formation of PM<sub>10</sub> through secondary particulate formation in the presence of a stable atmospheric and high relative humidity.

### ***Sulfur Oxides***

Sulfur oxides, primarily SO<sub>2</sub>, are a product of high-sulfur fuel combustion. The main sources of SO<sub>2</sub> are coal and oil used in power stations, in industries, and for domestic heating. SO<sub>2</sub> is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO<sub>2</sub> concentrations have been reduced to levels well below the state and national standards, but further reductions in emissions are needed to attain compliance with standards for PM<sub>10</sub>, of which SO<sub>2</sub> is a contributor.

### ***Suspended Particulate Matter***

Particulate matter pollution consists of very small particles suspended in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when industry and gaseous pollutant undergo chemical reactions in the atmosphere. Respirable particulate matter (PM<sub>10</sub>) and fine particulate matter (PM<sub>2.5</sub>) represent fractions of particulate matter. PM<sub>10</sub> refers to particulate matter less than 10 microns in diameter and PM<sub>2.5</sub> refers to particulate matter that is 2.5 microns or less in diameter. Major sources of PM<sub>2.5</sub> results primarily from diesel fuel combustion (from motor vehicles, power generation, industrial facilities, etc.), residential fireplaces, and wood stoves. PM<sub>10</sub> include all PM<sub>2.5</sub> sources as well as emissions from dust generated by construction, landfills, and agriculture; wildfires and brush/waste burning, industrial sources, windblown dust from open lands, and atmospheric chemical and photochemical reactions. PM<sub>10</sub> and PM<sub>2.5</sub> are also formed in the atmosphere through reactions of ammonia with nitrogen oxides from motor vehicles and other combustion sources, which produce ammonium nitrate. PM<sub>10</sub> and PM<sub>2.5</sub> pose a greater health risk than larger-size particles, because these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract increasing the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Whereas, larger particles tend to collect in the upper portion of the respiratory system, PM<sub>2.5</sub> are so tiny that they can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility. USEPA recently adopted a new more stringent standard of 35 µg/m<sup>3</sup> for 24-hour exposures, based on a review of the latest new scientific evidence. At the same time, USEPA revoked the annual PM<sub>10</sub> standard due to a lack of scientific evidence correlating long-term exposures of ambient PM<sub>10</sub> with adverse health effects.

## **Toxic Air Contaminants (TAC)**

TACs are a broad class of compounds known to cause morbidity or mortality (usually through cancer) and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., benzene near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to the CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants programs.

CARB reports that air pollution studies have shown an association that diesel exhaust and other cancer-causing toxic air contaminants emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines (diesel particulate matter [DPM]) was found to make up much of that risk. In 1998, CARB formally identified DPM as a TAC. Diesel particulate matter is of particular concern since it can be distributed over large regions, thus leading to widespread public exposure. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. The vast majority of diesel exhaust particles (over 90 percent) consist of PM<sub>2.5</sub>, which are the particles that can be inhaled deep into the lung. Like other particles of this size, a portion will eventually become trapped within the lung possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, the CARB's 1998 action was specific to DPM that accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM emissions 85 percent by 2020. The USEPA and CARB adopted low sulfur diesel fuel standards in 2006 which should reduce diesel particulate matter substantially.

In cooler weather, smoke from residential wood combustion can be a source of TACs. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind; the pollution can persist for many hours. This occurs in sheltered valleys during the winter. Wood smoke also contains a significant amount of PM<sub>10</sub> and PM<sub>2.5</sub>. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

## **Local Air Pollution Sources**

For the most part, air quality is very good in Petaluma. Particulate matter is the primary air pollutant of concern in Petaluma, since nearby air monitoring stations measure levels that exceed the standards each year. Emissions of air pollutants that form ozone are also a concern since many inland parts of the Bay Area measure levels above the standard during each summer. Transport of ozone, or ozone precursor pollutants, from the urban areas located to the south and east combined with emissions of ozone precursors from automobiles in the area is the major cause elevated ozone levels in the area. Automobile uses are the primary source of air pollutant emissions in Petaluma. Residential wood burning and other outdoor burning are sources of air pollutants (primarily particulates and CO) during late fall and winter.

## Existing Air Quality Conditions

The BAAQMD monitors air quality conditions at over 30 locations throughout the Bay Area. The closest monitoring station to Petaluma is located in Santa Rosa on Fifth Street. Criteria pollutants monitored include ozone, carbon monoxide, nitrogen dioxide, PM<sub>10</sub>, and PM<sub>2.5</sub>. The gaseous pollutants (i.e., ozone, carbon monoxide and nitrogen dioxide) are monitored continuously while particulate matter (i.e., PM<sub>10</sub> and PM<sub>2.5</sub>) are measured for 24-hours every sixth day. A summary of the data recorded at this station is shown in Table 4.5-2 for the period 2002 through 2006.

**TABLE 4.5-2**  
**Measured Air Pollutant Concentrations near Petaluma**

Pollutant	Average Time	Measured Air Pollutant Levels (in ppm)				
		2002	2003	2004	2005	2006
<b>Santa Rosa</b>						
Ozone (O <sub>3</sub> )	1-Hour	0.08 ppm	<b>0.10 ppm</b>	0.08 ppm	0.07 ppm	0.08 ppm
	8-Hour	0.06 ppm	<b>0.08 ppm</b>	0.06 ppm	0.05 ppm	0.06 ppm
Carbon Monoxide (CO)	8-Hour	2.1 ppm	1.8 ppm	1.6 ppm	2.0 ppm	1.7 ppm
Nitrogen Dioxide (NO <sub>2</sub> )	1-Hour	0.05 ppm	0.06 ppm	0.05 ppm	0.05 ppm	0.04 ppm
	Annual	0.013ppm	0.012ppm	0.011ppm	0.011 ppm	0.011 ppm
Fine Particulate Matter (PM <sub>2.5</sub> )	24-Hour	51 µg/m <sup>3</sup>	39 µg/m <sup>3</sup>	27 µg/m <sup>3</sup>	34 µg/m <sup>3</sup>	<b>59 µg/m<sup>3</sup></b>
	Annual	11 µg/m <sup>3</sup>	9 µg/m <sup>3</sup>	8 µg/m <sup>3</sup>	8 µg/m <sup>3</sup>	9 µg/m <sup>3</sup>
Respirable Particulate Matter (PM <sub>10</sub> )	24-Hour	<b>60 µg/m<sup>3</sup></b>	36 µg/m <sup>3</sup>	48 µg/m <sup>3</sup>	39 µg/m <sup>3</sup>	<b>90 µg/m<sup>3</sup></b>
	Annual	18 µg/m <sup>3</sup>	17 µg/m <sup>3</sup>	18 µg/m <sup>3</sup>	16 µg/m <sup>3</sup>	19 µg/m <sup>3</sup>

Source: Illingworth & Rodkin 2007

Notes: ppm = parts per million  
Values reported in bold exceed ambient air quality standard.

Except for one day in 2003, there have been no exceedances of the National or State ambient air quality standards for ozone in Santa Rosa. In 2003, there was one day that hourly ozone levels exceeded CAAQS. Measured concentrations of carbon monoxide or nitrogen oxide also did not exceed ambient air quality standards. PM<sub>10</sub> levels were measured above the State standard twice in 2002 and twice in 2006. However, annual averages were below the standards. The new national PM<sub>2.5</sub> standard was exceeded once in 2006. Data from all stations throughout the Bay Area indicate that NAAQS for 1-hour ozone concentrations (recently revoked) was exceeded on 0 to 2 days annually. The 8-hour NAAQS for ozone was exceeded 0 to 12 days annually. The more stringent State ozone standards were exceeded on 7 to 22 days annually. The State PM<sub>10</sub> standard was exceeded on 6 to 15 sampling days annually and the PM<sub>2.5</sub> national standard was exceeded up to 10 days annually.

## **Air Quality Attainment Status**

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The Bay Area as a whole does not meet State or national ambient air quality standards for ground level ozone and State standards for PM<sub>10</sub> and PM<sub>2.5</sub>.

Under the Federal CAA, the USEPA has classified the region as marginally nonattainment for the 8-hour ozone standard. The EPA requires the region to attain the standard by 2007. The Bay Area has met the carbon monoxide standards for over a decade and is classified attainment maintenance by the USEPA. The USEPA grades the region unclassified for all other air pollutants, which include PM<sub>10</sub> and PM<sub>2.5</sub>. Historical data indicates that the North Bay Area meets the current national PM<sub>2.5</sub> standards; however, USEPA will not make attainment rulings until review of a three-year data set collected after the standards went into place in 2006. Attainment designations are anticipated around 2009 or 2010.

At the State level, the Bay Area as a whole is considered serious non-attainment for ground level ozone. Since ozone is a regional air pollutant, resulting from emissions basin-wide, attainment designations apply to the Bay Area as a whole. The Bay Area is also considered non-attainment for PM<sub>10</sub>, which is both a local and regional air pollutant. CARB has not yet designated the area with respect to the State PM<sub>2.5</sub> standard. CAAQS are more stringent than NAAQS. The region is required to adopt plans on a triennial basis that show progress towards meeting the State ozone standard. The area is considered attainment or unclassified for all other pollutants.

## **Greenhouse Gas Emissions and Climate Change**

Climate change is a shift in the average weather patterns observed on earth, which can be measured by such variables as temperature, wind patterns, storms and precipitation. The temperature on earth is regulated by what is commonly known as the “greenhouse effect.” Naturally occurring greenhouse gases in the atmosphere, including carbon dioxide, methane, nitrous oxides, and water vapor, absorb heat from the earth’s surface and radiate it back to the surface.

Human activities result in emissions of four principal greenhouse gases: carbon dioxide, methane, nitrous oxide, and halocarbons. Of all human activities, the burning of fossil fuels is the largest contributor in overall greenhouse gas emissions, releasing carbon dioxide gas into the atmosphere. (IPCC, 2007)

The resulting increases in greenhouse gas emissions from human activities are leading to higher concentrations and a change in composition of the atmosphere. For instance, the concentration of CO<sub>2</sub> in the atmosphere has risen about 30 percent since the late 1800s. Many sources and models indicate that temperatures on earth are currently warming and will continue to warm at unprecedented levels. The global mean surface temperature has increased by 1.1° F since the 19th century (IPCC, 2001), and the 10 warmest years of the last century all occurred within the last 15 years. (IPCC, 2007)

The many effects of Greenhouse Gas Emissions are still being researched and are not fully known, but are expected to include increased temperatures which would: reduce snowpack, a primary source of drinking water; exacerbate air quality problems and adversely impact human health by increasing heat stress and related deaths; increase the incidence of infectious disease, asthma and respiratory health problems; cause sea levels to rise, threatening urban and natural coastlands; increase pests and pathogens; and cause variations in crop quality and yields.

## **State of California**

No current CEQA regulation, statute or judicial decision outlines how CEQA analysis of a project's greenhouse gas emissions impact should be performed. In August 2007, the Senate passed SB 97 requiring the State Office of Planning and Research to prepare and submit guidelines to the State Resources Agency by July 1, 2009 for the analysis and mitigation of greenhouse gas emissions in CEQA documents. The Resources Agency must adopt the regulations by January 1, 2010. It is likely that these prospective Guidelines will provide needed guidance on significance criteria and how to reconcile AB 32, the Global Warming Solutions Act, rollback provisions with CEQA's mandate that CEQA documents are not required to mitigate existing pre-project conditions. Until such time as Guidelines become available, the following analysis is the City's best effort to address this important issue given the current available information.

In California, the majority of human activity greenhouse gas emissions can be broken down into four sectors: transportation, industrial, electrical power, and agriculture/forestry. The largest source is from the transportation sector. (Climate Action Team, 2006)

In 2005, Governor Schwarzenegger issued Executive Order S-02-05, calling for statewide reductions to 2000 levels by 2010, 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. The Executive Order also called for the creation of a state "Climate Action Team", which would report to the Governor every two years on both progress toward meeting the targets and effects of greenhouse gas emissions on the state.

In the Fall of 2006, the Governor signed Assembly Bill 32 (AB32), the "Global Warming Solutions Act of 2006," committing the State of California to reducing greenhouse gas emissions to 1990 levels by 2020. The statute requires the California Air Resources Board (CARB) to track emissions through mandatory reporting, determine what 1990 emissions were, set annual emissions limits that will result in meeting the target, and identify a list of discrete early actions that directly address greenhouse gas emissions, are regulatory, and can be enforced by January 1, 2010.

The initial report of the Climate Action Team was published in March 2006. This report identifies a wide range of recommended measures, of which 11 are currently being implemented and account for a reduction of approximately 68 million metric tons of CO<sub>2</sub>-equivalents (MMTCO<sub>2</sub>E). In June 2007, the CARB approved the *Proposed Early Actions to Mitigate Climate Change in California* (April 20, 2007). In September 2007 CARB published the *Draft Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California*. The two ARB reports combined include 44 measures that are estimated to reduce greenhouse gas emissions by 42 MMTCO<sub>2</sub>E. To achieve the 2020 target, California must reduce its emissions by 177 MMTCO<sub>2</sub>E (CEC, 2006). The remaining reduction needed will come from a Scoping Plan currently available for public review, and adopted no later than January 1, 2009 by CARB.

Some of the measures identified in these documents have a direct relation to emissions at the project level. For example, in 2002 the State of California adopted a goal to achieve 20 percent of retail electricity sales from renewable energy sources by 2017, referred to as the Renewable Portfolio Standard (RPS). In 2003 the goal was accelerated to 2010. The RPS in 2006 was 13.2 percent. Therefore, electricity usage in 2010 would be approximately 7 percent cleaner. In 2005 the California Public Utilities Commission issued a draft final report, *Achieving a 33 Percent Renewable Energy Target*, which found a 33 percent RPS was economically and technologically feasible to achieve by 2020. If this goal is adopted it would further increase the amount of clean



energy used for electricity. Of particular note for the WREP is the Water Use Efficiency strategy identified in the Climate Action Team report of 2006. This strategy focuses on water conservation, developing and maintaining efficient operations, increasing storage for operational flexibility, and increasing energy production from renewable sources as ways of reducing emissions from the conveyance, treatment, distribution, and use of water and wastewater. Other measures in the Climate Action Team report include increasing the efficiency of vehicles and vehicle fuels, planting trees in urban areas, energy efficiency programs, and implementing Smart Land Use and Intelligent Transportation policies and programs.

### ***City of Petaluma***

On August 5, 2002, the City Council adopted Resolution 2002-117 committing to participate in the Cities for Climate Protection. By doing so the City committed to:

- Taking a leadership role in promoting public awareness about the causes and impacts of Greenhouse Gas Emissions.
- Undertaking the Cities for Climate Protection program's five milestones to reduce greenhouse gas and air pollution emissions throughout the community by:
  1. Conducting a greenhouse gas emissions inventory and forecast to determine the source and quantity of GHG emissions.
  2. Establishing a greenhouse gas emissions reduction target.
  3. Developing an action plan with both existing and future actions to meet the greenhouse gas reduction target.
  4. Implementing the action plan.
  5. Monitoring to review progress.

In 2005 the City completed steps 1 and 2. The City's municipal greenhouse gas emissions were reported as 4,700 tons for year 2000. On July 18, 2005 the City passed Resolution 2005-118, "Resolution to Establish GHG Emission Reduction Target(s) for the City of Petaluma". Resolution 2005-118 established a greenhouse gas emissions reduction target of 20% below 2000 levels by 2010 for municipal operations and 25% below 1990 levels for community emissions. The City is currently working on Step 3, development of the action plan for municipal emissions.

Since 2005 the City has implemented, or is in the process of implementing, many programs to reach the municipal operations goal. These include: a major lighting retrofit at City Hall, the Police Department and the Lucchesi Community Center; replacement of four traditional fuel fleet vehicles with one zero emission electric vehicle and three hybrid vehicles; retrofit of nine "off-road" vehicles (dump trucks, vacuum trucks, etc) to comply with the California Air Resources Board lower vehicle emission regulations; replacement of 99 percent of the incandescent traffic lights with LED lights; and replacement of three of nine 1989 diesel buses with four, 2007 Gillig models, which are equipped with clean burning diesel engines that meet the 2010 CARB regulations. As standard procedure, the Public Works Maintenance & Operations staff replaces older lighting fixtures with energy efficient units, as the original fixtures burn out.

## GOALS, OBJECTIVES, AND POLICIES

Table 4.5-3 identifies air quality related goals, objectives, and policies. The table also indicates which criteria in the Air Quality Section are responsive to each set of policies.

**TABLE 4.5-3**  
**Goals, Objectives, and Policies – Air Quality**

Adopted Plan Document	Document Section	Document Numeric Reference	Policy	Relevant Evaluation Criteria <sup>1</sup>
Petaluma General Plan 2025	The Natural Environment	Policy 4-P-15-A	Continue to work with the Bay Area Air Quality Management District to achieve emissions reductions for non attainment pollutants; including carbon monoxide, ozone, and PM-10, by implementation of air pollution control measures as required by State and federal statutes. <i>The BAAQMD's CEQA Guidelines should be used as the foundation for the City's review of air quality impacts under CEQA.</i>	1
Petaluma General Plan 2025	The Natural Environment	Policy 4-P-15-B	Continue to use Petaluma's development review process and the CEQA regulations to evaluate and mitigate the local and cumulative effects of new development on air quality.	1-6
Petaluma General Plan 2025	The Natural Environment	Policy 4-P-15-C	Continue to require development projects to abide by the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines. <i>These measures would reduce exhaust and particulate emissions from construction and grading activities.</i>	1,3,5
Petaluma General Plan 2025	The Natural Environment	Policy 4-P-16	To reduce combustion emissions during construction and demolition phases, the contractor of future individual projects shall encourage the inclusion in construction contracts of the following requirements or measures [	1,3,5
Petaluma General Plan 2025	The Natural Environment	Goal 4-G-6	Reduce the contribution to greenhouse gases from existing sources and minimize the contribution of greenhouse gases from new construction and sources.	6

**TABLE 4.5-3**  
**Goals, Objectives, and Policies – Air Quality**

Adopted Plan Document	Document Section	Document Numeric Reference	Policy	Relevant Evaluation Criteria <sup>1</sup>
Petaluma General Plan 2025	The Natural Environment	Policy 4-P-6	Improve air quality through required planting of trees along streets and within park and urban separators, and retaining tree and plant resources along the river and creek corridors.	6
Sonoma County General Plan	Resources Conservation Element	Goal RC-13 Objective RC-13.1 Policy RC-13d Policy RC-13f	Preserve and maintain the projected county air quality and minimize air pollution	1-4

Source: Petaluma 2025, Sonoma County 1989.

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

The evaluation criteria presented in Table 4.5-4 have been developed according to Environmental Checklist Form contained in Appendix G of the CEQA Guidelines and the Bay Area Air Quality Management District CEQA Guidelines.

**TABLE 4.5-4**  
**Evaluation Criteria with Threshold of Significance – Air Quality**

Evaluation Criteria	As Measured by	Threshold of Significance	Justification
1. Will construction of the WREP generate emissions that expose people to high levels of dust and equipment exhaust?	Size of construction area, duration of construction, and proximity of receptors.	Application of appropriate mitigation measures recommended by BAAQMD.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pgs. 13-15) Petaluma General Plan 2025
2. Will the WREP emissions cumulatively exceed allowable limits?	Emissions of Reactive Organic Compounds, Nitrogen Oxides, Sulfur Dioxide, and particulates.	Greater than 80 pounds/day for each pollutant.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 16) Petaluma General Plan 2025
3. Will the WREP expose sensitive receptors to substantial levels of toxic air contaminants?	Emissions of toxic air contaminants.	Probability of contracting cancer at receptor exceeds 10 in one million or causes non cancerous health effects.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 18) Petaluma General Plan 2025

**TABLE 4.5-4**  
**Evaluation Criteria with Threshold of Significance – Air Quality**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
4. Will the WREP violate or contribute to violation of ambient air quality standards?	Carbon monoxide emissions and traffic impacts.	1) Daily carbon monoxide emissions greater than 550 pounds, 2) Substantial traffic impacts at intersections operating at Level of Service D, E, or F now and in the future, and 3) 10% increase in traffic on nearby arterial roadways.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 16-18) Petaluma General Plan 2025
5. Will the WREP cause odor impacts?	Number of Complaints.	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints per year averaged over 3 years.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 16-18) Petaluma General Plan 2025
6. Will the WREP increase greenhouse gas emissions levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?	Increase of equivalent carbon dioxide (eCO <sup>2</sup> ) emissions over pre-project levels.	Substantial increase.	Petaluma General Plan 2025 EIR

Source: Illingworth & Rodkin 2007

## IMPACTS AND MITIGATION MEASURES

**Impact:** **AQ-1: Will construction of the WREP generate emissions that expose people to high levels of dust and equipment exhaust?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Near-term improvements include construction of a tertiary storage tank, its associated facilities, as well as several miles of new pipelines. Construction activities associated with these improvements would result in local and regional impacts to air quality.

Construction of the new facilities would result in the generation of dust. A portion of this dust would contain PM<sub>10</sub>, which is a criteria air pollutant regulated at both the federal and state levels. Diesel particulate matter emitted by construction equipment and trucks is a toxic air contaminant that could affect local land uses. Equipment operation and trucks

also emit nitrogen oxides during construction that could contribute to regional ozone levels.

Storage tank construction would require excavation of approximately 19,000 cubic yards of material from the hillside and import of approximately 4,000 cubic yards. The area of disturbance is estimated at about five acres. During these construction activities, dust would be generated. Most of the dust would result during excavation and import of soils. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed, amount of activity, soil conditions and meteorological conditions. Typical winds during late spring through summer are from the west-northwest. Nearby residences could be adversely affected by dust generated during construction activities. The closest sensitive receptors (i.e., residences) are located several hundred feet from this site. Without proper controls, substantial dust could be emitted from this activity due to extensive ground disturbance and import of fill material.

Pipeline construction, along with modifications to utilities and the existing roads, would result in ground disturbances that would also generate dust and equipment exhaust. These activities would be localized and short-term. Typically, trenches would be dug to place the new pipes and then back filled and finished. This type of activity would be temporary, with much of the primary activity lasting a few workdays in any one place.

Although demolition, grading and construction activities would be temporary, they would have the potential to cause both nuisance and health air quality impacts.  $PM_{10}$  is the pollutant of greatest concern associated with dust. If uncontrolled,  $PM_{10}$  levels downwind of actively disturbed areas could possibly exceed State standards. The dust control measures listed in Project Measure PD-20, Air Quality Protection, would control dust generated by demolition, grading and construction activities. The air quality impacts would be less than significant with implementation of the required dust control measures which are designed to reduce dust and exhaust impacts.

#### *Program-Level Improvements –Less than Significant*

Program-level improvements would include an open reservoir, pipelines, and construction of one pump station.

Construction activities would be similar to those described above for the near-term improvements. Construction of the reservoir would result in the greatest construction period impacts as numerous pieces of construction equipment would be used for extended periods. If uncontrolled, emissions of dust or  $PM_{10}$  could be substantial from this earthwork. Construction of the pipelines and pump station would result in local impacts that would be very short in duration. However, those projects could also result in significant short-term air quality impacts if not properly controlled.

Implementation of the measures recommended by the BAAQMD and listed in Project Measure PD-20 Air Quality Protection, would reduce the air quality impacts associated with grading and new construction to a less- than-significant level. Measures to reduce diesel particulate matter and  $PM_{2.5}$  from construction are also included in PD-20 to ensure that short-term health impacts to nearby sensitive receptors are avoided.

Mitigation: No mitigation is necessary.

**Impact: AQ-2: Will the WREP emissions cumulatively exceed allowable limits?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Less than Significant*

Long-term operation of the storage tank, and its associated facilities, would result in minor air pollutant emissions associated with the few daily vehicle trips. There may be minor emissions associated with maintenance activities, but these emissions would have a less-than-significant impact on emissions.

*Program-Level Improvements – Less than Significant*

Long-term operation of the program-level improvements is not anticipated to result in substantial emissions. Similar to the operation of the near-term improvements, there may be some minor emissions associated with routine maintenance. Operation of the pump station may involve some small combustion equipment. For example, emergency generators that are powered by diesel fuel may be used. However, detailed plans that depict these types of sources are not available. Any diesel-powered generators that are rated 50 horsepower or greater would be subject to BAAQMD permit requirements. Sources of air pollutant emissions complying with all applicable BAAQMD regulations generally would not be considered to have a significant air quality impact. Stationary sources that are exempt from BAAQMD permit requirements because they fall below emission thresholds for permitting would not be considered to have a significant air quality impact. Operation of the pipelines would not result in any air pollutant emissions.

Mitigation: No mitigation is necessary.

**Impact: AQ-3: Will the WREP expose sensitive receptors to substantial levels of toxic air contaminants?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Less than Significant*

Construction of the near-term improvements would create emissions of criteria air contaminants, including toxic air contaminants as a component of ROG emissions. However, the City has agreed to implement Measure PD-20 Air Quality Protection, as part of the project description, thereby decreasing effects to less than significant.

Operation of the project is not expected to result in emissions of toxic air contaminants. Minor emissions could occur during maintenance activities, but would not be considered significant.

*Program-Level Improvements – Less than Significant*

Construction of the program-level improvements would create emissions of criteria air contaminants, including toxic air contaminants as a component of ROG emissions. However, the City has agreed to implement Measure PD-20 Air Quality Protection, as part of the project description, thereby decreasing effects to less than significant.

Operation of the program-level improvements is not expected to result in emissions of toxic air contaminants. Minor emissions could occur during maintenance activities, but would not be considered significant. Any combustion equipment, such as backup generators that could emit toxic air contaminants would be subject to BAAQMD permit requirements and CARB emission limitations. However, these types of sources have not

been identified for the project. Operation of the pipelines would not result in any air pollutant emissions.

Mitigation: No mitigation is necessary.

**Impact: AQ-4: Will the WREP violate or contribute to violation of ambient air quality standards?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Less than Significant*

Operation of the project would not affect air pollutant levels, since daily emissions, from infrequent maintenance activities, would be quite small.

*Program-Level Improvements: Pipelines and Irrigation – No Impact; Pump Station and Open Reservoir – Less than Significant*

The pipelines and application of recycled water would not create emissions. Operation of the project would not affect air pollutant levels, since daily emissions associated with maintenance activities would be quite small (i.e., few daily vehicle trips per day).

Mitigation: No mitigation is necessary.

**Impact: AQ-5: Will the WREP cause potential odors?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Less than Significant*

During construction the various diesel powered vehicles and equipment in use on the site could create localized odors. These odors would be temporary and not likely to be noticeable for extended periods of time much beyond the project's site boundaries due to atmospheric dissipation. Long-term operation of the project is not expected to produce odors.

*Program-Level Improvements: Use of Recycled Water – No Impact; Pipelines, Pump Station and Open Reservoir – Less than Significant*

Operation of pipelines and application of recycled water would not cause odors. During construction the various diesel powered vehicles and equipment in use on the site could create localized odors. These odors would be temporary and not likely to be noticeable for extended periods of time much beyond the project's site boundaries due to atmospheric dissipation. Long-term operation of the project is not expected to produce odors, as has been demonstrated with the operation of the existing system. Therefore, this impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact:** **AQ-6: Will the WREP increase greenhouse gas emissions levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements – Less than Significant*

Implementation of the WREP will require energy, mostly from existing pumping facilities, for the distribution of recycled water. However it is not anticipated that implementation of the WREP will cause a substantial increase in greenhouse gas emissions. The source of the recycled water is from the Ellis Creek WRF, located along Lakeville Highway in Petaluma. The tertiary recycled water will replace, on the most part, existing uses of potable water within the City such as at playing fields and parks. A majority of the potable water that serves the City is delivered by the Sonoma County Water Agency from the Rainey collectors along the Russian River (approximately 15 straight-line miles from the City of Petaluma). More energy would be required to lift and convey water to customers from the Rainey collectors than from the Ellis Creek WRF. When looking at distribution of recycled water from the Ellis Creek WRF, without taking into consideration energy saved from potable off-set, energy use increases by approximately 12 percent from 2005 to 2025 (Petaluma, 2007). In 2005 energy use associated with the distribution of recycled water was 1,718,750 kWh per year. Energy use in 2025 is estimated to be 1,943,750 kWh per year (Dodson-Psomas, 2006). Given General Plan 2025 Policy 4-P-13 which requires the City to periodically evaluate pumping facilities to identify measures to improve efficiency, the potential exists for the 2025 energy estimates to be lower. This is in compliance with the State's Water Use Efficiency strategy discussed in the Setting section above. In addition, the State has strategies in place to increase the amount of green, renewable energy that enters the grid from the current 13% to 30% by 2020. Therefore, greenhouse gas emissions for the project would not increase at the same rate as energy, and may in fact go down. Taking into account all these considerations, including expected energy savings from potable water offset because of more energy required to transmit SCWA potable water, it is not anticipated that the project would result in a substantial increase in greenhouse gases and would not conflict with AB 32. Therefore, this impact is considered less than significant.

The one new pump station that would be built as part of the project, and would replace an existing pump station, would deliver recycled water to the Petaluma Golf and Country Club. Currently potable water is delivered to the golf course via a 10 hp pump station that uses approximately 37,000 kwh per year (Simmons 2007). The new pump station would be 7.5 hp and use approximately 29,000 kwh per year (Hunt 2007). Therefore, there would be a reduction in energy use and therefore a reduction in greenhouse gas emissions. No other significant sources of energy would be necessary to implement the WREP.

**Mitigation:** No mitigation is necessary.



## CUMULATIVE IMPACTS

**Impact:** **AQ-C1 – C5: Will the WREP plus cumulative projects create impacts to air quality based on evaluation criteria 1 through 6?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements - Less than Significant*

Under the BAAQMD CEQA Guidelines, projects that individually have a significant air quality impact would be considered to have a cumulative impact to air quality. For projects that do not individually have a significant impact to air quality, the determination of a significant cumulative impact is based on the consistency of the project with the local General Plan and the Bay Area Clean Air Plan (i.e., 2005 Bay Area Ozone Strategy). With construction period mitigation measures, the project is not anticipated to have a significant air quality impact. The project is not anticipated to induce any more growth in population than assumed in the latest planning assumptions. Construction of any future stationary air pollutant sources (i.e., emergency standby generators) would be subject to all applicable air quality rules and regulations. As a result, the project is not expected to conflict or obstruct the implementation of local and regional air quality planning efforts.

**Mitigation:** No mitigation is necessary.

**Impact:** **AQ-C6: Will the WREP plus cumulative projects substantially increase greenhouse gas emissions levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements - Significant*

Implementation of the WREP would support implementation of the General Plan 2025. Implementation of the WREP was included in the cumulative analysis of greenhouse gas emissions in the Petaluma General Plan 2025 Air Quality – Greenhouse Gas Emissions Section Revised Draft EIR (2007), part of the City's certified General Plan 2025 EIR (2008). On April 7, 2008, the Petaluma City Council certified the EIR for the Petaluma General Plan 2025, which included the WREP in its cumulative analysis of greenhouse gases. Pursuant to 14 California Code of Regulations ("CEQA Guidelines") §§15162 and/or 15183, unless new and more severe significant impacts peculiar to the WREP or to the site(s) on which the WREP will be constructed are identified in this environmental study, the cumulative analysis in the EIR for the General Plan 2025 is adequate and relied on for an evaluation of cumulative greenhouse gas emissions and climate change impacts from the WREP.

The General Plan 2025 EIR found that estimated 2025 greenhouse gas emissions would be 8% below pre-project conditions with implementation of both the General Plan 2025 greenhouse gas reduction policies and State reduction strategies. However, despite the City's best efforts to identify probable greenhouse gas reductions from State measures and General Plan policies and programs, not all the State reduction measures have been formally adopted at this time. In addition, there is a substantial level of uncertainty about their effectiveness and how they will apply to local governments, and about the impact on global climate change of local, regional and State measures. Therefore, in the General

Plan 2025 EIR it could not be determined to a reasonable degree of certainty that buildout under the General Plan would not result in a cumulatively considerable contribution to the significant cumulative impact of global climate change. This impact is therefore considered significant; at least until regulatory thresholds of significance are established and/or further regulatory CEQA guidance is provided.

Mitigation: The Mitigation Measures assigned to Impact 3.10-6 in the General Plan 2025 EIR shall apply to the Project to the extent they are applicable and feasible. These measures include, but are not limited to, 4-P-13A Periodically evaluate the efficiency of potable and sewer pumping facilities and identify measures to improve pumping facilities, 4-P-13B Investigate and implement alternative sources of renewable power to supply City facilities, and 4-P-14 Encourage use and development of renewable or nontraditional sources of energy. For reasons described at length in the General Plan 2025 EIR, mitigation is considered insufficient to reduce the project's cumulative impacts to less-than-significant levels, and, therefore, the impact remains significant and unavoidable.

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## 4.6 NOISE

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This section identifies potential impacts related to noise including impacts due to demolition, construction, and operational activities associated with the project.

### SETTING

#### Fundamentals of Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Decibels and other technical terms are defined in Table 4.6-1.

Most of the sounds that we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a filter that reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range. This is called "A" weighting and the decibel level so measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and in industry are shown in Table 4.6-2 for different types of noise.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources that create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors – L01, L10, L50, and L90 – are commonly used. They are the A-weighted noise levels equaled or exceeded during 1% (L01), 10% (L10), 50% (L50), and 90% (L90) of a stated time period. A single number descriptor called the Leq is also widely used. The Leq is the average A-weighted noise level during a stated period of time.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, Ldn or DNL (day/night average sound level), was developed. The Ldn divides the 24-hour day into the daytime of 7:00 AM to 10:00 PM and the nighttime of 10:00 PM to 7:00 AM. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Community Noise Equivalent Level (CNEL) is another 24-hour average that includes both an evening and nighttime weighting.

**TABLE 4.6-1**  
**Definitions of Acoustical Terms**

<b>Term</b>	<b>Definitions</b>
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
L01, L10, L50, L90	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 PM to 10:00 PM and after addition of 10 decibels to sound levels in the night between 10:00 PM and 7:00 am.
Day/Night Noise Level, Ldn	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 PM and 7:00 am.
Lmax, Lmin	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

**TABLE 4.6-2**  
**Typical Sound Levels Measured in the Environment and Industry**

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Pile Driver (50')	100		Very Loud
Ambulance Siren (100')			
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80	In Kitchen With Garbage Disposal Running	
Freeway (100')			
	70		Moderately Loud
Vacuum Cleaner (10')	60	Data Processing Center	
		Department Store	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')			
	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		
	0		Threshold of Hearing

Source: Illingworth & Rodkin

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA has been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA Ldn. Typically, the highest steady traffic noise level during the daytime is about equal to the Ldn and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA Ldn with open windows and 65 to 70 dBA Ldn if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an

acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

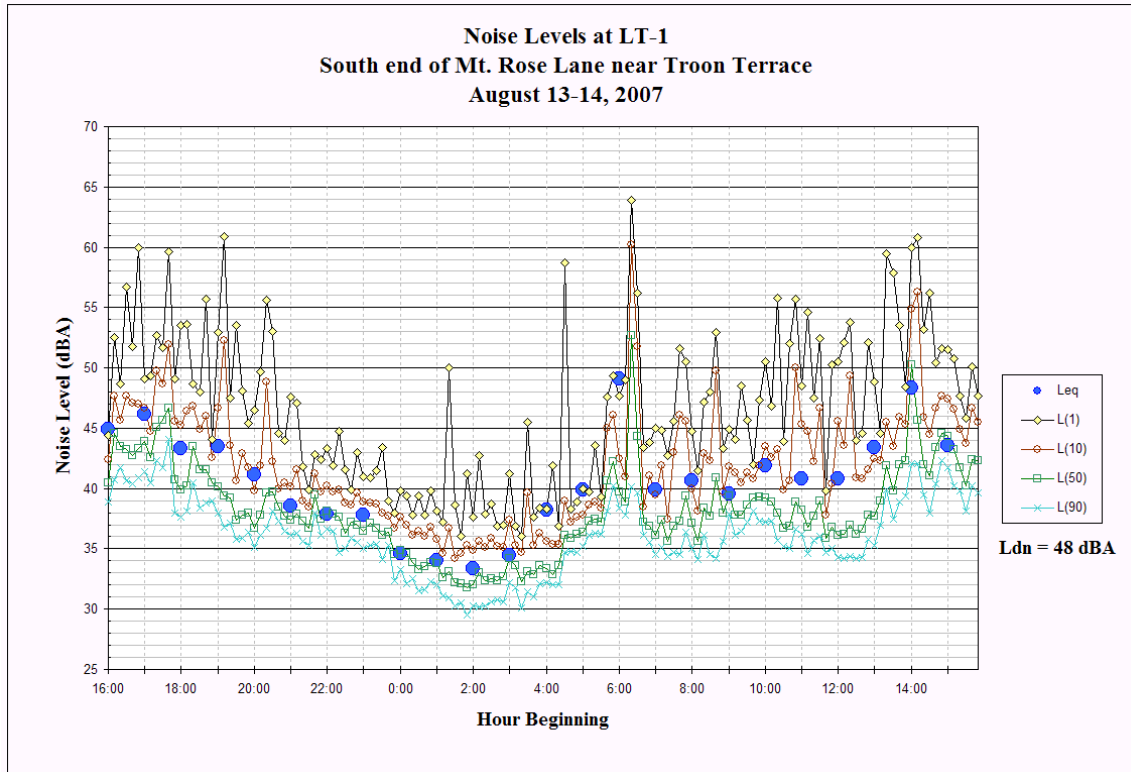
Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The Ldn as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA Ldn. At an Ldn of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the Ldn increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an Ldn of 60 to 70 dBA. Between an Ldn of 70 to 80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed.

### **Existing Noise Environment**

The noise environment in and around the City of Petaluma varies depending on the noise sources present near proposed development sites. The existing ambient noise environment in the study area is primarily comprised of transportation noise sources including Highway 101, arterial roadways including Adobe Road, Lakeville Highway, and East Washington Street, local collector streets, and aircraft flyovers.

The pump station is the only component of WREP that would produce a lasting noise impact. A noise monitoring survey quantified existing ambient noise conditions near residential receivers in the vicinity of the proposed Petaluma Country Club Pump Station. Since the specific location of the pump station has not been determined, noise measurements were made near a site representative of the quietest residential areas in vicinity of Petaluma Country Club. The specific location of this noise measurement was at the south end of Mt. Rose Lane near Troon Terrace. Ambient noise levels at this location were primarily the result of vehicle traffic along Mt. Rose Lane, aircraft overflights, and distant, low-level traffic noise generated by Highway 101. The results of the long-term noise measurement are depicted in Figure 4.6-1. Data presented on this figure includes the hourly average noise level (Leq) and statistical noise descriptors representing the noise level exceeded 1-, 10-, 50-, and 90 percent of the time (L01, L10, L50, L90). The figure depicts the hourly distribution of noise levels over a 24-hour period. Ambient noise levels during the daytime varied from about 40 dBA Leq to 48 dBA Leq. At night, ambient noise levels ranged from 33 dBA Leq to 49 dBA Leq. The day-night average noise level was 48 dBA Ldn.

**Figure 4.6-1**



**Regulatory Background**

The State of California, Sonoma County, and the City of Petaluma have developed guidelines for evaluating land-use compatibility for different levels of noise. Following is a summary of the relevant portions of these guidelines:

***State of California Guidelines***

The California Environmental Quality Act (CEQA) has established guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. CEQA asks the following questions relevant to this project:

Would the project result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?



### **City of Petaluma General Plan Guidelines and Noise Regulations**

The City of Petaluma's land use planning policies and guidelines regarding noise are set forth in Chapter 10, "Health and Safety" of the General Plan (City of Petaluma 2025). The objective of the Noise Element of this document is to minimize the amount of noise created by future development and the overall noise exposure within the City. Policies in the Noise Element that would regulate implementation of the project are as follows:

- Policy 10-P-3-D: Continue to require control of noise or mitigation measures for any noise-emitting construction equipment or activity. *The City's Noise Ordinance establishes controls on construction-related noise.*
- Policy 10-P-3-G: In making a determination of impact under CEQA, consider an increase of four or more dBA to be "significant" if the resulting noise level would exceed that described as normally acceptable for the affected land use in Figure 10-3 [of General Plan 2025] Land Use Compatibility for Community Noise Environments.
- Require sound buffers (particularly landscaped buffers), open space, or other mitigation measures between residential areas and areas producing higher noise levels, such as freeways, commercial sites, and industrial developments to achieve the sound level reduction necessary to produce noise-compatible land uses.

The City of Petaluma Zoning Ordinance specifically prohibits construction activity between the hours of 10:00 PM and 7:00 AM Monday through Friday, and between 10:00 PM and 9:00 AM on Saturdays, Sundays, and State, Federal, or local holidays. The Zoning Ordinance also restricts maximum permissible noise generated by stationary noise sources to be 60 dBA Leq or less at the property line of the receiving use.

### **Sonoma County**

The Noise Element of the Sonoma County General Plan contains a goal (Goal NE-1): "to protect people from the harmful effects of exposure to excessive noise and to achieve an environment in which people and land uses may function without impairment from noise." Noise level performance standards in Table 4.6-3 are to be applied as performance standards for noise producing land uses which may affect noise sensitive land uses and vice versa. These standards also apply to other sensitive receptors such as schools, hospitals, rest homes, and long-term medical or mental care facilities. Recently, the Planning Commission has prepared guidelines to address some technical problems with the original standards (Sonoma County 2005). Sonoma County does not have a Noise Ordinance to regulate intermittent activities, but often implements these planning guidelines for discretionary projects to regulate noise-producing uses. The Noise Element of the County's General Plan includes the following policy (Policy NE-1c):

- Control non-transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table 4.6-3 as measured at the exterior property line of any affected residential land use. Limit exceptions to the following:
  - If the ambient noise level exceeds the standards in Table 4.6-3, adjust the standards to equal the ambient level.

- Reduce the applicable standards in Table 4.6-3 by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.
- Reduce the applicable standards in Table 4.6-3 by 5 decibels if they exceed the ambient level by 10 or more decibels.

**TABLE 4.6-3**  
**Maximum Allowable Exterior Noise Exposures for Non-transportation Noise Sources**  
**(Table NE-2)**

Hourly Noise Metric <sup>1</sup>	Maximum Exterior Noise Level Standards, dBA	
	Daytime 7 AM to 10 PM	Nighttime 10 PM to 7 AM
L50 (30 Minutes)	50	45
L25 (15 Minutes)	55	50
L08 (5 Minutes)	60	55
L02 (1 Minute)	65	60

Source: County of Sonoma, Sonoma County General Plan Noise Element, 1989 revised 1991

Notes:

<sup>1</sup> The sound level exceeded n% of the time in any hour. For example, the L50 is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L02 is the sound level exceeded 1 minute in any hour.

**Construction Noise Limits**

Quantitative noise limits for construction are not established in local General Plans or Municipal Codes. The State’s Office of Noise Control Model Community Noise Control Ordinance includes suggested noise limits for construction activities. Table 4.6-4 presents the construction noise limits recommended by the State’s Office of Noise Control, which will be used as evaluation criteria in the construction noise analysis.

**TABLE 4.6-4**  
**Maximum Noise Limits for Construction and Stationary Equipment, Leq**

Time	Single-Family Residential	Multi-Family Residential	Mixed-Residential & Commercial
Daily, except Sundays and Legal Holidays, 7 AM to 7 PM	60 dBA	65 dBA	70 dBA
Daily, 7 PM to 7 AM and all day Sunday and Legal Holidays	50 dBA	55 dBA	60 dBA

Source: California Department of Health, Office of Noise Control, Model Community Noise Control Ordinance, 1977

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

The State, County and City criteria presented in the preceding section and listed below have been used to develop noise impact evaluation criteria to determine the threshold of significance of the project’s noise impacts on area land uses. These criteria are presented in Table 4.6-5, below.

**TABLE 4.6-5**  
**Evaluation Criteria with Threshold of Significance - Noise**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
1. Will construction of the WREP generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Projected noise levels as measured at the receiving land use based on applicable state or local regulation.	Uncontrolled construction noise greater than 60 dBA Leq daytime, 55 dBA Leq nighttime.	CEQA Guidelines Appendix G, Checklist Item XI (a) California Department of Health, Office of Noise Control Model Community Noise Ordinance City of Petaluma Noise Ordinance Petaluma General Plan 2025
2. Will construction of the WREP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?	Projected noise levels at the receiving land use with the construction activities compared to existing ambient noise levels.	Greater than 60 dBA Leq and increase ambient noise environment by 5 dBA Leq or more during daytime for a period of more than one year (one construction season).	CEQA Guidelines Appendix G, Checklist Item XI (d) Historical precedent based upon community annoyance studies. City of Petaluma Noise Ordinance Petaluma General Plan 2025
3. Will operation of the WREP generate noise levels exceeding local regulatory criteria or cause a substantial permanent increase in ambient noise levels above existing levels in the vicinity?	Projected noise levels as measured at the receiving land use based on applicable state or local regulation or, Projected noise levels at receiving land uses with the project compared to ambient noise levels.	Increase long-term noise levels as follows: 1) Greater than 5 dBA Ldn increase and remaining below “normally acceptable” noise level for affected use, or 2) Greater than 3 dBA Ldn increase exceeding the “normally acceptable” level for the affected use.	CEQA Guidelines Appendix G, Checklist Item XI (a) Noise Element of the General Plans of Sonoma County and the City of Petaluma City of Petaluma Zoning Ordinance CEQA Guidelines Appendix G, Checklist Item XI (c) Historical precedent based upon community annoyance studies. City of Petaluma Noise Ordinance Petaluma General Plan 2025

Source: Illingworth & Rodkin 2007, Petaluma General Plan 2025

## METHODOLOGY

This noise analysis presents noise levels that could result from the construction and operation of the project. Components of the project are located in different jurisdictions and are subject to the applicable regulations, standards, and policies of each applicable local jurisdiction. The significance of the noise impacts from each component is assessed against the applicable evaluation criteria identified in Table 4.6-5.

Noise levels associated with a particular component are determined by identifying the individual noise sources that make up the component, adding them together, and then calculating the effect of distance between the source and the receptor. In addition to distance, there are other factors that provide additional attenuation (reduction) in noise levels, including molecular absorption by the atmosphere, other atmospheric effects such as wind and temperature profiles, ground effects, and barriers. In this analysis, only distance is assumed in the calculation of noise attenuation. Calculated noise levels presented in this analysis represent a credible worst-case scenario.

### Construction Noise

Noise levels within and adjacent to the construction areas would increase during the construction period. Construction noise would be temporary and during daytime hours only. Noise impacts from project construction activities are a function of the level of noise generated by individual pieces of construction equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities.

Construction noise would primarily consist of the operation of vehicles and equipment during site preparation and clearing, excavation, earthmoving, foundation preparation, facility construction, and finish work. Representative sound levels for the most common types of construction equipment and usage factors, contained in FHWA's Roadway Construction Noise Model, were used to calculate noise levels during various stages of construction. The usage factors represent the percentage of time that the equipment would be operating at full power. Table 4.6-6 provides the noise data and usage factors assumed in the calculations of construction noise levels.

Noise impacts resulting from construction activities are assessed with respect to the State Model Noise Ordinance construction noise limits. Construction is planned during daytime hours only. Noise levels that would exceed 60 dBA Leq and the ambient noise environment by 5 dBA Leq or more at nearby receptors for more than one construction season would cause a significant impact. The cumulative noise level would assume all pieces of construction equipment were operating simultaneously at the site and represent a conservative worst-case prediction of site construction noise levels during each construction phase.

### Operational and Maintenance Noise

The proposed pumping station is a potential source of operational and maintenance noise. Noise generated by the Petaluma Country Club pump station was calculated based on noise data of similar pumping stations contained in Illingworth & Rodkin, Inc. files. Average noise levels for the proposed equipment were calculated at a reference distance of 100 feet assuming no acoustical shielding (e.g., noise barrier, pump house, etc.). A noise performance standard was established based on ambient noise data. The performance standard allows the project to avoid operational impacts by limiting noise levels below local regulatory standards. The performance standard also was selected to avoid substantially increasing noise levels during noise-sensitive nighttime hours.

TABLE 4.6-6

CA/T Noise Emission Reference Levels and Usage Factors					
filename: EQUIPLST.xls					
revised: 7/26/05		Acoustical	Spec 721.560	Actual Measured	No. of Actual
Equipment Description	Impact Device ?	Use Factor (%)	Lmax @ 50ft (dBA, slow)	Lmax @ 50ft (dBA, slow)	Data Samples (Count)
				(samples averaged)	
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-- N/A --	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-- N/A --	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-- N/A --	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

## IMPACTS AND MITIGATION MEASURES

**Impact:** NOI-1: Will construction of the WREP generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

**Analysis:** *Project-Level Near-Term Conveyance Improvements - Less than Significant*

Construction for the near-term improvements is scheduled to begin in 2009 and be complete in 2010. Table 4.6-7 presents the construction phase noise levels resulting from the construction of near-term improvements. Construction of the storage tank is calculated to generate a noise level of 87 dBA Leq at a distance of 50 feet assuming the operation of all equipment simultaneously. Construction activities would generate noise levels greater than 60 dBA Leq at receptors located within about 1,120 feet of the construction site. The nearest off-site receptors, approximately 2,000 feet away from the storage tank site, would be exposed to construction noise levels of about 55 dBA Leq. Noise generated by the construction of the storage tank would not result in a significant noise impact because construction noise levels would not exceed 60 dBA Leq at the nearest receivers.

**TABLE 4.6-7**  
**Estimated Construction Noise Levels**

Construction Phase	Leq Noise Level (dBA) at 50 feet from Construction Site	Distance to 60 dBA Leq Noise Contour (feet)
Tank Construction	87	1,120
Pipeline Installation	86	1,000

Source: Illingworth and Rodkin, 2007

The installation of pipelines would result in noise levels of approximately 86 dBA Leq at a distance of 50 feet. Pipeline construction activities are calculated to generate noise levels greater than 60 dBA Leq at receptors located within about 1,000 feet of the proposed pipeline alignment along Ielmorini Road and along East Washington Street between Parkland Drive and Adobe Road. The nearest receptors to the pipeline alignment along Ielmorini Road are located approximately 300 feet away. These receptors would be exposed to construction noise levels of about 70 dBA Leq when construction occurs at its closest point. The nearest receptors to the pipeline alignment along East Washington Street are located approximately 50 feet away; noise levels are calculated to be 86 dBA at this distance. Pipeline installation would occur at a rate of approximately 100 feet or more per day. Therefore, construction noise levels would only exceed 60 dBA Leq for about 10 days at any individual receiver. In addition, as part of the project, PD-19, Construction Noise Control, would be implemented. This measure includes use of noise muffling equipment, inspection of equipment to ensure they function properly, and identification and avoidance of sensitive receptors were feasible. Therefore, this is considered a less than significant impact.

*Program-Level Improvements – Less than Significant*

As described under the near-term improvements, the installation of pipelines would generate noise levels of about 86 dBA Leq at a distance of 50 feet. Pipelines would be installed at a rate of approximately 100 feet or more per day. Therefore, construction noise levels would only exceed 60 dBA Leq for about 10 days at any individual receiver along the program-level improvement pipeline alignment. This would be a less than significant noise impact given the short duration of pipeline construction activities.

An open reservoir would be constructed north of the intersection of Stage Gulch Road and Lakeville Highway at an elevation of about 300 and 400 feet. The construction duration is unknown at this time.

Construction of the reservoir is calculated to generate noise levels ranging from 86 to 91 dBA Leq at a distance of 50 feet, and noise levels would exceed 60 dBA Leq and the ambient noise environment by 5 dBA Leq or more at receptors located within about 1,770 feet of the construction site. The nearest receptors are approximately 500 to 1,000 feet away from the potential reservoir site, would be exposed to construction noise levels ranging of about 65 to 71 dBA Leq assuming the attenuation provided by distance. Noise generated by the construction of the storage reservoir could generate construction noise levels exceeding 60 dBA Leq, and the ambient noise environment by 5 dBA Leq or more, at the nearest receivers for an undetermined period of time.

Given the topography of the reservoir site area, it is anticipated that the reservoir would be located in a valley and separated from nearby residences by intervening terrain. An additional 5 to 10 dBA of noise reduction would be expected if receivers would not have direct line of sight to construction activities. If fully shielded from view, noise generated by the construction of the storage reservoir would likely be less than 60 dBA Leq at the nearest receivers.

Program level improvements would also include the construction a new pump station in the general vicinity of the Petaluma Golf and Country Club. The pump station would require up to 0.5 acre and likely be housed within a structure that blends with the surrounding neighborhood or have other screening features.

Construction noise levels reaching 84 dBA Leq would be expected at a distance of 50 feet from the pump station site. Construction noise levels would exceed 60 dBA Leq and the ambient noise environment by 5 dBA Leq or more at receptors located within about 800 feet of the construction site.

As part of the project, Measure PD-19 would be implemented. This measure includes use of noise muffling equipment, inspection of equipment to ensure they function properly, and identification and avoidance of sensitive receptors were feasible. This impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: NOI-2: Will construction of the WREP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Less than Significant*

Construction of near-term improvements would generate noise levels ranging from 86 to 87 dBA Leq at a distance of 50 feet, and would generate noise levels greater than 60 dBA Leq at receptors located within approximately 1,000 to 1,770 feet of the construction site.

Construction noise levels may at times substantially exceed existing daytime ambient noise levels, which typically range from about 40 to 50 dBA Leq. Construction noise levels exceeding 60 dBA Leq, and the ambient noise environment by 5 dBA Leq or more, would be temporary (less than one construction season). Although noise levels would be elevated in the immediate vicinity of construction sites, the impact is less than significant recognizing the short-term nature of construction period noise.

Construction traffic would access the storage tank site via Ielmorini Road via East Washington Street or Adobe Road. During peak earthmoving periods, an estimated 150 truck round trips per day plus 20 vehicle round trips per day for workers for up to 1 month may be required during earthwork construction activities at the tank site. Average trip generation throughout project construction is estimated at 10 to 20 truck trips per day. Approximately 4 to 5 trips are assumed during the worst-hour. Construction traffic noise levels were calculated with the Caltrans' LeqV2 traffic noise model. Construction traffic is calculated to generate an hourly noise level of 55 dBA Leq at a distance of 50 feet. Construction traffic would not generate noise levels that would exceed 60 dBA Leq and the ambient noise environment by more than 5 dBA Leq, and would not substantially increase daily average noise levels along Ielmorini Road. Construction traffic along Adobe Road and East Washington Street would generate similar levels and would not substantially increase daily average noise levels. The impact is less than significant.

*Program-Level Improvements – Less than Significant*

Construction of program-level improvements would generate noise levels ranging from 84 to 91 dBA Leq at a distance of 50 feet, and would generate noise levels greater than 60 dBA Leq at receptors located within approximately 800 to 1,770 feet of the construction site. Construction noise levels may at times substantially exceed existing daytime ambient noise levels. Construction noise levels exceeding 60 dBA Leq and the ambient noise environment by 5 dBA Leq or more could occur over a period exceeding one construction season. As discussed under impact NOI-1, Project Measure PD-19 Construction Noise Control would be implemented as part of the project. This measure includes use of noise muffling equipment, inspection of equipment to ensure they function properly, and identification and avoidance of sensitive receptors where feasible. This impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: NOI-3: Will operation of the WREP generate noise levels exceeding local regulatory criteria or cause a substantial permanent increase in ambient noise levels above existing levels at sensitive receivers in the vicinity?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

Mechanical noise sources are not proposed at the storage tank site or its associated facilities. The operation of pipelines would not generate measurable noise levels. There would be no increase in ambient noise levels at sensitive receptors as a result of near-term improvements.



*Program-Level Improvements: Open Reservoir and Pipelines – No Impact; Pump Station – Significant*

Mechanical noise sources are not proposed at the open reservoir site. The operation of pipelines would not generate measurable noise levels. There would be no increase in ambient noise levels at sensitive receptors as a result of these program-level improvements and no impact would result.

The proposed Petaluma Golf and Country Club pump station would consist of two to three duty pumps and one stand-by pump (total of 7.5 horsepower) likely housed within a structure or screened from nearby receivers. The specific location of this pump station is unknown at this time.

Operational noise generated by a pump station within City limits would be subject to the Petaluma's Zoning Ordinance. The Zoning Ordinance restricts maximum permissible noise generated by stationary noise sources to be 60 dBA Leq or less at the property line of the receiving use. For receptors outside the City Limits noise would be subject to the standards established in the Sonoma County General Plan. The Sonoma County General Plan identifies the maximum exterior noise levels allowed for non-transportation sources at 45 dBA measured at the exterior property line of an affected residential land use.

Operational noise levels generated by a 7.5 Hp pump station are calculated to be 50 dBA Leq at a distance of 100 feet, assuming no attenuation from the pump house or terrain, or excess attenuation as a result of ground or molecular absorption. Noise generated by the pump station, depending on the specific location and proximity to nearby receptors, could exceed existing noise thresholds and the performance standard at the nearest noise-sensitive receptors. The impact is considered significant.

Mitigation: **NOI-1 Pump Station Noise Control**

After

Mitigation: *Program-Level Improvements – Less than Significant*

Implementation of the noise control measures will ensure consideration of location and design of the pump station to reduce noise impacts to sensitive receptors. Noise levels would be expected to be at least 10 to 15 dBA lower with implementation of this measure.

## **CUMULATIVE IMPACTS**

**Impact: NOI-C1 through C3: Will the WREP plus cumulative projects disturb noise-sensitive receptors during or after construction based on evaluation criteria 1 through 3?**

Analysis: *Project-Level Near-Term Improvements and Program-Level Improvements – Less than Significant*

The proposed construction sites are located at sufficient distances from one another that construction noise levels generated by various components of the WREP would not combine to result in substantially increased noise levels at nearby noise-sensitive receivers.

Sonoma County is proposing a signalization and widening project at the intersection of Adobe Road and East Washington Street in 2009. This project would occur over 600 feet

from residential receivers southeast of Ielmornini Road. Noise generated by the construction of this project would be less than 60 dBA Leq at the nearest receivers and would not add to the noise levels generated by simultaneous construction of near-term improvements. The cumulative duration of both projects is anticipated to be less than one construction season. Significant cumulative construction noise impacts are not anticipated.

Similarly, cumulative operational noise impacts are not expected. There are no known noise-generating projects proposed in the vicinity of the Petaluma Country Club pump station that would result in a cumulative permanent noise level increase at neighboring noise-sensitive receivers.

Mitigation: No mitigation is necessary.

## REFERENCES

- California Department of Health, Office of Noise Control. 1977. Model Community Noise Control Ordinance.
- California Department of Transportation. LeqV2 for DOS. Release 1.203.
- City of Petaluma. 2008. *Final General Plan 2025*. May.
- Federal Highways Administration. Roadway Construction Noise Model. 2006.
- Petaluma. 1997. City of Petaluma, CA Zoning Ordinance No. 2049, Section 22-301: Noise Regulations, sub-section 22-302.3.
- Sonoma County. 1989. Sonoma County General Plan. March 23. Revised to Reflect Amendments and Correction as of March 1, 1994.
- Sonoma County Noise Element. 2005. Staff report from Denise Peter to the Planning Commission. December 1.

## 4.7 PUBLIC HEALTH AND SAFETY

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This chapter provides information regarding potential public health and safety impacts resulting from the WREP. Impacts may include exposure to infectious agents from use of recycled water, exposure to hazardous materials or wastes, construction safety hazards, disease transmission by mosquitoes, fire hazards, flooding hazards from reservoir failure, and hazards associated with placement of facilities near airports. To provide a basis for this evaluation the setting section describes the applicable policies and regulations for each issue.

### SETTING

#### Non-Potable Use of Recycled Water

The California Department of Public Health (CDPH) is the state agency responsible for protecting public health in California. The CDPH has developed and adopted water reuse criteria since 1918 and in 2001 adopted the most recent version of its criteria. For non-potable uses of recycled water, the criteria are principally directed at control of microbial pathogens. For irrigation in urban areas, the criteria require that the water be oxidized and highly disinfected to virtually eliminate all measurable levels of viable microbial pathogens in the product water.

The WREP would only use recycled water for non-potable purposes. Non-potable uses are not intended for ingestion. The CDPH water recycling criteria for non-potable use of recycled water do not address regulated chemical contaminants or emerging non-regulated contaminants, such as pharmaceuticals, endocrine disruptors, and personal care products. However, the water recycling criteria are enforced by the state's Regional Water Quality Control Boards (RWQCB), and the RWQCBs include requirements addressing chemical contaminants for wastewater treatment facilities through National Pollutant Discharge Elimination System (NPDES) permits. The CDPH water recycling criteria for non-potable use of recycled water do not address pharmaceuticals, endocrine disruptors, and personal care products because the water is not intended as a source of potable supply, and because these chemicals are generally present in recycled water at very low concentrations. A more detailed discussion of the applicable CDPH water recycling criteria for recycled water is provided below. In addition, the quality of recycled water and its use for irrigation purposes was covered extensively in the General Plan 2025 Final EIR Technical Appendix G-2, and is incorporated in this Draft EIR by reference.

#### California Code of Regulations Title 22

Criteria for recycled water quality are established under Title 22 of the California Code of Regulations (Title 22, California State Code of Regulations, §60301 et. seq.). Title 22 specifies treatment requirements and establishes water quality standards for recycled water (Water Recycling Criteria). The California Water Recycling Criteria are the stringent regulations for control of water reuse and are intended to protect public health with multiple barriers to contaminants and pathogens. The CDPH is the agency responsible for development and implementation of the regulations for use of recycled water.

As described in Appendix C, California Regional Water Quality Control Board San Francisco Bay Region Order 96-011, the City would monitor the quality of the secondary and tertiary treated recycled water to ensure that the CDPH and the Regional Board water quality requirements are achieved.

## Water Recycling Criteria

Untreated wastewater potentially contains infectious agents (i.e., bacteria, viruses, and parasites) that must be removed to allow safe use of recycled water. The potential for pathogenic contamination of recycled water is expressed as the number (measured by the MPN) of coliform bacteria present in water sources. Coliform bacteria are “indicator organisms” whose presence is evidence that pollution (associated with fecal contamination from humans or other warm-blooded animals) has occurred. Indicator organisms may be accompanied by pathogens, but do not necessarily cause disease themselves. Indicators have the following general characteristics: they are absent from unpolluted waters; are present in greater numbers than pathogenic organisms; have greater survival time than pathogens; and their detection is generally more reliable and less time-consuming.

To ensure an appropriate level of treatment for protection of public health from pathogenic organisms, the CDPH has established treatment requirements for a variety of recycled water uses (Title 22, California Code of Regulations, §60301 et seq.). These conventional and widely practiced water and wastewater treatment processes are considered by the CDPH to be capable of reducing pathogenic constituents to acceptable levels.

Title 22 criteria for recycled water are intended to prevent transmission of disease by any of the possible mechanisms: skin contact, ingestion, inhalation of infectious agents in water, or by direct contact with a contaminated object. Recycled water must be treated to an appropriate level to protect surface water and to prevent transmission of pathogens through aerosols (small particles of water suspended in air) from spray irrigation. The level of treatment varies with the ultimate use of the recycled water. At minimum, wastewater must receive secondary treatment prior to use as recycled water. Those uses with the highest potential for human exposure are permitted to use only disinfected tertiary recycled water (Table 4.7.1)

**TABLE 4.7-1**  
**Categories of Recycled Water as Defined in California’s Recycled Water Regulations**

Recycled Water Category	Definition
Disinfected Tertiary Recycled Water	<p>Tertiary recycled water is recycled water that has been coagulated, filtered, and meets the following total coliform, disinfection process and turbidity limits prior to delivery for reuse purposes. Coagulation need not be used as part of the treatment process provided the turbidity of the influent to the filters does not exceed 5 NTU more than 5 percent of the time.</p> <p><b>Total coliform</b></p> <p>After adequate contact with disinfectant the number of total coliform organisms shall not exceed: (1) a median value of 2.2 MPN/100ml as determined from the bacteriological results of the last seven days for which sample analyses have been completed, and (2) a maximum value of 23 MPN/100ml in more than one sample in any 30 day period. No sample shall exceed a total coliform value of 240 MPN/100ml.</p> <p><b>Disinfection Process</b></p> <p>1) A chlorine disinfection process that provides a CT (chlorine concentration times modal contact time) value of not less than 300 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak daily design flow (or an equivalent combination of chlorine concentration and contact time subject to Executive Officer approval); or</p> <p>2) A disinfection process that, when combined with the filtration process, has been demonstrated to reduce the concentration of plague-forming units of F-specific bacteriophage MS-2, or polio virus, per unit volume of water in the</p>

**TABLE 4.7-1**  
**Categories of Recycled Water as Defined in California’s Recycled Water Regulations**

	<p>wastewater to one hundred thousandths (1/100,000) of the initial concentration in the filter influent throughout the range of qualities of wastewater that will occur during the recycled water treatment process. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstrations. The above demonstration must be approved by the DHS and the Executive Officer.</p> <p><b>Turbidity</b> The turbidity of filtered recycled water shall not exceed any of the following: 1) 2 NTU daily average, 5 NTU more than 5 percent of the time, or 10 NTU at any time.</p>
Disinfected Secondary-2.2 Recycled Water	<p>Secondary-2.2 recycled water is recycled water that meets the following total coliform limit prior to delivery for reuse purposes:</p> <p><b>Total coliform</b> - After adequate contact with disinfectant the number of total coliform organisms shall not exceed: (a) a median value of 2.2 MPN/100ml as determined from the bacteriological results of the last seven days for which sample analyses have been completed, and (b) a maximum value of 23 MPN/100ml in more than one sample in any 30 day period.</p>
Disinfected Secondary-23 Recycled Water	<p>Secondary-23 recycled water is recycled water that meets the following total coliform limit prior to delivery for reuse purposes:</p> <p><b>Total coliform</b> - After adequate contact with disinfectant the number of total coliform organisms shall not exceed: (a) a median value of 23 MPN/100ml as determined from the bacteriological results of the last seven days for which sample analyses have been completed, and (b) a maximum value of 240 MPN/100ml in more than one sample in any 30 day period.</p>

Source: Order 96-011: General Water Reuse Requirements for Municipal Wastewater and Water Agencies

The many suitable uses of tertiary and secondary recycled water are summarized in Attachment A of Appendix C of this EIR. As noted in Appendix C, tertiary treated recycled water may be used for urban irrigation of parks and playfields within the City. Secondary recycled water may be used for agriculture where the edible portion is produced above ground and not contacted by recycled water.

### Regulatory Setting for Hazardous Materials/Wastes

Hazardous substances that have been released to the environment (e.g., due to spills and leaking underground storage tanks) have the potential to adversely affect public health if they are encountered unexpectedly during the construction phase of the WREP or during operations over the lifetime of the WREP. The United States Environmental Protection Agency (USEPA) defines a “hazardous” waste as one “which because of its quantity, concentrations, or physiochemical or infectious properties, may either increase mortality or produce irreversible or incapacitating illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.”

At the federal level, the storage and handling of hazardous substances is regulated under the Resource Conservation and Recovery Act (RCRA), which follows hazardous substances from "cradle to grave" and regulates hazardous waste generators, transporters, and treatment, storage, and disposal facilities. California has been authorized by the Environmental Protection Agency (EPA) to administer its own RCRA program. The California Department of Toxic Substances Control (DTSC) is responsible for

implementing RCRA, as well as for implementing and enforcing California's Hazardous Waste Control Law. The California Hazardous Waste Control Law and its associated regulations are similar to RCRA but regulate a larger number of chemicals because they define hazardous waste more broadly. Hazardous wastes regulated by California, but not by the EPA, are called non-RCRA hazardous wastes.

The cleanup of sites contaminated by releases of hazardous substances (hazardous wastes) is regulated primarily by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), which was amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA), and by similar state laws. Known hazardous waste release sites are subject to oversight by federal, state, and/or local agencies.

The State's Hazardous Waste and Substances Sites List (Cortese List) identifies sites with leaking underground fuel tanks, hazardous waste facilities subject to corrective actions, solid waste disposal facilities from which there is a known migration of hazardous waste, and other sites where environmental releases have occurred. Pursuant to Government Code §65962.5, before a local agency accepts an application as complete for any development project, the applicant must certify whether or not the project site is on the Cortese list.

Chapter 6.95, §25503(a), of the California Health and Safety Code and Title 19 of the California Code of Regulations §2729, et seq., require any business that handles a hazardous material or mixture containing a hazardous material in reportable quantities to establish and implement a Hazardous Materials Business Plan for emergency response to a release or threatened release of a hazardous material. The minimum reportable quantities are 500 pounds for a solid, 55 gallons for a liquid, and 200 cubic feet for a gas at standard temperature and pressure. Some acutely hazardous materials are reportable at much decreased quantities. Businesses in the WREP area submit their plans to the City fire department. The Business Plan must identify the type of business, location, emergency contacts, emergency procedures, mitigation plans, and chemical inventory at each location.

Certain chemicals that could be released to the environment and might affect surrounding communities are regulated by California's Accidental Release Prevention Law. This State law and similar federal laws (i.e., the Emergency Preparedness and Community Right-to-Know Act [EPCRA] and the Clean Air Act) allow local oversight of both the State and federal programs. The State and federal laws are similar in their requirements, however, the California threshold planning quantities for regulated substances are lower than the federal values.

Hazardous waste management in Petaluma and nearby County areas is administered by the Sonoma County Waste Management Agency (SCWMA) through the Countywide Integrated Waste Management Plan (CoIWMP). As required by State law, this planning document includes the Source Reduction and Recycling Element (SRRE), Household Hazardous Waste Element (HHWE), Non-Disposal Facility Element (NDFE), as well as the Siting Element.

In addition, State law requires that communities form a Consolidated Unified Protection Agency (CUPA) to manage the acquisition, maintenance, and control of hazardous waste by industrial and commercial business. In Petaluma, the Fire Marshal's Office has the responsibility for administering CUPA programs. As a CUPA, the Fire Department regulates all aspects of hazardous materials storage, use, and waste disposal. This includes policy, training of personnel, and procedures for processing the various elements of the CUPA program.

## **Construction Hazards**

Hazards associated with construction activities can affect the safety of both workers and the general public. The safety of workers is regulated by the California Department of Industrial Relations, which receives its authority from Title 8 of the California Code of Regulations. These regulations also indirectly protect the general public by requiring construction managers to post warnings signs, to limit public access to construction areas, and to obtain permits for work considered to present a significant risk of injury (e.g., excavations greater than 5 feet into which a person is required to descend).

Where excavations or other activities would occur in public rights-of-way, an encroachment permit is required from the appropriate agency such as the California Department of Transportation for State highways, departments of Public Works for roadways within the City, or the Sonoma County Department of Public Works or Office of Emergency Services for county roads (refer to Section 4.10, Transportation in this EIR). These permits are designed to protect the public by providing a system of notification to providers of emergency or other important services of road closures. Compliance with these requirements would minimize the safety and health hazards associated with construction activities.

## **Vector Control**

Mosquitoes are both pests and vectors of disease to humans and animals. Mosquito populations can increase rapidly, especially during the warmer summer months. Twenty-two species of mosquitoes are known to occur in Marin and Sonoma Counties.

The California Health and Safety Code provides authority for mosquito abatement districts to provide advice and control mosquito production on private and public lands and to assess the landowner for the cost of that control. The districts also have the authority to hold hearings and assess civil penalties to abate nuisance and potential health threats to the public (California Health and Safety Code, Sections 2270-2294). The Marin/Sonoma Mosquito and Vector Control District and the Vector Borne Disease Section of the CDPH are responsible for overseeing the mosquito prevention program within the WREP area. The primary objective of the Marin/Sonoma Mosquito and Vector Control District is to suppress the mosquito population below the threshold level required for disease transmission or nuisance tolerance level.

The Marin/Sonoma Mosquito and Vector Control District has produced several documents addressing mosquitoes and other biting arthropods associated with wastewater reclamation or disposal projects. These documents provide project design criteria for mosquito prevention as well as guidelines for proper management of wastewater reclamation or disposal projects. The design criteria include minimizing the amount of over-irrigation, ponding, or tail water, thereby significantly reducing the need to treat these sites with pesticides and the subsequent need to provide the Marin/Sonoma Mosquito and Vector Control District with compensation for that control effort.

## **Fire Hazards**

In the period 1989 to 2000, there were 21 wildland fires over 100 acres in Sonoma County. Nine fires were between 100 and 200 acres, nine fires were between 200 acres and 1,000 acres, and the remaining three fires were of 1,200, 2,127, and 6,125 acres. Of all fires over 50 acres since 1989, 19 percent were caused by arson, 3 percent were caused by lightning, 22 percent were associated with powerlines, and the remaining 56 percent were associated with other human activities or facilities. In summary, 97 percent of the wildland fires over 50 acres since 1989 were caused by human activities or facilities (County of Sonoma 2002).



The California Department of Forestry and Fire Protection (CDFF) has mapped areas in Sonoma County with the potential for large wildland fires. CDFF classifies the fire potential for wildlands based on three factors: fuel load, climate and topography. CDFF also administers the “SRA Fire Safe Regulations” that constitute the basic wildland fire protection standards for lands within State Responsibility Areas (SRAs). Fire safety standards adopted by the County include the Uniform Fire Code, National Fire Code, Uniform Building Code and companion codes, and the subdivision and zoning ordinances.

## **Flooding Hazards**

Flooding could occur as a result of failure at the open water reservoir, a structural failure of the water storage tank on Ielmorini Road, or rupture of pipelines carrying recycled water throughout the City of Petaluma. WREP structures would be constructed in the City of Petaluma and Sonoma County jurisdictions. The City of Petaluma and Sonoma County have adopted building codes, typically based on the Uniform Building Code, that specify design and construction standards and require that an approved building permit be obtained prior to construction. These codes include earthquake-protection standards. They also require that a building inspector review plans and inspect the construction site and grant final approval upon completion of construction.

The State Water Code (Division 3) stipulates that the supervision of non-federal dams in California is generally under the jurisdiction of the Department of Water Resources, Division of Safety of Dams (DSOD). The DSOD supervises the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. The DSOD has jurisdiction over all non-federal dams in the State that are 25 feet or higher (regardless of storage capacity) and dams with a storage capacity of 50 acre-feet of water or greater (regardless of height).

An exception exists in the Water Code for certain water impoundments that are part of wastewater control facilities. Specifically, a wastewater impoundment that is less than 1,500 acre-ft in volume, and with a maximum depth less than 15 ft, may qualify as non-jurisdictional. For purposes of determining jurisdictional authority the maximum depth is defined as the vertical distance between the maximum possible water surface and the lowest elevation of the outboard toe of the embankment. It is expected that the open secondary reservoir would not be large enough to qualify for DSOD jurisdiction. Therefore, the reservoir would only be subject to the standard of care that is typical for this type of facility.

## **Airport Operations**

The State’s Public Utilities Code requires that each county with an airport that is operated for the benefit of the general public establish an Airport Land Use Commission (ALUC). Among its duties, the ALUC is responsible for ensuring the safe operation of new and existing airports within its jurisdiction.

The ALUC prepares an airport land use plan to address safety and other planning issues (e.g., noise, land use compatibility) associated with airports in the county. From a safety perspective, the plan establishes safety compatibility standards and sets limitations on building heights and other factors that may interfere with the safe operation of the airport or that may otherwise present an aviation hazard for the public.

The Petaluma Municipal Airport is located within the WREP study area in the northeast portion of the City. The airport is included in the Comprehensive Airport Land Use Plan (CALUP) for Sonoma County (Sonoma County 2001). The CALUP uses the criteria defined in Part 77 of the Federal Aviation Regulations (F.A.R.) for airspace protection standards around all public use airports in Sonoma County.

## GOALS, OBJECTIVES, AND POLICIES

Table 4.7-2 identifies public health and safety goals, objectives, and policies that relate to the WREP. The table also indicates which criteria in the Public Health and Safety Section are responsive to each set of policies.

**TABLE 4.7-2**  
**Goals, Objectives, and Policies – Public Health and Safety**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Petaluma General Plan 2025	Water Resources	Policy 8-P-9-B	Operate and maintain the Ellis Creek Water Recycling Facility to produce recycled water to meet or exceed current regulatory standards.	1
Petaluma General Plan 2025	Water Resources	Policy 8-P-12	Provide water of adequate quality and quantity to meet customer needs.	1
Petaluma General Plan 2025	Health and Safety	Policy 10-P-4	Minimize the risk to life and property from the production, use, storage, and transportation of hazardous materials and waste by complying with all applicable State and local regulations.	3
Petaluma General Plan 2025	Community Facilities, Services, and Education	Policy 7-P-27 Policy 7-P-27-E	Reduce the impacts of wildland fires. Conduct regular reevaluation of Citylands designated as Very High or High Fire Hazard Severity Zones.	6
Petaluma General Plan 2025	Mobility	Policy 5-P-52-B	Future land uses in the airport area are to be compatible with airport use, including compliance with the County's Comprehensive Airport Land Use Plan for Sonoma County.	8
Sonoma County General Plan	Resource Conservation Element	Goal RC-3	Conserve, enhance, and manage water resources, protect their quality, and assure an adequate long term supply of water for domestic, fishing,	1

**TABLE 4.7-2**  
**Goals, Objectives, and Policies – Public Health and Safety**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
			industrial, and agricultural use	
Sonoma County General Plan	Public Safety Element	Goal Site 2.1	Prevent unnecessary exposure of people and property to risks of damage or injury from flooding	5
Sonoma County General Plan	Public Safety Element	Goal Site 3.1	Prevent unnecessary exposure of people and property to risks of damage or injury from wildland and structural fires	6
Sonoma County General Plan	Public Safety Element	Goal Site 4 Objective Site 4.2	Prevent unnecessary exposure of people and property to risks from hazardous materials, and regulate their transport, storage and use to reduce risks to acceptable levels	1,3
Sonoma County General Plan	Air Transportation Element	Goal AT-2 Objective AT-2.1	Provide appropriate conditions that will permit the safe passage of aircraft operating to and from airports in the County	8

Sources: Petaluma General Plan 2025, Sonoma County General Plan 1989

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

The evaluation criteria for hazardous materials and hazardous waste management are based on standards promulgated by the federal government and by the State of California (Table 4.7-3).

**TABLE 4.7-3**

**Evaluation Criteria with Threshold of Significance – Public Health and Safety**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
1. Will the WREP expose the public to pathogenic viruses, bacteria, or other disease organisms and chemicals at concentrations detrimental to human health?	Proposed measures not in compliance with Title 22 regulations for the use of recycled water.	Greater than 0 occurrences.	CDPH Water Recycling Criteria (California Title 22 regulations governing the use of recycled water) Petaluma General Plan 2025
2. Will the WREP expose workers or the public to hazards from a known hazardous waste site?	Ground disturbance on or within 500 feet of a hazardous waste site(s).	Less than 500 feet.	CEQA guidelines; Resource Conservation and Recovery Act; Comprehensive Environmental Response Compensation and Liability Act (as amended by the Superfund Amendments and Reauthorization Act)
3. Will the WREP increase potential exposure of the public to hazardous materials due to a chemical release?	Increase in use or storage of hazardous materials not in accordance with County, State and Federal hazardous materials or waste regulations.	Greater than 0 occurrences.	California and Federal hazardous materials and waste regulations; CoIWMP and CUPA Program Elements Petaluma General Plan 2025
4. Will the WREP expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?	Use of heavy machinery, vehicles or equipment; or creation of excavations in public areas not in accordance with State construction safety regulations.	Greater than 0 occurrences.	California Construction Safety Regulations (Title 8, CCR, Sections 1500 to 1938)
5. Will the WREP increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?	Creation of mosquito habitat.	Greater than 0 acres of new mosquito habitat.	Marin/Sonoma Mosquito and Vector Control District and CDPH Vector Borne Disease Section criteria for mosquito abatement

**TABLE 4.7-3**

**Evaluation Criteria with Threshold of Significance – Public Health and Safety**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
6. Will the WREP expose people or structures to a risk of loss, injury or death involving wildland fires?	Design and construction not in compliance with County and State Adopted Fire Safe Regulations	Greater than 0 occurrences.	Public Resources Code 4290; Uniform Fire Code, National Fire Code, Uniform Building Code and companion codes, subdivision and zoning ordinances. Petaluma General Plan 2025
7. Will the WREP expose the public to a flooding hazard?	Increased risk of inundation due to proposed element(s) not in compliance with locally adopted building codes and construction standards	Greater than 0 occurrences.	Compliance with locally adopted building codes and construction standards will reduce the risk of structural failure that could result in flooding.
8. Will the WREP create a safety hazard for people residing or working near a public or private airport or airstrip?	Construction or structures not in compliance with airport safety standards and land use policies	Greater than 0 occurrences.	Airport Land Use Plan for Sonoma County F.A.R. Part 77, Subpart C – Obstruction Standards Petaluma General Plan 2025

**METHODOLOGY**

**Water Reuse**

The evaluation criterion is based on CDPH treatment requirements for a variety of recycled water uses (Title 22, California Code of Regulations, §60301 et seq.) These requirements are believed to be capable of reducing pathogenic constituents to acceptable levels. In addition, an evaluation of emerging non-regulated compounds such as pharmaceuticals, endocrine disruptors, and personal care products is provided related to non-potable use of recycled water. Both toxicity and bioaccumulation were evaluated based on a Human Health Risk Assessment prepared by the City of Santa Rosa for its recycled water use (City of Santa Rosa 2003). The risk assessment is applicable to Petaluma since the source water is supplied by the same regional agency (Sonoma County Water Agency). In addition, Petaluma has less industry than Santa Rosa. A risk assessment models how chemicals and pathogens move through the environment and what effects they might have on individuals.

**Hazardous Waste**

The hazardous waste criterion is based on the CEQA requirement that lead agencies consult the Hazardous Waste and Substances Sites List compiled pursuant to Section 65962.5 of the California Government Code to determine whether the proposed project is located on a listed site. The list is compiled by the Regional Water Quality Control Boards, the DTSC, and the California Integrated Waste Management Board.

## **Hazardous Materials**

The hazardous materials storage and use criterion is based on the requirements of the County Integrated Waste Management Plan as well as the Consolidated Unified Protection Agency program elements.

## **Construction Hazards**

The criteria for safety hazards during construction are based on safety regulations (Title 8, CCR §1500 to §1938) regarding construction sites. While the regulations have been promulgated to protect workers in the construction industry, the WREP could pose safety hazards in areas accessible to the public. The criteria have been developed to protect the public in areas where they may encounter construction activities.

## **Vector Control**

The criterion for disease vectors is based on the requirements of the Marin/Sonoma Mosquito and Vector Control District and the Vector Borne Disease Section of the CDPH, which are responsible for overseeing the mosquito prevention program within the WREP area. The Marin/Sonoma Mosquito and Vector Control District has issued criteria for mosquito prevention in wastewater reclamation or disposal projects.

## **Fire Hazards**

The criterion for fire hazards is based on the State's Fire Safe Regulations and locally adopted fire safety codes. These documents recognize the importance of reducing fuel loads and ignition sources in wildland areas.

## **Flooding Hazards**

The criterion for flooding is based on construction of WREP facilities in compliance with adopted building codes and construction standards, including earthquake-protection standards.

## **Airport Hazards**

The criterion for safe airport operations is based on the requirements of the CALUP and the Sonoma County Airport Land Use Commission, which is responsible for ensuring the safe operation of the airports within the WREP study area. Near term improvements and program-level improvements are evaluated to determine whether they comply with the CALUP. The CALUP uses the criteria defined in Part 77 of the F.A.R. rules and regulations for airspace protection standards around all public use airports in Sonoma County. Improvements are also evaluated to determine compliance with these rules and regulations.

## IMPACTS AND MITIGATION MEASURES

**Impact:**       **PHS-1: Will the WREP expose the public to pathogenic viruses, bacteria, or other disease organisms and chemicals at concentrations detrimental to human health?**

**Analysis:**       *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Neither construction nor normal operation of the pipelines or water storage tanks would release recycled water to the environment; therefore, no exposure to the public would occur.

Temporary exposure of the public to runoff from a pipe rupture could occur for a very brief time period. Recycled water flow and pipeline pressure would be monitored from the control room at the Ellis Creek WRF. If a pipeline rupture were to occur, flow would increase substantially and pressure would drop. If an unanticipated substantial increase in recycled water flow were to occur, facility staff would shut off water to the pipelines and runoff would cease. The average rate of recycled water flow from a completely severed urban or agricultural reuse pipeline would be up to approximately 10.7 cubic feet per second (cfs) for about 30 minutes. Exposure would be of a limited duration and quantity, and impacts would be less than significant.

*Program-Level Improvements – Less than Significant*

Neither construction nor normal operation of the pipelines, open reservoir, or pump station would release recycled water to the environment; therefore, no exposure to the public would occur. Temporary exposure of the public to runoff from a pipe rupture could occur for a very brief time period. Exposure would be brief, quantities would be limited, and impacts are considered less than significant.

Use of Recycled Water. The WREP would increase the volume of recycled water that would be released to the environment through irrigation. Use of recycled water would occur by two primary mechanisms: 1) reuse for urban irrigation within the Urban Growth Boundary of the City; and 2) reuse for agricultural irrigation in unincorporated areas of Sonoma County south and east of the City.

The use of recycled water would not create a public health and safety impact because the quality of the City's recycled water would meet or exceed criteria adopted by the CDPH to be protective of human health. Recycled water would be treated and tested in accordance with California's laws and regulations governing water reuse to assure that the water quality meets the State's health standards.

The City submitted a Notice of Intent (NOI) to cover the use of recycled water under the General Water Reuse Order No. 96-011 to the RWQCB and the CDPH (at that time known as the Department of Health Services) on August 10, 2005. The City received a letter of approval from the CDPH on October 10, 2005 and the RWQCB on October 21, 2005. Order 96-011 includes requirements for use of tertiary and secondary recycled water. Project Measure PD-16, adopted as part of the project, would require the City to meet the requirements of General Water Reuse Order 96-011 authorizing municipal wastewater reuse by producers, distributors, and users of non-potable recycled wastewater and follows all provisions of the NOI. This includes compliance with the Prohibitions, the Reuse Water Quality Requirements and Limitations, the Reuse Program Provisions, and General Provisions listed in the general order. Under Measure PD-16, the City would also design and implement a self-monitoring program as specified in

Appendix C of Order 96-011. The City would implement the monitoring program during periods when recycled water is in use. The program would include the observations, sampling, measurements, and analyses as specified in the order.

The CDPH criteria also include use area requirements as an added safety measure to reduce potential ingestion of the recycled water. Measures include prohibition of recycled water spray, mist or runoff in dwellings; designated outdoor eating areas or food handling facilities; protection of drinking water fountains against contact with recycled water; signs at sites using recycled water that are accessible to the public; prohibition of hose bibs on recycled water piping systems accessible to the public; and conformance to cross connection regulations. In addition, the California Health and Safety Code requires a color-coded labeling or marking system for pipes and appurtenances that clearly distinguishes recycled water from potable water.

Human health risk assessments prepared by others have shown that recycled water does not pose a risk to human health. In 2003, the City of Santa Rosa certified its Incremental Recycled Water Program EIR which contained a Human Health Risk Assessment for tertiary treated recycled water. The recycled water produced by the new Ellis Creek Water Recycling Facility in Petaluma is expected to be of very similar or better quality to the water produced at the Laguna Plant. The sources of water coming into both treatment plants are similar, although Petaluma has less industry. The City of Santa Rosa's Human Health Risk Assessment (HHRA) is therefore referenced as a basis for evaluating health effects of recycled water used for agricultural or urban irrigation by the City of Petaluma.

The Human Health Risk Assessment quantitatively assessed the health risk from domestic use (e.g., drinking, showering, washing, inhaling, eating fish) of undiluted recycled water, including movement of surface water to groundwater where it may be used as a domestic water supply, exposure to surface water during recreational use of the Petaluma River, and eating fish which grew in the Petaluma River.

These pathways were evaluated for both the chemicals and microorganisms that historically have been detected in the Laguna Plant recycled water. The chemical concentrations were below risk-based threshold levels and/or drinking water standards and thus they would not present a health risk via the exposures associated with full domestic use, let alone the occasional dermal or inhalation pathways from irrigation exposure (Santa Rosa 2003).

It is recognized that an increasing body of evidence exists confirming that common drugs, components of consumer products, naturally-occurring chemicals and other chemicals not regulated in wastewater treatment plant effluents are present at detectable concentrations in treated wastewater and in receiving water bodies. These chemicals are usually present at very low environmental concentrations requiring sophisticated analytical techniques for detection (Santa Rosa 2007).

The ability to detect non-regulated chemicals at very low concentrations has outpaced the scientific and regulatory communities' abilities to determine whether typical concentrations in receiving waters are a health hazard for humans and wildlife. The significance of non-regulated chemicals in water is an ongoing area of research by the USEPA and other regulatory agencies. Regulatory agencies have not developed standards or adjusted existing standards to address non-regulated chemicals due to insufficient data to evaluate potential effects of exposure to humans or the environment (Santa Rosa 2007).



Based on studies at other wastewater treatment plants (WWTPs), non-regulated compounds present in recycled water at the City's WWTP are expected to be present only at very low concentrations and concentrations are expected to be reduced or possibly eliminated through various advanced treatment technologies (tertiary treatment). However, it is currently unknown how effective treatment processes are in removing the wide range of non-regulated compounds observed in influent to WWTPs (Santa Rosa 2003). Additional research about the specific adverse human health effects of non-regulated compounds and their mixtures will be needed before it is possible to quantitatively analyze human health risks posed by low environmental concentrations thereof (HHRA 2007). Although potential risks due to exposure to non-regulated chemicals in recycled water cannot be quantified, no reliable evidence links such exposure to adverse human health effects in studies of receiving waters below other WWTPs (HHRA 2007). It should be recognized that the WREP would only involve the use of recycled water for non-potable urban and agricultural irrigation and is not intended to be consumed. Thus, the concerns associated with ingestion of water containing these contaminants do not apply to the WREP.

Scientific literature does not provide any information indicating that pharmaceuticals and endocrine disruptors become concentrated on vegetation or in soil via irrigation with recycled water. Drugs detected in the environment are generally in the ug/L – ng/L (parts per billion – parts per trillion) range and many have short half-lives (Daughton et al, 1999). Also, most pharmaceuticals and endocrine disruptors have low volatility or are non-volatile and thus would not be expected to present a health concern from inhalation at spray irrigation sites.

In summary, pathogens are present in untreated municipal wastewater but are reduced to very low levels by the City's wastewater treatment processes. In addition, there are no data indicating that the use of recycled water from the City's WWTP for non-potable urban and agricultural irrigation presents a health risk from pharmaceuticals, endocrine disruptors, or personal care products.

Petaluma's updated WWTP, which will include production of disinfected tertiary recycled water, will conform to all of the regulations contained in the CDPH water recycling criteria. Thus, existing data indicate that the use of non-potable recycled water for urban and agricultural irrigation will not present a public health risk.

Mitigation: No mitigation is necessary.

**Impact: PHS-2: Will the WREP expose workers or the public to hazards from a known hazardous waste site?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Improvements along East Washington and Ielmorini Road. Improvements include a tertiary pipe within the public right-of-way along East Washington and Ielmorini Road, a tertiary treated water storage tank on the east side of Ielmorini Road, and a pipeline connecting the tank to an existing detention basin on the west side of Ielmorini Road.

The EDR Radius Map Report did not identify any hazardous sites located on the properties in which these improvements would be constructed. The EDR Radius Map Report did identify an active leaking underground storage tank (LUST) site at the Petaluma Municipal Airport located at 601 Sky Ranch Road. The site of the former tank is approximately 650 feet east of the nearest portion of the proposed pipeline along East Washington Road. According to information available on the State GeoTracker database,

total petroleum hydrocarbons as gasoline have been detected in groundwater at the site at concentrations ranging from 94 to 2000 parts per billion during quarterly monitoring performed since July of 2002. GeoTracker information also indicated that the extent of the plume has been defined on-site, and that the historical direction of groundwater flow at the site is towards the south, away from East Washington Street. For these reasons, the LUST site at 601 Sky Ranch Road is not expected to expose workers or the public to hazards during construction.

A Construction Management Program (Measure PD-9) is included as part of the project. The Construction Management Program would provide for the assessment and management of potentially contaminated soil and groundwater and minimization of potential impacts to public health and safety, to the extent feasible. This measure would reduce temporary hazards from known hazardous waste release sites to a level that is less than significant.

Improvements along Browns Lane. Improvements would include two 20-inch pipelines, one tertiary and one secondary, that would be placed in Browns Lane between Booster Pump Station #1 at the Ellis Creek Water Recycling Facility and Ely Road. The new secondary pipeline would replace an existing asbestos cement pipeline and would connect to an existing 18-inch pipeline in Browns Lane. Much of the existing cement pipeline would be abandoned in place; some portions may need to be removed.

The EDR Radius Map Report did not identify any hazardous sites located on the properties in which these improvements would be constructed. The EDR Radius Map Report did identify a closed LUST site located at 405 Browns Lane. The exact location of the former tank could not be determined from the information available in the EDR Radius Map Report and the State GeoTracker database. A review of aerial photos suggests that the tank could have been located as close as 350 feet west of the nearest portion of the proposed pipeline along Browns Lane.

A Construction Management Program (Measure PD-9) is included as part of the WREP. The Construction Management Program would provide for the assessment, management, and disposal of potentially contaminated soil, groundwater, and asbestos-containing materials and minimization of potential impacts to public health and safety, to the extent feasible. This measure would reduce temporary hazards from known hazardous waste release sites and materials to a level that is less than significant.

#### *Program-Level Improvements – Less than Significant*

The program-level improvements include construction of transmission and distribution pipelines throughout the City, a pump station near the Petaluma Golf and Country Club, and a secondary open water reservoir southeast of the City near Lakeville Highway and Stage Gulch Road. The exact locations of these facilities have not yet been sited, and thus it is possible that some sites would be within 500 feet of a hazardous waste release site(s).

A Construction Management Program (Measure PD-9) is included as part of the project. The Construction Management Program would provide for the assessment and management of potentially contaminated soil and groundwater and minimization of potential impacts to public health and safety, to the extent feasible.

The Construction Management Program would include a Hazardous Material Project Assessment following portions of the American Society of Testing Materials guidelines along pipeline corridors and near other project facilities to identify potential hazardous

waste sites that may affect construction activities. It also would include monitoring construction activities in the vicinity of hazardous materials/waste release sites for subsurface contamination of both soil and groundwater.

All potentially contaminated materials encountered during construction activities would be evaluated in the context of applicable local, state and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous will be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines.

Mitigation: No mitigation is necessary.

**Impact: PHS-3: Will the WREP increase potential exposure of the public to hazardous materials due to a chemical release?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Minor amounts of hazardous materials would be used during construction of the facilities (e.g., fuel for vehicles). Compliance with federal and State hazardous materials laws and regulations would minimize the risk to the public presented by these potential hazards.

*Program-Level Improvements – Less than Significant*

The impacts for the program-level improvements would be the same as those described for the near-term improvements.

Mitigation: No mitigation is necessary.

**Impact: PHS-4: Will the WREP expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Construction of near-term improvements would utilize heavy machinery, vehicles, and equipment. The machinery, vehicles, and equipment would be operated in accordance with State regulations regarding construction safety. None of the proposed construction equipment or techniques would be unsafe if safety regulations are followed. Thus, construction activities would have a less-than-significant impact on public safety.

Construction of the pipelines would create excavations within the public rights-of-way. Public access to excavation areas would be restricted at all times and construction would comply with State regulations regarding construction safety. There are no proposed excavations that would be unsafe if safety regulations are followed.

*Program-Level Improvements – Less than Significant*

Construction of program-level improvements would utilize heavy machinery, vehicles, and equipment. Such equipment would be operated in accordance with State regulations regarding construction safety. There are no proposed construction equipment or techniques that would be unsafe if safety regulations are followed. Thus, construction activities would have a less-than-significant impact on public safety.

Construction of pipelines would create excavations within public rights-of-way. The open water reservoir would be located in a rural area with limited public access. Excavations would be protected from the public at all times and constructed in accordance with State regulations regarding construction safety.

Mitigation: No mitigation is necessary.

**Impact: PHS-5: Will the WREP increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?**

Analysis *Project-Level Near-Term Conveyance Improvements – No Impact*

Neither construction nor operation and maintenance of the pipelines and water tanks would create an open body of water where mosquitoes could breed. Any ponding created from a pipeline rupture would be temporary and would not exist long enough to support mosquitoes or other disease vectors.

*Program-Level Improvements: Pipelines and Pump Station – No Impact; Use of Recycled Water and Open Reservoir – Less than Significant*

Neither construction nor operation and maintenance of the pipelines or pump station would create an open body of water where mosquitoes could breed. Any ponding created from a pipeline rupture would be temporary and would not exist long enough to support mosquitoes or other disease vectors. The pump station would not release recycled water to the environment or to open bodies of water, therefore no creation of mosquito habitat would occur.

Use of recycled water for urban and agricultural irrigation could result in ponding when irrigation rates exceed uptake by plants, evapotranspiration and percolation. Surface water that persists for more than four days would provide potential habitat for mosquito larvae. With implementation of the CDPH approved Notice of Intent, the impact is considered to be less than significant.

The water in the open reservoir would also create potential habitat for mosquitoes. This reservoir would be dry during the winter and early spring and full during the summer as water is withdrawn for irrigation. The Mosquito Prevention Program (Measure PD-10) included as part of the project would ensure that the reservoir is designed in a manner that minimizes favorable conditions for the development of potential mosquito habitat as described in the CDPH and the Marin/Sonoma Mosquito Abatement District's Criteria for Mosquito Prevention in Wastewater Reclamation or Disposal Projects. The criteria identify three general principles of mosquito control: (1) the manipulation of the physical features of the impoundment, (2) biological control, and (3) chemical control. This Program would suppress mosquito populations below the threshold level required for disease transmission or nuisance tolerance levels. Thus, this impact would be less than significant.

Mitigation: No mitigation is necessary.

**Impact: PHS-6: Will the WREP expose people or structures to a risk of loss, injury or death involving wildland fires?**

Analysis *Project-Level Near-term Conveyance Improvements – Less Than Significant*

The proposed pipeline, water storage tank, and detention basin along and adjacent to Ielmorini Road north of Adobe Road would be located in a High Fire Hazard Severity Zone (CDF FRAP Map 2007). The pipeline along Browns Lane would be located in an area that ranges from a Moderate to High Fire Hazard Severity Zone. High Fire Hazard Zones are subject to the requirements of §4421 et seq. of the Public Resources Code and §51175 et seq. of the Government Code that are intended to prevent fires in wildland areas. The impact would be temporary during the construction phase. Because construction activities might bring ignition sources (e.g., the exhaust pipe of vehicles can ignite dry grasses) into high fire hazard areas, Measure PD-9, Construction Management Program, requires procedures to manage ignition sources and to reduce the risk and hazard from wildland fires. Ignition source controls would reduce impacts to less than significant.

*Program-Level Improvements: Pipelines, Pump Station, and Use of Recycled Water – No Impact; Open Reservoir – Less than Significant*

The use of recycled water would not expose the public to an increased risk of wildfire. The proposed pump station would be located in the general vicinity of the Petaluma Golf and Country Club, which is located in a moderate fire hazard severity zone. The potential for pump station construction to expose people or structures to a risk of loss, injury or death involving wildland fires would be less than significant.

The majority of pipelines would not be located in wildland areas that are at increased risk of fire. The pipeline that would connect to the open reservoir would be constructed in areas having moderate to high fire severity zones. The open reservoir would be located east of the City limits near Stage Gulch Road and Lakeville Highway. The fire hazard severity zone for this area ranges from moderate to high.

The impact would be temporary during the construction phase. Because construction activities might bring ignition sources (e.g., the exhaust pipe of vehicles can ignite dry grasses) into high fire hazard areas, Measure PD-9, Construction Management Program, requires procedures to manage ignition sources and to reduce the risk and hazard from wildland fires. Ignition source controls would reduce impacts from pipeline and open reservoir construction to less than significant.

Mitigation: No mitigation is necessary.

**Impact: PHS-7: Will the WREP expose the public to a flooding hazard?**

Analysis *Project-Level Near-term Conveyance Improvements: Pipelines – No Impact; Tanks – Less than Significant*

There would be no danger of flooding due to pipelines even from an accidental release because the volumes of water that could be released would be too small to produce flooding. Recycled water flow and pipeline pressure would be monitored from the control room at the Ellis Creek WRF. If a pipeline rupture were to occur, flow would increase substantially and pressure would drop. If an unanticipated substantial increase in recycled water flow were to occur, facility staff would shut off water to the pipelines

and runoff would cease. The average rate of recycled water flow from a completely severed urban or agricultural reuse pipeline would be up to approximately 10.7 cfs for about 30 minutes.

As described in Section 4.3, Geology, Soils, and Seismicity, maps depicting the potential for intensity of earthquake shaking have been generated by ABAG and indicate that the near-term improvements would be located in strong ground shaking areas due to the proximity of the Rodgers Creek and San Andreas Fault systems.

Measure PD-8, Seismic Design to Resist Ground Shaking, is adopted as part of this project. This measure would take into account the high probability of strong seismic ground shaking by incorporating design features that accommodate lateral movements and flexibility. Construction of all facilities would meet the most updated versions of the adopted building codes. Earthquake-resistant design and materials would meet or exceed the current seismic engineering standards of the California Building Code Seismic Zone 4 requirements. With implementation of Measure PD-8, as well as measures for Slope Stabilization (PD-4) and Reduction of Risk of Damage due to Liquefaction (PD-5), the potential for a flooding hazard from tank failure is found to be less than significant.

*Program-Level Improvements: Pipelines, Pump Station, and Use of Recycled Water – No Impact; Open Reservoir – Less than Significant*

There would be no danger of flooding due to the use of recycled water and pipelines. Even during an accidental release, the volume of water that could be released would be too small to produce flooding. As described above, the average rate of recycled water flow from a completely severed urban or agricultural reuse pipeline would be up to approximately 4 cfs for about 30 minutes. This amount of flow is approximately equal to the capacity of one large or two small drop inlets that are designed to convey storm water runoff from the street to the gutter.

The pump station would not release recycled water to the environment or to open bodies of water, therefore there would be no flooding risk.

The open reservoir would be located southeast of the City near Lakeville Highway and Stage Gulch Road. At this time, the location and size of the proposed water reservoir has not been determined, except that it is within the area shown on Figure 2-2.

Based on the proposed size, the reservoir contemplated under the WREP currently meets the criteria for a non-jurisdictional reservoir. For such a reservoir, the City must pass a resolution accepting responsibility for the design, construction and maintenance of the reservoir. In either case the DSOD must review the proposed design for purposes of determining if the reservoir satisfies the criteria for a non-jurisdictional reservoir.

The reservoir will be designed under the supervision of registered engineers in accordance with the standard of care that is typical for this type of facility. Accordingly, the reservoir embankment and appurtenances would be designed to remain serviceable after a maximum-probable earthquake. In addition, the reservoir design would consider local geologic and geotechnical characteristics, including regional and local geology, geologic hazards, soil, bedrock, and groundwater conditions, maximum cutslope inclination, fill placement and compaction, and under-drain and sub-drainage requirements. Using the standard of care described above, the risk of reservoir failure is considered to be less than significant.

Mitigation: No mitigation is necessary.

**Impact:** **PHS-8: Will the WREP create a safety hazard for people residing or working near a public or private airport or airstrip?**

Analysis *Project-Level Near-Term Conveyance Improvements – Less Than Significant*

Near-term improvements include pipelines along East Washington Street, Ielmorini Road, and Browns Lane. The pipelines along Browns Lane and the northern portion of the pipeline along Ielmorini Road are located outside of the Airport Safety Zones of the Petaluma Municipal Airport. Construction of these facilities would not create a safety hazard for people residing or working near a public or private airport or airstrip.

The pipelines along East Washington Street are located within several of the Airport Safety Zones of the Petaluma Municipal Airport (Sonoma County 2001). These include the Sideline Safety Zone (SSZ), the Runway Protection Zone (RPZ), the Inner Turning Zone (ITZ) and the Traffic Pattern Zone (TPZ). Underground facilities, such as pipelines, are permitted uses within these safety zones (Sonoma County 2001). Because pipelines are a permitted use within these safety zones, construction-related impacts would be temporary and would not affect airport operations. This is a less-than-significant impact.

The proposed water storage tank on Ielmorini Road would be located within the airspace obstruction height limit boundary for the Petaluma Municipal Airport. The established elevation at the Petaluma Municipal Airport is 89 feet. The proposed storage tank would be 33.5 feet high and 117 feet in diameter, and would be partially buried in the hillside. The elevation of the top of the proposed tank would be approximately 313.5 feet above sea level. The difference in elevation between the top of the proposed tank and the Petaluma Municipal Airport is thus 223.5 feet. The approximate horizontal distance between the airport and the tank is 5,850 feet. The elevation gain over the horizontal distance represents a 3.8% slope, or in other words, for every 100 feet of horizontal distance, there would be a gain of 3.8 feet in elevation.

In administering CFR Part 77, the prime objectives of the FAA are to promote air safety and the efficient use of the navigable airspace. To accomplish this mission, aeronautical studies are conducted based on information provided by proponents on an FAA Form 7460-1, Notice of Proposed Construction or Alteration. CFR Title 14 Part 77.13 would require the City to notify the Administrator of the FAA since the tank would exceed the 100:1 slope from the runway surface.

The Sonoma County CALUP states that no structure shall be permitted to exceed the height limits established in accordance with Part 77, Subpart C. However, there is an exception for objects that would be substantially shielded by existing permanent structures or terrain in a manner such that it clearly would not affect the safety of air navigation. In addition, the criterion would not apply to projects that the FAA has conducted an aeronautical study and either determined that the object would not result in a hazard to air navigation or made recommendations for the object's proper marking and lighting as an obstruction.

Measure PD-12, Avoidance of Airport Land Use Conflicts, is included as part of the project, and would require the proper notification to the FAA for the water storage tank on Ielmorini Drive. The notification process would provide a basis for determining the significance of the proposed construction on air navigation.

The FAA study will determine if the tank will be adequately shielded by the natural terrain so as to not result in a hazard to air navigation, or if the tank needs to be marked

and lighted in accordance with Advisory Circular AC 70/7460-1 (Obstruction Marking and Lighting). With implementation of Measure PD-12, the impact is considered to be less than significant.

*Program-Level Improvements: Pump Station, Use of Recycled Water, and Open Reservoir – No Impact; Pipelines – Less than Significant*

Program-level improvements include a pump station near the Petaluma Golf and Country Club and an open secondary recycled water reservoir southeast of the City near Lakeville Highway and Stage Gulch Road. Both the pump station and the reservoir would be located outside the Airport Safety Zones of the Petaluma Municipal Airport. Construction of these facilities would not create a safety hazard for people residing or working near a public or private airport or airstrip.

Program-level improvements also include construction of transmission and distribution pipelines throughout Petaluma. Although specific alignments have not been designated, it is possible that some of the pipelines could be located within Airport Safety Zones of the Petaluma Municipal Airport. Underground facilities, such as pipelines, are permitted uses within these safety zones, and thus construction-related impacts would be temporary and would not affect airport operations. This is less than significant.

Mitigation: No mitigation is necessary.

## CUMULATIVE IMPACTS

**Impact: PHS-C1: Will the WREP plus cumulative projects expose the public to pathogenic viruses, bacteria, or other disease organisms and chemicals at concentrations detrimental to human health?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Neither construction nor normal operation of the near-term improvements would release recycled water to the environment; therefore, no exposure to the public would occur. Temporary exposure of the public to runoff from a pipe rupture could occur for a very brief time period. However, exposure would be of a limited duration and quantity and its contribution would not be considerable. Therefore, the impact remains less than significant.

*Program-Level Improvements – Less than Significant*

There are no other recycling projects listed in Appendix B that have the potential to increase exposure of the public to constituents in recycled water. If there were any other recycled water projects, they would have to meet Title 22 and Regional Board requirements, so potential impacts of those projects would have to be fully mitigated. Thus the cumulative impact would not be expected to be significant, and no further mitigation is required.

Mitigation: No mitigation is necessary.



**Impact: PHS-C2: Will the WREP plus cumulative projects expose workers or the public to hazards from a known hazardous waste site?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Exposure would be a site-specific hazard and is not subject to any additional or cumulative impacts from other projects. Measure PD-9, Construction Management Program, would reduce temporary site-specific hazards from known hazardous waste release sites to a level that is less than significant.

*Program-Level Improvements – Less than Significant*

Exposure would be a site-specific hazard and is not subject to any additional or cumulative impacts from other projects. The impact would remain less than significant with implementation of Measure PD-9, Construction Management Program.

Mitigation: No mitigation is necessary.

**Impact: PHS-C3: Will the WREP plus cumulative projects increase potential exposure of the public to hazardous materials due to a chemical release?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Because use of hazardous materials for the near-term improvements and by all other cumulative projects must be fully in accordance with applicable laws, and these laws are protective of public safety considering all hazardous chemical use, cumulative impacts would be less than significant.

*Program-Level Improvements – Less than Significant*

Use of hazardous materials for program-level improvements and all other cumulative projects must be fully in accordance with applicable laws, and since these laws are protective of public safety considering all hazardous chemical use, cumulative impacts would be less than significant.

Mitigation: No mitigation is necessary.

**Impact: PHS-C4: Will the WREP plus cumulative projects expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

This impact would be a site-specific hazard and is not subject to cumulative impacts from other projects.

*Program-Level Improvements – Less than Significant*

This impact would be a site-specific hazard and is not subject to cumulative impacts from other projects.

Mitigation: No mitigation is necessary.

**Impact: PHS-C5: Will the WREP plus cumulative projects increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?**

Analysis *Project-Level Near-Term Conveyance Improvements – No Impact*

Near-term improvements would not create ponding that would exist long enough to support mosquitoes or other disease vectors. Therefore, the near-term improvements contribution is not considerable.

*Program-Level Improvements: Pipelines and Pump Station – No Impact; Use of Recycled Water and Open Reservoir – Less than Significant*

Since neither construction nor operation and maintenance of the pipelines or pump station would create an open body of water where mosquitoes could breed, the contribution of these facilities to cumulative impacts is not considerable.

The Mosquito Prevention Program (Measure PD-10) included as part of the project would ensure that the open reservoir is designed in a manner that minimizes favorable conditions for the development of potential mosquito habitat as described in the CDPH and the Marin/Sonoma Mosquito Abatement District's Criteria for Mosquito Prevention in Wastewater Reclamation or Disposal Projects. Because the Abatement District has jurisdiction over the entire Program area subject to this impact and similar projects in the Program area would also be subject to the requirements, the District will be able to manage mosquito habitat sufficiently to reduce cumulative impacts to a less-than-significant level.

With implementation of the CDPH approved Notice of Intent, the impact potential for ponding as a result of excess irrigation would be reduced to less than significant. Since similar projects in the Program area would also be subject to the requirements, the CDPH will be able to manage mosquito habitat sufficiently to reduce cumulative impacts to a less-than-significant level.

Mitigation: No mitigation is necessary.

**Impact: PHS-C6: Will the WREP plus cumulative projects expose people or structures to a risk of loss, injury or death involving wildland fires?**

Analysis *Project-Level Near-term Conveyance Improvements – Less Than Significant*

This impact would be a temporary (during construction), site-specific hazard and is not subject to cumulative impacts from other projects.

*Program-Level Improvements: Pipelines, Pump Station, and Use of Recycled Water – No Impact; Open Reservoir – Less than Significant*

This impact would be a temporary (during construction), site-specific hazard and is not subject to cumulative impacts from other projects.

Mitigation: No mitigation is necessary.

**Impact: PHS-C7: Will the WREP plus cumulative projects expose the public to a flooding hazard?**

Analysis *Project-Level Near-term Conveyance Improvements: Pipelines – No Impact; Tanks – Less than Significant*

There would be no danger of flooding due to near-term pipelines; therefore, there would be no considerable contribution to cumulative impacts. There are no other projects listed in Appendix B that would construct water storage tanks near the proposed tertiary tank. Therefore, the tertiary tank contribution to cumulative impacts is not considerable. The impact remains less than significant with implementation of implementation of Measure PD-8, as well as the measures for Slope Stabilization (PD-4) and Reduction of Risk of Damage due to Liquefaction (PD-5).

*Program-Level Improvements: Pipelines, Pump Station, and Use of Recycled Water – No Impact; Open Reservoir – Less than Significant*

There would be no danger of flooding due to recycled water use, the pump station, or the program-level pipelines; therefore, there would be no considerable contribution from these facilities to cumulative impacts.

There are no other projects listed in Appendix B that would construct water storage reservoirs near the proposed open reservoir. Therefore, the open reservoir's contribution to cumulative impacts is not considerable. Using the standard of care described in PHS-7, the risk of reservoir failure remains less than significant.

Mitigation: No mitigation is necessary.

**Impact: PHS-C8: Will the WREP plus cumulative projects create a safety hazard for people residing or working near a public or private airport or airstrip?**

Analysis *Less Than Significant*

This impact would be a site-specific hazard and is not subject to cumulative impacts from other projects.

Mitigation: No mitigation is necessary.

## REFERENCES

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## 4.8 BIOLOGICAL RESOURCES

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This section describes and evaluates impacts to aquatic and terrestrial resources, plant communities, wildlife habitats, and special-status species within the vicinity of proposed project-level near-term conveyance improvements and program-level improvements.

### SETTING

The WREP study area consists of areas within the Urban Growth Boundary of the City of Petaluma and unincorporated areas of Sonoma County south and east of the City. The urban areas of the City of Petaluma range from high density housing, retail, and commercial areas in the city center to low density housing on the outskirts. In the surrounding rural suburbs houses occupy larger parcels associated with farming. In the surrounding valley and foothills, ranches that support agriculture, livestock, and vineyards dominate the landscape. The Petaluma River, a tributary to San Pablo Bay, is tidally influenced and supports saline marshes along each bank, until it reaches the city where dredging and other management practices have increased the channel depth and reduced vegetation. Beyond the city center to the north the river becomes more creek like and is vegetated with a thick willow riparian corridor that extends beyond the northern boundary of the City limits.

### Proposed Project

#### ***Project-Level Near-Term Conveyance Improvements***

##### *Storage Tank*

The proposed one-acre storage tank site, and its associated facilities, consists of a north facing slope vegetated with non-native grasses due to the historical use of the lands for livestock grazing. The existing detention basin, which would be used for emergency overflow of the storage tank, is located below the tank site adjacent to Washington Creek.

##### *Pipelines*

One 20-inch tertiary pipeline would be placed within the roadway along E. Washington Street and Ielmorini Road from Parkland Drive to the tertiary storage tank. A 12-inch diameter pipe, 535 feet long would connect the storage tank to the detention basin. The pipe would cross two private gravel roads but would mostly be buried beneath open fields. Two 20-inch pipelines would be placed in the existing roadway in Browns Lane extending from the Ellis Creek Water Recycling Facility to Ely Road where they would be tied in to existing pipelines. A small portion of these pipes would cut across a hayfield and manmade drainage from Lakeville Highway to Browns Lane.

#### ***Program-Level Improvements***

##### *Open Reservoir*

The proposed site for the open reservoir located northeast of the Lakeville Highway and Stage Gulch Road intersection is comprised primarily of non-native grasslands which have historically supported livestock grazing.

### *Pump Station*

The proposed site for the pump station is located in the vicinity of the Petaluma Golf and Country Club including an area that is hilly terrain that, due to the presence of scattered stands of oak trees, was likely once an Oak Woodland that existed prior to cattle grazing.

### *Pipelines*

The 28 miles of proposed pipelines would predominantly be placed within existing roadbeds mostly in the urban areas; however some may be placed in dirt or gravel roads, and possibly over open terrain.

## **Plant Communities and Associated Wildlife Habitat**

The plant community descriptions and nomenclature conventions used in this analysis employ the California Department of Fish and Game California Wildlife Habitat Relationships System (CWHR). This classification scheme is based on the 59 wildlife habitats described in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988) and may be used as a model to predict what wildlife species may inhabit specific plant communities. Supplemental information was obtained from *California Vegetation* (Holland and Keil, 1995). During the reconnaissance survey, wildlife observations were documented, which are listed below for each community in which they were observed (see Figure 4.8-1, Plant Communities).

### ***Pastoral Grassland***

Pastoral plant communities are dominated by introduced annual grasses that are adapted to intense livestock grazing (Holland and Keil 1995). Typical vegetation present consists primarily of oats (*Avena sativa* and *A. fatua*), Italian ryegrass (*Lolium multiflorum*), and several species of introduced thistle including Italian thistle (*Carduus pycnocephalus*), bull thistle (*Cirsium vulgare*), and yellow star thistle (*Centaurea solstitialis*). Other herbaceous species included tarplant (*Hemizonia* sp.), bristly ox-tongue (*Picris echioides*), mustard (*Brassica* sp.), curly dock (*Rumex crispus*), filaree (*Erodium* sp.), reed canarygrass (*Phalaris arundinacea*), and field bindweed (*Convolvulus arvensis*). Wildlife species observed during the July surveys in this community included barn swallow (*Hirundo rustica*), northern rough-winged swallow (*Stelgidopteryx serripennis*), red-tailed hawk (*Buteo jamaicensis*) with young, turkey vulture (*Cathartes aura*), American goldfinch (*Carduelis tristis*), American crow (*Corvus brachyrhynchos*), house finch (*Carpodacus mexicanus*), western bluebird (*Sialia mexicana*), wild turkey (*Meleagris gallopavo*), western fence lizard (*Sceloporus occidentalis*), Botta's pocket gopher (*Thomomys bottae*), and California vole (*Microtus californicus*).

Sensitive plant species with potential to occur in pastoral grasslands include Franciscan onion, alkali milk-vetch, round-leaved filaree, fragrant fritillary, Marin western flax (in serpentine soils), and two-fork clover. Pastoral grasslands often contain lacustrine environments such as wetlands, stock ponds, and occasionally, vernal pools. Sensitive species associated with wetlands and the earthen margins of stock ponds include Petaluma popcorn-flower, and Point Reyes checkerbloom. Sensitive species associated with vernal pools include Sonoma sunshine, dwarf downingia, Contra Costa goldfields, and legenera.

Sensitive wildlife species that could occur in pastoral grasslands include burrowing owl, Townsend's big eared bat and pallid bat (in barns, old buildings), loggerhead shrike, and

American badger. Pastoral grasslands often provide upland habitat for California red-legged frog and California tiger salamander, particularly when riverine or lacustrine habitat is nearby.

### **Urban**

The CWHR scheme classifies urban vegetation into five definitions; tree grove, street strip, shade tree/lawn, lawn, and shrub cover. Residential landscapes, parks, golf courses, and school grounds are included in this classification. Biomass productivity is greater than natural grasslands because of irrigation and fertilization (Mayer and Laudenslayer 1988). The variable planting design and local climate produce complex mosaics offering wildlife a good source of additional food such as fruits and berries. Examples of popular landscape species in urban and natural areas in Petaluma that have spread into other habitats include eucalyptus (*Eucalyptus* sp.), acacias (*Acacia* sp.), mimosa tree (*Albizia julibrissin*), fruit trees (*Prunus* spp.), pampass grass (*Cortaderia jubata*), firethorn (*Pyracantha angustifolia*), crimson bottlebrush (*Callistemon citrinus*), English ivy (*Hedera helix*), as well as numerous other species.

Ruderal plant communities are assemblages of plants that thrive in waste areas, roadsides and similar disturbed sites in towns and cities and along rural roadways (Holland and Keil 1995). Plants that occur in ruderal communities include scarlet pimpernel (*Anagallis arvensis*), puncture vine (*Tribulus terrestris*), sweet fennel (*Foeniculum vulgare*), pineapple weed (*Chamomilla suaveolens*), plantain (*Plantago* sp.), field bindweed, and star thistle.

Wildlife species observed in the urban areas of Petaluma during the survey included California towhee (*Pipilo crissalis*), western scrub-jay (*Aphelocoma californica*), Anna's hummingbird (*Calypte anna*), American crow, house sparrow (*Passer domesticus*), and house finch. Mammals associated with urban areas include raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*).

Urban environments are unlikely to provide suitable habitat for rare plants due to disturbed soil conditions and the predominance of exotic landscape species that compete successfully with native vegetation for resources such as space, nutrients and water. Urban habitats are also dominated by generalist scavenger wildlife species that prey upon sensitive wildlife species thus decreasing the likelihood that listed species would be found in urban areas. Exceptions may include listed species that are found in appropriately vegetated riverine and lacustrine habitats that are in urban areas.

### **Riverine**

Riverine habitats are rivers, creeks and streams that occur in association with a variety of terrestrial habitats and are frequently contiguous to lakes and fresh emergent wetland habitats (Mayer & Laudenslayer 1988). Rivers and streams often support riparian vegetation. The Petaluma River and its tributaries are riverine. Most of the tributaries are seasonal streams draining small, highly modified watersheds. The Petaluma River is a shallow, 18-mile long tidal estuary draining a watershed of approximately 126 square miles. Because of an excessive sediment load from tributaries and surrounding land uses, the river is regularly dredged and intensively managed to maintain channel capacity, provide adequate clearance for commercial and recreational navigation, and limit flooding of urban and rural residential areas. The riparian vegetation commonly associated with rivers has largely been altered or removed over time.

Riverine waters provide food for birds such as waterfowl, herons, shorebirds, and belted kingfishers, and habitat for fish, pond turtles, amphibians and other aquatic species. As a tidal

estuary and as part of the San Pablo Bay estuary, the Petaluma River and Marsh support a variety of aquatic species on a regular, seasonal, or occasional basis, including a number of special-status species.

Tributaries on the east side of the Petaluma River within the project region include Lynch Creek, Washington Creek, East Washington Creek, Adobe Creek, Ellis Creek, Stage Gulch Creek, and a few small unnamed seasonal drainages all of which originate from the Sonoma Mountains east of Petaluma and flow west through pasturelands into the river. Two tributaries on the west side of the river which originate from the hills to the southwest, Kelly Creek and Thompson Creek, flow down through pastoral grasslands and urban areas east to points along Eighth Street in Petaluma where they have been diverted underground and flow via culverts into the river.

The riverine habitats support entirely aquatic plants. No aquatic plants were listed on the CNDDDB, USFWS or CNPS databases. Sensitive wildlife species with potential to occur in the riverine habitats include California freshwater shrimp, steelhead, Sacramento splittail, California tiger salamander, California red-legged frog, foothill yellow-legged frog, and western pond turtle.

### **Valley Foothill Riparian**

Valley and foothill riparian communities are found adjacent to rivers and streams. Riparian vegetation consists of one or more species of deciduous trees, shrubs, and herbs that grow on the banks of most streams, lakes, and springs (Holland and Keil 1995). Riparian vegetation provides wildlife habitat in the form of food, shelter, and breeding sites. Tree canopies shade aquatic habitat and lower water temperatures which is necessary for salmonid spawning and rearing.

Lynch Creek, Washington Creek, East Washington Creek, Adobe Creek, Ellis Creek, State Gulch Creek, Kelly Creek, and Thompson Creek support riparian vegetation which provides nesting habitat for birds. Vegetation along these creeks is fairly sparse in the pasturelands and densely urban areas although restoration efforts are being undertaken by the Southern Sonoma County Resource Conservation District (SSCRCD) and various community-based organizations. The more abundantly vegetated reaches support species such as willows (*Salix* spp.), big leafed maple (*Acer macrophyllum*), coast live oak (*Quercus agrifolia*), valley oak (*Q. lobata*), buckeye (*Aesculus californica*), snowberry (*Symphoricarpos albus*), poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), Oregon ash (*Fraxinus latifolia*), sycamore (*Platanus racemosa*), common rush (*Juncus patens*), watercress (*Rorippa* spp.), and understory non-native plants such as poison hemlock (*Conium maculatum*), Himalayan blackberry (*Rubus discolor*), and sweet fennel. Some portions of the creek that lack tree canopy and ponded water support cattails (*Typha* spp.), pampass grass, sparse willows, and an assortment of non-native grasses.

During the July surveys several stretches of these creeks were mostly dry with areas of occasional ponded water. The creek substrates in most reaches were a mix of cobble and silt. Mosquitofish (*Gambusia affinis*) were abundant where water was present. Wildlife observed at the various creeks included Anna's hummingbird, black phoebe (*Sayornis nigricans*), Bewick's wren (*Thryomanes bewickii*), Nuttall's woodpecker (*Picoides nuttallii*), pacific-slope flycatcher (*Empidonax difficilis*), and oak titmouse (*Baeolophus inornatus*).

Sensitive plant species with potential to occur in valley foothill riparian include alkali milk-vetch, round-leaved filaree, Petaluma popcorn-flower, and two-fork clover. Sensitive wildlife species with potential to occur in valley foothill riparian include California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, and pallid bat (in dead trees).



### **Saline Emergent Wetlands**

Saline Emergent Wetlands are characterized as salt or brackish marshes that support vegetation that is adapted to varying degrees of soil and water salinity. These wetlands occur along the margins of bays, lagoons, and estuaries and are sheltered from excessive wave action (Mayer & Laudenslayer 1988). The Petaluma River supports expanses of saline emergent wetlands east of U. S. Highway 101 to San Pablo Bay. Many of these marshes are contiguous with croplands where ditches or canals have been excavated to drain the agricultural fields. Plant species observed in these wetlands include cattails, tules (*Scirpus californicus*), saltgrass (*Distichlis spicata*), sparse patches of pickleweed (*Salicornia virginiana*) and alkali heath (*Frankenia salina*). Wildlife species observed in the wetlands included song sparrow (*Melospiza melodia*), cinnamon teal (*Anas cyanoptera*), and red-winged blackbird (*Agelaius phoeniceus*). Saline emergent wetlands provide habitat for listed wildlife species dependent upon salt marsh vegetation. These species include saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), San Pablo song sparrow (*M. melodia samuelis*), California black rail (*Laterallus jamaicensis coturniculus*), California clapper rail (*Rallus longirostris obsoletus*), and salt-marsh harvest mouse (*Reithrodontomys raviventris*), all of which are special status species.

Special status plant species with potential to occur in saline emergent marsh include Point Reyes bird's-beak, soft bird's-beak, Marin knotweed Petaluma popcorn-flower, and Suisun Marsh aster.

### **Annual Grassland**

Annual Grassland habitats are open grasslands composed primarily of annual plant species and are largely influenced by weather patterns, livestock grazing, agricultural practices, and anthropogenic disturbance. Introduced annual grasses are the dominant plant species in this habitat which historically consisted of native grasslands. Native plant species may sparsely persist in annual grasslands but are ultimately prevented from reestablishing by exotic species.

Plant species observed in the annual grasslands during July surveys include oats, Italian rye, wild radish (*Raphanus sativus*), bur clover (*Medicago polymorpha*), foxtail barley (*Hordeum murinum*), lupine (*Lupinus* spp.), and clover (*Trifolium* spp.). Wildlife observed in annual grasslands during surveys included western fence lizard, black-tailed jackrabbit (*Lepus californicus*), Botta's pocket gopher, red-tailed hawk, turkey vulture, and blacktail deer (*Odocoileus hemionus*).

Special status plant species with potential to occur in pastoral grasslands include Franciscan onion, alkali milk-vetch, round-leaved filaree, fragrant fritillary, Marin western flax (in serpentine soils), and two-fork clover. Annual grasslands often contain lacustrine environments such as wetlands, and occasionally, vernal pools. Special status species associated with wetlands and stock ponds include Petaluma popcorn-flower, and Point Reyes checkerbloom. Sensitive species associated with vernal pools include Sonoma sunshine, dwarf downingia, Contra Costa goldfields, and legenera.

Special status wildlife species associated with annual grasslands include burrowing owl, Townsend's big eared bat and pallid bats (in barns, old buildings), loggerhead shrike, and American badger. Annual grasslands often provide uplands habitat for California red-legged frog and California tiger salamander, particularly when riverine or lacustrine habitat is nearby.

## **Croplands**

Croplands in the project area include a variety of agricultural crops including grapes, alfalfa hay, wheat, corn and numerous others. Vegetation in this habitat includes a variety of sizes, shapes, and growing patterns (Mayer & Laudenslayer 1988). Most cropland types in California are annuals and are managed in crop rotation methods. Due to the high rate of disturbance associated with agricultural needs (i.e., plowing, mowing, watering regimes) there is very little wildlife diversity in croplands. Wildlife species observed in the croplands in the project area include European starling (*Sturnus vulgaris*), mourning dove (*Zenaida macroura*), Brewer's blackbird (*Euphagus cyanocephalus*), blacktail jackrabbit, and red-tailed hawk.

Holland describes weed species that grow alongside crops and in abandoned agricultural fields as agrestal plant communities. Such weed species include oats, sow-thistle (*Sonchus* spp.), field bindweed, and Russian knapweed (*Acroptilon repens*). Fallow croplands over time become annual grasslands (Holland and Keil 1995).

Special status species would be similar to those listed above under Annual Grassland.

## **Oak Woodlands**

Oak Woodlands occur at elevations ranging from about 30 to 5,000 feet where summers are warm and dry and winters are mild and wet. Oak Woodlands vary depending on the dominant tree species; the two types that dominate the project vicinity are Valley Oak Woodland, and Coastal Oak woodland. Valley Oak Woodlands are dominated by valley oak and range from savanna-like to forest-like stands comprised mostly of winter-deciduous, broad-leaved species. Coastal Oak Woodlands are extremely variable and dominated by coast live oak along with mixed evergreen species such as California bay (*Umbellularia californica*), madrone (*Arbutus menziesii*), tanbark oak (*Lithocarpus densiflorus*), and Douglas fir (*Pseudotsuga menziesii*). Typical understory plants include toyon (*Heteromeles arbutifolia*), creeping snowberry (*Symphoricarpos* spp.), and California blackberry.

Livestock grazing and agriculture have greatly reduced the Oak Woodlands in the Petaluma vicinity, however scattered stands remain. Oak Woodlands provide valuable habitat for a variety of species such as acorn woodpecker (*Melanerpes formicivorus*), white-breasted nuthatch (*Sitta carolinensis*), oak titmouse, bushtit (*Psaltriparus minimus*), red-tailed hawk, and many others.

Special status plant species would be similar to those listed above under Annual Grassland.

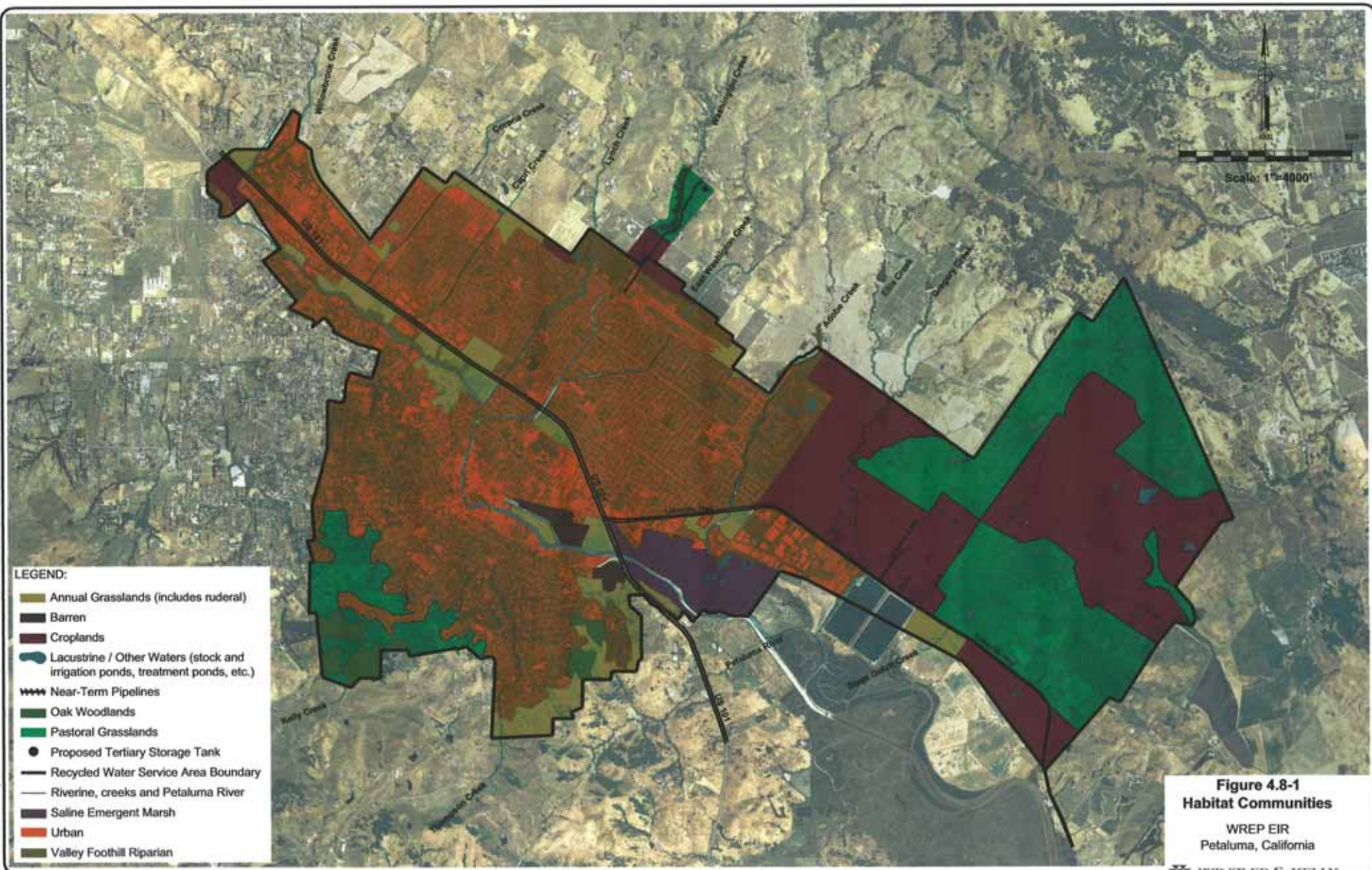
Oak woodlands may provide upland habitat for California red-legged frog, and California tiger salamander, particularly when riverine or lacustrine habitat is nearby. Sparse oak woodlands may support American badger in open areas.

## **Lacustrine**

Lacustrine habitats are inland depressions or dammed riverine channels containing standing water, permanently flooded reservoirs, intermittent lakes and ponds (including stock or agricultural ponds), freshwater marshes, wetlands, and vernal pools. Most permanent lacustrine systems support fish and amphibians; intermittent types usually do not (Mayer & Laudenslayer 1988). There are a significant number of stock ponds and agricultural reservoirs in Petaluma in the rural valleys and surrounding hills that were formed either by the damming of springs, creeks, or drainages, or by excavation. Many of these ponds are indicated on Figure 4-8-1, Habitat

Communities, and are indicated in the legend as 'other waters'. Lacustrine environments that support standing water throughout the year often develop an algal component and higher vegetation associated with freshwater marshes such as cattails, willows, juncus, and duckweed (*Lemna* spp.). Wetlands and vernal pools often support hydric plants that are unique to certain soil conditions and inundation regimes.

The lacustrine habitats support entirely aquatic plants, none of which was listed on the CNDDDB, USFWS or CNPS databases. Special Status plant species with potential to occur on the earthen margins of lacustrine environments include Petaluma popcorn-flower, Point Reyes checkerbloom Sonoma sunshine, dwarf downingia, Contra Costa goldfields, and legenera. Sensitive wildlife species with potential to occur in lacustrine habitats include California tiger salamander, California red-legged frog and western pond turtle.



## **Barren**

Barren habitat is any area that has less than 2% total vegetative cover such as rock quarries, paved roads, sidewalks, bridges and rock outcrops. Barren areas provide very little wildlife habitat value although some species, such as feral pigeons (*Columba livia*) may inhabit such sites. Several species of bats sometimes roost in crevices underneath bridges, and cliff swallows (*Petrochelidon pyrrhonota*) and, less often, Vaux's swift (*Chaetura vauxi*) nest underneath bridges.

Barren habitats that have a history of disturbance, such as areas where gravel mining occurs or commercial yards do not provide suitable resources such as water and soil that sensitive plant species require. Bridges may provide roosting habitat for pallid bats. Rock outcrops may provide roosting habitat for pallid bats and nesting sites for sensitive bird species such as Peregrine falcon or prairie falcon.

## **Wetlands and Waters**

The only wetlands or waters that have been identified in the project-level improvements construction area are some wetlands and a man-made drainage which are potentially jurisdictional wetlands near the intersection of Lakeville Highway and Browns Lane. There may be wetlands and waters distributed throughout the program-level improvements construction area, including the Petaluma River and its tributaries.

## **Special-status Species**

Special-status species include:

- plants and animals that are legally protected or proposed for protection under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA);
- plants and animals defined as endangered or rare under the California Environmental Quality Act (CEQA);
- animals designated as species of special concern by the USFWS or CDFG;
- animals listed as "fully protected" in the Fish and Game Code of California (Sections 3511, 4700, 5050 and 5515), and;
- plants listed in the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants of California (CNPS 1999).

A complete list of special-status plant and animal species was compiled from lists identified by the USFWS, California Natural Diversity Data Base (CNDDB [Rarefind] 2007), and the CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS 2007).

## **Discussion of Species with Suitable Habitat in the Project Area**

### ***Franciscan Onion***

Franciscan onion (*Allium peninsulare* var. *franciscanum*) is a CNPS list 1B plant, a member of the Lily family, and is an uncommon perennial herb that occurs on dry, wooded or open hillsides below elevations of 1,000 ft. The blooming period for this species is between May and June. There is one CNDDB record for the Franciscan onion in the project vicinity with no specific location documented (Occurrence 10) for a specimen collected in 1880 with the location described as Petaluma. It is unlikely that this species would occur on the project site, however the

pastoral and annual grasslands in the project region may contain suitable habitat therefore special-status plant surveys should be conducted during the blooming period in accordance with CDFG survey guidelines (CDFG 1983).

### ***Alkali Milk-vetch***

Alkali milk-vetch (*Astragalus tener* ssp. *tener*), a CNPS list 1B (rare) plant, is an uncommon annual with small flowers that bloom between March and June. This species occurs in grassy alkaline flats, valley and foothill grasslands in adobe clay soils, and vernal pools with alkaline soils at elevations below 200 ft. There is one CNDDDB record for Alkali milk-vetch in Sonoma County (occurrence 39) which, like the Franciscan onion was a specimen collected in 1880 with Petaluma listed as the general location. It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of valley and foothill grasslands; therefore appropriately timed plant surveys should be conducted.

### ***Sonoma Sunshine***

Sonoma sunshine (*Blennosperma bakeri*) is a federal and state listed endangered and CNPS list 1B plant that occurs in vernal pools, and swales in valley and foothill grasslands at elevations below 350 feet. The nearest CNDDDB record (occurrence 5) is several miles northeast of Petaluma in Sonoma Valley Regional Park, east of Glen Ellen. There is no designated critical habitat for this species; however it is included in the USFWS *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of valley and foothill grasslands; therefore appropriately timed plant surveys during the blooming period between March and April should be conducted.

### ***Round-leaved Filaree***

Round-leaved filaree (*California macrophyllum*), a CNPS list 1B species is a rare annual herb in the geranium family. This species occurs in cismontane woodlands, and valley and foothill grasslands in clay soil between elevations of 50 to 4,000 ft and blooms from March to May. There is one CNDDDB record for round-leaved filaree in Sonoma County (occurrence 59) which, like the Franciscan onion and alkali milk vetch profiled above was a specimen collected in 1880 with Petaluma listed as the general location. It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of valley and foothill grasslands; therefore appropriately timed plant surveys should be conducted.

### ***Point Reyes Bird's Beak***

Point Reyes birds beak (*Cordylanthus maritimus* ssp. *palustris*) is a CNPS list 1B plant species that occurs in coastal salt marshes and swamps. This member of the figwort family blooms between June and October and is found at elevations below 35 feet. The nearest CNDDDB record is for plants found in 1993 in the Petaluma Marsh (occurrence 61) between Woloki and Mud Hen Sloughs approximately 5 miles southeast of Petaluma. The only other records in Sonoma County are for plants found in salt marshes near Bodega Head. It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of saltwater emergent wetlands; therefore appropriately timed plant surveys should be conducted.

### **Soft bird's-beak**

Soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*) is a federal endangered, state rare, and CNPS list 1B plant. This annual herb occurs in saline emergent marshes and blooms between July and September at elevations below 10 feet. The nearest CNDDDB record is for plants found in 1993 in the Petaluma Marsh (occurrence 61) between San Antonio Creek and Mud Hen Slough approximately 5 miles southeast of Petaluma. The soft bird's-beak is included in the *Tidal Marsh Ecosystem Recovery Plan* that is being developed by the USFWS for tidal marsh ecosystems; no critical habitat exists in the vicinity of the proposed project. It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of saline emergent wetlands thus appropriately timed plant surveys should be conducted.

### **Dwarf Downingia**

Dwarf downingia (*Downingia pusilla*) is a CNPS list 2 (endangered in California) plant found in moist plains in Sonoma County (Best et al. 1996). The blooming period for this species is between March and May where it occurs at elevations below 350 feet. The nearest CNDDDB record is for plants observed in the Sonoma Valley Regional Park several miles northeast of Petaluma (occurrence 29). It is unlikely that this species would occur anywhere in the project vicinity, however its presence cannot be ruled out entirely due to the presence of valley and foothill grasslands; therefore appropriately timed plant surveys should be conducted.

### **Fragrant Fritillary**

Fragrant fritillary (*Fritillaria liliacea*), a CNPS list 1B plant, is a member of the lily family that occurs in open hills and fields in heavy soils (Best et al. 1996) and often in serpentine soils. This rare, bulbiferous herb blooms between February and April at elevations below 700 feet. The nearest CNDDDB records to the project vicinity are for several plants observed in 1981 north of the Taylor Mountain Summit, east of Petaluma (occurrence 62) and a 1930 record (occurrence 47) several miles northwest of Petaluma. There may be suitable habitat present in the valley and foothill grasslands in the project vicinity therefore floristic surveys should be conducted during the early spring blooming period.

### **Marin Western Flax**

Marin western flax (*Hesperolinon congestum*) is a federal and state threatened and a CNPS 1B listed plant species that occurs in chaparral, and valley and foothill grasslands in serpentine soils. There is no critical habitat for this species; however it is included in the USFWS *Recovery Plan for Serpentine Soil Species of the San Francisco Bay*. This plant blooms between May and July at elevations between 100 to 1,200 feet. The nearest CNDDDB records (occurrence 25 and 26) were for plants observed in Mt. Burdell Open Space several miles south of Petaluma near Novato. There may be suitable habitat present in the valley and foothill grasslands on serpentine soils in the project vicinity therefore floristic surveys should be conducted during the early spring blooming period.

### **Contra Costa Goldfields**

Contra Costa goldfields (*Lasthenia conjugens*) is federal listed endangered species and a CNPS list 1B annual herb often found in vernal pools, valley and foothill grasslands, and mesic meadows. This plant species is included in the USFWS *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*; however the project region is not within

designated critical habitat. This species blooms from March to June in elevations between sea level and 1,550 feet. There is no likely habitat for this species on the project site however the presence of valley and foothill grasslands and the close proximity of a CNDDDB record (occurrence 39) located in a vernal pool near Stage Gulch Road and State Route 116 warrants floristic surveys for this species during its March to June blooming period.

### **Legenere**

Legenere (*Legenere limosa*) is a CNPS 1B plant that occurs in wet areas and vernal pools. The blooming period for this plant is between May and June and it occurs in elevations below 500 feet. The nearest CNDDDB record was for plants observed in 1989 in a vernal pool several miles northeast of Petaluma in the Sonoma Mountains that has since been filled in (occurrence 8). It is unlikely that this species would occur within the project region, however due to the presence of valley and foothill grasslands that may harbor wetlands, floristic surveys are recommended for this plant during the blooming period.

### **Petaluma Popcorn-flower**

Petaluma popcorn-flower (*Plagiobothrys mollis* var. *vestitus*) is a CNPS list 1A (presumed extinct) plant. The plant is believed to have occurred in valley and foothill grasslands, and on the margins of saline emergent wetlands at elevations between 35 and 170 feet. It has a brief blooming period between June and July. There is one CNDDDB record for Petaluma popcorn-flower in Sonoma County (occurrence 1) which, like the Franciscan onion and alkali milk vetch profiled above, was a specimen collected in 1880 with Petaluma listed as the general location. It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of valley and foothill grasslands and saline emergent wetlands; therefore appropriately timed plant surveys should be conducted.

### **Marin Knotweed**

Marin knotweed (*Polygonum marinense*) is a CNPS list 3.1 (seriously endangered) plant that occurs in coastal salt or brackish marshes and swamps at elevations below 35 feet. This member of the buckwheat family blooms between June and August. The nearest CNDDDB record (occurrence 3) is for plants observed in 1945 in a salt marsh near Mt. Burdell, several miles south of Petaluma. The presence of Marin knotweed cannot be ruled out due to the existence of saline emergent wetlands therefore appropriately time plant surveys are recommended.

### **Point Reyes Checkerbloom**

Point Reyes checkerbloom (*Sidalcea calycosa* ssp. *rhizomata*) is a CNPS list 1B plant that grows near freshwater marshes and swamps among tussocks of rush and sedge (Best et al. 1996) at elevations between 15 to 250 feet. The blooming period is between May and November. There is one CNDDDB record for Petaluma popcorn-flower in Sonoma County (occurrence 10) which, like the Franciscan onion and alkali milk vetch profiled above, was a specimen collected in 1880 with Petaluma listed as the general location. It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of lacustrine habitat therefore appropriately timed plant surveys should be conducted.



### **Suisun Marsh Aster**

Suisun Marsh aster (*Symphotrichum lentum* or *Aster lentus*) is a CNPS list 1B plant that occurs in freshwater and brackish marshes and swamps at elevations below 10 feet. The blooming period is between May and November. There is one CNDDDB record for Petaluma that describes collections in 1880 and 1897 with a location description as possibly central Petaluma or the Petaluma Valley (occurrence 149). It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of lacustrine and saline emergent wetlands; therefore appropriately timed plant surveys should be conducted.

### **Two-fork Clover**

Two-fork clover (*Trifolium amoenum*) is a federal endangered species and a CNPS list 1B plant that occurs in low, wet swales, valley and foothill grasslands in moist heavy soils below 330 feet. There is no designated critical habitat or recovery plan. This species was considered extinct until a single plant was discovered in 1993 on private property 2 miles south of Petaluma on Point Reyes Road (occurrence 19). It is unlikely that this species would occur anywhere on the project site, however its presence cannot be ruled out entirely due to the presence of valley and foothill grasslands; therefore appropriately timed plant surveys should be conducted during the blooming period for this plant which is April to June.

### **California Freshwater Shrimp**

The California freshwater shrimp (*Syncaris pacifica*) is listed as federal and state endangered and is the only extant member of the genus *Syncaris*. It is the subject of the USFWS *Recovery Plan for the California Freshwater Shrimp*; however there is no designated critical habitat. The shrimp is endemic to Marin, Sonoma, and Napa counties. The shrimp is found in low elevation (less than 115 meters, 380 feet), low gradient (generally less than 1 percent) perennial freshwater streams or intermittent streams with perennial pools where banks are structurally diverse with undercut banks, exposed roots, overhanging woody debris, or overhanging vegetation (USFWS 1998). Existing populations are threatened by introduced fish, deterioration or loss of habitat resulting from water diversion, impoundments, livestock and dairy activities, agricultural activities and developments, flood control activities, gravel mining, timber harvesting, migration barriers, and water pollution (op cit). There is a CNDDDB record for this species several miles to the northwest in the Russian River Watershed (occurrence 10), and two records several miles northeast on the east side of the Sonoma Mountains in the Yulupa Creek Watershed (occurrence 1) and the Sonoma Creek Watershed (occurrence 14). Potentially suitable habitat may exist in the riverine systems in the project region.

### **Steelhead**

Steelhead (*Oncorhynchus mykiss irideus*) in the Petaluma River are included by the National Marine Fisheries Service (NMFS) in the Central California Coast Evolutionarily Significant Unit (ESU) and are listed as a federal threatened species. The ESU includes all naturally spawned populations of steelhead (and their progeny) from the Russian River south to Aptos Creek in Santa Cruz County and the drainages of the San Francisco and San Pablo Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers and their tributaries. The Petaluma River and its tributaries were a historical migration route and habitat for steelhead (Leidy et al. 2005). The project site is also located within designated critical habitat for the Central California Coast Steelhead ESU; a draft recovery plan for this species is under development by NMFS.

Steelhead are anadromous; the adults return to their natal streams to spawn after 1-3 years at sea. Unlike other Pacific salmon, adults do not automatically die after spawning--some (mostly females) survive, return to the ocean, and may spawn again one or two years later. Most steelhead of the Central California Coast ESU begin their spawning runs in the winter months of November and as late as the end of April. Juveniles spend from one to three or more years rearing in their natal stream before migrating to sea as smolts. After entering the sea, steelhead grow rapidly to adult size, as do other salmon species.

Successful spawning and juvenile rearing requires certain types of habitat, including coarse, clean, well-oxygenated gravel for spawning and incubation. Excessive accumulations of fine sediment directly affect the viability of eggs, embryos, and juveniles (Reiser and Bjornn 1979; Barnhart 1986). After emerging from the gravel, juveniles require cool, clean water that persists through the dry season, a supply of invertebrate food, and shelter for resting and protection from predators.

Spawning and juvenile rearing usually take place in the upper reaches of smaller tributaries where suitable spawning gravel is present and cooler water persists throughout the summer months. Steelhead have been observed in Adobe Creek (CNDDDB occurrence 1) and Lynch Creek (Leidy et al. 2005). Some of the riverine habitat in the project region provides suitable habitat for this species. Any effect on sedimentation, turbidity, or toxicity levels in the Petaluma River could affect steelhead in Petaluma River migrating to or from spawning and rearing areas in Adobe Creek, San Antonio Creek, or upper Ellis Creek, or on juveniles rearing in the estuary (Petaluma Water Recycling Facility Final EIR 2002).

### **Sacramento Splittail**

The Sacramento splittail (*Pogonichthys macrolepidotus*) is a member of the minnow family (*Cyprinidae*) and the only existing member of the genus *Pogonichthys* in California. The term splittail refers to its deeply forked caudal fin, the upper lobe of which is significantly longer than the lower lobe. Splittail are found in slow-moving reaches of larger rivers (including the Petaluma River) that drain into San Pablo Bay, and in low-salinity areas of estuaries, including San Pablo Bay. Splittail may live 5 to 7 years, reaching a length of 14 inches or more (Moyle 1976; Moyle et al. 1995). Spawning occurs in dead-end sloughs and lower reaches of rivers, among submerged macrophytes or flooded streambank vegetation. Foods include benthic invertebrates, earthworms in flooded areas in spring, and eggs of other fish species.

Splittail representing several different year classes were found in the Petaluma River near downtown Petaluma in July-August, 1999 (CNDDDB occurrence 8). Any project related impact to the river and its fringing coastal brackish and salt marsh may affect the species.

### **California Tiger Salamander**

The California tiger salamander (*Ambystoma californiense*) is a federally threatened species and a state listed species of special concern. There is no designated critical habitat for the Petaluma area and it is not part of the USFWS *Santa Rosa Conservation Strategy* recovery planning for the Sonoma County population. These salamanders inhabit low elevation (below 1,500 ft) grasslands and foothills that support vernal pools, seasonal ponds, and stock ponds that retain water into the early spring. The salamanders rely on rodent or ground squirrel burrows, or deep crevices in the ground where they spend most of their lives underground. With the onset of the rainy season, usually November in Sonoma County, they emerge from their refuge burrows at night and enter the wetlands to breed during the months of December through March. The females deposit eggs,

which hatch in two to four weeks. The larvae remain in the water undergoing metamorphosis until the pond dries during the warmer weather, then migrate to the upland burrows to aestivate underground until the rainy season arrives. Juveniles have been found to migrate as far as 5,290 feet from wetland environments into upland habitat (Jennings and Hayes 1994).

The USFWS has determined that the California tiger salamander has three primary requirements 1) standing bodies of fresh water, including natural and man-made (e.g., stock) ponds, vernal pools, and dune ponds, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a sufficient length of time (i.e. 12 weeks) necessary for the species to complete the aquatic portion of its life cycle; 2) barrier-free uplands adjacent to breeding ponds that contain small mammal burrows. Small mammals are essential in creating the underground habitat that adult California tiger salamanders depend upon for food, shelter, and protection from the elements and predation; and 3) upland areas between breeding locations and areas with small mammal burrows that allow for dispersal among such sites (USFWS 2004). The CTS requires large interconnected breeding and upland refuge habitat. The conversion of grazing land to suburban housing developments and other agricultural uses has significantly decreased the amount of unfragmented habitat available to sustain salamander populations.

The nearest CNDDDB occurrence (531) was 3.8 miles north of the storage tank site near the town of Penngrove. The lacustrine habitats in the project region provide potential breeding habitat for the California tiger salamander.

### **California Red-legged Frog**

The California red-legged frog (*Rana aurora draytonii*) is a federal listed endangered species and a state species of special concern. This frog is the subject of the USFWS *Recovery Plan for the California Red-legged Frog*; however there is no designated critical habitat in Sonoma County. The California red-legged frog is a large brown to reddish brown frog that historically occurred in coastal habitats from the vicinity of Point Reyes National Seashore and inland from the vicinity of Redding southward to northwestern Baja California, Mexico (Jennings and Hayes 1994, USFWS 2000). The species has been extirpated from seventy percent of its historic range (USFWS 2000). Though still fairly common in the northern San Francisco Bay area and along the central coast, the remainder of the California red-legged frog's distribution has been reduced to isolated localities in the Sierra Nevada, northern Coast Range, and northern Transverse Range (USFWS 2000).

Beginning with commercial hunting for the restaurant industry prior to the turn of the century, this species has been subjected to a variety of pressures that have resulted in its decline and disappearance over the majority of its historic range (Jennings and Hayes 1994). Other factors that have contributed to the decline of California red-legged frog include destruction of riparian habitat due to development, agriculture, or flood control practices, and the introduction of exotic predators such as bullfrogs, crayfish, and a variety of non-native fishes (Jennings and Hayes 1994).

The California red-legged frog inhabits a variety of aquatic, upland, and riparian environments, including ephemeral and permanent ponds, seasonal wetlands, perennial creeks, intermittent streams, manmade aquatic features (e.g. stock ponds), riparian corridors, blackberry thickets, non-native annual grasslands, and oak savannahs (USFWS 2000a). This species appears to be capable of utilizing almost any aquatic system provided a permanent source of water, ideally lacking non-native predators, is nearby (Stebbins 1985, Jennings and Hayes 1994, USFWS

2000a). “The importance of riparian vegetation for this species is not well understood” (USFWS 2000a). The ability of this species to disperse relatively great distances (over 2 miles [about 3 kilometers]), serves as an important key to its long-term survival, by enabling it to recolonize areas subjected to localized extinctions and colonize new or previously uncolonized areas (op cit.).

Breeding occurs during winter and early spring (late November through April). After mating, the female attaches egg masses containing 2,000 to 6,000 eggs to emergent vegetation at or near the water’s surface. The embryos hatch within 6 to 14 days after fertilization and the larvae typically complete metamorphosis between July and September, 3.5 to 7 months after the eggs were laid. Sexual maturity is attained in 2 years by males and 3 years by females. Juveniles may be active both diurnally and nocturnally, while adults are highly nocturnal (Jennings and Hayes 1994, USFWS 1997a and 2000a, Storer 1925).

There are CNDDDB records for creeks in Petaluma including 3 California red-legged frogs observed in Kelly Creek (occurrence 840) near the D Street crossing in 2005; in 2001, one individual was observed in a seasonal flood control channel south of Magnolia Avenue on the west side of Petaluma (occurrence 183) adults and juveniles were observed 6 miles east of Petaluma in 2003 in an intermittent drainage upstream of Tolay Creek and larvae was observed in a stock pond nearby (occurrence 659); and in 1994 two adults were observed in Ellis Creek between South Ely Road and Lakeville Highway (occurrence 959).

### ***Foothill Yellow-legged Frog***

The foothill yellow-legged frog (*Rana boylei*) is a medium-sized (2 in. body length) ranid frog found in shallow, rocky or cobbly streams containing riffles and pools, and a partially open riparian canopy (i.e., at least dappled sunlight). This species is more likely to occur in small streams than in large streams or rivers. Eggs are attached in masses to rocks or cobbles in flowing water along the stream edge in spring, after most of the high winter flows are over (Jennings and Hayes 1994). The larvae are nearly black when first hatched, but soon change to cryptic coloration that closely matches the streambed. This species is a federal and state species of concern. Although this species has disappeared from many parts of its former range, particularly in the southern half of the range, it is still common in streams with suitable habitat in Sonoma County.

Many foothill yellow-legged frogs were been observed in Adobe Creek in 1997 (occurrence 159). With the exception of the Petaluma River, suitable habitat exists in a number of reaches in the riverine habitat in the project vicinity.

### ***Northwestern Pond Turtle***

The Western pond turtle (*Clemmys marmorata marmorata*), a state listed species of special concern occurs throughout northern California extending northward from the vicinity of the American River. Pond turtles are associated with permanent water or nearly permanent water including ponds, lakes, streams and irrigation ditches or permanent pools along intermittent streams in a variety of environments. Pond turtles are often observed basking on exposed sites, such as logs and mud banks (Stebbins 1985). An omnivorous species, pond turtles feed on a variety of items including aquatic plant material, small insects, aquatic invertebrates, fish, and frogs. They lay their eggs upland of streams in nests they dig in dry soil with sparse vegetation and southern exposure. After the eggs are deposited in the nest they cover the hole with a mixture

of vegetation and wetted soil. Nesting occurs during the months of April through August (*op. cit.*).

CNDDDB records for the nearest observations of western pond turtles include 4 adult turtles that were observed in 2003 in an unnamed drainage between Lakeville Highway and the Petaluma River east of the Petaluma Wastewater Oxidation Ponds (occurrence 244); numerous adults and juveniles were observed in a reservoir in a pastoral grassland 1.2 miles north and east of the intersection of State Route 116 and Browns Lane (occurrence 127); and one adult was observed in a reservoir near the intersection of Adobe Road and Stage Gulch Road (occurrence 133). The lacustrine and riverine systems in the project region provide suitable habitat for the northwestern pond turtle.

### **California Clapper Rail**

The California clapper rail (*Rallus longirostris obsoletus*) is a federal and state listed endangered species. This species is included in the USFWS *Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan* which will eventually be replaced by the *Tidal Marsh Ecosystem Recovery Plan*, which is under development. No critical habitat has been designated. This rail is a small, secretive water bird that inhabits the coastal salt marshes, brackish marshes and tidal sloughs of northern California. California clapper rails are year-round residents of the upper to lower zones of coastal salt marshes characterized by dense pickleweed and cordgrass (*Spartina foliosa*). The rails forage in the soft mud exposed at low tide along the tidal sloughs and channels in the salt marsh. Foods consumed by the rails include crabs, mussels, clams, snails, insects, spiders, amphipods, polychaete worms, small rodents, and fish. Nests are constructed with local plant materials near the tidal sloughs under the protective cover of the pickleweed and cordgrass. Five to ten eggs are laid, on average; during the nesting period and incubation duties are shared by both parents. The young hatch in 23 to 29 days (Applegarth 1938, Zucca 1954) and soon leave the nest. Parental care continues until the chicks are approximately eight weeks old (Zemba 1991). Young fledge at ten weeks and are usually displaced from the parental territory shortly thereafter. Juvenile dispersal may occur up to 10 km (6.2 mi) away from the natal area. Clapper rails will readily re-nest if they lose a clutch or brood (Applegarth 1938). Some pairs may successfully nest twice in the same season.

This subspecies is in danger of extinction due to significant loss, degradation, and fragmentation of suitable habitat. Tidal wetlands within the San Francisco Bay area have been reduced 85 to 95 percent since the mid 1800's, from an original estimated 181,000 acres. One decade after federal listing, the population of California clapper rails was estimated at 1,500 birds, 80 percent of which occurred in the South San Francisco Bay area. However, by the mid-1980s the population was declining dramatically. By the winter of 1991-1992, only an estimated 300 birds remained in South San Francisco Bay. Much of the remaining suitable habitat for clapper rails is highly fragmented and degraded. Invasive, non-native predators including red foxes, Norway rats, and feral cats and dogs also prey on clapper rails and their eggs.

The long-term viability and recovery of the California clapper rail depends largely on the preservation and restoration of sufficiently large tracts of suitable salt marsh habitat. The establishment of the San Francisco Bay National Wildlife Refuge in 1972 and its expansion to 43,000 acres in 1988 provided the largest reserve for clapper rail in the San Francisco Bay area. Ongoing cooperative acquisition and restoration programs between the USFWS, CDFG, East Bay Regional Park District, Regional Water Quality Control Board, other state and federal agencies, and numerous conservation organizations continue to provide opportunities to increase the amount of land dedicated to clapper rail conservation. In addition, ongoing predator control

programs within the national wildlife refuge have effectively reduced predation pressure on this subspecies.

Historically, the distribution of California clapper rail extended from Humboldt Bay in Humboldt County south to Morro Bay in San Luis Obispo County. This subspecies is now known to occur only in San Francisco and Suisun Bays, with the largest numbers of California clapper rail occurring in the salt marshes of South San Francisco Bay. The nearest CNDDDB occurrence (105) to the project region was for several individuals observed during a focused survey in Mud Hen Slough six miles southeast of Petaluma in 1973. Presence has also been documented in wetlands bordering the Petaluma River near the Ellis Creek Water Recycling Facility (Evans 2003). The saline emergent wetlands within the project boundary may also provide suitable habitat for this species.

### **California Black Rail**

The California black rail (*Laterallus jamaicensis*) is a state listed threatened and fully protected species. This small sparrow sized rail is a year long resident of saline, brackish, and fresh emergent wetlands in the San Francisco Bay area (Zeiner et al. 1990a). Habitat used by black rail ranges from almost pure pickleweed to sedges, saltgrass, bulrushes and cattails. The species nests in dense vegetation near the upper limits of tidal flooding. The foraging habitat of the species in the San Francisco Bay area consists of tidal emergent wetlands, tidal sloughs, and freshwater supporting bulrush. During high tides, these areas provide protection from predation. Escape cover is critical to the survival of these birds. Predation by large waders (e.g., egrets and herons) in habitats without sufficient escape cover is particularly high during high seasonal tides (typically during December and January). Black rails are considered non-migratory, although juveniles may disperse long distances (32 km) away from their natal nesting areas (BioSystems Analysis, Inc. 1994).

The California black rail population is currently declining due to habitat loss, predation, habitat contamination and nest disturbance. Nest desertion is common when individuals are disturbed during nesting. Maintenance of existing, occupied habitat is also important since black rail recolonization of restored marshes has not been particularly successful (BioSystems Analysis, Inc. 1994).

Historically, the California black rail is believed to have occurred from Bodega Bay south along the coast to northern Baja California and in inland freshwater marshes of the Sacramento-San Joaquin River Delta, San Bernardino-Riverside area, Salton Sea, and lower Colorado River north of Yuma. Today more than 80 percent of California black rails live in the northern reaches of the San Francisco Bay estuary, where they occur almost exclusively in marshes with unrestricted tidal influence (BioSystems Analysis, Inc. 1994). Within the San Francisco Bay area the subspecies is currently confined to mostly pristine remnants of historical tidal marshlands along the large tributaries and shoreline of northern San Pablo Bay, along the Carquinez Strait, and throughout parts of Suisun Bay (Evens et al. 1991).

The nearest CNDDDB record (occurrence 90) to the project region was the observance of rails in Black John Slough several miles south of Petaluma near Novato in 2005. Individuals have also been identified near the Ellis Creek Water Recycling Facility. The saline emergent wetlands in the project region may provide habitat for the black rail.

### **Burrowing Owl**

The Western burrowing owl (*Athene cunicularia hypugea*) is designated as a species of special concern by the CDFG, and is also protected under the Migratory Bird Treaty Act. The owl is small in size, with sandy coloring on the head, back, and upper parts of the wings and white-to-cream with barring on the breast and belly. Burrowing owls are found in open, dry grasslands, agricultural and range lands, and desert communities, often in association with burrowing animals. Burrowing owls may also be found at the margins of airports, irrigation ditches, golf courses, and vacant urban lots. Burrowing owls are primarily crepuscular (active at dusk and dawn), but will hunt throughout a 24-hour period. Burrows created by ground squirrel or other small mammal are typically used for shelter and nesting.

Burrowing owl populations have declined throughout California as a result of habitat loss from agricultural conversion and urbanization, and from the secondary effects of ground squirrel poisoning programs.

The nearest CNDDDB record for burrowing owls is for one individual that was observed on a burrow approximately 3 miles southwest of Petaluma (occurrence 769) in 2005. The annual and pastoral grasslands and croplands in the project region may provide habitat for the western burrowing owl.

### **Loggerhead Shrike**

The Loggerhead shrike (*Lanius ludovicianus*) is designated as a species of special concern by the CDFG and is also protected under the Migratory Bird Treaty Act. The loggerhead shrike occurs in lowlands and foothills throughout California. The species inhabits open areas with scattered trees and scrub, and other available hunting perches, such as fences and wires. Open croplands and grasslands serve as important foraging areas. Common prey items include insects, small birds, mammals, amphibians, reptiles, and other invertebrates.

Although the direct cause is not known, population declines have been recently noted for the species. Pesticides and habitat encroachment have been proposed as potential causes of this species decline.

Though there are no CNDDDB records for this species in Sonoma County, a loggerhead shrike was observed foraging along the roadside on Stage Gulch Road approximately .25 mile south of the Stage Gulch and Adobe Road intersection in 2006 (personal observation). The annual and pastoral grasslands and croplands in the project region may provide habitat for the loggerhead shrike.

### **Saltmarsh Common Yellowthroat**

The saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), a CDFG species of special concern, nests in a variety of habitats ranging from brackish marsh and emergent wetland to riparian woodland. Nests are placed near or on the ground, or may be over water in emergent aquatic vegetation, dense shrubs, or other dense growth (Zeiner et al. 1990a). Common yellowthroat generally have home ranges between 0.3 to 1.4 ha (0.8 to 3.4 ac). Breeding occurs from early April to mid-July with peak activity in May and June. Clutch size ranges between 3 and 6 eggs (average 4). Male common yellowthroat are usually monogamous, but they may also be polygynous, depending on the availability and quality of suitable habitat. The diet of common yellowthroat is almost exclusively insectivorous, but occasionally includes seeds. Predators

include snakes, accipiters and small mammals. Yellowthroat nests are also commonly parasitized by brown-headed cowbirds (*Molothrus ater*).

The saltmarsh common yellowthroat is restricted to the marshes and wetland habitats of San Francisco and San Pablo Bays, and along the central coast of California. The historic breeding range of this species extended from Tomales Bay in Marin County south to San Jose and east to the Carquinez Strait (Grinnell and Miller 1944). Surveys have located saltmarsh common yellowthroat in Marin, Sonoma, Napa, Solano, Alameda, San Francisco, San Mateo, and Santa Clara counties (Foster 1977, Hobson et al. 1986).

The nearest CNDDDB records for this species in the project region is a record for a breeding pair in the McNear Peninsula along the Petaluma River (occurrence 58) in 1985; and, according to a survey in 2004, in various locations along the Petaluma Marsh (occurrence 59). The freshwater and saltwater marshes in the project region may provide habitat for this species.

### **San Pablo Song Sparrow**

As a breeding species, the song sparrow (*Melospiza melodia*), a CDFG species of special concern, is found across North America from southern Alaska and central and eastern Canada to northern Florida and Mexico (Goals Project 2000). In 1858, the San Pablo Bay song sparrow (*M. melodia samuelis*) was recognized as one of three distinct subspecies inhabiting San Francisco Bay area year-round. Nests of the species are found to an average of 9.5 inches above ground, associated with four main marsh plant species of *Salicornia*, *Spartina*, *Grindelia*, and *Distichlis* (Goal Project 2000).

The nearest CNDDDB occurrence (25) for this species is a 1940 record one quarter of a mile south of Petaluma. Most other records for the area are for sloughs located several miles south of Petaluma. The saltwater marshes in the project region may provide habitat for this species.

### **Townsend's Big-eared Bat**

The Townsend's big-eared bat (*Corynorhinus townsendii townsendii*), a CDFG species of special concern, is one of five subspecies of *C. townsendii* that ranges throughout California and often overlaps with *C.t. pallescens*, another subspecies (Pierson and Rainey 1996). This bat is a colonial species found in human-made structures such as old mine sites and buildings especially along the coast. Unlike other bats they avoid roosting in crevices but prefer to roost in the open, hanging from walls and ceilings making them vulnerable to disturbance (*op. cit.*). This species appears to be quite sedentary and individuals do not move more than a few kilometers from their natal roosts (*op. cit.*).

Females aggregate in the spring at nursery sites and give birth to one young in the late spring or early summer where they remain until the young are independent in late summer or early fall (Pierson and Rainey 1996). These bats show fidelity to both their group and chosen roost sites, where if left undisturbed, they return year after year. Male bats typically roost alone during the breeding and rearing season (*op. cit.*).

Townsend's big-eared bats are in serious decline in the west due to habitat destruction. The nearest CNDDDB record is for *C.t. townsendii* roosting individually in various historic structures in Rancho Olompali, several miles south of Petaluma in 2001 (occurrence 121). Numerous outbuildings and barns associated with livestock and agriculture provide potential habitat for this species in the project region.



### **Pallid Bat**

The pallid bat (*Antrozous pallidus*) is a state species of special concern. It occurs throughout most of California in lower elevations in a wide variety of habitats including grasslands, shrublands, woodlands, and forests. Day roost and hibernation roost sites include caves, rock or bridge crevices, buildings, and hollow trees. At night they roost usually in the open near foliage or in open buildings. Pallid bats leave their day roost an hour after sunset capturing their prey on foliage or on the ground. They hibernate in the winter near the summer day roost. Maternity colonies form in early April and may have between a dozen to 100 individuals (Harris 2005). The young are born from April to July.

The nearest CNDDDB records are for numerous adults and juveniles roosting in a building east of the Petaluma River (occurrence 66) and for an individual bat found roosting in a home in the southwest residential portion of Petaluma. The crevices under bridges and rock outcrops in the project region provide day, maternity, and hibernation roosts and the open fields nearby provide night roosts and foraging habitat for this species.

### **American Badger**

The American badger (*Taxidea taxus*) is a state species of special concern; it has no federal status. Though badgers range from northern Alberta southward to central Mexico and from the Pacific Coast eastward through Ohio, populations have drastically declined in California over the last century (CDFG 2007). Badgers occupy a diversity of habitats that provide sufficient food, friable soils, and relatively open, uncultivated ground such as grasslands. The entrances to their underground dens are fairly distinct in shape, being oval and usually about 12 inches wide and 8 inches tall. Badgers breed in August and September then spend most of the winter in their dens, seldom emerging until they bear their young between February and May. Badgers can occupy a territory as large as three miles square (CDFG 2007). Fragmentation of habitat and the use of poison in agricultural areas to eradicate burrowing animals are largely responsible for their decline.

The nearest CNDDDB records are for the western outskirts of Petaluma where there are badger dens, trails, and foraging areas (occurrence 22); and for a museum specimen collected in the Petaluma vicinity in 1949 (occurrence 233). The pastoral and annual grasslands and agricultural fields in the project area provide habitat for this species.

### **Salt Marsh Harvest Mouse**

The salt marsh harvest mouse (*Reithrodontomys raviventris halicoetes*) is a federal and state listed endangered species. It is included in the USFWS *Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan* which will eventually be replaced by the *Tidal Marsh Ecosystem Recovery Plan*, which is under development. No critical habitat has been designated. The principal populations of this species live primarily in pickleweed habitat in the Petaluma and Napa salt and brackish marshes of San Pablo Bay, and along the coast of Suisun Bay in Contra Costa County. Adjacent uplands with dense vegetation cover provide protection from predation during times when high tides flood the marshes. This harvest mouse is a small (9-gram) nocturnal mouse and appears to be solitary outside the breeding season (Zeiner et al. 1990b). Reproduction includes only 1 to 2 litters per year, with an average litter size of 3 to 4 young. Foods used by this mouse consist mainly of salt marsh plant stems and leaves, seeds and insects. Like other endemic salt marsh wildlife, salt marsh harvest mouse appears to have a physiological tolerance of high salinity levels in its food and water.

The primary reason for the listing of this species was loss, fragmentation, and degradation of habitat. Development along the shores of San Francisco Bay has eliminated up to 95 percent of existing marsh habitat. Filling of the bay lands, freshwater discharge from sewage treatment plants, and subsidence resulting from excessive draw down of groundwater has made much of the former marsh habitat in San Francisco Bay unsuitable for this species. However, salt marsh harvest mouse habitat is now protected within the San Francisco Bay and San Pablo Bay National Wildlife Refuges, on California wildlife management areas and on an increasing number of tracts of land being acquired by the state, Bay Area cities, and a variety of conservation organizations.

The nearest CNDDDB record is for individuals trapped during a focused survey 0.5 miles southeast of the U. S. Highway 101 and State Route 116 interchange (occurrence 44). Individuals have also been identified from the Ellis Creek Water Recycling Facility area and from Shollenberger Park. The saline emergent marshes in the project region provide potential habitat for the salt marsh harvest mouse.

## **Regulatory Framework**

### ***Federal Endangered Species Act***

The Federal Endangered Species Act of 1973 (Act) recognizes that many species of fish, wildlife, and plants are in danger of or threatened with extinction and established a national policy that all federal agencies should work toward conservation of these species. The Secretary of the Interior and the Secretary of Commerce are designated in the Act as responsible for identifying endangered and threatened species and their critical habitats, carrying out programs for the conservation of these species, and rendering opinions regarding the impact of proposed federal actions on endangered species. The Act also outlines what constitutes unlawful taking, importation, sale, and possession of endangered species and specifies civil and criminal penalties for unlawful activities.

Biological assessments are required under Section 7(c) of the Act if listed species or critical habitat may be present in the area affected by any major construction activity conducted by, or subject to issuance of a permit from, a federal agency as defined in Part 404.02. Under Section 7(a)(3) of the Act every federal agency is required to consult with the U.S. Fish and Wildlife Service or National Marine Fisheries Service on a proposed action if the agency determines that its proposed action may affect an endangered or threatened species.

Section 9 of the Federal Endangered Species Act prohibits the “take” of any fish or wildlife species listed under the FESA as endangered or threatened. Take, as defined by the FESA, means” to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such action.” However, Section 10 allows for the “incidental take” of endangered and threatened species of wildlife by non-Federal entities. Incidental take is defined by the FESA as take that is “incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.” Section 10(a)(2)(A) requires an applicant for an incidental take permit to submit a “conservation plan” that specifies, among other things, the impacts that are likely to result from the taking and the measures the permit applicant will undertake to minimize and mitigate such impacts. Section 10(a)(2)(B) provides statutory criteria that must be satisfied before an incidental take permit can be issued.

### ***Wetlands and Other Jurisdictional Waters of the U.S.***

The CEQA Guidelines (1994) state that effects on the environment that conflict with adopted environmental plans or goals are normally regarded as significant. A “no net loss of wetland acreage or value” policy is established within both the state and federal executive branches (California Wetlands Conservation Policy 1993). Ditching, draining, or other activities which could alter the characteristic physical, chemical, biological or public interest values (as defined by 40 CFR 230 Subparts C-F) associated with wetlands and other waters of the U.S. are considered impacts under ACOE authority. For the purposes of this document, any destruction of wetlands or other waters of the U.S. (either in fill or other disturbance) is considered significant.

Placement of fill material in waters of the U.S. is regulated through Section 404 of the Clean Water Act (CWA), under jurisdiction of the ACOE. Waters defined under Section 404 include, but are not limited to, areas subject to the ebb and flow of the tide, streams, and wetlands (33 CFR §328.23[3]). The extent of the waters in streams is defined by elevations along the stream bank above which water normally does not rise (ordinary high water). Wetlands are defined as areas that are saturated or inundated by surface or ground water for a frequency and duration sufficient to support the prevalence of plants adapted for life in saturated soil conditions (33 CFR §328 [(b)b]).

The goal of the CWA is to maintain, restore, and enhance the physical, chemical, and biological integrity of the Nation’s waters. In reviewing proposed projects involving impacts to wetlands, the ACOE requires no net loss of wetland functions and values. Compensatory mitigation for unavoidable impacts to wetlands permitted by the ACOE requires replacement acreage, preferably in-kind and in the same watershed, sufficient to achieve the goal of no net loss. Replacement acreage is determined by the ACOE based on the functions and values of the area being filled, the functions and values of the proposed mitigation site, and the likelihood of success of the proposed mitigation. Wetland mitigation may include restoration, creation, and/or preservation. The mitigation must be based on the functions and values of wetlands that are affected and the local opportunities to utilize these three approaches. Compensation should be completed before or concurrent with the impact, as near to the site of impact as practicable, and the mitigation site must be protected from subsequent loss or degradation.

Since 1984, with the implementation of its settlement agreement final regulations, the ACOE began to regulate the discharge of fill into isolated waters. The 1984 draft regulations also included the now expired Nationwide Permit (NWP) 26 for discharges into isolated waters and other waters above the headwaters. NWP 26 has been replaced, in large part, by NWP 39, and other NWP’s, effective June 1, 2000. Lacking information about migratory bird use, the ACOE assumed jurisdiction over seasonal wetlands, including seasonal pools and ponds, that are isolated or above the headwaters hinging its regulatory authority on the Migratory Bird Species Act. The ACOE operated under this assumption until the January 2001 United States Supreme Court decision *Solid Waste Agency of Northwestern Cook County versus United States Army Corps of Engineers et al.* commonly known as the SWANCC decision. The Court apparently removed the jurisdictional status of isolated intrastate waters including vernal pools, abandoned, water-filled quarry pits, some ponds and lakes without outlets, isolated wetlands, seeps and seasonally wet depressions.

Current policy statements issued by ACOE General Counsel assert that, “the Corps’ ecological judgment about the relationship between waters and their adjacent wetlands provides an adequate basis for legal judgment that adjacent wetlands may be defined as waters under the Act. In sum, the holding, the facts, and the reasoning of *United States versus Riverside Bayview Homes*

continued to provide authority for the USEPA and the Corps to assert CWA jurisdiction over, inter alia, all of the traditional navigable waters, all interstate waters, and all tributaries to navigable or interstate waters, upstream to the highest reaches of the tributary systems, and over all wetlands adjacent to any and all of these waters.”

A recent memorandum provides guidance from the Environmental Protection Agency (EPA) and the Corps on implementing the Supreme Court’s “Rapanos” decision (Corps 2007). The memorandum provides the following explanations. The agencies will continue to assert jurisdiction over traditional navigable waters, wetlands adjacent to traditional navigable waters, non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), and wetlands that directly abut such tributaries.

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water: non-navigable tributaries that are not relatively permanent, wetlands adjacent to non-navigable tributaries that are not relatively permanent, and wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

### ***Section 401, Water Quality Certification***

Section 401 applies to construction where there could be permanent or temporary fill of waters or wetlands. This section of the CWA requires that, prior to the issuance of a federal license or permit for an activity or activities that may result in a discharge of pollutants into navigable waters (see Section 404 discussion, below), the permit applicant must first obtain a certification from the State in which the discharge would originate. A State water quality certification indicates that the proposed activity or activities would not result in a violation of applicable water quality standards established by federal or State law, or that no water quality standards apply to the proposed activity. Water quality certifications would be required as part of any Section 404 permits issued by the Corps for fill activities affecting a “water of the U.S.”

### ***Migratory Bird Treaty Act***

The federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21).

### ***California Environmental Quality Act***

Rare or endangered species are defined in the CEQA Guidelines (Section 15380) as follows:

- (a) “Species” as used in this section means a species or subspecies of animal or plant or variety of plant.
- (b) A species of animal or plant is:
  - (1) “Endangered” when its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors; or
  - (2) “Rare” when either:

(A) Although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or

(B) The species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered “threatened” as that term is used in the Federal Endangered Species Act.

(c) A species of animal or plant shall be presumed to be rare or endangered if it is listed in:

(1) Sections 670.2 or 670.5, Title 14, California Administrative Code; or

(2) Title 50, Code of Federal Regulations Sections 17.11 or 17.12 pursuant to the Federal Endangered Species Act as rare, threatened, or endangered.

(d) A species not included in any listing identified in subsection (c) shall nevertheless be considered to be rare or endangered if the species can be shown to meet the criteria in subsection (b).

The CEQA Guidelines, under Section 15065, Mandatory Findings of Significance, also define a significant biological impact as follows (Section 15065 (a)(1):

The project has the potential to substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of an endangered, rare or threatened species; or eliminate important examples of the major periods of California history or prehistory.

### ***CDFG 1602 Streambed Alteration Agreement***

The CDFG also regulates activities that may affect streambeds. Division 2, Chapter 6, Section 1602 of the California Fish and Game Code states that “...general plans sufficient to indicate the nature of a project for construction by, or on the behalf of, any government agency, state or local, and any public utility, of any project which will divert, obstruct or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the Department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, or will use material from the streambeds designated by the Department, shall be submitted to the Department.”

### ***California Endangered Species Act***

The California Endangered Species Act (Fish and Game Code Sections 2050-2098) established a State policy to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat. The Fish and Game Commission is charged with establishing a list of endangered and threatened species. State agencies must consult with the Department of Fish and Game to determine if a proposed Project is likely to jeopardize the continued existence of any endangered or threatened species.

Section 2081 of the Fish and Game Code allows the “take” of a species listed as threatened or endangered by the California Endangered Species Act. Take is defined as any act that involves direct mortality or other actions that may result in adverse impacts when attempting to take

individuals of a listed species. Under Section 2081, the State Department of Fish and Game may issue a permit to authorize take for scientific, educational or management purposes, or take that is incidental to otherwise lawful activities.

### ***California Fish and Game Code Native Plant Protection Policy***

The goals of the California Native Plant Protection Policy are as follows:

The intent of the Legislature and the purpose of this chapter (Chapter 10) is to preserve, protect, and enhance endangered or rare plants of this state (Section 1900). For purposes of this Chapter, a 'native plant' means a plant that grows in a wild uncultivated state which is normally found native to the plant life of this state (Section 1901).

The commission may adopt regulations governing the taking, possession, propagation, transportation, exportation, importation, or sale of any endangered or rare native plants. Such regulations may include, but shall not be limited to, requirements for persons who perform any of the foregoing activities to maintain written records and to obtain permits that may be issued by the department (Section 1907).

No person shall import into this state, or take, possess, or sell within this state, except as incident to the possession or sale of the real property on which the plant is growing, any native plant, or any part or product thereof, that the commission determines to be an endangered native plant or a rare native plant, except as otherwise provided in this chapter (Section 1908).

All state departments and agencies shall, in consultation with the department, utilize their authority in furtherance of the purposes of this chapter by carrying out programs for the conservation of endangered or rare native plants. Such programs include, but are not limited to, the identification, delineation, and protection of habitat critical to the continued survival of endangered or rare native plants (Section 1911).

### ***Sonoma County General Plan***

The goals of the Sonoma County General Plan (Sonoma County 1989) apply to the unincorporated lands within the project area. General Plan elements with relevant goals and policies include the Resource Conservation (RC) Element and Open Space (OS) Element. Policies regarding unincorporated areas east and south of Petaluma are as follows:

#### *Critical Habitat Areas – Policy 3.1*

The Petaluma River and associated marsh habitat southeast of the City of Petaluma is designated as a critical habitat area targeted for natural resource protection in the Sonoma County General Plan Open Space Element. Critical habitat is defined by the plan as certain biotic resource communities that are highly sensitive to change and could be adversely affected by development. Policies regarding construction in or near critical habitat include Objective OS-4c, a requirement to prepare a biotic resource assessment to develop mitigation measures if the County's Planning Director determines that a discretionary project could adversely impact a designated critical habitat area; and OS-4e, a requirement that building permits provide a minimum setback of 50 feet from the edge of any wetlands that are within a critical habitat area.

### *Riparian Corridors – Policy 3.2*

The County is in the process of developing a classification system for riparian corridors along selected streams in order to provide protection measures. The classification system described in Objective OS-5c establishes 50-foot streamside conservation areas from urban and upland riparian corridors, and a 100-foot setback for upland riparian corridors. Uplands are defined as the corridors adjacent to streams not included in the other two categories. In Objective OS-5e, any utility crossings within the streamside conservation areas would have to be considered by the County. Objective OS-5f allows for the placement of utility lines if no significant disturbance of riparian habitat would occur. Objective OS-5h requires that utility construction should seek to minimize and mitigate, where feasible, any damage incurred to riparian areas; that vegetation removal should be minimized for necessary stream crossings; and that grading, filling or construction shall not substantially diminish or divert any stream flow or result in any substantial increase in bank instability or erosion. Objective RC-8c requires the design of public and private projects to minimize damage to the stream environment and to maintain in stream flows.

### *Oak Woodlands – Policy 5.1*

The goal of Policy 5.1, Conservation of Biotic Resources, is to promote and maintain the County's diverse plant and animal communities and protect biotic resources from development activities. Objective RC-5.4 requires identification of important valley oak habitat areas and protect and enhance valley oaks and valley oak woodlands in these areas. The Conservation Policy Requirements Map indicates that there are several locations in the environs of Petaluma that are within the Valley Oak Habitat Boundary. The storage tank site, reservoir site, and pump station site near the Petaluma Golf and Country Club are within, or in close proximity to Valley Oak Habitat Boundaries. The goal for the valley oak habitats is to develop and require compliance with standards and guidelines for mitigating losses of valley oaks and valley oak woodlands in these designated areas. Currently there is no County permit or approval required but a "Notice of Intention" must be filed which indicates which trees are proposed for removal.

### *Protection of Rare and Endangered Species – Policy 5.2*

Objective RC-6.2 requires that any development on lands containing rare and endangered species be done in a manner which protects the resource or mitigates adverse impacts.

## **City of Petaluma General Plan 2025**

The Petaluma General Plan (2025) has several goals and policies applicable to the project, and these are excerpted below.

Policy 4-P-1: Protect and enhance the Petaluma River and its tributaries through a comprehensive river management strategy [A through M as listed in the General Plan].

Policy 4-P-1-D: Create setbacks for all tributaries to the Petaluma River extending a minimum of 50 feet outward from the top of each bank, with extended buffers where significant habitat areas, vernal pools, or wetlands exist. Development shall not occur within this setback, except as part of greenway enhancement (for example, trails and bikeways). Where there is degradation within the zone, restoration of the natural creek channels and riparian vegetation is mandatory at time of adjacent development.

Policy 4-P-2: Conserve wildlife ecosystems and sensitive habitat areas in the following order of protection preference: 1) avoidance, 2) on-site mitigation, and 3) off-site mitigation.

Policy 4-P-2-A: Utilize Technical Memorandum 3: Biological Resources Review as a baseline document, expanding to address project specific impacts.

Policy 4-P-3: Protect special status species and supporting habitats within Petaluma, including species that are State or Federal listed as endangered, threatened, or rare.

Policy 4-P-3-A: As part of the development review process, site-specific biological resource assessments may be required to consider the impacts on riparian and aquatic resources and the habitats they provide for invertebrates, fish, amphibians, reptiles, birds, mammals, and plants. If development is located outside these ecologically sensitive regions, no site-specific assessment of biological resources may be necessary. Appropriate mitigation measures to reduce impacts to sensitive habitats and special status species shall be imposed on a project-by-project basis according to Petaluma's environmental review process.

Policy 4-P-4-A: Coordinate with Sonoma County's Agricultural Preservation and Open Space District, Permit and Resource Management Department, and Water Agency to protect riparian corridors and critical biological habitats as well as to reduce cumulative impacts on sensitive watershed areas outside of the city limits.

Policy 4-P-4-B: Work with County, State and federal agencies to ensure that development within the Planning Referral Area does not substantially affect State or federally listed rare, endangered, or threatened species or their habitats. Require assessments of biological resources prior to approval of any development in or within 00 feet of ecologically sensitive areas.

Policy 4-P-5: Support wetland mitigation and oak woodlands restoration in the unincorporated areas outside the UGB.

Policy 4-P-6-A: Require planting of trees for every significant tree removed at a project site. Replacement planting may occur on the project site or on a publicly owned area, with long-term maintenance assured.

The Petaluma Zoning Ordinance Section 23-400 requires that existing trees over 6" in diameter, measured 3 feet above the based of the truck, shall be retained whenever possible.

### ***Petaluma Watershed Enhancement Plan***

The Southern Sonoma County Resource Conservation District (USDA, SSCRCDC 1999) has a current watershed enhancement plan that includes the Lakeville Highway proposed project site and other areas within the Petaluma River watershed. The Petaluma Watershed Enhancement Plan was developed in 1999 by the USDA, SSCRCDC's watershed council and numerous stakeholders in concert with the RWQCB's efforts to improve watershed conditions and water quality. Of the four goals set forth in the plan, Goal D, to conserve and enhance existing wildlife habitat applies to the analysis of impacts to biological resources.



**EVALUATION CRITERIA WITH THRESHOLDS OF SIGNIFICANCE**

**TABLE 4.8-1**

**Evaluation Criteria with Thresholds of Significance – Biological Resources**

<b>Evaluation Criteria</b>	<b>As Measured By</b>	<b>Thresholds of Significance</b>	<b>Justification</b>
1. Will the WREP result in the loss of any species identified as a threatened, endangered, candidate, sensitive or special-status species or its habitat?	a. Number of individuals of species that would be lost.	a. Greater than 0 individuals.	a. FESA Sec. 9 (§ 1538) City of Petaluma General Plan – Policy 24 Fish & Game Code 2000; 1900-1930 FESA 50 CFR 424.12 Petaluma General Plan 2025
	b. Number of plant populations that would be lost.	b. Greater than 15 percent of known populations in southern Sonoma County for CNPS List 2, 3 and 4 plant species.	b. California Native Plant Protection Act (CDFG Code Sections 1900-1913), CEQA (Article 5, Section 15065) Petaluma General Plan 2025
	c. Acres of occupied designated critical habitat.	c. Greater than 0 acres.	c. FESA 50 CFR 17.3 Petaluma General Plan 2025
	d. Acres of habitat modification.	d. Greater than 0 acres.	d. FESA Sec. 9 (§ 1538) Fish & Game Code 2000; 1900-1930 Petaluma General Plan 2025
2. Will the WREP have a substantial adverse effect on any riparian habitat or other sensitive natural community?	a. Linear feet of stream habitat lost	a. . Greater than 0 linear feet of stream habitat.	a. CDFG 1602 County of Sonoma – General Plan Policy 3.2 Petaluma General Plan 2025
	b. Acres of sensitive native plant communities (as defined by the CNDDDB).	b. Greater than 0.10 acre terrestrial or 0.01 acre aquatic special-status native plant community lost.	b. Native Plant Protection Act. Fish & Game Code 1900-1913 Oak Woodland Protection Act. County of Sonoma General Plan Policy 3.1 and 5.1 Petaluma General Plan 2025

**TABLE 4.8-1**  
**Evaluation Criteria with Thresholds of Significance – Biological Resources**

<b>Evaluation Criteria</b>	<b>As Measured By</b>	<b>Thresholds of Significance</b>	<b>Justification</b>
3. Will the WREP have a substantial adverse effect on protected wetlands or waters through direct removal, filling, or other means?	Acreage of discharge to or placement of fill in potential jurisdiction wetlands or waters of the U.S.	Greater than 0 acre.	Clean Water Act, 40 CFR 230 404(b)(10) Corps, EPA and State of California 'no-net loss' policies Sonoma County General Plan OS-4 and RC-5 Petaluma Watershed Plan Petaluma General Plan 2025
4. Will the WREP interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?	a. Number of active nesting or nursery sites.	a. Greater than 0 active nest sites.	a. FESA Sec. 9 (§ 1538) Federal Migratory Bird Treaty Act Fish & Game Code 3303, 3503.5 & 3800 Petaluma General Plan 2025
	b. Number of corridors substantially blocked or disrupted.	b. Greater than 0 corridors.	b. Fish & Game Code 2053 Magnuson-Stephens Fishery Act Petaluma General Plan Goals 6.3-5, 6.3-6 Petaluma Watershed Plan Sonoma County General Plan Objectives OS-4 and RC-5 Petaluma General Plan 2025
5. Will the WREP result in the loss of protected trees or Sonoma County designated critical habitat?	Number of trees removed or damaged.	Trees > 6" DBH at 3 ft from trunk base.	City of Petaluma Zoning Ordinance 23-400 County of Sonoma General Plan Policy 5.1 Petaluma General Plan 2025
6. Will the WREP conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?	Number of acres of protected habitat that would be lost.	Greater than 0 acres.	Baylands Ecosystem Habitat Goals Project CalFed Bay-Delta Program Multiple Species Conservation Strategy Petaluma General Plan 2025
7. Will the WREP expose organisms to hazardous levels of toxic substances?	Ecological Quotient (EQ), which is the ratio of the exposure concentration or exposure rate to the appropriate benchmark value.	Ecological Quotient greater than 10.	Menzie et al. 1993 Barnthouse et.a. 1986 USEPA 1989 Watkin and Stelljes 1993 CEQA Guidelines Appendix G, Checklist tem VII(a) and VII(b) Petaluma General Plan 2025

## METHODOLOGY

The California Department of Fish and Game Natural Diversity Database (CNDDDB 2007) was searched for records of listed wildlife species occurring in the USGS 7.5-minute map for the Glen Ellen, Petaluma, and Petaluma River quadrangles. Also a search was made of the project area for species listed on the U. S. Fish and Wildlife Service (USFWS) online database for federal and threatened endangered species (USFWS 2007). The California Native Plant Society online website (CNPS 2007) was also consulted for listed plants reported in the region of the project site. Other sources included existing literature and websites maintained by state and federal agencies. Utilizing these lists, field surveys were conducted to determine what plant and animal species were observed on the site and to determine suitability for listed species habitat.

On July 19, 26, and August 1, 2007, general reconnaissance plant and wildlife surveys were conducted in the project area. Observations were made regarding biological resources including various aquatic and terrestrial communities and habitat types.

### ***Toxicity and Bioaccumulation***

Both toxicity and bioaccumulation were evaluated based on an Ecological Risk Assessment prepared by the City of Santa Rosa for its recycled water use (City of Santa Rosa 2003). A risk assessment models how chemicals and pathogens move through the environment and what effects they might have on animals and their food supplies. The Ecological Risk Assessment analyzes impacts on fish and wildlife either through direct contact with chemicals in surface soil, water, sediments, or through ingestion.

## IMPACTS AND MITIGATION MEASURES

**Impact:**           **BIO-1: Will the WREP result in the loss of any species identified as a threatened, endangered, candidate, sensitive or special-status species or its habitat?**

**Analysis:**       *Project-Level Near-Term Conveyance Improvements - Significant*

Potential habitat for several special-status species is located near the tertiary pipeline that parallels Ielmorini Road and E. Washington Street near Washington Creek. No special status individuals have been identified in the area, but habitat may be present for California freshwater shrimp, California red-legged frog, yellow-legged frog, western pond turtle, and steelhead. The pipeline would be buried within the road bed, and the construction zone would not enter the creek or the riparian area. No special status plants would be affected. However, close proximity of the creek to the construction zone, particularly along Ielmorini Road, and culverts that cross beneath the road could lead to sedimentation and turbidity in Washington Creek if construction spoils are not confined, and these changes to water quality in Washington Creek could adversely affect special status aquatic wildlife species.

Wetlands habitat also occurs near the Browns Lane project area, and a man-made drainage, considered a potentially jurisdictional wetland, is along Browns Lane. (For impacts to wetlands, refer to the discussion under Impact BIO-3.) No special status individuals have been identified in the project area, but habitat may be present for California red-legged frog and Western pond turtle. The existing vegetation community in the wetland is ruderal, and no potential for special-status plants exists. The pipelines would be buried within Browns Lane, except for a short reach that would temporarily impact approximately 75 square feet of wetland. Impacts to the wetland could damage

potential habitat for special status wildlife or individuals of special status wildlife if present. Close proximity of the construction zone to the wetland and man-made drainage could lead to sedimentation and turbidity in the wetlands and drainage potential degrading water quality and adversely affecting special status aquatic wildlife.

Measure PD-21, Riparian and Sensitive Habitat Protection would be incorporated as part of the project. Measure PD-21 includes requirements to install and maintain during the construction period silt fencing or other devices that would prevent construction materials or spoils from entering the protected habitat or culverts. Measure PD-21 also would require that riparian areas within 50 feet of the construction site, including the riparian area along Washington Creek, be delineated with construction fencing to prevent construction activities from entering. Impacts to special status wildlife and wildlife habitat along E. Washington Street and Ielmorini Road would be prevented by Measure PD-21, and impacts at this location are considered less than significant. Impacts to special status wildlife near Browns Lane would be reduced by Measure PD-21, but direct impacts to the wetland area may still impact special status habitat or directly affect individuals. This impact is considered significant.

The construction of the storage tank could cause the possible loss of individuals of sensitive plant species associated with pastoral grasslands. Habitat for two plant species exists at the tank site: Franciscan onion and two-fork clover. Although no rare plants were identified on the property, protocol surveys were not completed, and the potential exists for the loss of rare plants due to construction. American badger and the western burrowing owl, both being state designated species of special concern, may also exist at the storage tank site. Impacts to these special status plant and wildlife species are considered a significant impact.

Each of the construction areas has trees which could serve as roosting or nesting locations for special status birds, such as ferruginous hawk, bald eagle, and Cooper's hawk. Dense riparian woodland occurs along Ielmorini Road, and several oak trees are present near both Browns Lane and the tank site. Foraging habitat for such birds could be affected at the tank site as well. Although the trees would not be removed as a result of the project, construction activities could adversely affect the success of the nests. This is considered a significant impact.

No impacts from operation of the pipelines or storage tank have been identified.

Mitigation: **BIO-1a Avoid the Loss of Candidate, Sensitive, or Special Status Species and their Habitats**

**BIO-1b Rare, Threatened and Endangered Plant Protection Program**

**BIO-4a Native Wildlife Nursery Protection Program**

After  
Mitigation: *Less than Significant*

Implementation of the three mitigation measures provides a minimum level of compensation for loss of habitat for listed species as well as measures to avoid the loss of a listed species. The measures also provide vegetation trimming guidelines to protect fish species. Implementation of avoidance measures and detailed compensatory measures for species that actually occur within the project area would result in a less than significant impact to listed species.

*Program-Level Improvements: Use of Recycled Water – Less than Significant; Pipelines, Open Reservoir, and Pump Station - Significant*

Use of Recycled Water: Irrigation of existing agricultural lands and landscaped areas with recycled water in place of other sources of potable water would not cause loss of individuals or habitat for endangered, threatened, or rare species.

Removal of secondary recycled water from the existing system would result in some land no longer receiving secondary water for irrigation during the summer. This irrigation is mainly used for production of a summer hay crop. If these lands are not irrigated with an alternative source of water, the character of the landscape would change, in that the fields would become dry and fallow in the summer with only a winter hay crop being cultivated, as traditionally occurred on these lands. It is not anticipated that elimination of the summer irrigation would result in loss of habitat for special status species. Four threatened or endangered animal species are currently known to occur or may occur in suitable habitats within the croplands community: California tiger salamander, California red-legged frog, American badger, and the burrowing owl. Even without the summer irrigation these species would still forage and use the land to the extent possible given the cultivation activities that would still occur in the winter. This impact is considered less than significant.

Pipelines: The exact location of pipelines from the Ellis Creek WRF to users located throughout the recycled water service area has not been determined, nor has the location of the secondary pipeline from Ellis Creek WRF to the reservoir north of Lakeville Highway. The City could install up to 25 miles of new tertiary water pipelines and up to three miles of new secondary pipelines. Most of these pipelines would be installed along existing roadways, although there could be temporary disturbance adjacent to the roadway. Installation of pipelines is estimated to result in temporary impact up to a total of 118 acres, and 21 acres of these impacts would occur off-road in undeveloped areas or adjacent to an existing roadway. No permanent impacts to habitat would occur.

Sixteen threatened or endangered animal species are currently known to occur or may occur in suitable habitats both within developed and undeveloped areas where pipeline installation might occur: California freshwater shrimp, California tiger salamander, steelhead, Sacramento splittail, California red-legged frog, foothill yellow-legged frog, western pond turtle, California clapper rail, California black rail, loggerhead shrike, burrowing owl, saltmarsh common yellowthroat, San Pablo song sparrow, pallid bat, American badger, and the salt marsh harvest mouse. Temporary construction activities could adversely affect individuals and habitat.

The pipeline construction would likely occur near trees which could serve as roosting or nesting locations for special status birds, such as ferruginous hawk, bald eagle, and Cooper's hawk. Construction activities could adversely affect the success of the nests.

There are no known records of threatened, endangered, or CNPS List 1B plant species within the areas where pipeline installation could occur. However, the vegetation communities that occur in this area may support rare plants. There are 16 State and federal rare, threatened, or endangered species or CNPS list 1B species that may occur within one or more vegetation communities that are present (refer to Appendix D). Pipeline construction could directly affect the special-status plants and their habitat. This is considered a significant impact.

Open Reservoir: The open reservoir could temporarily impact up to 10 acres from construction activities and permanently impact 2 acres. Four threatened or endangered

animal species are currently known to occur or may occur in suitable habitats within the undeveloped croplands in and around the potential reservoir site: California tiger salamander, California red-legged frog, American badger, and the burrowing owl. Construction activities could adversely affect individuals and habitat, and permanent loss of annual grassland habitat would result.

Construction would likely occur near trees which could serve as roosting or nesting locations for special status birds, such as ferruginous hawk, bald eagle, and Cooper's hawk. Foraging habitat would be lost. Construction activities could adversely affect the success of the nests.

No known State and federal rare, threatened, or endangered species or CNPS list 1B species has been identified within the pastoral grasslands community. Several special-status plant species may occur (refer to Appendix D). Reservoir construction would directly affect the special-status plants, if present. This is considered a significant impact.

Pump Station: The new pump station could temporarily impact up to 1 acre of annual grassland and urban areas. Approximately a half acre would be permanently disturbed. The annual grasslands in the pump station area could support seven sensitive wildlife species: burrowing owl, Townsend's big eared bat and pallid bats (in barns, old buildings), loggerhead shrike, and American badger, California red-legged frog, and California tiger salamander. Construction activities could adversely affect individuals and their habitat, and permanent loss of annual grassland habitat would result.

Construction would likely occur near trees which could serve as roosting or nesting locations for special status birds, such as ferruginous hawk, bald eagle, and Cooper's hawk. Foraging habitat may be lost. Construction activities could adversely affect the success of the nests.

The vegetation communities that occur near the potential pump station site may support rare plants. Sensitive plant species with potential to occur in grasslands near the area include Franciscan onion, alkali milk-vetch, round-leaved filaree, fragrant fritillary, Marin western flax (in serpentine soils), and two-fork clover. The table in Appendix D provides the status of each species; the habitat in which the species is located, and the known occurrences in the program area. Pump station construction would directly affect the special-status plants, if present. Impacts are considered significant.

No impacts have been identified from operation of the pipelines, reservoir, and pump station.

Mitigation: **BIO-1a Avoid the Loss of Candidate, Sensitive, or Special Status Species and their Habitats**

**BIO-1b Rare, Threatened and Endangered Plant Protection Program**

**BIO-4a Native Wildlife Nursery Protection Program**

After  
Mitigation: *Less than Significant*

Implementation of the mitigation measures provides a minimum level of compensation for loss of habitat for listed species as well as measures to avoid the loss of a listed species. Implementation of avoidance measures and detailed compensatory measures for species that actually occur within the project area would result in a less than significant impact to listed species.

**Impact: BIO-2: Will the WREP have a substantial adverse effect on any riparian habitat or other sensitive natural community?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Washington Creek parallels a portion of Ielmorini Road and E. Washington Street where a pipeline route is proposed. The pipeline would be buried within the road bed, but the riparian corridor is immediately adjacent to the road in this segment. The riparian woodland would not be directly affected.

A short segment of pipeline near the intersection of Lakeville Highway and Browns Lane would follow a cross-country route for approximately 120 feet. The pipeline would be installed adjacent to a wetland which could be affected if construction activities occur close to the area. The pipeline also would cross a man-made drainage with ruderal vegetation, resulting in a temporary impact of approximately 75 square feet.

Measure PD-2 requires temporarily disturbed waters of the U.S. to be restored and revegetated, and Measure PD-21 requires installation and maintenance of exclusionary fencing to keep construction equipment and construction materials out of protected zones. These project description measures would avoid impacts by keeping construction activities away from the riparian and wetlands habitats adjacent to the pipeline construction corridor and restoring the minor amount of wetland that would be temporarily affected. No other sensitive natural communities are known to occur in the vicinity of the proposed project level near-term conveyance improvements construction zone. Impacts would be less than significant.

Mitigation: No mitigation is necessary.

*Program-Level Improvements: Use of Recycled Water – No Impact; Pipelines – Less than Significant; Open Reservoir and Pump Station - Significant*

Use of Recycled Water: Irrigation of existing agricultural lands and landscaped areas with recycled water in place of potable water would not result in a loss of riparian habitat or other sensitive natural communities.

Open Reservoir: The open reservoir could temporarily impact up to 10 acres from construction activities and 2 acres permanently. No riparian habitat has been identified in the area, but wetland habitats may be present, and if present may be impacted. Measure PD-2, adopted as part of the project, would restore wetlands or sensitive communities impacted temporarily by construction. Permanent impacts of the reservoir, however, are considered a significant impact.

Pipelines: Pipelines could temporarily affect up to 21 acres off-road. The sensitive natural communities associated with these impacts could be riparian woodlands, wetlands, or oak woodlands. Measures PD-2 and PD-21, adopted as part of the project, commit the City to revegetating temporarily disturbed areas in kind and onsite if possible and protecting adjacent resources. Because no permanent impacts would occur to sensitive communities, and temporary impacts would be restored, this impact is found to be less than significant.

Pump Station: The new pump station could temporarily impact up to 1 acre of annual grassland and urban areas. Approximately a half acre would be permanently disturbed. The annual grasslands often contain lacustrine environments such as wetlands, and occasionally, vernal pools. Measures PD-2 and PD-21, adopted as part of the project,

commit the City to revegetating temporarily disturbed areas in kind and onsite if possible and protecting adjacent resources. Permanent impacts to these environments are considered significant.

No impacts from operation of the reservoir, pipelines, or pump station have been identified.

Mitigation: **BIO-2a Avoid Loss of Riparian Habitat or Other Sensitive Natural Communities**

**BIO-2b Avoid Loss of Aquatic Habitat due to Open Reservoir**

After

Mitigation: *Less than Significant*

Implementation of the mitigation measures would either avoid impacts to riparian and other sensitive communities or compensate for any impacts by replacing or restoring them in kind and, if possible, on site at appropriate replacement ratios.

**Impact: BIO-3: Will the WREP have a substantial adverse effect on protected wetlands or waters through direct removal, filling, or other means?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Less than Significant*

No wetlands were observed on the proposed storage tank site or pipeline alignment along E. Washington Street and Ielmorini Road during surveys. There is a stock pond on the western parcel below the storage tank site that was dry during the July survey; it would be avoided in accordance with Measure PD-21, Riparian and Sensitive Habitat Protection. The measure requires that sensitive areas adjacent to construction activities be identified and exclusionary fencing installed to keep construction activities away from the site. Protecting the stock pond from construction impacts would reduce the potential impacts to less-than-significant levels.

Several small wetlands have been identified in and around the project area at the intersection of Lakeville Highway and Browns Lane and along Browns Lane. At the point where the pipelines would leave the hayfield and enter Browns Lane, one of these wetlands would be crossed during construction. This would result in a temporary impact estimated at 75 square feet. Measure PD-2, adopted as part of the project, commits the City to restore and revegetate the wetlands area temporarily impacted. With the implementation of this measure, the impact is found to be less than significant.

Mitigation: No mitigation is necessary.

*Program-Level Improvements: Use of Recycled Water – No Impact; Pipelines – Less than Significant; Open Reservoir and Pump Station - Significant*

Use of Recycled Water: Irrigation of existing agricultural lands and landscaped areas with recycled water in place of other sources of potable water would not result in impacts to wetlands.

Open Reservoir: The open reservoir could permanently impact up to two acres and temporarily impact up to 5 acres from construction activities. Wetlands resources may be present within the area in which the reservoir would be built. Temporary wetlands impacts would be restored through implementation of Measure PD-2, but permanent impacts would remain significant.



Pipelines: The final location of pipelines necessary to distribute recycled water from Ellis Creek WRF to users within the recycled water service area has not been determined, nor has the location of the secondary pipeline from Ellis Creek WRF to the reservoir north of Lakeville Highway. The City could install up to 25 miles of new tertiary water pipelines and up to three miles of new secondary pipelines. Most of these pipelines would be installed along existing roadways, although there could be temporary disturbance adjacent to the roadway. Installation of pipelines is estimated to disturb up to 118 acres; 21 acres of which could occur off-road in undeveloped areas or adjacent to an existing roadway.

There could be wetlands within the temporarily disturbed areas along the pipeline routes. Temporary impacts to wetlands as a result of pipeline construction are estimated at up to 4.3 acres. The pipeline could intersect jurisdictional watercourses at an estimated 56 locations. Any undercrossing of the Petaluma River would occur via a tunneling technique and would not impact waters in the River. Temporary impacts of jurisdictional watercourses are estimated at 2.6 acres. This is considered a less-than-significant impact.

Pump Station: The new pump station could temporarily impact up to 1 acre of annual grassland and urban areas. Approximately a half acre would be permanently disturbed. The annual grasslands often contain lacustrine environments such as wetlands, and occasionally, vernal pools. Temporary wetlands impacts would be restored through implementation of Measure PD-2, but permanent impacts would remain significant.

No impacts from operation of the reservoir, pipelines, or pump station have been identified.

Mitigation: **BIO-3 Avoid Fill and Other Impacts to Jurisdictional Waters and Wetlands**

After

Mitigation: *Less than Significant*

Implementation of the mitigation measure would provide for compensatory mitigation of permanent impacts, thereby reducing impacts to a less-than-significant level.

**Impact: BIO-4: Will the WREP interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?**

Analysis: *Project-Level Near-Term Conveyance Improvements –Significant*

Construction of the near-term improvements is not expected to impede movement of fish or wildlife species. The storage tank and associated underground pipelines would not form physical barriers along restricted movement corridors or impose impassable barriers to other open space areas. Animals would have to move around the storage tank, however, there is sufficient open space surrounding the tank site for such movement.

Construction of the storage tank and pipelines could result in disturbance of nesting habitat for birds within 500 feet of the construction zones. Impacts are found to be significant.

Mitigation: **BIO-4a Native Wildlife Nursery Protection Program**

After

Mitigation: *Less than Significant*

Implementation of Mitigation Measure BIO-4a requires that a pre-construction survey be conducted to determine if active nests exist within 500 feet of the construction zone. If active nests are present, then buffers and monitoring is provided to ensure that nesting activities are not adversely affected.

Analysis: *Program-Level Improvements: Use of Recycled Water – No Impact; Open Reservoir, Pump Station, and Pipelines - Significant*

Use of Recycled Water: Irrigation of existing agricultural lands and landscaped areas with recycled water in place of potable water would not impede migration for any species and would not disturb active nests and would not result in impacts.

Open Reservoir and Pump Station: Because no terrestrial species are likely to be present that utilize or rely upon specific major migration or travel corridors, there would be no impacts to terrestrial animal corridors from construction of the reservoir or pump station. No streams cross the reservoir or pump station areas that could serve as migratory areas for fish.

Construction of the reservoir and pump station could disturb active nests, if present, in trees within 500 feet of the construction zone. This impact is considered significant.

Pipelines: Construction activities at stream crossings or near streams could impact migration movements of anadromous fish species including steelhead and Sacramento splittail. Depending on the season, both adults and/or juveniles of these species could be in streams in urban areas within the recycled water service area. For example, steelhead are known to occur in Lynch Creek and Adobe Creek.

Because there are no terrestrial species in the region that utilize or rely upon specific major migration or travel corridors, there would be no impacts to terrestrial animal corridors.

Pipeline construction could disturb active nests, if present, in trees within 500 feet of the construction zone. This impact is found to be significant.

Mitigation: **BIO-4a Native Wildlife Nursery Protection Program**

**BIO 4b Avoid Blocking Major Wildlife Migration or Travel Corridors**

After

Mitigation: *Less than Significant*

Implementation of Mitigation Measure BIO-4a requires that a pre-construction survey be conducted to determine if active nests exist within 500 feet of the construction zone. If active nests are present, then buffers and monitoring is provided to ensure that nesting activities are not adversely affected, and impacts would be less than significant.

For anadromous fishes, restricting instream activities to the summer months as specified by CDFG and NMFS regulations and designing culverts and underpasses according to CDFG guidelines would result in a less-than-significant impact.

Impact: **BIO-5: Will the WREP result in the loss of protected trees or Sonoma County designated critical habitat?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

No protected trees would be damaged or removed as part of the near-term improvements.

Mitigation: No mitigation is necessary.

*Program-Level Improvements: Use of Recycled Water – No Impact; Pipelines, Open Reservoir and Pump Station - Significant*

Use of Recycled Water: Irrigation of existing agricultural lands and landscaped areas with recycled water in place of potable water would not affect protected trees.

Pipelines, Open Reservoir and Pump Station: The pipelines, reservoir and pump station could be located in areas which could result in damage to or loss of protected trees. The impact would be significant.

Mitigation: **BIO-5 Avoid Permanent Impacts to Protected Trees**

After

Mitigation: *Less than Significant – Program-Level Improvements*

Implementation of mitigation measure BIO-5 would ensure that the City avoids, protects, or replaces protected trees impacted by the project.

**Impact: BIO-6: Will the WREP conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?**

Analysis: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements – Significant*

There are several adopted habitat conservation plans which cover species or habitat that occur within the project area:

Sonoma sunshine - Critical habitat has not been designated for this species, however it is included in the USFWS Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.

Marin western flax - Critical habitat has not been designated for this species; however it is included in the USFWS Recovery Plan for Serpentine Soil Species of the San Francisco Bay.

California freshwater shrimp - Critical habitat has not been designated for this species; however it is the subject of the USFWS Recovery Plan for the California Freshwater Shrimp.

Steelhead - The project area is located within designated critical habitat for the Central California Coast Steelhead ESU; a draft recovery plan for this species is under development by NMFS.

California red-legged frog - Critical habitat has not been designated in Sonoma County for this species; however, the red-legged frog is the subject of the USFWS Recovery Plan for the California red-legged frog.

California clapper rail - Included in the USFWS Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan which will eventually be replaced by the Tidal Marsh Ecosystem Recovery Plan, which is under development. No critical habitat has been designated.

Salt marsh harvest mouse - Included in the USFWS Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan which will eventually be replaced by the Tidal Marsh Ecosystem Recovery Plan, which is under development. No critical habitat has been designated.

Measure PD-21, Riparian and Sensitive Habitat Protection would be incorporated as part of the project. Measure PD-21 includes requirements to install and maintain during the construction period silt fencing or other devices that would prevent construction materials or spoils from entering the culverts. Measure PD-21 also would require that riparian areas within 50 feet of the construction site, including the riparian area along Washington Creek, be delineated with construction fencing so as to prevent construction activities from entering.

Mitigation: **BIO-1a Avoid the Loss of Candidate, Sensitive, or Special Status Species and their Habitats**

**BIO-1b Rare, Threatened and Endangered Plant Protection Program**

After  
Mitigation: *Less than Significant*

Implementation of the mitigation measures provides a minimum level of compensation for loss of habitat for listed species as well as measures to avoid the loss of a listed species. Implementation of avoidance measures and detailed compensatory measures for species that actually occur within the project area would result in conditions consistent with the habitat conservation plans, and impacts would be less than significant.

**Impact: BIO-7: Will the WREP expose organisms to hazardous levels of toxic substances?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Pipelines do not release recycled water to the environment and therefore present no ecological risk to native plants or animals under normal operating conditions. In the event of a pipeline rupture, limited quantities of recycled water would be released. Because releases from a pipeline rupture would be infrequent and exposure would be for a brief time period, the ecological risk associated with a rupture is considered to be less than significant.

Under normal conditions tanks do not release recycled water to the environment. In the event of a tank rupture or overflow, recycled water would be released. Because releases from the tank would be infrequent and exposure would be brief, the ecological risk associated with an overflow is considered to be less than significant.

*Program-Level Improvements – Less than Significant*

Use of Recycled Water and Open Reservoir: Increased irrigation and a new open reservoir provide the opportunity for wildlife and plants to come into contact with recycled water. The quality of the water would meet the Department of Health Services Title 22 water quality criteria as discussed in Section 4.4 Hydrology and Water Quality.

Ecological risk assessments prepared by others have shown that recycled water does not pose organisms to hazardous levels of toxic substances. In 2003, the City of Santa Rosa certified its Incremental Recycled Water Program EIR which contained an Ecological

Risk Assessment for tertiary treated recycled water. The recycled water produced by the new recycled water facility in Petaluma is expected to be of similar or better quality to the water produced at the Laguna Plant. The sources of water coming into both treatment plants are similar, although Petaluma has less industry. The City of Santa Rosa's Ecological Risk Assessment is therefore referenced as the basis for evaluation of recycled water for agricultural or urban irrigation.

The Ecological Risk Assessment analyzed impacts on target fish, wildlife, and plant species for 100 percent direct contact with chemicals in surface soil, water, sediments, or through ingestion of plants or animals which grew in 100 percent recycled water over the course of the animal's or plant's expected lifetime. Factors were included to account for bioaccumulation of toxins for carnivorous animals.

The Ecological Risk Assessment conducted by the City of Santa Rosa as part of the Incremental Recycled Water Program (City of Santa Rosa 2003) indicates that no substances were identified as a potential concern to terrestrial or aquatic biological communities exposed to recycled water. The Risk Assessment concluded that no significant risk was identified for exposure of organisms to organic chemicals and metals found at detectable levels in the recycled water or in the sediment. The study also concluded that all Environmental Quotients (EQs) were below the significance level of 10, and that no significant risk to aquatic or terrestrial animal or plant species was identified.

It is recognized that an increasing body of evidence exists confirming that pharmaceuticals, personal care products, naturally-occurring chemicals and other chemicals not regulated in wastewater treatment plant effluents are present at detectable concentrations in recycled water. Compounds known as endocrine disrupting compounds (EDCs) have been suggested as agents responsible for declines in reproductive success and sexual development of fish and other aquatic animals. (Refer also to Chapter 4.7, Public Health and Safety, for a detailed discussion about non-regulated compounds). EDCs are expected to be present in the tertiary effluent to be produced by the Ellis Creek Water Recycling Facility. A number of potential EDCs which are degradation products of personal care products and pharmaceuticals are likely present at very low concentrations in the secondary recycled water currently produced, although testing for these constituents in Petaluma's secondary recycled water is not currently performed.

Some EDCs are regulated by water quality standards or drinking water standards based on toxicological and carcinogenic effects. However, most EDCs are not regulated and neither the federal government nor State of California have set criteria for natural or synthetic estrogens or related pharmaceutical chemicals, and no draft or proposed standards are under consideration. Further, tests are not routinely performed on a number of compounds that may function as EDCs. Consequently, assessing the impacts on fish and wildlife potentially exposed to EDCs is problematic.

A number of factors would suggest that the effect of the WREP would be minimal with regards to exposing fish and wildlife to these compounds.

Terrestrial exposure to irrigated water would increase from approximately 650 MG per year of secondary recycled water used for agricultural irrigation, to approximately 1,000 MG per year of secondary and tertiary recycled water to be used for agricultural and urban irrigation. Aquatic exposure to stored recycled water would increase somewhat due to the addition of the open reservoir covering up to 2 acres (the existing storage ponds cover approximately 16 acres). Exposure to secondary recycled water discharge in the

Petaluma River would be less in the future by the increased volume of recycled water to be irrigated, approximately 350 MG per year. These changes in irrigation, storage, and discharge would result in the recycled water being distributed to a wider geographic area, somewhat increased terrestrial exposure, but decreased aquatic exposure of fish and aquatic wildlife and plants. Because fish are the primary animals to be identified as potentially affected by EDCs, these changes in exposure would be likely to decrease impacts.

The open reservoir would not provide suitable habitat for native salmonids or other special-status species.

Recycled water applied to fields and to urban landscape areas would evaporate, percolate into the soil, or be taken up by plants. Measure PD, Implement BMPs for Runoff, Erosion, and Agricultural Chemical Use, requires that irrigation must consistently be equivalent to crop or landscaping demand. The sequestration of the recycled water in the terrestrial environment would limit exposure to fish and wildlife. Exposure of the recycled water to soil may increase biodegradation and/or adsorption of EDCs and other non-regulated chemicals to organic matter, thereby reducing concentrations and availability to fish and wildlife. Exposure of recycled water to sunlight also may cause photo-degradation of compounds of emerging concern.

In summary, ecological risk assessments have shown that exposure to recycled water does not pose a risk to animals or plants. In addition, exposure of aquatic wildlife and plants to recycled water is expected to decrease due to the project.

Pipelines and Pump Station: The pipelines and pump station would not release recycled water to the environment and therefore pose no ecological risk to organisms. The risk associated with a pipeline rupture is the same as described for the project-level improvements. Impacts would be less than significant.

Mitigation: No mitigation is necessary.

## CUMULATIVE IMPACTS

**Impact: BIO-C1: Will the WREP cumulatively impact biological resources?**

Analysis: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements - Less than Significant*

The County of Sonoma is in the process of updating their General Plans.

The Draft General Plan for the County of Sonoma includes new and revised goals relative to biological resources affected by the project. Consistency of the WREP with those new goals is evaluated below:

Objective OSRC - 7.5. Maintain the connectivity between natural habitat areas.

The WREP maintains connectivity as analyzed in Impact BIO-6 relative to migration corridors which is less than significant.

Objective OSRC - 8.1. Designate all streams shown on USGS 7.5 minute quadrangle topographic maps as of March 18, 2003, as Riparian Corridors and establish streamside conservation areas along these designated corridors.

Objective OSRC - 8.3. Recognize and protect riparian habitat functions and values of undesignated streams during review of discretionary projects.

Policy OSRC 8.2. Provide standards for land use and development in streamside conservation areas which protect riparian vegetation, water resources and habitat values while considering the needs of residents, agriculture, businesses and other land users.

Policy 8f. Develop and/or adopt, where appropriate, revised streamside specific standards, guidelines, and/or best management practices that provide for protection of Riparian Corridors by watershed, stream, or other geographic areas.

The WREP is consistent with Objectives regarding riparian corridors and stream protection as shown in Impact BIO-1 and BIO-2. Measure PD-21 and Mitigation Measure BIO-2a also indicate the project's commitment to protection of riparian vegetation and woodlands.

Reasonably foreseeable cumulative projects include continued development of urban and agricultural uses within the recycled water service area. Numerous other pipeline projects and small agricultural reservoirs can be expected to be built within the recycled water service area over the life of the project. Water quality in the area may tend to continue degrading due to point and non-point sources of urban and agricultural stormwater runoff. Cumulative projects, however, would be regulated by the resource agencies to prevent loss of endangered or special-status species, wetlands, and other regulated biological resources.

The impacts of the project on biological resources are minor. Many impacts would be avoided altogether through implementation of measures adopted as part of the project. Temporary impacts to resources would be mitigated through restoration efforts which would return the resource to the same or better function and value. Permanent impacts are limited to approximately 1 acre of annual grassland for the storage tank, 2 acres of annual grasslands for the reservoir, and 0.5 acre of annual grassland for a pump station. To the extent that these permanent disturbances impact special status species habitat or protected communities, impacts would be compensated for by creating new habitat at appropriate mitigation ratios. Operational impacts are expected to be nil or minor, with ecologic risk to plants and wildlife has been shown to be very low. On this basis, biological impacts of the WREP are expected to be minor and not constitute a considerable contribution to cumulative biological impacts.

Mitigation: No mitigation is necessary.

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## 4.9 TRANSPORTATION AND CIRCULATION

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This section identifies potential project impacts to transportation and circulation including roadway congestion, traffic delays, restricted access, increased traffic hazards, and damage to roadbeds. In order to provide a basis for the evaluation of impacts on transportation, the setting section describes the existing roadway network and other modes of transportation in the WREP planning area.

### IMPACTS EVALUATED IN OTHER SECTIONS

The following items are related to the Transportation and Circulation, but are evaluated in other sections of this document:

- Air quality impacts caused by construction traffic are evaluated in Section 4.5, Air Quality.
- Noise increases caused by construction traffic are evaluated in Section 4.6, Noise.

### SETTING

#### Transportation System Roadway Network

The regional roadway network includes roads ranging from freeways to rural roads. Outside of urban areas, most of the roadways are two-lane rural roads with relatively narrow lanes and shoulders, variable grades, and restricted opportunities for passing over much of their length. Because Sonoma County is a tourist area the vehicle mix includes recreational and sightseeing vehicles as well as autos and trucks. Due to the type of agricultural activities in the area, local and rural roads may carry large farm-related trucks and other heavy equipment.

The transportation network within the study area includes several types of roadways, each of which serves a different function in terms of movement and access.

#### ***Freeways***

Freeways carry long distance inter-city and intra-city trips and are characterized by having access controls that strictly limit the points where traffic can enter and exit the facility. The average daily traffic on Highway 101 Sonoma County ranges from approximately 40,000 vehicle trips in the northern area of the County to in excess of 120,000 vehicle trips in downtown Santa Rosa.

Highway 101 serves regional and countywide travel as the major north-south, through route for the North Coast region. It provides regional access to Mendocino County to the north and to Marin County and the San Francisco Bay area to the south. Highway 101 is a commuter corridor between Sonoma County and the San Francisco Bay area and is heavily traveled during the morning and evening peak time. There are ongoing improvements within the Highway 101 corridor that will add a high occupancy vehicle (HOV) lane from the Town of Windsor in the north to the City of Petaluma in the south. Some portions of these improvements have been constructed and others are in the planning and programming process.

## **State Highways**

The state highways provide for interregional and inter-city travel. The study area includes portions of Highway 101 and Highway 116. These facilities primarily serve through traffic, commuters, and tourists; however, due to the rural characteristics of the counties, they also carry a significant percentage of the local trips that travel any distance. These facilities are congested during commute periods on weekdays and, due to tourism and recreational travel, on weekends as well. The state highways in Sonoma County carry between 20,000 and 70,000 daily vehicle trips.

## **Local Roadway Network**

The City of Petaluma's "functional street classification" establishes a set of standards for the operation of roadways within the City. The City classifies streets into the following four functional classifications:

- *Arterial* streets provide relatively high-speed/high-capacity access to regional transportation facilities. Access to arterials is generally from collector and local streets and direct access to abutting land uses may be limited.
- *Collector* streets provide medium-speed/medium-volume access within and between neighborhoods. Collectors are meant to collect trips from local streets and distribute them to the arterial network.
- *Connector* streets provide low-speed/medium-volume access within and between neighborhoods and nearby collector and arterial streets.
- *Local* streets are low-speed/low-volume roadways that provide direct access to abutting land uses.

*East Washington Boulevard* is classified as a two-lane two-way arterial street in the project area. It is a paved street with a speed limit of 45 mph.

*Ielmorini Road* is a two-lane two-way partially paved private road in the project area.

*Adobe Road* is a two-lane two-way paved arterial street in the project area. It has a speed limit of 55 mph.

*Browns Lane* is a two-lane two-way paved collector street in the project area. It does not have a posted speed limit in the vicinity of the project.

*Ely Road* is a two-lane two-way paved rural arterial street in the project area. It does not have a posted speed limit in the vicinity of the project.

The City restricts the following vehicles in the central traffic district except on designated arterial and collector streets between the hours of 10:00 AM and 6:00 PM of any day:

- Any freight vehicle more than eight and one-half feet in width, with load, or any freight vehicle so loaded that any part of its load extends more than twenty feet to the front or rear of such vehicle;
- Any vehicle carrying building material that has not been loaded or is not to be loaded at some point within the central traffic district; and

- Any vehicle conveying refuse, rubbish, garbage or dirt except the duly authorized franchise holder for refuse collection in the city.

Vehicles exceeding a maximum gross weight of three tons are required to use designated truck routes, and are prohibited from using the following streets at any time:

- Payran Street between E. Washington Street and Petaluma Blvd. No.;
- Payran Street from Jefferson Street to Washington Street between the hours of seven p.m. and seven a.m.;
- East "D" Street between Payran Street and Lakeville Street;
- Tenth Street between "B" and "D" Streets;
- Fair Street between Western Avenue and "B" Street; and
- Howard Street and Sixth Street between Western Avenue and "D" Street.

### ***Intersections***

The intersection of Adobe Road and East Washington Street is a two-way stop-controlled intersection, where Adobe Road is the major street and East Washington Street is the minor street with stop control.

The intersection of Browns Lane and Ely Road is a two-way stop-controlled intersection, where Browns Lane is the major street and Ely Road is the minor street with stop control.

### ***Existing Traffic Volumes***

The weekday travel patterns in Petaluma are typical of outlying portions of urban areas. The primary peak periods of travel are between 7:00 and 9:00 AM and between 4:00 and 6:00 PM. There are a significant number of commuters that travel south to Marin County and San Francisco during the morning peak and return during the evening peak. The existing peak periods occur due to the combination of local traffic and long distance commute traffic.

In addition to these weekday peaks, the WREP study area also has very high weekend traffic volumes due to the recreational and tourist traffic in the area. The weekend traffic tends to peak during mid-day on Saturday when local travel and tourist travel are each at their peak.

The City of Petaluma Traffic Division monitors hourly traffic volumes on City roads. Available traffic data for roads in the vicinity of the project were obtained from the Traffic Division to determine existing roadway usage and Level of Service (Petaluma 2007). Traffic data were collected by the City between April 17, 2007 and April 26, 2007.

Level of Service (LOS) is a qualitative description of operating conditions ranging from a LOS "A," or free-flow conditions with little or no delay, to LOS "F," or jammed conditions with excessive delays. Roadway segment LOS was analyzed based on the volume-to-capacity ratio (V/C). This method is the City standard for defining LOS for urban and suburban arterial segments, and is defined in the Petaluma General Plan (1987-2005). The City's Transportation Policy 1, states:

*Policy 1: On city streets where Level of Service (LOS) is currently at “C” or better, LOS shall not deteriorate below level “C”. Where 1985 LOS was “D” or “E,” LOS shall not deteriorate to the next lower level.*

The Sonoma County General Plan does not have defined LOS criteria for county roadway facilities. However, the County’s desired level of service is LOS “C” or better on arterials and collector roadways. Level of Service “C” is defined by daily and peak hour maximum vehicle capacity.

Figure 4.9-1 shows the existing peak hour and average daily traffic (ADT) for roadways in the vicinity of the near-term improvements. Table 4.9-1 summarizes the existing LOS for these roadways based on a capacity of 1,200 vehicles per hour per lane (vphpl). Based on the City’s LOS criteria, all roadway segments analyzed are currently operating at a LOS “C” or better.

**TABLE 4.9-1**  
**Existing Arterial Roadway Level of Service<sup>1</sup>**

Roadway	Direction <sup>2</sup>	No. Lanes	Capacity (vph) <sup>3,4</sup>	AM Peak Hour			PM Peak Hour		
				Volume	V/C <sup>5</sup>	LOS	Volume	V/C <sup>5</sup>	LOS
Ely Rd. south of Old Redwood Hwy	NB	1	1,200	137	0.11	A	201	0.17	A
	SB	1	1,200	193	0.16	A	210	0.18	A
Corona Rd. west of Adobe Rd.	EB	1	1,200	195	0.16	A	354	0.30	A
	WB	1	1,200	243	0.20	A	227	0.19	A
E. Washington St. west of Adobe Rd.	EB	1	1,200	304	0.25	A	342	0.29	A
	WB	1	1,200	307	0.26	A	351	0.29	A
Casa Grande Rd. west of Adobe Rd.	EB	1	1,200	124	0.10	A	120	0.10	A
	WB	1	1,200	159	0.13	A	137	0.11	A
Frates Rd. west of Adobe Rd.	EB	1	1,200	284	0.24	A	440	0.37	A
	WB	1	1,200	405	0.34	A	310	0.26	A
Adobe Rd. east of Frates Rd.	NB	1	1,200	589	0.49	A	965	0.80	C
	SB	1	1,200	756	0.63	B	637	0.53	A
Lakeville Hwy at Canon Road <sup>6</sup>	NB	1	1,300	800	0.62	B	800	0.62	B
	SB	1	1,300	755	0.58	A	755	0.58	A

Notes:

<sup>1</sup>Level of Service criteria from City of Petaluma General Plan, 1987-2005

<sup>2</sup>NB=northbound, SB=southbound, EB=eastbound, WB=westbound

<sup>3</sup>vph = vehicles per hour

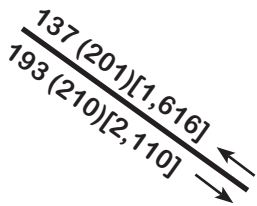
<sup>4</sup>Roadway capacity assumes 1,200 vehicles per hour per lane and existing lane configurations.

<sup>5</sup>v/c=volume to capacity ratio

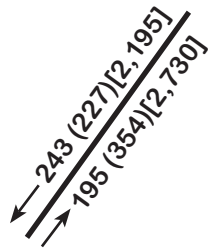
<sup>6</sup>Counts on Lakeville Hwy extrapolated from 2000 24-hour volumes available from SCTA



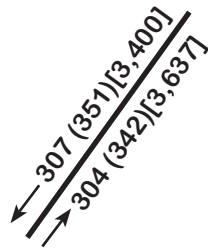
**1 Ely Rd**



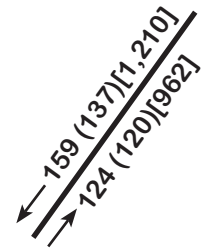
**2 Corona Rd**



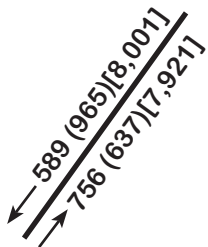
**3 E. Washington St**



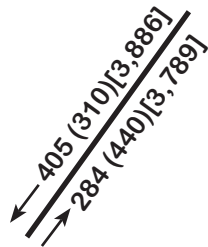
**4 Casa Grande**



**5 Adobe Rd (E. of Frates)**



**6 Frates Rd**



**Legend**

XXX AM Peak Hour (veh/hr)  
 (XXX) PM Peak Hour (veh/hr)  
 [XXXX] ADT (veh/day)

**Figure 4.9-1  
 Traffic Volumes**

WREP EIR  
 Petaluma, California

## ***Parking***

Central Petaluma experiences high parking demand on weekdays during business hours and on weekends. On-street parking, two parking garages and surface parking lots are available to meet the long-term and short-term parking demand in Petaluma. Recent parking studies have recommended increased parking enforcement and strategies to discourage employees from occupying public and short-term parking spaces in the core area.

## ***Bicycle and Pedestrian Facilities***

The City maintains the following bikeway classifications:

- Class I bikeways are completely separated from motor vehicle traffic and may be shared with pedestrians.
- Class II bikeways are located on streets and allow bicyclists to utilize a separate lane of travel designated by striping, markings and signs.
- Class III bikeways are located on streets where cyclists share the travel lane with motor vehicles, and are designated by signs only.
- Recreational trails are off street bicycle and pedestrian facilities where a Class I bikeway is not feasible or desired.
- Bicycle Boulevards are modified Class III routes in which the bicyclists are given precedence over cars by means of barriers, traffic calming or signs.

The bikeway network remains disjointed and has not yet been developed as a viable commute alternative in Petaluma. Bicycle lanes and support facilities are lacking in most areas.

The City's pedestrian network consists primarily of sidewalks, trails, and crosswalks. Sidewalks are found along most roadways in the study area, and lighted crosswalks are becoming more prevalent at mid-block crossings on streets that receive moderate to high levels of traffic.

## ***Transit Service***

The City operates the Petaluma Transit, a division of the Department of Public Works. Services include five fixed routes and para-transit services, both operating within the Petaluma City limits. Fixed-routes are provided Monday through Friday and Saturday.

The Sonoma County Transit provides transit and para-transit services weekdays and weekends between Petaluma, Sonoma, Rohnert Park, Santa Rosa and other destinations.

The Golden Gate Bridge, Highway and Transportation District, which is based in San Francisco, operates the Golden Gate Transit bus system which provides regional fixed-route peak-hour bus service in San Francisco, Marin and Sonoma counties. The Golden Gate Transit provides basic, commuter and para-transit service weekdays and weekends through most of the service area. Limited service is provided outside of the peak hours.

## ***Rail Service***

Use of the Northwestern Pacific Railroad line has decreased significantly over the last fifty years, and there is currently no active regional commuter or freight rail service serving the City of



Petaluma on this rail line. The Northwestern Pacific Railroad alignment runs north-south between Eureka and Larkspur passing through the City of Petaluma. The North Coast Rail Authority (NCRA) owns the right-of-way north of Healdsburg, and has a freight easement between Healdsburg and Highway 37. The NCRA does not have an easement south of Highway 37. The Sonoma Marine Area Rail Transit (SMART) District was formed in 2003 to oversee the development and implementation of passenger rail service in Sonoma and Marin Counties. The plan for this service is currently under development.

### ***Air Transportation***

The Petaluma Municipal Airport currently receives approximately 145 flights per day, and over 53,000 flights per year. The airport is classified by Caltrans as “Regional General Aviation”. While the airport is not likely to become a major link in Petaluma’s transportation network, recommended capital improvement projects and increased integration of the airport with the City’s transportation networks would maintain or increase the role of the airport in the local and regional transportation system.

The East Washington Street pipeline is located within the Traffic Pattern Zone (TPZ), Runway Protection Zone (RPZ), Sideline Safety Zone (SSZ) and Inner Turning Zone (ITZ). No other project components are located within Petaluma Municipal Airport Safety Zone.

### ***Water Transportation***

The Petaluma River bisects the City and is a navigable up to approximately Western Avenue. While water transport no longer plays the important role it once did in the City’s daily life, there are still several important industries that depend on the river for transportation. The City is also a major destination for Bay Area yacht clubs and local boaters.

## **Regulatory Setting**

The California Department of Transportation (Caltrans) is governed by the California Vehicle Code and the California Streets and Highways Code. Caltrans operates and maintains US 101, which is the principal highway bisecting the City and connecting it with destinations to the north and south. Any work performed on or beneath Caltrans right-of-way at Lakeville Highway, State Route 116, or Highway 101 would require an Encroachment Permit. Transport of heavy or oversized loads during construction may require a Transportation Permit.

The Sonoma County General Plan applies to the unincorporated areas within the project study area. The project is located in the Petaluma and Environs Planning Area, which at the time the current General Plan was written, had the county’s highest out-commute rate. Through goals, objectives and policies the General Plan Circulation and Transit Element addresses the location and extent of existing and planned transportation routes and facilities, and plans for future transportation facilities. The General Plan is currently in the process of being updated.

The Sonoma County Transportation Authority (SCTA) acts as the countywide planning and programming agency for transportation related issues: securing funds, project oversight and long term planning. The SCTA is governed by a twelve member Board of Directors. Nine of these members are chosen from the Councils of the nine incorporated cities or towns, and three are chosen from the County Board of Supervisors.

The City General Plan applies to the incorporated areas and Urban Growth Boundary of the City of Petaluma. The Transportation Element of the General Plan describes the conditions at the time the General Plan was adopted in 1987, and outlines the City’s objectives, policies and programs. The current General Plan is currently in the process of being updated.

## GOALS, OBJECTIVES, AND POLICIES

Table 4.9-2 identifies transportation goals, objectives, and policies. The table also indicates which criteria in the Transportation Section are responsive to each set of policies.

**TABLE 4.9-2**  
**Goals, Objectives, and Policies – Transportation**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Sonoma County General Plan	Circulation and Transit Element	Goal CT-1	Develop a comprehensive circulation and transit system that is safe, efficient, environmentally sound, accessible, and coordinated with the land use plan.	1-4
Sonoma County General Plan	Circulation and Transit Element	Objective CT-2.1	Reduce congestion on the countywide highway system by maintaining a “C” level of service or better on designated arterial and collector roadways unless a lower level of service is shown on Figures CT-2c and CT-2d on pages 291-293 ....”	1
Petaluma General Plan 2025	Mobility	Policy 5-P-10	Maintain an intersection level of service (LOS) standard for motor vehicle circulation that ensures efficient traffic flow and supports multi-modal mobility goals. LOS should be maintained at Level D or better for motor vehicles due to traffic from any development project.	1
Petaluma General Plan 2025	Mobility	Policy 5-P-9-C	Designate official truck routes to ensure truck traffic minimizes its impact on residential neighborhoods and avoids mixed use and main streets, where possible, and enforce truck parking restrictions.	6

**TABLE 4.9-2**  
**Goals, Objectives, and Policies – Transportation**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Petaluma General Plan 2025	Mobility	Policy 5-P-5	Consider impacts on overall mobility and travel by multiple travel modes when evaluating transportation impacts.	1,2,3

Source: Petaluma General Plan 2025, Sonoma County 1989

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

Table 4.9-3 summarizes the evaluation criteria and thresholds of significance used for assessing the impacts of the project on transportation and circulation. The evaluation criteria are drawn from local and state policies, standards, and requirements.

**TABLE 4.9-3**  
**Evaluation Criteria with Threshold of Significance – Transportation and Circulation**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
1. Will the WREP traffic cause congestion along study area roadways?	Deterioration in corridor level of service along study area roadways.	Exceed roadway capacity.	Professional Judgment Petaluma General Plan 2025
2. Will lane closures due to WREP construction cause traffic delays, transit delays, restricted access, and rerouting of traffic, including emergency vehicles?	Miles of lane closures not in compliance with Standard Transportation Procedures.	Greater than 0 miles.	Sonoma County Public Works Department; California Department of Transportation, and Professional Judgment Petaluma General Plan 2025
3. Will WREP construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Number of locations where there is ingress/egress of construction equipment onto a major roadway not in accordance with regulations <sup>1</sup> .	Greater than 0 locations.	Sonoma County Public Works Department; California Department of Transportation Petaluma General Plan 2025
4. Will WREP construction traffic damage public or private roadbeds?	Number of miles of roadway which project does not restore to existing conditions or better.	Greater than 0 miles.	Sonoma County Public Works Department; California Department of Transportation; City of Petaluma Public Works Department

**TABLE 4.9-3**

**Evaluation Criteria with Threshold of Significance – Transportation and Circulation**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
5. Will there be inadequate parking for WREP activities?	Any on-street parking.	Greater than 0 vehicles.	Code requirements for Sonoma County and City of Petaluma
6. Will WREP construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Number of roadways traveled by project heavy vehicles on non-designated truck routes without a Transportation Permit.	Greater than 0 roadways.	Sonoma County Public Works Department, California Department of Transportation; City of Petaluma Public Works Department Petaluma General Plan 2025

**METHODOLOGY**

Traffic and circulation impacts associated with WREP components were evaluated against the criteria listed in Table 4.9-3. The traffic and transportation impacts caused by the construction of the near-term improvements were identified based on typical construction practices.

Construction of the WREP components would result in short-term increases in vehicle traffic and construction activities. Operation and maintenance related traffic trips are expected to be minimal. The tertiary storage tank, open reservoir, and pump station would generate approximately one round-trip per week. Site visits related to the irrigation sites would be on an as-needed basis, and result in up to three round-trips per week.

Temporary increases due to construction traffic are factored into the methodology for determining short-term changes in LOS. Construction traffic volumes generated by project-level and program-level improvements were estimated to determine if construction traffic would potentially increase traffic and decrease LOS beyond acceptable levels on study area roadways. Each component was also evaluated to determine if construction would result in lane closures or access restrictions. Worker parking and construction staging areas are discussed in terms of their potential traffic impacts.

**Standard Traffic Control Procedures**

Standard Traffic Control Procedures are a part of the project description measures adopted by the City and are presented in Measure PD-11 in Chapter 3 of this EIR. They detail typical encroachment permit provisions within the WREP area roadway system right-of-way that would be required by each relevant jurisdiction. Elements of the Standard Traffic Control Procedures provide for encroachment permits, transportation permits, alternative routes and detours, construction along roadways, construction across roadways, construction near schools, trenches, access, road damage, emergency vehicle access, parking, oversize vehicles and equipment, construction hours, and ingress/egress of construction equipment onto a major roadway.

## **Near-Term Improvement Construction Conditions**

### ***Storage Tank***

The phased construction of the future expansion of the recycled water transmission, storage and distribution system is estimated to begin in 2008 and be complete in 2009. The construction of the new recycled water storage tank would require the off haul of approximately 19,000 cubic yards of material from the site and 4,000 cubic yards of fill material brought to level the site. It is estimated that construction of the storage tank would require between 10 and 20 workers (including equipment operators, laborers, foreman, construction manager, iron/concrete workers, and inspectors) on-site at the same time depending on the construction activity.

The most critical activity that would affect roadway traffic is hauling excavated material from and fill material to the storage tank site. An estimated maximum 150 truck round trips per day plus 20 vehicle round trips per day for workers for up to 1 month may be required during earthwork construction activities at the tank site. Refer to Table 4.9-3 for additional details on construction related traffic.

Approximately one round-trip would be made each week for the purposes of operation and maintenance at the storage tank.

### ***Pipelines***

Open trench construction of the 20-inch diameter pipeline on East Washington Street from Parkland Drive to Ielmorini Road and up to the new tank would require the excavation and off haul of approximately 3,500 cubic yards of material and bringing in approximately 3,000 cubic yards of fill.

Open trench construction of the two 20-inch diameter pipelines on Browns Lane would require the excavation and off haul of approximately 2,100 cubic yards of material and bringing in approximately 1,800 cubic yards of fill.

The number of construction workers for each pipeline construction project varies according to the construction activity. Installation of each pipeline would require between 8 and 10 workers (including equipment operators, laborers, foreman, traffic control, construction manager, and inspectors) on site at the same time.

### ***Construction Transportation***

Two different types of trucks would be used to transport materials and fill. A truck with a trailer attached totaling approximately 60 feet in length would be used to transport fill, and a single unit truck approximately 30 feet long would be used for off hauling materials. The truck with the attached trailer would have a turning radius of approximately 55 feet and the single unit truck would have a turning radius less than 50 feet.

Inbound/outbound truck traffic to and from the storage tank construction site or the East Washington Street pipeline construction area would travel to US 101 via Adobe Road either north to Corona Road or Old Redwood Highway or south to Frates Road and Lakeville Highway.

Inbound/outbound truck traffic to and from the Browns Lane pipeline construction area would travel to US 101 via Lakeville Highway.

Truck and other traffic associated with program-level improvements would travel to and from US 101 via roadways outside of central Petaluma. Project construction-related heavy vehicles would not travel through the central traffic district except on designated arterial and collector streets between the hours of 10:00 AM and 6:00 PM of any day, per City ordinance. Also, vehicles exceeding a gross weight of three tons would use designated truck routes.

The hours of construction are anticipated to be from 7 AM to 6 PM with most activities occurring from 8 AM to 5 PM.

Estimated project construction traffic volumes are identified in Table 4.9-4.

**TABLE 4.9-4**  
**Project Construction Traffic Volumes**

	<b>Project</b>	<b>Activity</b>	<b>Peak vehicles/day</b>	<b>Average vehicles/day</b>
<b>Trucks</b>	Storage Tank <sup>1</sup>	Excavation/Fill	150	15
	E. Washington Street	Trench Excavation	50	15
	Browns Lane	Trench Excavation	50	15
<b>Cars</b>	Storage Tank <sup>1</sup>	Excavation/Fill	20	10
	E. Washington Street	Trench Excavation	10	6
	Browns Lane	Trench Excavation	10	6
		<b>Subtotal</b>	<b>290</b>	<b>67</b>

Notes:

<sup>1</sup>Assumes excavation activities occur over a 30-day period.

**Construction Staging and Parking**

Construction staging for the storage tank would be at the tank site. Equipment that would be stored on site includes graders, compactors, excavators, backhoes, cranes, forklifts, trucks, concrete mix trucks, water truck, and other specialty vehicles. Parking for construction workers would be at the staging area or at the tank site. Pipeline construction staging areas would be located within the 30-foot construction corridor along the East Washington Street and Browns Lane alignments, where available, or could occur in one of two 1-acre staging areas.

**Improvements**

After pipe installation Ielmorini Road would be overlaid between Adobe Road and the tank site. East Washington Street and Browns Lane would be restored to previous or better conditions.

**IMPACTS AND MITIGATION MEASURES**

**Impact:** TR-1: Will the WREP traffic cause congestion along project area roadways?

**Analysis:** Project-Level Near-Term Conveyance Improvements – Less than Significant

Construction would require both construction workers and heavy equipment. This construction may cause temporary, localized traffic congestion associated with

mobilization of construction equipment, disposal of excess excavated materials, delivery of materials, pavement restoration, and soil compaction and dust control, and construction worker vehicles. Construction of the East Washintong/Ielmorini area improvements would temporarily increase traffic volumes along Adobe Road, with a peak of approximately 230 construction-related trips per day if all components of the project were constructed simultaneously. This increase in traffic is less than 1 percent of the current AM peak traffic volumes on Adobe Road and on East Washington Street (City of Petaluma 2007). As the peak hour traffic generated by construction of the storage tank would be approximately 29 vehicles, the increase in traffic over the current peak traffic levels, 307 to 756 respectively for East Washington Street and Adobe Road, would not exceed the available capacity of 1,200 vehicles per hour (as shown in Table 4.9-1). Therefore the temporary impact would be less than significant.

Construction of the Browns Lane area improvements would temporary increase traffic volumes along Lakeville Highway by approximately 60 trips per day or 7.5 trips per hour. The AM peak volume on Lakeville Highway is 800 trips. The additional construction-related trips would therefore not exceed the capacity of Lakeville Highway (as shown in Table 4.9-1). This impact is considered less than significant.

The increase in traffic due to operation and maintenance of the storage tank would average one trip per week. This would not exceed the available capacity of the roadways, and therefore the permanent impact would be less than significant.

*Program-Level Improvements – Less than Significant*

Construction of the improvements would require both construction workers and heavy equipment. This construction may cause temporary, localized traffic congestion associated with mobilization of construction equipment, disposal of excess excavated materials, delivery of gravel, asphalt, and water for pipeline trenches, pavement restoration, and soil compaction and dust control, deliveries of piping, and construction worker vehicles. Specific pipeline locations have not been determined, and therefore the roadways that would be used to access the construction sites are not known.

Increases in traffic during construction are expected to be less than or equal to the levels reported in Table 4.9-4 for trench excavation. While the construction of the small open reservoir may involve the excavation of soil volumes similar in magnitude to those for the storage tank, the vast majority of excavated material is expected to be reused on site for the reservoir construction. Traffic increases would be temporary and are anticipated to be less than the available capacity of the roadways. Therefore, this would be a less than significant impact.

The increase in traffic due to operation and maintenance of the pump station and reservoir would average one round-trip to each site per week. The pump station would be monitored remotely via a wireless communication system. The pump station would be located near the golf course on the west side of Petaluma while the reservoir would be off of Lakeville Highway southeast of Petaluma in unincorporated Sonoma County. Trips related to the irrigation sites could be up to three times per week. Given the small number of trips and the distance between the facilities this impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact:** **TR-2: Will lane closures due to WREP construction cause traffic delays, transit delays, restricted access, and rerouting of traffic, including emergency vehicles?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements – Less than Significant*

No lane closures would be required for construction of the storage tank, as all construction activities associated with these improvements would occur on-site. Also, no restrictions on access to other properties, or traffic or transit delays would be required as construction of the storage tank would be located within a temporary construction easement or on City property. Construction traffic would enter and leave the tank sites via Ielmorini Road. A maximum of approximately 150 trips per day would be generated by the construction and because of the relatively moderate levels of traffic on Adobe Road and the four-way stop at East Washington/Ielmorini and Adobe Road no safety hazards would be created at the intersection of Ielmorini Road and Adobe Road. Project Measure PD-11 Standard Traffic Control Procedures is incorporated as part of the project. Under PD-11 the City would comply with provisions outlined in any required Encroachment and Transportation permits in accordance with governing agency regulations and specifications.

It is anticipated that construction of the pipelines along East Washington Street may cause partial lane closures. The major construction activities associated with installation of the pipelines that would cause temporary lane closures consist of the mobilization of construction equipment; stockpiling lengths of piping along pipeline alignments; delivery of gravel, asphalt, and water for pipeline trenches; pavement restoration; soil compaction and dust control; breaking and removing pavement; excavation of pipeline trench; and installation of pipe sections. Browns Lane will be closed to through traffic during installation of the pipeline. Construction will take up to 30 days. During this time PD-11 Standard Traffic Control Procedures will be followed. This impact is considered less than significant.

However, substantial traffic and transit delays are not expected to occur because construction would be conducted in accordance with existing regulations as outlined in PD-11 Standard Traffic Control Procedures. Under these procedures, the City would identify alternative routes, where feasible, to avoid the construction zone and would provide alternate route information signage and other information to alert motorists, cyclists and pedestrians of alternative routes and potential delays. In addition, the City would contact emergency response (hospitals, police, fire, and ambulance), transit, and school bus providers and inventory the locations of their primary routes that may be affected by the construction. This impact is considered less than significant.

*Program-Level Improvements – Less than Significant*

Construction of program-level improvements would not require road closures except for partial lane closures associated with the construction of pipelines. Substantial traffic and transit delays are not expected. Measure PD-11 Standard Traffic Control Procedures is incorporated as part of the project. Under these procedures, the City would identify alternative routes, where feasible, to avoid the construction zone and would provide alternate route information signage and other information to alert motorists, cyclists and pedestrians of alternative routes and potential delays. At no time would the City restrict access of an emergency vehicle. In addition, the City would contact emergency response (hospitals, police, fire, and ambulance), transit, and school bus providers and inventory



the locations of their primary routes that may be affected by the construction. This impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: TR-3: Will the WREP construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Construction traffic associated with project-level improvements would not substantially increase traffic hazards to motor vehicles, bicycles, or pedestrians because PD-11 Standard Traffic Control Procedures to minimize traffic hazards shall be implemented as part of the project. Under these procedures, construction flagging and signage and other safety measures shall be in conformance with the “California Manual on Uniform Traffic Control Devices” (California MUTCD). These procedures require the City to obtain an Encroachment Permit and Transportation Permit to regulate ingress and egress from the construction sites, thus reducing any potential hazards. In addition, the City would identify alternative routes, where feasible, to avoid the construction zone and would provide alternate route information signage and other information to alert motorists, cyclists and pedestrians to potential traffic hazards.

*Program-Level Improvements – Less than Significant*

As discussed under near-term improvements construction traffic associated with program-level improvements would not substantially increase traffic hazards to motor vehicles, bicycles, or pedestrians because Measure PD-11 Standard Traffic Control Procedures has been incorporated as part of the project to minimize traffic hazards.

Mitigation: No mitigation is necessary.

**Impact: TR-4: Will WREP construction traffic damage public or private roadbeds?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Construction traffic associated with the storage tank component could damage Ielmorini Road, which is a private road. However, as part of the project the road, between Adobe Road and the storage tank site would be overlaid after construction. This would restore the road to a condition exceeding pre-construction conditions.

If heavy vehicles are used during construction of the near-term improvements, they could damage affected public roadways. Under Measure PD-11 Standard Traffic Control Procedures the City would prepare a summary of baseline conditions for roads scheduled to have construction on or near them, and then be required to return the roadways to equal or better condition within one year after construction.

The impact of construction traffic on public or private roadbeds, therefore, would be less than significant.

*Program-Level Improvements – Less than Significant*

If heavy vehicles are used in construction of the program-level improvements, including pipelines, the storage reservoir, and the pump station, they could damage affected

roadways. Under Measure PD-11 Standard Traffic Control Procedures the City would prepare a summary of baseline conditions for roads scheduled to have construction on or near them, and then be required to return the roadways to equal or better condition within one year after construction.

Mitigation: No mitigation is necessary.

**Impact: TR-5: Will there be inadequate parking for WREP activities?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Construction activities would create a temporary increase in demand for parking by workers and material suppliers. However, Measure PD-11 Standard Traffic Control Procedures requires that construction equipment and construction worker vehicles be parked within designated areas within the construction easements. Construction vehicles associated with the storage tank would be easily accommodated at the tank site. Construction vehicles associated with the pipeline along East Washington would be accommodated within the designated staging area or within construction easements. Construction vehicles associated with Browns Lane pipeline construction can easily be accommodated at the Ellis Creek WRF on Lakeville Highway or along Browns Lane. Therefore impacts on parking availability would be less than significant.

During operation and maintenance, generally, no more than one to two vehicles would visit the storage tank at a given time. Adequate parking would be available for the operation and maintenance at the facility site or within the roadway easement.

*Program-Level Improvements – Less than Significant*

Construction activities would create a temporary increase in demand for parking by workers and material suppliers. However, Measure PD-11 Standard Traffic Control Procedures requires that construction equipment and construction worker vehicles be parked within designated areas within the construction easements. Therefore impacts on parking availability would be less than significant.

During operation and maintenance, generally, no more than one to two vehicles would visit each facility at a given time. Adequate parking would be available for the operation and maintenance at each facility site or within the roadway easement.

Mitigation: No mitigation is necessary.

**Impact: TR-6: Will WREP construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than significant*

Project construction activities would require the use of heavy vehicles for transporting materials and performing the work. These heavy vehicles would not use roadways not designated or suitable as truck routes. The highway destination for construction-related heavy vehicle traffic would be US 101. Inbound/outbound truck traffic to and from the storage tank construction site would travel on designated truck routes to US 101 staying outside of the City central traffic district.

Inbound/outbound truck traffic to and from the East Washington Street pipeline construction area and the Ielmorini tank site would travel to US 101 via Adobe Road

either north to Corona Road or Old Redwood Highway or south to Frates Road and Lakeville Highway.

Inbound/outbound truck traffic to and from the Browns Lane pipeline construction area would travel to US 101 via Lakeville Highway.

Construction-related heavy vehicles would not travel through the central traffic district except on designated arterial and collector streets between the hours of 10:00 AM and 6:00 PM of any day, per City ordinance.

*Program-Level Improvements – Less than Significant*

Program-level improvements construction activities would require the use of heavy vehicles for transporting materials and performing the work. These heavy vehicles would not use roadways not designated or suitable as truck routes. Vehicles exceeding a gross weight of three tons would use designated truck routes. On the most part truck and other traffic associated with program level improvements would travel to and from US 101 via roadways outside of central Petaluma. Project construction-related heavy vehicles would not travel through the central traffic district except on designated arterial and collector streets between the hours of 10:00 AM and 6:00 PM of any day, per City ordinance. Some pipelines may be installed within the central traffic district. Construction of any portion of the project within the central traffic district would be required to prepare a Traffic Control Plan as outlined in PD-11 Standard Traffic Control Procedures. This impact is considered less than significant.

Mitigation: No mitigation is necessary.

## **CUMULATIVE IMPACTS**

**Impact: TR-C1 through C6: Will the WREP plus cumulative projects cause impacts to traffic based on evaluation criteria 1 through 6?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

The potential exists for the near-term conveyance improvements plus cumulative projects to cause congestion along study area roadways. Three additional construction projects along Adobe Road and East Washington Street may occur during construction of the near-term improvements. This includes the Sonoma County Public Works Adobe Road and East Washington Street Signalization and Widening (construction estimated to start in 2009), the East Washington Park Improvements project (construction estimated to start in 2009), and the Sonoma County Water Agency Cotati-Kastania Pipeline (construction estimated in 2010). Under PD-11 Standard Traffic Control Procedures, the City would coordinate construction of the near-term improvements with the County so that construction at the intersection of Adobe Road and East Washington Street does not occur at the same time. In addition, the City will coordinate internally with the East Washington Park Improvements project. Coordination of the construction schedules would minimize construction related traffic impacts. This impact is considered less than significant.

Mitigation: No mitigation is necessary.

Analysis: *Program-Level Improvements – Significant*

There are a number of additional proposed construction projects in the WREP study area that could have effects on traffic congestion. These projects, and continued growth, include street reconstruction and widening projects and pipeline replacement projects proposed by the City of Petaluma, the Sonoma County Public Works Department, and Caltrans. These projects will ultimately improve traffic flow, but would cause temporary traffic congestion, delays, access restrictions and hazards during the construction period. In addition, the City of Petaluma is proposing a number of surface water, wastewater, and potable water utility projects, all of which would disrupt roadways and have construction-period impacts on traffic. PD-11 requires the City to coordinate construction schedules. However, the number and extent of the other projects is not known at this time and if constructed simultaneously with the program-level improvements, these cumulative projects could raise the level of significance from less than significant to significant.

Mitigation: No feasible mitigation has been identified. Therefore this impact is identified as significant and unavoidable.

## REFERENCES

City of Petaluma. 2008. *Final General Plan 2025*. May.

City of Petaluma Traffic Division. 2007. Traffic Counts. April.

Sonoma County. 1994. *Sonoma County General Plan*. March 1.

## 4.10 CULTURAL AND PALEONTOLOGICAL RESOURCES

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This section discusses the potential impacts to cultural resources related to disturbance of archaeological, historical, architectural, and traditional cultural properties. It also discusses the potential for impacts to paleontological resources.

### SETTING

#### Regional Overview

The following prehistoric archaeological, ethnographic, and historic regional overviews are taken from Koenig 2007.

##### ***Prehistoric Archaeological and Ethnographic Overview***

An analytic framework for the interpretation of Sonoma County prehistory is provided by Fredrickson (1974), who divided human history in California into three broad periods: the Paleoindian period, the Archaic period, and the Emergent period. This scheme used sociopolitical complexity, trade networks, population and the introduction and variation of artifact types to differentiate between cultural units. This scheme, with minor revisions (Fredrickson 1994), remains the dominant framework for prehistoric archaeological research in this region.

The Paleoindian period (10000 B.C. to 6000 B.C.) was characterized by small, highly mobile groups occupying broad geographic areas. During the Archaic period, consisting of the Lower Archaic (6000 B.C. to 3000 B.C.), the Middle Archaic (3000 B.C. to 500 B.C.), and the Upper Archaic (500 B.C. to A.D. 1000), geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The addition of milling tools, obsidian and chert concave-base projectile points, and the occurrence of archaeological sites in a wider range of environments suggest that the economic base was more diverse than during the Paleoindian period. By the Upper Archaic period, mobility was being replaced by a more sedentary adaptation in the development of numerous small villages, and the beginnings of a more complex society and economy began to emerge. During the Emergent period (A.D. 1000 to contact), social complexity developed toward the ethnographic pattern of large, central villages where political leaders resided, with associated hamlets and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched points, mortars and pestles, and a diversity of beads and ornaments (Fredrickson 1994; Gerike et. al. 1996:3.11-3.17).

Ethnographic literature indicates that at the time of historic contact, the area was within the territory of Coast Miwok speakers (Barrett 1908; Kelly 1978; Kroeber 1925). Three ethnographic villages are located within the study area: *Péta lu-ma*, *Likatuit*, and *Etem*. Barrett located *Péta lu-ma* “on a low hill east of Petaluma creek at a point probably about three and one-half miles a little north of east of the town of Petaluma” (1908:310). He describes the village as large and important, taking into consideration the continued use of the name for the town, river, township, and school district. The village was also referred to as *tule’ yome* – the name of the adjacent [Tolay] creek. *Etem* was located just north of the town center of Petaluma (Barrett 1908:310).

*Likatuit* was located just northeast of *Etem* on the west bank of the Petaluma River (Kelly 1978:415).

Coast Miwok settlements focused on bays and estuaries, at the mouths of fresh watercourses, or along perennial interior streams. The Coast Miwok economy was based on fishing, hunting, and gathering. These activities revolved around a seasonal cycle, during which people traveled to certain points throughout their territory to make use of resources as they became available. Marine foods, including kelp, clams, crabs, and, especially, fish were year-round staples. Acorns were gathered in season and stored for use throughout the year. Some Coast Miwok villages defended their territory against trespassers, but land was not considered privately owned (Kelly 1978:418). The establishment of missions at San Francisco, San Rafael and Sonoma began the displacement of tribelets from their traditional territory. By the time of California's initial integration into the United States in the late 1840s, the Coast Miwok population had dwindled to one-eighth of its estimated size before European contact (Kelly 1978:414).

### ***Historical Overview***

European explorers first traveled the Petaluma River in 1776, when Ferdinand Quiros and his party passed through the area. In 1819 Father Mariano Payéras visited the Llano de los Petalumas, or the Plain of the Petaluma Indians (Gudde 1998:287). In 1834 Mariano Vallejo began construction of his adobe home about 4 miles to the east of the present-day downtown, within his Rancho Petaluma. During the Gold Rush, hunters' camps and trading posts appeared on the banks of the river. The town was laid out and the post office established in 1852, and the City was incorporated in 1858 (Durham 1998:679). In the early 1850s, the Petaluma Valley became an important production area for grain and vegetables, and by the 1870s had become well known as a center of the poultry industry (Hoover et al 1990:478, 482-483). The Petaluma River became a useful transportation corridor, linking the area to San Francisco. The Northwest Pacific Railroad came through Petaluma in 1870. In 1879 Lyman Byce invented the first practical chicken incubator and caused a sensation at the Sonoma-Marin Agricultural Society Fair. In 1898 the first commercial hatchery in Sonoma County, called Pioneer Hatchery, was established at 418 Sixth Street in Petaluma and employed Byce's incubators. By 1915 Petaluma produced approximately 10 million eggs a year, at an average price of 30 cents per dozen (Heig 1982:109-113). By the 1940s more than 30 percent of the state's eggs were produced in Petaluma.

### ***Paleontological Overview***

The oldest geologic units in the vicinity are the Jurassic to early-Cretaceous Franciscan Complex and the Lower Cretaceous Great Valley Sequence. The Cretaceous Period dates between 145 and 65 million years ago and the Jurassic Period dates between 213 and 145 million years ago (USGS 2006). The Franciscan Complex consists of folded and faulted sandstones, shale, conglomerate, chert, greenstone, and serpentine rocks. Marine invertebrates have been found in shale within the Franciscan Complex. Chert within this geologic unit sometimes contains marine microfossils. The Great Valley Group consists of marine mudstones, sandstones, and conglomerates. Radiolarian and marine invertebrates have been found in deposits of the Lower Cretaceous Great Valley Sequence (Parsons 2003).

Younger Miocene to Pliocene sedimentary rocks, including the Wilson Grove Formation (marine sandstone, conglomerate, and tuff) and the Petaluma Formation (mostly non-marine claystone, mudstone, and siltstone) were deposited on top of the Franciscan Complex. The Miocene Epoch dates between 23.8 to 5.3 million years ago and the Pliocene Epoch dates between 5.3 to 1.8 million years ago (USGS 2006). The marine sediments of the Wilson Grove Formation are

known to contain such fossils as clams, snails, brachiopods, sand dollars, sea urchins, crabs, polychaete tubes, and various plant types. Vertebrate fossils are also known to exist in this geologic unit. Brackish and freshwater mollusc fossils are found in the Petaluma Formation as are a wide range of invertebrate and vertebrate fossils, including bison, horse, deer, turtle, rhino, camel, mastodon, and plant leaves (Parsons 2003).

Also during the Pliocene, volcanic activity resulted in the deposition of the Sonoma Volcanics (basalt, andesite, rhyolite, and tuff) in eastern Sonoma County. Sonoma Volcanics contain interbedded tuffaceous sedimentary rocks and diatomite. Rhyolitic tuff and tuff of this unit are known to contain significant plant and fish fossils.

More recently, Pleistocene to Holocene alluvium, including the Glen Ellen Formation, was deposited in the northwest-trending valleys. This alluvium is the youngest natural unit in the area. These deposits date between 1.8 million years ago to 8,000 years ago (USGS 2006). The Glen Ellen Formation consists of fluvial gravel, silt, sand, and clays eroded from the adjacent highlands. Fossils dating to the Pleistocene have been recovered from alluvial/colluvial deposits in the Glen Ellen Formation within Sonoma County.

### **Project-Level Near-Term Conveyance Improvements Study Area**

The project-level, near-term conveyance improvement study area consists of two separate areas: the East Washington/Ielmorini area and the Browns Lane area. The East Washington/Ielmorini area includes a 3,700-foot section of East Washington Street right-of-way running from Parkland Drive northeast to Adobe Road, and continuing another 3,800 feet along the Ielmorini Road to the site where the tertiary water storage tank would be constructed. The pipeline study area is a 30-foot wide corridor that includes the roadway and in the case of Ielmorini Road approximately 5 feet on either side.

The Browns Lane area is a 1,900-foot section of Browns Lane right-of-way between Lakeville Highway and South Ely Road. Two 20-inch pipelines would be placed within the existing roadway. The study area is a 30-foot wide corridor that includes the roadway.

### ***Cultural Resources***

A literature and records search conducted in July 2007 by Sonoma State University Anthropological Studies Center staff for the project-level improvements (Koenig 2007a) found that four prehistoric archaeological sites (two midden sites, a petroglyph site, and a scatter of obsidian debitage), one multicomponent site (stone tools and debitage and old bottle glass), and one historic-period ranch complex have been recorded within ½ mile of the East Washington/Ielmorini study area (Koenig 2007a). The archaeological field survey conducted for the near-term improvements identified one previously unrecorded possible historic-period resource just outside the study area of the proposed East Washington/Ielmorini area pipeline: a concrete perimeter foundation of a storage shed/workshop. This site was recorded and documented on a Department of Parks and Recreation Continuation Sheet 523L.

The literature and records search found that one prehistoric archaeological site (a midden site), and two historic-period resources (a ranch complex and a segment of the old Northwestern Pacific Railroad grade) have been reported within ½ mile of the Browns Lane project-level study area (Koenig 2007a). The archaeological field survey conducted for the project identified no historical or archaeological resources within the Browns Lane study area.



During the July site visits, one possible historic-period resource was identified during the survey. The resource consists of a concrete perimeter foundation of a storage shed/workshop and was identified outside, but adjacent to, a portion of the pipeline area of impact not far from the proposed tank site. One 12 inch by 12 inch redwood timber with several attached wire nails and approximately 10 pieces of burned 2 inch by 4 inch planks were piled in the center of the foundation perimeter. Two fragments of brown bottle glass were observed.

During the November site visit one historic period site (a water catchment system, described elsewhere in this report as detention basins, and prepared flat or terrace) functionally associated to the dairy ranching operations of the Henelly/Ielmorini Ranch was recorded within the project-level study area. This site was recorded as components of the greater ranch complex and documented on a Department of Parks and Recreation Continuation Sheet 523L.

The original water catchment system was initially constructed for use by the ranch. The current configuration reflects modifications made to control the release rate of stormwater from the Ielmorini Quarry (now closed) into the adjacent creek. The current system includes two basins. The southern basin has an approximate 175 by 135-foot interior pool with 12-foot wide machine constructed berms. The northern basin is approximately 80 by 80 feet. A stone lined drainage channel is east of the larger pool. North of the smaller pool is a severely eroded drainage leading into the Washington Creek. Based on a review of historical maps, the smaller basin appears to have been built after 1968. The larger basin did not show up on the historical maps reviewed. (Koenig 2007b)

A prepared flat or terrace that could have once maintained a barn or other large outbuilding is located at the proposed location of the project staging area and a section of the overflow pipeline. The flat is 300 feet north/south and 40 to 80 feet east/west. Several piles of hewn timber are located on the flat. Board width varies; all of the nails observed are wire nails. Three circular, concrete water troughs are also located on the flat. The troughs, measuring 5 feet in diameter and 2 feet deep, are spaced 30 feet apart. The two southern troughs have protruding water pipes in the center. At the north end of the flat is a wooden construction that appears to have been a feeding trough. It is approximately 30 feet long and 5 feet wide. No historic maps reviewed show a building on the prepared flat. (Koenig 2007b)

### ***Paleontological Resources***

Geology maps of the Petaluma area locate the northern portion of the East Washington/Ielmorini area pipeline and the storage tank site within the Petaluma Formation. The remainder of the pipeline route is mapped as late Pleistocene and Holocene alluvial fan deposits. Paleontological resources known to occur within the Petaluma Formation are brackish and freshwater mollusk fossils, and a wide range of invertebrate and vertebrate fossils, including bison, horse, deer, turtle, rhino, camel, mastodon, and plant leaves. Fossils are also known to occur within alluvial fan deposits.

### **Program-Level Improvement Study Area**

The program-level improvement study area is located within the Urban Growth Boundary of the City of Petaluma, as well as on lands located in unincorporated Sonoma County to the south and east of the City.

## ***Cultural Resources***

Archaeologists and ethnographers have documented that the Petaluma area was intensively occupied by Native American groups. Coast Miwok settlements focused on bays and estuaries, near perennial interior watercourses and springs, at the confluence of watercourses, along midslope terraces, and along ridgelines. The greater Petaluma area incorporates all of these elements and was, therefore, a highly favored location for prehistoric populations.

Historic-period cultural resources have also been recorded throughout the greater Petaluma area. The large number of historic buildings, structures, and archaeological sites indicates intensive use and occupation of the area through the historic period. This is reflected in materials remains, both archaeological sites and the built environment.

The records search found that prehistoric and historic-period resources have been recorded throughout the program-level study area including 61 prehistoric sites, 17 historic sites, and 5 multicomponent sites. Furthermore, Petaluma has a high concentration of historic-period buildings and structures, seven of which are listed on the National Register of Historic Places. The Petaluma Adobe is listed as a California Historical Landmark. The commercial district of Petaluma is a National Register of Historic places historic district. The City of Petaluma has also designated two historic residential districts.

## ***Paleontological Resources***

Paleontological resources have been found within the geologic formations present within the program-level improvement study area dating as early as 213 and 145 million years ago to 1.8 million to 8,000 years ago. The oldest paleontological resources found are marine invertebrates and microfossils known to occur within the Franciscan Complex geologic unit dating from the Jurassic to early-Cretaceous geologic period. Younger Miocene to Pliocene sedimentary rocks within the area, including the Wilson Grove Formation, are known to contain such fossils as clams, snails, brachiopods, sand dollars, sea urchins, crabs, polychaete tubes, various plant types, and vertebrate fossils. The Petaluma Formation contains mollusk fossils, a wide range of invertebrate fossils, and bison, horse, deer, mastodon and other vertebrate fossils. Volcanic activity in eastern Sonoma County during the Pliocene resulted in the deposition of the Sonoma Volcanics which contain many plant and fish fossils. Fossils dating to the Pleistocene and Holocene have been recovered from alluvial/colluvial deposits, which is the youngest natural unit in the area.

## **Regulatory Framework**

### ***Cultural Resources***

#### ***National Historic Preservation Act***

The National Register of Historic Places, established by the National Historic Preservation Act of 1966 (NHPA), as amended, recognizes historical properties that are significant at local, state, and national levels. According to the NHPA, significance is determined by four criteria as follows.

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, association, and

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That have yielded, or may be likely to yield, information important in prehistory or history.

Since the process for listing a site on the National Register can be lengthy, federal agencies and the California State Office of Historic Preservation can determine a site as eligible for listing on the National Register, which has the same effect as regards the treatment of the property. Unless a resource is of exceptional importance or value, sites younger than 50 years are not considered eligible for the National Register. However, it is recommended that sites 45 years old or older be considered during the evaluation process to allow for potential delays between evaluation and construction periods. "Unknown archaeological resources," referred to in the Evaluation Criteria below, means previously undiscovered and/or buried archaeological resources.

#### *California Environmental Quality Act (CEQA)*

CEQA defines a "historical resource" as a resource that is eligible for listing on the California Register of Historical Resources (California Register), listed in a local register of historical resources (as defined at California Public Resources Code §5020.1(k)), identified as significant in a historical resource survey meeting the requirements of §5024.1(g) of the Public Resources Code, or determined to be a historical resource by a project's lead agency (§15064.5(a)). A historical resource consists of:

Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Generally, a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources (§15064.5(a)(3)).

#### *California Register of Historical Resources*

A cultural resource is evaluated under four criteria to determine its historical significance. These criteria require that the resource be significant at the local, state, or national level under one or more of the following:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; or
2. It is associated with the lives of persons important to local, California, or national history; or
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values; or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, the California Register requires that sufficient time pass after a resource's period of significance to "obtain a scholarly perspective on the events or individuals associated with the resource". Fifty years is used as a general estimate of the time needed to develop the perspective to understand the resource's significance (Title 14, California Code of Regulations §4852 (d)(2)).

The California Register also requires that a resource possess integrity, which is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance" (California Office of Historic Preservation 2006). Resources that are significant, meet the age guidelines, and possess integrity will generally be considered eligible for listing on the California Register.

#### *California Health and Safety Code*

California Health and Safety Code §7050.5 regulates the treatment of human remains. The Code states that "Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in §5097.99 of the Public Resources Code".

In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined that the remains are not subject to his or her authority. If the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the State Native American Heritage Commission.

#### *California Public Resources Code*

Public Resources Code §5097.9 regulates the State's treatment of Native American religion, establishes the State Native American Heritage Commission, and indicates how Native American human remains shall be handled.

#### *Native American Graves Protection and Repatriation Act*

According to the Native American Graves Protection and Repatriation Act (NAGPRA), the ownership or control of Native American human remains and associated funerary objects excavated or discovered on federal or tribal lands after November 16, 1990, belongs to the lineal descendants of the Native American buried or, if lineal descendants cannot be found, ownership belongs to the tribe which has "the closest affiliation with such remains or objects and which, upon notice, states a claim for such remains or objects" (25 United States Code 3002 §3 (a)). When such remains are discovered on federal or tribal property, NAGPRA mandates consultation with both the agency that manages the property and the tribe that is associated with the remains.

#### ***Paleontological Resources***

Paleontological resources include fossil specimens, fossil sites, and fossil-bearing rock units. Fossils can be important for their potential to provide scientific information regarding past life forms, paleoecology, stratigraphy, and geological formation processes.

Significant nonrenewable paleontological resources are fossils and fossiliferous (i.e., fossil bearing) deposits of vertebrate fossils and their indicators providing information about the circumstances and processes of fossilization and associated environmental features. Invertebrate or botanical fossils are also considered significant when present within a given vertebrate assemblage. Certain plant and invertebrate fossils or assemblages may also be defined as significant. A significant fossiliferous deposit is a rock unit or formation that contains significant nonrenewable paleontological resources comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces, and other data that provide information about fossilization, taxonomy, evolutionary classification, ecology, and stratigraphy (Conformable Impact Mitigation Guidelines Committee 1995:26).

CEQA guidelines indicate that a project could have a significant effect on the environment if project activities directly or indirectly destroy a unique paleontological resource or site (CEQA, Appendix G).

Public Resources Code §5097.5 prohibits the excavation or removal of any “vertebrate paleontological site, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.” Public lands are defined as lands owned by or under the jurisdiction of the State or any city, county, district, authority, or public corporation. Any unauthorized disturbance or removal of archaeological, historic, or paleontological materials or sites located on public lands is considered a misdemeanor.

The Archaeological and Historic Data Preservation Act of 1974, as amended, provides for the survey, recovery, and preservation of significant scientific, prehistoric, historic, archaeological, or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally-licensed, or federally-funded project.

## GOALS, OBJECTIVES, AND POLICIES

Table 4.10-1 identifies goals, objectives, and policies that provide guidance for development in relation to cultural resources. The table also indicates which evaluation criteria are responsive to each set of policies. There are no goals, objectives, and policies related to paleontological resources.

**TABLE 4.10-1**

**Goals, Objectives and Policies – Cultural and Paleontological Resources**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Goal, Objective or Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Sonoma County General Plan	Open Space Element	Goal OS-9 Objective OS-9.3 Policy OS-9f	Preserve significant archaeological and historical sites that represent the ethnic, cultural and economic groups of the county.	1, 2, 3, 4

**TABLE 4.10-1**  
**Goals, Objectives and Policies – Cultural and Paleontological Resources**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Goal, Objective or Policy</b>	<b>Relevant Evaluation Criteria<sup>1</sup></b>
Petaluma General Plan 2025	Historic Preservation	Policy 3-P-1	Protect historic and archaeological resources for the aesthetic, cultural, educational, environmental, economic, and scientific contribution they make to maintaining and enhancing Petaluma’s character, identity and quality of life.	1
Petaluma General Plan 2025	Historic Preservation	Policy 3-P-1-A	A. Maintain the historic-era integrity of the Petaluma Historic Commercial District, which is listed on the National Register of Historic Places, by adhering to the city’s Historic Commercial District Design Guidelines.	1
Petaluma General Plan 2025	Historic Preservation	Policy 3-P-1-J	Ensure the protection of known and unrecorded archaeological resources in the city by requiring a records review for any development proposed in areas that are considered archeologically sensitive for Native American and/or historic remains.	1,2
Petaluma General Plan 2025	Historic Preservation	Policy 3-P-1-K	In accordance with CEQA and the State Public Resources Code, require the preparation of a resource mitigation plan and monitoring program by a qualified archaeologist in the event that archaeological remains are discovered.	1,2
Petaluma General Plan 2025	Historic Preservation	Policy 3-P-6	Ensure that new development adjacent to eligible historic and cultural resources is compatible with the character of those resources.	1

Source: Petaluma General Plan 2025; Sonoma County 1989

Note: The evaluation criteria are identified in Table 4.10–2.

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

**TABLE 4.10-2**

**Evaluation Criteria with Threshold of Significance– Cultural and Paleontological Resources**

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
<p>1. Will the WREP cause a substantial adverse change in the significance of a historical or archeological resource as defined in Title 14, California Code of Regulations §15064.5 or adverse effect on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places?</p>	<p>Physical demolition, destruction, relocation, or material alteration of a historical or archeological resource.</p> <p>The direct or indirect alteration of any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.</p>	<p>Greater than 0 historical or archaeological resources.</p> <p>Greater than 0 historic properties.</p>	<p>CEQA Guidelines Appendix G, Checklist Item V (a) and Item V (b)                      Title 14, California Code of Regulations §15064.5                      Public Resources Code §21084.1</p> <p>National Historic Preservation Act of 1966, as amended, Section 106                      Petaluma General Plan 2025</p>
<p>2. Will the WREP disturb any human remains, including those interred outside of formal cemeteries or disturb any Native American human remains, associated grave goods, or items of cultural patrimony?</p>	<p>Disturbance of any human remains</p> <p>Disturbance of any Native American human remains, associated grave goods, or items of cultural patrimony.</p>	<p>Any human remains, associated grave goods, or items of cultural patrimony.</p>	<p>CEQA Guidelines Appendix G, Checklist Item V (d)                      Title 14, California Code of Regulations §15064.5(d)                      Health and Safety Code §7050.5                      Public Resources Code §5097.9                      NAGPRA if on federal or tribal lands                      Petaluma General Plan 2025</p>
<p>3. Will the WREP destroy a unique paleontological resource or site?</p>	<p>Destruction of a unique paleontological resource or site.</p>	<p>Greater than 0 occurrences.</p>	<p>CEQA Guidelines Appendix G, Checklist Item V (c)                      Public Resources Code §5097.5                      Archeological and Historic Data Preservation</p>

**TABLE 4.10-2**  
**Evaluation Criteria with Threshold of Significance– Cultural and Paleontological Resources**

Evaluation Criteria	As Measured by	Significance Thresholds	Sources of Criteria
			Act of 1974

## METHODOLOGY

This cultural resources analysis identifies known cultural resources within the project- and program-level study areas, including prehistoric and historical archaeological sites, historical architectural resources, and historic landscapes; identifies the potential for unknown cultural resources to be present in the study areas; and analyzes the potential impacts to these resources. The paleontological resources analysis identifies the potential for paleontological resources to be present within the project- and program-level study areas, and identifies the potential impacts to these resources. The analysis considers that potential sources of impacts to cultural and paleontological resources from the project and program may be as follows:

- Damage to or destruction of archaeological and paleontological resources as a result of ground disturbance;
- Increased access to cultural and paleontological resources by project personnel who may collect or move artifacts or fossils;
- Demolition or removal of historically or architecturally significant buildings, structures, or objects;
- Changes to watercourse flows that result in erosion, which affects cultural and paleontological resources;
- Alteration of the setting of cultural resources by introducing major new landscape elements;
- Intrusion of visible or audible elements, which alter the use of traditional cultural properties; and
- Damage to resources caused by unanticipated events, such as tank overflow, pipeline ruptures and/or repairs.

## Cultural Resources

### ***Project-Level Near-Term Conveyance Improvements***

Identification of cultural resources for the project-level near-term conveyance improvements consisted of a three step process that included: 1) a records and literature search; 2) contacts with potentially interested parties; and 3) an archaeological and historical field survey. This information was used to determine the potential for impacts to cultural resources from the project and to formulate appropriate mitigation measures.

The records and literature search was conducted at the Northwest Information Center by Sonoma State University Anthropological Studies Center (ASC) staff. Additional research was conducted using the files and literature at the ASC. The search area included a ½-mile radius around the project-level study area to 1) determine if known archaeological resources have been recorded within or adjacent to the study area; 2) assess the likelihood of unrecorded archaeological



resources based on historical references and the distribution of environmental settings of nearby sites; and 3) develop a context for identification and preliminary evaluation of cultural resources.

Included in the review were the *California Inventory of Historical Resources* (California Department of Parks and Recreation 1976), the California Office of Historic Preservation's *Five Views: An Ethnic Historic Site Survey for California* (1988), *California Historical Landmarks* (1990), *California Points of Historical Interest* (1992), and the *Historic Properties Directory Listing* (2007). The Historic Properties Directory includes listing of the National Register of Historic Places and the California Register of Historical Resources, and the most recent listing (through 11 June 2007) of the California Historical Landmarks and California Points of Historical Interest.

The California Native American Heritage Commission (NAHC) was contacted with a request to review the Sacred Lands file for information on Native American cultural resources in or near the project-level study area. The NAHC responded on 12 July 2007 (Sanchez 2007). According to their files, no Native American cultural resources are known to be in the study area. A list of further contacts was provided. Nick Tipon, Representative of the Sacred Sites Protection Committee of the Federated Indians of Graton Rancheria, was contacted by telephone and letter on 9 July 2007. Mr. Tipon, responding by letter on 23 July 2007, requested a pre-construction meeting with the City of Petaluma and the contractor to review project plans. The City met with Nick and Ken Tipon on November 13, 2007 to discuss any potential concerns about the project. The results of this discussion are reflected in the mitigation monitoring plan.

The Sonoma County Historical Society was also asked for information or concerns they might have in regards to historical sites within the project-level study area. No response has been received as of publication of this document.

An archaeological survey of the Project-level Study Area was undertaken on July 19<sup>th</sup> and 23<sup>rd</sup>, 2007, and again on November 28<sup>th</sup>, 2007, by a qualified archaeologist from the Sonoma State University Anthropological Studies Center (Koenig 2007a). The on-foot survey included the 2-acre location of the storage tank, the existing detention basins, a 50-foot wide swath between the storage tank site and the existing detention basins, the proposed staging area, the 30-foot wide pipeline corridor and adjacent ground surface from the storage tank site to Adobe Road, the 5-foot right-of-way along either side of East Washington Street from Adobe Road to Parkland Drive, and the 5-foot right-of-way on the east and west sides of Browns Lane.

Based upon the results of the records and literature search, contacts with potentially interested parties, and the archaeological field survey, it was concluded that there is potential for buried or otherwise undiscovered prehistoric resources.

### ***Program-Level Improvements***

Identification of cultural resources for program-level improvements consisted of a records search to determine resource sensitivity of the program-level study area and make recommendations for follow-on studies based upon resource sensitivity. In July 2007, the ASC requested a summary list of study area cultural resources on file at the NWIC. The NWIC houses historical resource records for 16 northern California counties, including Sonoma County. Base maps were reviewed to locate identified cultural resources within the study area.

## Paleontological Resources

### ***Project-level and Program-level Improvements***

Identification of paleontological resources for the project-level and program-level improvements study areas consisted of identifying the geologic units that are present within these areas by referring to published geologic maps, identifying the potential for paleontological resources to be present within the geologic units, and evaluating the potential for the project and program to affect those resources.

## IMPACTS AND MITIGATION MEASURES

**Impact:** **CR-1: Will the WREP cause a substantial adverse change in the significance of a historical or archeological resource as defined in Title 14, California Code of Regulations §15064.5 or have an adverse effect on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements - Significant*

Based upon the results of a literature review and records search, contacts with interested parties, and on-site archaeological surveys undertaken for the project, two previously recorded resource sites and one previously unrecorded resource site were identified near proposed East Washington/Ielmorini improvement locations (Koenig 2007a and 2007b): 1) a previously recorded prehistoric archaeological site (CA-SON-1241) located 100 feet from the pipeline route running along Ielmorini Road; 2) the previously recorded Henelly/Ielmorini ranch complex (P-49-001777) is situated about 250 feet north of the storage tank site; 3) previously unrecorded water catchment system remnants and a prepared flat area or terrace, which were likely associated with the Henelly/Ielmorini Ranch, are located to the northwest of Ielmorini Road (site record prepared during site visit to update P-49-001775); and 4) a previously unrecorded possible historic archaeological resource (concrete perimeter foundation) remains located immediately adjacent to a portion of the pipeline route running along the dirt road that offshoots from Ielmorini Road.

CA-SON-1241. This archaeological site, a prehistoric midden, is located over 100 feet from Ielmorini Road. Because pipeline construction would occur within the road right-of-way, this site would not be directly affected by construction activities. Because a barbed-wire fence blocks access to the site's location, the site would also not be accessible and therefore would not be indirectly affected by the project.

P-49-001775. The Henelly/Ielmorini ranch complex is situated 250 ft from the storage tank site. It consists of a Queen Anne-style farmhouse constructed about 1880 and associated dairy-operation buildings on a 417-acre property. Although the complex has not been formally evaluated for National Register eligibility, the recorders of the complex recommended that the farmhouse was potentially eligible under NRHP criterion C (Properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction). The entire complex was recommended as potentially eligible under Criterion D (Properties that have yielded or may be likely to yield, information important in prehistory or history).

Storage tank construction activities would not directly affect the ranch complex but there is potential for the storage tank to represent a new visual element in the landscape that would alter the property's historic setting. However, as can be seen in Figure 4.10-1, an intervening hill and dense stands of trees serve as an effective visual barrier between the tank site and the ranch complex buildings. The tank's construction into the hillside would further reduce its potential visibility to and from the ranch complex buildings. Figure 4.11-2 shows a simulated view of the tank from the Rooster Run Golf Course. The tank is located in the center of the photo. The trees and hill above the tank block views of the ranch buildings. Although both the tank and a portion of the ranch complex buildings would be visible from the lower private dirt road, there is sufficient geographic distance between them that the property's historic setting would not be compromised. Therefore, it is concluded that the tank would have minimal to no effect on the property's historic setting.

Remnants of Water Catchment System and Prepared Flat (site record update for P-49-001775 during site visit). The detention basins that are part of the water catchment system would be used by the project to hold recycled water in the unlikely event the tertiary storage tank overflowed. A pipe would be placed in the ground connecting the storage tank to the detention basins. A portion of the pipe would be placed in the ground at the location of the prepared flat. The detention basins and prepared flat are functionally associated with the Henelly/Ielmorini Ranch complex. The period of significance for the Henelly/Ielmorini Ranch complex is ca. 1880s–1940. However, construction and use of the water catchment system and prepared flat fall outside the ranch's period of significance. Therefore, they are not considered contributing elements to the Henelly/Ielmorini Ranch complex and, consequently, do not constitute an historical resource.

Concrete Foundation Remnants (recorded during site visit). The foundation remnants are located outside the pipeline construction corridor and are unlikely to be affected by the project. However, because of their close proximity to pipeline construction activities, prior to initiation of pipeline construction the remnants would be fenced to ensure they are not inadvertently damaged by construction activities (project measure PD-22).

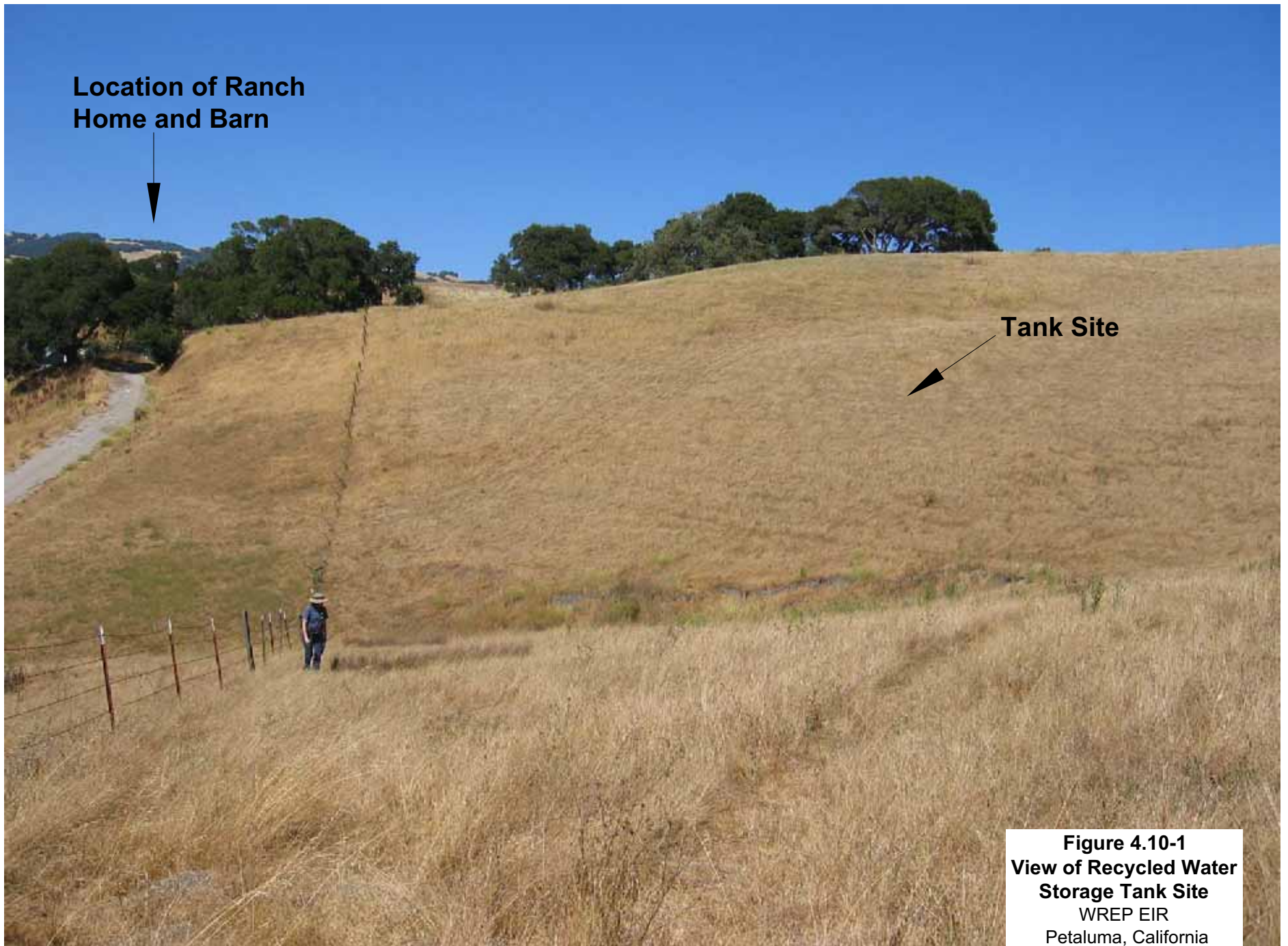
The remaining seven recorded sites identified during the record search, and discussed in the setting above, are of a substantial distance from the near-term improvements such that there would not be a direct or indirect impact from the project on the resources.

Based on the close proximity of the resources identified above, to the near-term improvements there is a potential for buried or otherwise undiscovered prehistoric and historic archaeological resources to be present in the project area. This is considered a significant impact.

Mitigation: **CR–1a Identify and Avoid or Minimize Impacts to Cultural Resources**

After  
Mitigation *Project-Level Improvements –Less than Significant*

Mitigation Measure CR – 1a contains provisions to avoid and/or minimize impacts to cultural resources. Potential impacts to resources will be evaluated and, if necessary, a Treatment Plan developed, in consultation with the State Historic Preservation Officer.



**Figure 4.10-1**  
**View of Recycled Water**  
**Storage Tank Site**  
WREP EIR  
Petaluma, California

*Program-Level Improvements – Significant*

Archaeologists and ethnographers have documented that the Petaluma area was intensively occupied by Native American groups. Preferential locations for Coast Miwok settlements were on bays and estuaries, near perennial interior watercourses and springs, at the confluence of watercourses, along midslope terraces, and along ridgelines. The study area for the program-level improvements contains all of these elements and therefore, the likelihood for encountering and affecting prehistoric resources within the study area is considered significant.

A literature and records search found that prehistoric and historic-period resources have been recorded throughout the Program-level study area including 61 prehistoric sites, 17 historic sites, and 5 multicomponent sites. Furthermore, Petaluma has a high concentration of historic-period buildings and structures, seven of which are listed on the National Register of Historic Places.

Impacts to these resources, as well as other currently unknown resources, are possible from construction and operation of program-level improvements, including recycled water conveyance pipelines, a recycled water storage reservoir, a new pump station, recycled water pump station, and associated facilities.

Mitigation: **CR-1b Identify and Avoid or Minimize Impacts to Cultural Resources**

After

Mitigation

*Program-Level Improvements – Less than Significant*

Mitigation Measure CR-1b contains provisions to identify and avoid any such resources. When avoidance is not possible, the potential significance of the resource would be evaluated using National Register of Historic Places and California Register of Historical Resources evaluation criteria. If the resource is significant, measures would be implemented in consultation with appropriate regulatory agencies and associated communities. Such mitigation measures may include, but are not limited to: 1) designing project actions to conform with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings; and 2) conducting archaeological data recovery in accordance with a research design approved by the relevant regulatory agencies, report preparation, and public interpretation.

**Impact: CR-2: Will the WREP disturb any human remains, including those interred outside of formal cemeteries or will the project disturb any Native American human remains, associated grave goods, or items of cultural patrimony?**

Analysis:

*Project-Level Near-Term Conveyance Improvements – Less than Significant*

No human remains or associated materials are known to be present within or near the project-level near-term conveyance improvements. The possibility of encountering human remains during construction cannot be discounted, however, given the presence of prehistoric occupation sites in the area. As is standard City practice, the requirements of Public Resources Code §5097.98, Health and Safety Code §7050.5, and the Native American Graves Protection and Repatriation Act, when applicable, shall govern the general notification and evaluation process should human remains be encountered. If human remains are encountered during construction activity, work in the area of the discovery shall be redirected to protect the remains, and the County Coroner shall be

notified immediately. At that time, an archaeologist shall be contacted to assess the situation. Project personnel shall not collect or move any human remains or associated materials. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Native American Most Likely Descendant to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods. Upon completion of the archaeological assessment, the archaeologist shall prepare a report documenting the methods and results of his or her assessment, and provide recommendations regarding the treatment of the human remains and any associated cultural materials.

*Program-Level Improvements – Less than Significant*

The cultural resources sensitivity of the program-level improvements area is high, given the intensive use of the Petaluma area during the prehistoric and historic periods, and the number of such resources that are known to exist in this area. Human burials and associated grave goods and items of cultural patrimony may be present that could be impacted by Program-level improvements. As is standard City practice, the requirements of Public Resources Code §5097.98, Health and Safety Code §7050.5, and the Native American Graves Protection and Repatriation Act, when applicable, shall govern the general notification and evaluation process should human remains be encountered.

Mitigation: No mitigation is necessary.

**Impact: CR-3: Will the WREP directly or indirectly destroy a unique paleontological resource or site?**

Analysis: *Project-Level Near-Term Conveyance Improvements - Significant*

There is potential for the presence of significant paleontological resources within the project-level near-term conveyance improvements area that could be affected by project construction. The northern portion of the pipeline corridor and the storage tank site within the East Washington/Ielmorini area are located in an area mapped as the Petaluma Formation. The remainder of the pipeline route is mapped as Holocene alluvial fan deposits. Brackish and freshwater mollusk fossils and a range of invertebrate and vertebrate fossils are found in the Petaluma Formation. The Browns Lane area is mapped as late Pleistocene and Holocene alluvial fan deposits.

There is potential for the presence of significant paleontological resources within the project-level near-term conveyance improvements area. The northern portion of the pipeline corridor and the storage tank site within the East Washington/Ielmorini area are located in an area mapped as the Petaluma Formation. The remainder of the pipeline route is mapped as Holocene alluvial fan deposits. The Browns Lane area is mapped as late Pleistocene and Holocene alluvial fan deposits.

Brackish and freshwater mollusk fossils and a range of invertebrate and vertebrate fossils are found in the Petaluma Formation. Fossils dating to the Pleistocene have been recovered from such deposits within Sonoma County.

Excavation into Petaluma Formation bedrock would be necessary for storage tank construction. Most of the pipelines would be at shallow depths (i.e. less than 5 feet) but would also encounter Petaluma Formation bedrock as well as native alluvial soils.

Construction of the near-term conveyance improvements could affect fossils, if present, and impacts would be significant.

*Program-Level Improvements – Significant*

Based upon the geologic mapping of the Program-level area, there is potential for the presence of paleontological resources. Portions of the area are mapped as Franciscan Complex, Wilson Grove Formation, and Petaluma Formation, all of which are fossil-bearing rock units. Impacts to these resources are possible from construction of program-level improvements, including recycled water conveyance pipelines, a recycled water storage reservoir, a new pump station, and associated facilities.

Mitigation: **CR-2 Evaluation and Treatment of Paleontological Resources**

After

Mitigation: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements - Less than Significant.*

Mitigation Measure CR-2 provides for the identification, evaluation, and avoidance of Paleontological Resources. When such resources cannot be avoided, the measure provides for treatment of the resource in accordance with standard guidelines for mitigation of adverse impacts to such resources.

## CUMULATIVE IMPACTS

**Impact: CR-C1 and C2: Will the WREP have a cumulative potential to impact cultural resources?**

Analysis: *Less than Significant*

Prehistoric and historic archaeological resources, and historic architectural resources are known to exist throughout the project-level and program-level study areas, within both urban and rural settings, and there is high potential that additional currently unknown resources are present as well. Impacts of the project and program have been reduced to less than significant through mitigation. Cumulative projects that involve ground-disturbing activities, construction of new buildings, or demolition of existing buildings in the Petaluma area could impact archaeological resources, and history architectural resources. Because implementation of mitigation measure CR-1a and CR1-b would reduce any WREP project- or program-level impacts to less than significant, the WREP would not contribute to any impacts to archaeological resources and historic architectural resources caused by cumulative projects.

Mitigation: No additional mitigation is necessary.

**Impact: CR-C3: Will the WREP have a cumulative potential to impact paleontological resources?**

Analysis: *Less than Significant*

Paleontological resources have been found within the types of geologic units present within the project-level and program-level areas, including both plant fossils, and vertebrate and invertebrate animal fossils. Cumulative projects that involve ground-

disturbing activities within these same geological units could impact paleontological resources as well, and add to the impacts of the project. However, because mitigation measure CR - 2 would reduce any impacts from the project and program, significant cumulative impacts to paleontological resources are very unlikely.

Mitigation: No additional mitigation is necessary.



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## 4.11 VISUAL RESOURCES

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This section describes and evaluates potential impacts to visual resources from the proposed project-level near-term conveyance improvements and program-level improvements within the Water Recycling Expansion Program (WREP) study area. Visual impacts of the storage tank on the adjacent ranch complex are evaluated in Section 4.10, Cultural Resources.

### SETTING

The WREP study area consists of areas within the Urban Growth Boundary of the City of Petaluma and unincorporated areas of Sonoma County south and east of the City. To identify the visual character of the project region, assess the quality of the study area's visual resources, and describe views of and from the near-term conveyance improvements and the program-level improvements areas, data were collected through ground-level reconnaissance including direct observation from public roads, and interpretation of aerial photography and site photographs.

#### ***Project-Level Near-Term Conveyance Improvements***

The near-term improvements would be predominantly located east and southeast of the City of Petaluma as shown in Figure 2-2. Existing urban development within the City is well established and bounded by an Urban Growth Boundary. The County has established Community Separators to the north and south of the City that consist of a visible band of open space that marks the edge of allowable urban development and defines the beginning of the larger open space areas that surround the City and separate it from neighboring cities. The surrounding open spaces support grazing, agriculture, and the dairy industry, and provide recreational opportunities and wildlife habitat. The County has established a Scenic Landscape Unit east of Adobe Road. County- and City-designated scenic routes within the near-term improvements areas are Lakeville Highway and Adobe Road. The tertiary storage tank that would be constructed as part of the near-term improvements would be located outside the Urban Growth Boundary approximately 3,500 feet northeast of the intersection of Adobe Road and East Washington Street within an unincorporated area. The storage tank area is predominantly grazing land and is adjacent to a residential structure and large barns, a ranch complex which has been nominated for the National Register of Historic Places (refer to the Section 4.10, Cultural Resources). The storage tank area is not visible from Adobe Road, but is visible from portions of the Rooster Run Golf Course. Views from Adobe Road to the storage tank area are predominantly of grass-covered rolling hills and agricultural lands, with a few isolated dwellings and agricultural buildings. There are scattered rows of eucalyptus and oak trees in the landscape. Open ridgelines enhance the open space and rural character of the area. Developed landscape occurs primarily to the southwest of Adobe Road.

One of the below-ground pipes that would be constructed as part of the near-term improvements would be placed within the public right-of-way along East Washington Street from Parkland Drive to Adobe Road and then along Ielmorini Road (a private road) from Adobe Road to the storage tank site. The other two below-ground pipes would be placed within the public right-of-way along Browns Lane starting at its intersection with Lakeville Highway and continuing to Ely Road South on unincorporated land within a ranching and grazing area.

### ***Program-Level Improvements***

The program-level improvements area is located within the City of Petaluma's Urban Growth Boundary and within unincorporated lands east and south of the City within Sonoma County (see Figure 2-2 in Chapter 2).

The Petaluma area is a diverse landscape of rolling and gently sloping terrain enclosing the Petaluma River, centered on the City. Considerable urban and suburban development has occurred both on the flatter valley floor and on adjacent rolling terrain. Outside the City boundaries rural residential development is intermixed with agricultural landscapes. Long distance views of surrounding hills can be obtained in open areas and from high points within the area. The downtown area of Petaluma is distinctive with its well-preserved Victorian architecture and adjacent homes located primarily west of the town center. The Petaluma River is a strong visual feature seen from its banks and from higher elevations, particularly towards the south where it winds through extensive wetlands as it approaches San Pablo Bay.

In addition to the Community Separators north and south of the City, the County has established a Scenic Landscape Units to the east and southeast of the City. City- and County-designated scenic routes in the program-level improvements areas are Lakeville Highway, Adobe Road, Sonoma Mountain Road, and Stage Gulch Road, Old Redwood Highway, U.S. 101, "D" Street, and Bodega Avenue. City-designated scenic routes also include "I" Street, Stony Point Road, and Western Avenue.

Program-level improvements include pipelines, an open secondary recycled water storage reservoir, and a pump station, each of which may require construction staging areas. These facilities could be constructed within the City's Urban Growth Boundary, or within adjacent unincorporated lands. They could be sited within or near areas identified in the Sonoma County or City of Petaluma general plans as scenic assets. Program-level improvements also include a transition from potable water to recycled water for irrigation as well as removal of some agricultural lands from recycled water irrigation.

### **Relevant Plans and Policies**

Both the Sonoma County General Plan and Petaluma General Plan recognize the importance of the visual resources. Caltrans has not designated any scenic highways within the project area.

#### ***Sonoma County General Plan***

The Sonoma County General Plan Open Space Element identifies Community Separators as a special type of scenic border. Community Separators are rural lands, or greenbelt areas intended to ensure the protection of open space that provides visual relief between identifiable cities and communities. These lands are not necessarily scenic in their own right, but impose development restrictions to function as buffers to prevent continuous, corridor-style urbanization patterns.

Goal OS-1 of the General Plan states: Preserve the visual identities of communities by maintaining open space areas between cities and communities. Three objectives under this goal that apply to the project are:

- Objective OS-1.1: Preserve important open space areas in the community separators.
- Objective OS-1.2: Retain a rural character and promote low intensities of development in community separators.

- Objective OS-1.4: Preserve existing specimen trees and tree stands within community separator areas.

The following Sonoma County policy to accomplish these objectives applies to the project:

- Policy OS-1e: Require that new structures meet the following criteria:
  - 1) They are sited below exposed ridgelines.
  - 2) They use natural landforms and existing vegetation to screen them from view from public roads. On exposed sites, screening with native, fire retardant plants may be required.
  - 3) Cuts and fills are discouraged and where practical, driveways are screened from public view.
  - 4) Utilities are undergrounded where economically practical.

The Open Space Element of the Sonoma County General Plan designates a Scenic Landscape Unit along the northeast side of Adobe Road. Scenic landscape units are identified to protect the openness of these areas and provide important visual relief from urban densities. These landscapes have little capacity to absorb development without significant impacts on their visual quality. The Sonoma Mountains are specifically addressed in the General Plan as highly valuable scenic lands, clearly defining the eastern edge of the Santa Rosa plain between Petaluma and Sonoma. They provide an important backdrop to the urban valley.

Goal OS-2 states: “Retain the largely open, scenic character of important scenic landscape units”. Several objectives under this goal relate to the project:

- Objective OS-2.1: Retain a rural, scenic character in scenic landscape units with very low intensities of development. Avoid their inclusion within spheres of influence for public service providers.
- Policy OS-2e: Require that new structures meet the following criteria:
  - 1) They are sited below exposed ridgelines.
  - 2) They use natural landforms and existing vegetation to screen them from view from public roads. On exposed sites, screening with native, fire retardant plants may be required.
  - 3) Cuts and fills are discouraged and where practical, driveways are screened from public view.
  - 4) Utilities are undergrounded where economically practical.
- Policy OS-2i: For development on parcels located both within scenic landscape units and adjacent to scenic corridors, apply the more restrictive siting and setback policies to preserve visual quality.

The Open Space Element of the Sonoma County General Plan designates several scenic corridors within the project area as listed above.

Goal OS-3 of the General Plan states: “Identify and preserve roadside landscapes which have a high visual quality as they contribute to the living environment of local residents and to the

county's tourism economy." Under Goal OS-3, the following Sonoma County policies to protect scenic corridors are:

- Policy OS-3c – Establish a rural scenic corridor setback of 30% of the depth of the lot to a maximum of 200 feet from the centerline of the road unless a different setback is provided in the planning area policies (Section 3). Prohibit development within the setback with the following exceptions:
  - 5) Other new structures if they are subject to design review and:
    - a) They are associated with existing structures;
    - b) There is no other reasonable location for the structures;
    - c) The location within the setback is necessary for the use; or
    - d) Existing vegetation and topography screen the use.
- Policy OS-3h – Design public works projects to minimize tree damage and removal along scenic corridors. Where trees must be removed, design replanting programs so as to accommodate ultimate planned highway improvements. Require revegetation following grading and road cuts.

### ***Petaluma General Plan***

The Petaluma General Plan contains goals, objectives and policies that focus on protecting the open space character and scenic qualities of the area. The Land Use, Growth Management, and Built Environment Element of the 2025 General Plan includes the following goals and policies related to community character:

Goal 1-G-2: Preserve the essential scenic and natural resources of the open ridgelines and hillsides that help define the unique character of Petaluma.

Policy 1-P-15-B: Enhance the hillside development regulations in the Development Code to include . . . preventing the significant alteration of hillside topography through grading and paving.

Policy 1-P-17: Maintain a permanent open space around the city through the continued use of the Urban Separator and the use of an Urban Separator Pathway, as designated.

Policy 1-P-22: Establish public scenic or overlook areas in appropriate locations within the Urban Separator concurrently with project design.

Policy 1-P-24: Support regulatory measures and work with other jurisdictions and agencies to maintain and expand the existing Community Separators in agreement with Sonoma and Marin Counties.

In addition, the Community Design, Character, and Green Building Element and the Historic Preservation Element of the 2025 General Plan includes the following policies related to community character:

Policy 2-P-5: Strengthen the visual and aesthetic character of major arterial corridors.

Policy 2-P-6: Create a strong sense of entry into the city at key locations, identified as Gateways. Each gateway should be considered individually with some requiring architectural and/or landscape treatments and others more simply protecting/enhancing what already exists (e.g. cultural landscapes and ecological diversity) to provide a sense of transition or entry to Petaluma.

3-P-7: Recognize landscape features, including trees in both their urban and natural environment as part of Petaluma's identity and part of the character defining features of the City's historic districts.

## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

These criteria are drawn primarily from City, County, and State agency policies and procedures, adapted where necessary to reflect CEQA requirements.

**TABLE 4.11-1**

**Evaluation Criteria with Threshold of Significance – Visual Resources**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
1. Will the WREP be inconsistent with the Sonoma County General Plan regarding Community Separators or Petaluma General Plan regarding Urban Separators?	Consistency with County Objective OS-1.1, 1.2, 1.4, and Policy OS-1e Consistency with City Policy 1-P-17, 1-P-22, and 1-P-24	Greater than 0 improvements inconsistent with Sonoma County General Plan or Petaluma General Plan	Sonoma County General Plan Petaluma General Plan 2025
2. Will the WREP be inconsistent with the Sonoma County General Plan regarding Scenic Landscape Units?	Consistency with County Objective OS-2.1 and Policy OS-2e, 2i	Greater than 0 improvements inconsistent with Sonoma County General Plan	Sonoma County General Plan
3. Will the WREP be inconsistent with the Sonoma County or Petaluma General Plans regarding scenic or major arterial corridors?	Consistency with County Policy OS-3c, 3h Consistency with City Policy 2-P-5	Greater than 0 improvements inconsistent with County or Petaluma General Plan	Sonoma County General Plan Petaluma General Plan 2025
4. Will the WREP be inconsistent with the Petaluma General Plan goal to preserve the scenic and natural resources of the open ridgelines and hillsides?	Consistency with City Goal 1-G-2	Greater than 0 improvements inconsistent with Petaluma General Plan.	Petaluma General Plan 2025
5. Will the WREP cause an adverse effect on foreground or middle-ground views from a recreation area, other public use area, or private residence?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Professional judgment
6. Will the WREP create a new source of substantial light and glare that would adversely affect day or nighttime views in the area?	High intensity light or glare towards private residences.	Greater than 0 residences affected.	CEQA case law

## METHODOLOGY

Visual impacts are generally assessed by estimating the amount of visual changes introduced by project components, the degree to which visual changes may be visible to surrounding viewer groups, and the general sensitivity of viewer groups to landscape alterations. In general, residents and travelers along scenic roadways are considered to be the most sensitive to visual changes since view frequency is high, view durations are long, and viewers have high expectations of visual quality.

For evaluation criteria 1, 2, 3 and 5, visual impact significance is measured by three indicators: changes in visual contrast, amount of view obstruction, and degradation in visual quality. Visual contrast is significant if it is strong as a result of regraded landforms, alteration or elimination of ridgelines, and if changes introduced by the project result in landscape colors, textures, and scale of visual components which are inconsistent with the natural surroundings. View obstruction is considered significant if foreground (0-2,000 feet) or middleground (2,000 feet to one mile) views seen from sensitive viewing areas are obstructed by the project. Degraded visual quality is considered significant if the project severely alters or displaces specific scenic resources composed of striking landform features, aesthetic water bodies, mature stands of native/cultural trees, or historic structures.

The use of recycled water for irrigation in place of potable water has no implications with regard to visual resources. Therefore this component of the program-level improvements has not been included in the analysis sections below. The loss of irrigation at some agricultural properties now receiving secondary recycled water may have visual consequences, so this component is evaluated below.

## IMPACTS AND MITIGATION MEASURES

**Impact:**        **VR-1: Will the project be inconsistent with the Sonoma County General Plan regarding Community Separators or the Petaluma General Plan regarding Urban Separators?**

**Analysis:**        *Project-Level Near-Term Conveyance Improvements – No Impact*

The near-term improvements, including the storage tank and its associated facilities, pipelines, and construction staging areas would not be located near or within a County-designated Community Separator. Therefore the improvements would not be inconsistent with the Sonoma County Open Space Element regarding Community Separators.

The pipeline along East Washington Street crosses through an Urban Separator at the City limits. Although public service facilities are not expressly allowed in an Urban Separator designation, pipelines are below-ground facilities and would not be considered an urban use and would not present a visual impact. There would be no impact.



*Program-Level Improvements: Pump Station and Open Reservoir – No Impact;  
Pipelines - Less than Significant*

A small portion of the WREP recycled water service area lies within the Petaluma/Rohnert Park Community Separator. The Sonoma County General Plan states that development on existing rural residential lots within this Community Separator would be intrusive unless properly sited and screened. The program-level improvements that could occur within this area include pipeline construction and temporary siting of pipeline construction staging areas. The pump station or open reservoir would not be located within this area.

Pipelines would be placed below ground and therefore would be consistent with the purposes of the Community Separator. Construction staging would be short-term and with implementation of Project Measure PD-13 Minimize Temporary and Permanent Visual Impacts, and Project Measure PD-2 Revegetate Temporarily Disturbed Sites, would not be inconsistent with the Community Separator policies. This impact is less than significant.

Mitigation: No mitigation is necessary.

**Impact: VR-2: Will the project be inconsistent with the Sonoma County General Plan regarding Scenic Landscape Units?**

Analysis: *Project-Level Near-Term Conveyance Improvements: Pipelines - Less than Significant;  
Storage Tank - Significant*

The tertiary storage tank, overflow pipe, detention basin, and pipeline from Adobe Road to the tank are within a Scenic Landscape Unit.

Pipelines. The pipeline would be placed below ground and therefore would be consistent with the purposes of the Scenic Landscape Unit. Project Measure PD-2, Revegetate Temporarily Disturbed Sites, and PD-13 Minimize Temporary and Permanent Visual Impacts, would minimize the disturbed area and reduce the amount of time that disturbed areas are exposed to view. Therefore, the pipelines would have a less-than-significant impact on the Scenic Landscape Unit.

Storage Tank. The tertiary storage tank would be located approximately 0.6 mile (3,500 ft) northeast of Adobe Road within this Scenic Landscape Unit. Consistent with County policies OS-2e and OS-2i, the tank is sited below an exposed ridgeline and would be partially buried into the hillside to reduce visibility. Visible utilities will be undergrounded. However, the tank requires substantial cuts into the hillside and would be visible from a public viewshed, a portion of the Rooster Run Golf Course, as well as from certain residences (refer to Figure 4.11-1 Existing View and Figure 4.11-2 Post Construction View). This is considered a significant impact.

Mitigation: **VR-1 Landscape Screening**

After  
Mitigation: *Less than Significant – Storage Tank*

Implementation of mitigation measure VR-1 would require planting oak trees around the tank to minimize the visual contrast and provide a landscape that blends with the existing surrounding oak woodlands. Refer to Figure 4.11-3 Mitigated View for what the site would look like five years after construction. It is estimated that between 20 to 25 years

after construction the trees would reach the top of the tank. With this mitigation, visual contrast would be slight, and impacts would be reduced to less than significant.

*Program-Level Improvements: Pump Station – No Impact; Pipelines and Open Reservoir – Less than Significant*

The pump station would not be located within a Scenic Landscape Unit. The following components may be within Scenic Landscape Units: existing agricultural land irrigated with secondary recycled water may no longer receive recycled water for irrigation, the open reservoir, or pipelines to serve irrigation or the open reservoir.

Loss of Recycled Water Irrigation on Agricultural Land. Some of the lands currently irrigated with secondary recycled water may no longer receive recycled water. If the land remains unirrigated, it may appear brown in the summer rather than green. This is consistent with the rural scenic nature of agricultural hillsides in Sonoma County and is not considered a significant impact.

Open Reservoir. A portion of the designated area is in a Scenic Landscape Unit. The open reservoir would cover up to 2 acres. Associated facilities would include circulation piping, lighting facilities, valve structures, SCADA/instrumentation (e.g., antennas), and miscellaneous facilities. County General Plan Goal OS-2 for scenic landscape units is to retain their largely open, scenic character. The open reservoir would be sited below exposed ridgelines, would not create large cuts, and any visible utilities would be undergrounded. Numerous small agricultural reservoirs already exist in the area, and the addition of this small reservoir would be consistent with the existing landscape. This is considered a less than significant impact.

Pipelines. Any pipelines within Scenic Landscape Units would be placed below ground. Construction staging would be temporary, and performed in compliance with Project Measure PD-13 Minimize Temporary and Permanent Visual Impacts, and PD-2, Revegetate Temporarily Disturbed Sites, to minimize construction-period visual impacts. The impact is considered less than significant.

Mitigation: No mitigation is necessary.



**Figure 4.11-1**  
**Existing View**  
WREP EIR

Petaluma, California



**Figure 4.11-2**  
**Post Construction View**  
WREP EIR  
Petaluma, California



**Figure 4.11-3**  
**Mitigation View - 5 Years**  
WREP EIR  
Petaluma, California

**Impact: VR-3: Will the WREP be inconsistent with the Sonoma County or Petaluma General Plans regarding scenic or major arterial corridors?**

*Analysis: Project-Level Near-Term Conveyance Improvements: Storage Tank - No Impact; Pipelines – Less than Significant*

The Sonoma County General Plan designates Adobe Road and Lakeville Highway as scenic corridors and has a policy requiring a 200-foot minimum building setback from the center of the roadway for structures along scenic corridors. The Petaluma General Plan 2025 has a policy to strengthen visual and aesthetic character of “major arterial corridors.”

Storage Tank. The storage tank and its associated facilities would be located approximately 0.6 mile (3,500 ft) northeast of Adobe Road and therefore would comply with the 200-foot minimum building setback. The surrounding hills and trees between the site and Adobe Road would screen views of the tank from the Adobe Road Scenic Corridor. The storage tank would not be located along a major arterial corridor as identified in the Petaluma General Plan 2025. This impact is considered less than significant.

Pipelines. The pipelines would be placed below ground and would not be visible from either Adobe Road or Lakeville Highway. A portion of one pipeline would be placed along East Washington Street, a designated arterial corridor in the Petaluma General Plan 2025. However, the pipeline would be buried beneath the street and the street returned to its previous condition after construction. The project would not be inconsistent with any recommended improvement for arterial corridors as outlined in the Petaluma General Plan 2025 under Policy 2-P-5. Any associated ground disturbance would be revegetated under Project Measure PD-2 Revegetate Temporarily Disturbed Sites. Any use of the area for construction staging would be short-term and subject to Project Measure PD-2 and PD-13 Minimize Temporary and Permanent Visual Impacts. The impact is considered less than significant.

*Program-Level Improvements: Pump Station – No Impact; Pipelines and Open Reservoir – Less than Significant*

The pump station would not be located near a scenic corridor or along a major arterial corridor. The following components may be near scenic corridors: existing agricultural land irrigated with secondary recycled water may no longer receive recycled water, open reservoir, and pipelines for irrigation or the reservoir.

Loss of Recycled Water Irrigation on Agricultural Land. Some of the lands currently irrigated with secondary recycled water may no longer receive recycled water. If the land remains unirrigated, it may appear brown in the summer rather than green. This is consistent with the rural scenic nature of agricultural hillsides in Sonoma County and is not considered a significant impact.

Open Reservoir. The open reservoir would not be located within the vicinity of a arterial corridor as designated in the Petaluma General Plan 2025. The open reservoir would be located west of Stage Gulch Road, a designated scenic corridor in the Sonoma County General Plan. Project Measure PD-1, Site and Design Facilities to Achieve Compatible Land Use, would be implemented as part of the project to site facilities to achieve compatibility with the County’s General Plan and other regulations, to the extent feasible. While it may not be feasible to site the open reservoir outside the 200-foot wide

minimum building setback, the reservoir would be no greater than five feet in height, would be made of natural materials, and is similar to common agricultural reservoirs in the area and therefore is not considered a structure as intended in the County General Plan policy. Location of the open reservoir within the 200-foot scenic corridor setback would be consistent with the purpose of the scenic corridor, and this impact is considered less than significant.

Pipelines. Pipelines would be placed below ground. Disturbed streetscapes would be returned to their previous condition after installation of the pipelines. Any associated ground disturbance would be revegetated under Project Measure PD-2, Revegetate Temporarily Disturbed Sites. Any staging areas would be subject to Project Measure PD-2 and PD-13 Minimize Temporary and Permanent Visual Impacts, which would minimize visual impacts. Therefore, pipelines and construction staging is considered a less-than-significant impact.

Mitigation: No mitigation is necessary.

**Impact: VR-4: Will the project be inconsistent with the Petaluma General Plan goal to preserve the scenic and natural resources of the open ridgelines and hillsides ?**

Analysis: *Project-Level Near-Term Conveyance Improvements: Pipelines – No Impact; Storage Tank - Significant*

Goal 1-G-2 of the Petaluma General Plan is to preserve the essential scenic and natural resources of the ridgelines and hillsides that help define the unique character of Petaluma.

Pipelines. Pipelines would be placed below ground and would not be visible. Construction staging would be short-term and visual impacts minimized by Project Measures PD-2 and PD-13 adopted as part of the project. Therefore, pipelines and construction staging would not obstruct or degrade views of important natural features. The impact is less than significant.

Storage Tank. The storage tank would be partially buried in a hillside and would not change or affect a ridgeline. It would, to a certain extent, change the topography and view of the hillside, as shown in Figure 4.11-1 and 4.11-2. This view can be seen from the Rooster Run Golf Course, and a limited number of residences. This impact is considered significant. .

Mitigation: **VR-1 Landscape Screening**

After

Mitigation: *Less than Significant – Storage Tank*

Implementation of mitigation measure VR-1 would require planting oak trees around the tank to minimize the visual contrast and provide a landscape that blends with the existing surrounding oak woodlands. Refer to Figure 4.11-3 Mitigated View for what the site would look like five years after construction. It is estimated that between 20 to 25 years after construction the trees would reach the top of the tank. This mitigation measure reduces visual contrast, and impacts would be reduced to less than significant.

*Program-Level Improvements – Less than Significant*

Pump Station. A new pump station would be located in the vicinity of the Petaluma Golf and Country Club. The location is not likely to obstruct views of ridgelines or hillsides.

Because of its small size, the pump station would not obstruct or degrade views of important natural or scenic features. In addition, PD-13 Minimize Temporary and Permanent Visual Impacts would be incorporated as part of the project and includes measures to reduce visual impacts through design. This impact is considered less than significant.

Pipelines. Pipelines would not obstruct or degrade views of important natural or scenic features because they are underground. Staging areas and construction impacts would be temporary and subject to PD-2 Revegetate Temporarily Disturbed Sites, and PD-13 Minimize Temporary and Permanent Visual Impacts, which would minimize visual impacts. Pipelines and staging areas are considered a less-than-significant impact.

Open Reservoir. The open reservoir would be located north of Lakeville Highway and west of Stage Gulch Road at between elevation 300 and 400 feet. The open reservoir and associated structures would have a low profile similar to other agricultural reservoirs in the area. The highest point in this area is at elevation 490 feet. Therefore, the open reservoir and associated facilities would not obstruct hilltop views or views of important natural features, including the Sonoma Mountains, Petaluma River and western hills. The visual impact of the open reservoir on important natural features would be less than significant.

Mitigation: No mitigation is necessary.

**Impact: VR-5: Will the WREP cause an adverse effect on foreground or middle-ground views from a recreation area, other public use area, or private residence?**

Analysis: *Project-Level Near-Term Conveyance Improvements: Pipelines – Less than Significant; Storage Tank - Significant*

Pipelines. Pipelines would be placed below ground and would not be visible. Staging areas of up to one acre may be established at various locations during construction. Any use of land for construction staging would be short-term and subject to Project Measure PD-13 Minimize Temporary and Permanent Visual Impacts, which would minimize the visual impacts of construction areas. The impact is less than significant.

Storage Tank. The overflow pipe would be buried beneath the ground and not visible. The storage tank and its associated facilities would be located approximately 0.6 mile northeast of Adobe Road. The surrounding hilltops and trees between the site and Adobe Road screen views of the tank from the Adobe Road. However, portions of the tank and associated driveway, fencing, and grading would be visible to portions of the Rooster Run Golf Course, a public recreation facility along East Washington Street approximately 0.90 mile from the proposed tank site. As shown in Figure 4.11-1 through 4.11-3, the upper portion of the tank and re-contoured slope would be visible from the Rooster Run Golf Course, and likely would be visible from some residences in the area. In addition, the re-contoured slope behind the tank would likely be visible from middleground (under a mile) portions of East Washington Street. Project Measure PD-2, Revegetate Temporarily Disturbed Sites, would be implemented as part of the project. PD-2 would require that the re-contoured slope above the tank be revegetated as soon as possible upon completion of construction.

Although the storage tank site could be visible from nearby residences in the vicinity of the Rooster Run Golf Course, it would be much less evident from those locations due to the nature of the views which would be scattered and filtered by tree canopies, fences and increased distance. One residence (approximately 1,400 feet to the west of the storage



tank site) would have a view of the storage tank. This residence sits on a hilltop at approximately elevation 250 feet, with views of the City of Petaluma to the southwest and the hills to the east. The tank site is nestled in the hills across a small valley, approximately ¼ of a mile from the residence. Numerous large trees are located around the residence and property, thus semi-obstructing the views from the residence to the tank site. However, the impact is still considered significant.

The open, unobstructed views from the nearest portions of the Rooster Run Golf Course represent the worst-case visibility scenario from a public area. Since the tank would be visible from the recreation facility, Rooster Run Golf Course, this is considered a significant impact.

Mitigation: **VR-1 Landscape Screening**

After

Mitigation: *Less than Significant – Storage Tank*

Implementation of mitigation measure VR-1 would require planting oak trees around the tank to minimize the visual contrast and provide a landscape that blends with the existing surrounding oak woodlands. Refer to Figure 4.11-3 Mitigated View for what the site would look like five years after construction. It is estimated that between 20 to 25 years after construction the trees would reach the top of the tank. This mitigation measure reduces visual contrast, and impacts would be reduced to less than significant.

*Program-Level Improvements – Less than Significant*

Pump Station. The pump station may be visible from the Petaluma Golf and Country Club. The pump station's dimensions would be approximately 12 ft high by 20 ft long and 10 feet wide. If necessary, it would be housed within a structure that blends with the surrounding neighborhood or have other screening features. It could have outdoor electrical panels or a small electrical building. Power lines would be undergrounded.

In addition, PD-13 Minimize Temporary and Permanent Visual Impacts would be incorporated as part of the project and includes measures to reduce visual impacts through design. Due to the small size of the pump station and the project commitments to minimize visual impacts, the visual impact of the pump station on the Petaluma Golf and Country Club is considered less than significant.

Pipelines. Pipelines would be placed below ground and would not be visible. Staging areas of up to one acre may be established, but would be temporary and subject to Project Measures PD-2 and PD-13 which would minimize visual impacts. The impact is less than significant.

Open Reservoir. The open reservoir would be located north of Lakeville Highway and west of Stage Gulch Road and is not expected to be visible from a recreation or public use area. The reservoir may be visible by nearby residences. However, the open reservoir and associated structures would have a low profile similar to other agricultural reservoirs in the area and not obstruct views. This impact is considered less than significant.

Mitigation: No mitigation is necessary.

**Impact: VR-6: Will the project create a new source of substantial light and glare that would adversely affect day or nighttime views in the area?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

Emergency lighting would be installed at the storage tank site to be turned on only when needed. The lighting could be visible from nearby residences. Project Measure PD-15, Lighting Design, adopted as part of this project, requires the City to design lighting for the tank site to utilize shielded, low-intensity light sources. This measure reduces the impact to less than significant. No new lighting would be required for the pipelines.

*Program-Level Improvements – Less than Significant*

Emergency lighting could be installed at the pump station and open reservoir sites to be turned on only when needed and may be visible from surrounding residences or the Petaluma Golf and Country Club. Project Measure PD-15, Lighting Design, adopted as part of this project, requires the City to design lighting to utilize shielded, low-intensity light sources. This measure reduces the impact to less than significant. No new lighting would be required for the pipelines.

Mitigation: No mitigation is necessary.

## **CUMULATIVE IMPACT**

**Impact: VR-C1 – C6: Will the WREP cumulatively impact Visual Resources?**

Analysis: *Less than Significant*

The project impacts to visual resources are minor except for the visibility of the storage tank from portions of the Rooster Run Golf Course, and the level of impact even from the Golf Course would be slight after implementation of Mitigation Measure VR-1 Landscape Screening. No specific cumulative projects have been identified near the project improvements that would impact community separators, scenic corridors, or viewsheds, although it is likely that some additional projects would occur in the hills east of the City over the course of the project. The residual impacts of the project after mitigation are considered slight, and therefore the project's contribution to potential cumulative impacts is not considerable.

Mitigation: No mitigation is necessary.

## REFERENCES

City of Petaluma. 1973. Petaluma Zoning Ordinance. January 17.

City of Petaluma. 2008. *Final General Plan 2025*. May.

Sonoma County. 1994. Sonoma County General Plan. March 1.

Sonoma County. 2005. Sonoma County Zoning Ordinance. June 28.

## 4.12 PUBLIC SERVICES, UTILITIES AND ENERGY

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This section assesses the potential increased demands for police and fire services, water supply and distribution, sewage treatment and disposal, and solid waste disposal capacities. To provide a context for the analysis, the setting section provides information on current levels of service in the Water Recycling Expansion Program (WREP) study area.

### IMPACTS EVALUATED IN OTHER SECTIONS

The following subjects are related to the Public Services and Utilities Section but are evaluated in other sections of this document:

- Health Effects of Recycled Water. Potential health effects of recycled water are discussed in Section 4.7, Public Health and Safety.
- Bicycle Travel. Potential impacts of WREP construction on bikeways and bicycle travel are evaluated in Section 4.9, Transportation.
- Construction Noise Impacts on School Facilities. Impacts are discussed in Section 4.6, Noise.
- Wildland Fires. Potential impacts of the WREP on wildland fires are discussed in Section 4.7, Public Health and Safety.
- Traffic Lane Closures and Interference with Access to Fire, Police and School Facilities. Impacts are discussed in Section 4.9, Transportation.
- Flooding. Impacts from floodplain alteration are discussed in Section 4.4, Hydrology and Water Quality.

### SETTING

As a basis for evaluating public services and utilities impacts, this section describes the existing public service facilities within the WREP study area.

#### Existing Public Services and Utilities

##### *Police Services*

Police services regulate the affairs of a population through the enforcement of laws. The California Highway Patrol and Sonoma County Sheriff's Department provide law enforcement in portions of the WREP study area in unincorporated Sonoma County and outside the City of Petaluma. The nearest Highway Patrol office is located approximately 10 miles from the WREP study area at 6100 LaBath Avenue in Rohnert Park. The Sonoma County Sheriff's Department has their nearest office in the Roseland Shopping Center at 555 Sebastopol Road, Santa Rosa and is located approximately 15 miles from the WREP study area. The City of Petaluma has its own police services located in the north section of downtown Petaluma at 969 Petaluma Boulevard North. City-owned properties would be the responsibility of the Petaluma City Police; however, the near-term conveyance improvements are located outside the city limits of Petaluma and thus would be patrolled by the Sonoma County Sheriff's Department and the California Highway Patrol.

### **Fire Services**

Fire protection services in the WREP study area are predominantly comprised of City and volunteer agencies. The City of Petaluma Fire Department has three stations: Station No. 1 is located at 198 D Street, Station No. 2 is located at 1001 North McDowell Boulevard, and Station No. 3 is located at 831 South McDowell Boulevard. Other volunteer fire departments that would serve the WREP study area include the San Antonio Road Volunteer Fire Company, 5497 Redwood Hwy South, Petaluma; the Rancho Adobe Fire Protection Department, 11000 Main Street, Penngrove; the Lakeville Volunteer Fire Company, 5565 Lakeville Highway, Petaluma; and the Two Rock Volunteer Fire Company, 55 Walter Road, Petaluma. Shared efforts to increase fire suppression would come from the Sonoma County Department of Emergency Services Fire Services Division and the State of California's Department of Forestry and Fire Protection. Fire safety standards for the City of Petaluma and Sonoma County include the Uniform Fire Code, National Fire Code, Uniform Building Code, general plan policies, and the subdivision and zoning ordinances. City-owned properties would be the responsibility of the Petaluma Fire Department even though the near-term conveyance improvements are located outside the city limits of Petaluma. The Petaluma Fire Department's total coverage is 160 square miles of southern Sonoma County which includes the City's entire 14 square miles.

### **Water**

The source of water for the WREP study area includes City-owned groundwater wells and a contracted water supply from the Sonoma County Water Agency (SCWA). The City uses its groundwater wells only in emergencies. The SCWA manages and maintains a water transmission system that provides potable water to the City. The Russian River watershed provides the water supply for the SCWA. Starting in 1998, the City began implementing various incentives and programs to reduce potable water use. The City currently coordinates over ten business and residential programs that have reduced the City's potable water use by approximately 235 acre-feet per year.

### **Wastewater**

Much of the wastewater generated within the WREP study area is collected in sanitary sewer pipelines and transported to the Wastewater Treatment Plant (WWTP) located at 950 Hopper Street in Petaluma. The remaining areas not served by City-owned sanitary sewer pipelines typically use individual septic systems including those areas in unincorporated Sonoma County and outside the WREP study area. Treated wastewater from the WWTP is conveyed from the WWTP pond influent pump station to the oxidation ponds. These oxidation ponds are located southwest of Lakeville Highway. Disinfected secondary effluent from the oxidation ponds is discharged into the Petaluma River or distributed to recycled water irrigation customers in the agricultural setting. The City is currently constructing the Ellis Creek Water Recycling Facility. This facility would produce tertiary treated recycled water that would be distributed through the conveyance system and program elements evaluated in this EIR.

### **Solid Waste**

The Sonoma County Waste Management Agency is the joint powers authority of the nine incorporated cities within the County of Sonoma. The Sonoma County Waste Management Agency implements regional waste diversion programs as required by the California Integrated Waste Management Act of 1989 (AB939). The Central Landfill located at 500 Mecham Road, approximately 4 miles northwest of the City of Petaluma, is the only permitted municipal solid

waste disposal site within Sonoma County but is currently inactive and used as a centralized transfer station. There are six other permitted transfer stations throughout the County that are used to consolidate, sort, and transfer waste to the Central Landfill. Petaluma’s solid waste is transported to the Redwood Sanitary Landfill located at 8950 Redwood Highway, Novato, California. The Redwood Sanitary Landfill is a Class III permitted landfill that accepts mixed municipal, sludge (biosolids), agricultural, construction/demolition, asbestos, tires, ash, wood waste and other designated waste products. The landfill has a permitted capacity of 2,300 tons per day. The estimated closure date is in 2039. Solid waste created from the near-term conveyance improvements would be sent to the Redwood Sanitary Landfill for disposal.

## GOALS, OBJECTIVES, AND POLICIES

Table 4.12-1 shows the City of Petaluma and Sonoma County General Plan goals, objectives and policies that are relevant to the WREP. The table also indicates which criteria in the Public Services and Utilities Section are responsive to each set of policies.

**TABLE 4.12-1**  
**Goals, Objectives and Policies – Public Services and Utilities**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Goal, Objective or Policy</b>	<b>Relevant Evaluation Criteria</b>
<b>Police and Fire</b>				
Petaluma General Plan 2025	Community Facilities, Services, and Education	Policy 7-P-17	Achieve and maintain a minimum ratio of one fire suppression personnel per 1,000 population served or a similar level of response service to meet increased call volumes.	1,2
Petaluma General Plan 2025	Community Facilities, Services, and Education	Policy 7-P-19	Maintain a four minute travel time for a total of 6-minute response time for emergencies within the City.	1,2
Petaluma General Plan 2025	Community Facilities, Services, and Education	Policy 7-P-19-A	Require that properties outside of the four-minute (travel) response radii utilize fire-resistant materials and maintain fire breaks surrounding residences.	1.2
Sonoma County General Plan	Public Facilities and Services Element	Policy PF-2a	Plan, design, and construct park and recreation, fire and emergency medical, public education, and solid waste services and public utilities in accordance with projected growth, except as provided in policy LU-4d.	1, 2
Sonoma County General Plan	Land Use Element	Policy LU-4d	Assure that County-provided physical services and infrastructure will accommodate the projected amount of growth authorized by the land use plan.	1, 2

**TABLE 4.12-1**  
**Goals, Objectives and Policies – Public Services and Utilities**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Goal, Objective or Policy</b>	<b>Relevant Evaluation Criteria</b>
<b>Water and Sewer</b>				
Petaluma General Plan 2025	Water Resources	Policy 8-P-4-A	The City shall continue to monitor the demand for water for projected growth against actual use, and ensure that adequate water supply is in place prior to, or in conjunction with, project entitlements.	1
Petaluma General Plan 2025	Water Resources	Policy 8-P-16	Comply with the current Statewide General Waste Discharge Requirements concerning the operation and maintenance of the City's sanitary sewer collection system.	1
Petaluma General Plan 2025	Water Resources	Policy 8-P-13	Work to convert existing potable water customers identified under the City's Recycled Water Master Plan to tertiary recycled water as infrastructure and water supply becomes available.	1
Petaluma General Plan	Community Health and Safety Element	Policy 33	The City shall maintain an updated sewage/wastewater treatment plan.	1
Sonoma County General Plan	Public Facilities and Services Element	Goal PF-1	Assure that water supply and wastewater management facilities are adequate to meet projected needs.	1
Sonoma County General Plan	Public Facilities and Services Element	Objective PF-1.1	Plan for healthful water supplies and wastewater facilities adequate to serve the growth projected in the general plan.	1
<b>Solid Waste</b>				
Petaluma General Plan 2025	The Natural Environment	Policy 4-P-21	Reduce solid waste and increase recycling, in compliance with the Countywide Integrated Waste Management Plan (CoIWMP).	1
Sonoma County General Plan	Public Facilities and Services Element	Goal PF-2	Assure that park and recreation, public education, fire suppression and emergency medical and solid waste services, and public utility sites are available to meet the future needs of Sonoma County residents.	1

**TABLE 4.12-1**  
**Goals, Objectives and Policies – Public Services and Utilities**

<b>Adopted Plan Document</b>	<b>Document Section</b>	<b>Document Numeric Reference</b>	<b>Goal, Objective or Policy</b>	<b>Relevant Evaluation Criteria</b>
Sonoma County General Plan	Public Facilities and Services Element	Objective PF-2.9	Use the County Solid Waste Management Plan as the policy document for solid waste management in the county.	1
<b>Energy</b>				
Petaluma General Plan 2025	The Natural Environment Element	Policy 4-P-18	Develop and adopt local energy standards that would result in less energy consumption than standards set by the California Energy Commission's (CEC) Title 24.	1
Petaluma General Plan 2025	The Natural Environment Element	Policy 4-P-18-A	Identify and implement energy conservation measures that are appropriate for public buildings and facilities . . . including periodically evaluating the efficiency of potable and sewer pumping facilities and identifying measures to improve pumping efficiency.	1
Petaluma General Plan 2025	The Natural Environment Element	Policy 4-P-18-C	Investigate and implement alternative sources of renewable power to supply City facilities, such as solar water heating at the Petaluma Swim Center, cogeneration at the Ellis Creek Water Recycling Facility, and solar photovoltaics on City-owned buildings.	1

Source: Petaluma General Plan 2025; Sonoma County General Plan 1989.



## EVALUATION CRITERIA WITH THRESHOLD OF SIGNIFICANCE

**TABLE 4.12-2**

**Evaluation Criteria with Threshold of Significance – Public Services and Utilities**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Threshold of Significance</b>	<b>Justification</b>
1. Will the WREP increase demand for police, fire, water, sewage treatment and disposal, solid waste, or energy removal to such a degree that accepted service standards are not maintained?	Change in response times or distance away from the Project construction.  Result in inefficient use of energy.	Greater than 0 changes in the response time, or within 500 feet of construction.  Not in compliance with General Plan 2025 policies.	General Plan of Sonoma County, Petaluma General Plan 2025
2. Will WREP construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	Change in response times or distance away from the Project construction.	Greater than 0 change in the response time, or within 500 feet of construction.	General Plan of Sonoma County, Petaluma General Plan 2025
3. Will the WREP conflict with wells, septic fields, or water or wastewater utilities?	Location of the WREP component in relation to wells, water lines, septic or wastewater lines.	WREP component within 50 feet of wells or water lines, or within 10 feet of septic or wastewater lines.	Title 22, Department of Health Services, California Code of Regulations

## IMPACTS AND MITIGATION MEASURES

**Impact:** **PS-1: Will the WREP increase demand for police, fire, water, sewage treatment and disposal, solid waste removal, or energy to such a degree that accepted service standards are not maintained?**

**Analysis:** *Project-Level Near-Term Conveyance Improvements – No Impact*

The project-level near-term conveyance improvements would not increase demand for public services given the adequate existing services available within the WREP study area. The construction of the near-term conveyance improvements such as the tank would be located on the outer fringe of the City but are served by mutually responsible fire protection services of the City, County, State and volunteer organizations. Police protection services are also jointly shared by the City, County and State agencies and are within close distances that would not hinder response times to such a degree that accepted service standards are not maintained. No increased demand for water and sewer services would occur from these improvements since the project improvements are a conservation effort to maximize existing potable water supplies by the better utilization of recycled water. Solid waste generation from the near-term improvements would be minimal as no demolition of large existing structures are expected to occur and, therefore, would not affect existing landfill capacity. No new pumping facilities would be built as part of the project-level improvements. Pumping recycled water to the tertiary storage tank would occur via the existing pumping system at the Ellis Creek WRF. A small amount of

energy would be required at the tertiary storage tank for the emergency light and controls. No impacts would occur.

*Program-Level Improvements – No Impact*

The program-level improvements would not increase demand for police and fire protection services given the adequate existing personnel, equipment and response times available within the WREP study area. For fire protection services, the area within unincorporated Sonoma County would continue to be served by the mutually responsible fire protection services of the Sonoma County Department of Emergency Services, the California Department of Forestry, by the City of Petaluma Fire Department and local volunteer fire departments. The Petaluma Fire Department has plans to relocate their headquarters and expand existing services and personnel. For police protection services, the study area would continue to be served by the City of Petaluma Police Department, California Highway Patrol and Sonoma County Sheriff's Department. It is not expected that construction and operation would increase the use of existing fire and police protection facilities such that a substantial physical deterioration, alteration, or expansion of these facilities would occur thus affecting standard of services. Construction-related activities could result in injuries to construction workers or properties and increase the demand for emergency response at various sites within the WREP study area. However, emergency service providers would be able to respond adequately to emergencies because service providers such as fire and police are located within adequate response times and close distances. Emergency response attributable to the risk of fire would likely be offset by information, training, and safety equipment provided by construction management. The program-level improvements are not likely to conflict with water or sewage treatment facilities since phased construction over an extended period of time would not require the entire water or sewer system to be shut down. No extensive disruption of water or sewer would occur. No increased need for services or staffing of new service facilities would occur (Orr, 2007). Solid waste disposal facilities contracted with the Sonoma County Solid Waste Management Authority would continue to accept solid waste generated by construction and operation of the program-level improvements. The program-level improvements are not anticipated to create a substantial amount of solid waste such that the landfill services would be affected and the Redwood Sanitary Landfill continues to have sufficient capacity and has an estimated closure date through the year 2039. The Sonoma County Solid Waste Management Authority continues ongoing planning efforts for solid waste facilities for Petaluma and all of Sonoma County (Caldwell, 2007). The majority of soil excavated during project construction would be used for on site activities. Any excess material not returned to cover pipelines and used at the site for embankment construction of the open reservoir would be hauled away by the contractor for appropriate disposal. No impacts from construction or operation are anticipated to occur to service standards.

Implementation of the WREP would require energy, mostly from existing pumping facilities, for the distribution of recycled water. The source of the recycled water would be from the Ellis Creek WRF, located along Lakeville Highway in Petaluma. The tertiary recycled water would replace, on the most part, existing uses of potable water within the City such as at playing fields and parks. A majority of the potable water that serves the City is delivered by the Sonoma County Water Agency from the Rainey collectors along the Russian River (approximately 15 straight-line miles from the City of Petaluma). More energy would be required to lift and convey water to costumers from the Rainey collectors than from the Ellis Creek WRF. A small amount of energy would be required

at the open reservoir for lighting, controls and circulation pumping. The Petaluma Golf and Country Club currently is served with potable water via a 10 hp pump station that uses approximately 37,000 kwh per year (Simmons, 2007). The golf course pump station that would be built as part of the program-level improvements would be 7.5 hp and use approximately 29,000 kwh per year (Hunt, 2007). Therefore, the new pump station would use less energy than the existing pump station, which would be taken off line when the new pump station is built. In addition, as noted in Table 4.12-1 the City has several General Plan policies related to reducing energy use wherever feasible, including periodically evaluating pumping facilities for energy efficiency.

Mitigation: No mitigation is necessary.

**Impact: PS-2: Will the WREP construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?**

Analysis: *Project-Level Near-Term Conveyance Improvements – No Impact*

The project-level near-term conveyance improvements would not disrupt police or fire protection services. No City police or fire stations are located along the proposed pipeline routes on Ielmorini Road, East Washington, and Browns Lane. The construction of the tank, and its associated facilities, would occur adjacent to an isolated road and would not prevent emergency fire and police service activities. The nearest schools from the tank sites are Sonoma Mountain Elementary School, Old Adobe Elementary School, Bernard Elementary School, McDowell Elementary School, La Tercera Elementary School and Casa Grande High School. These schools are located approximately 0.5 to 1 mile south of the tank site and are not located along the proposed pipeline route on East Washington Street for the near-term improvements. Due to this distance away from the construction area no disruptions to these schools are expected. The pipeline construction would be contained within existing roads and public right-of-way on East Washington Street and Ielmorini Road. No disruption to parks and recreation facilities would occur since parks and recreation facilities are predominantly located along North McDowell Boulevard and are located approximately 1 mile southwest from the storage tank site. No disruption to public services would occur.

*Program-Level Improvements – No Impact*

The program-level improvements would occur throughout the City in phases over an extended period of time. While construction of pipelines to these areas may cause temporary impacts, no disruption to police or fire protection services by these construction activities are anticipated to occur since traffic impacts would be of a short-term duration. In addition as part of the project (PD-11 Standard Traffic Control Procedures) coordination would occur with emergency response providers, transit, and schools when construction of pipelines blocks access to such facilities. No disruption to schools, parks and recreation facilities in the WREP study area are anticipated to occur since the program-level improvements would occur in phases over an extended period of time and with implementation of PD-11 Standard Traffic Control Procedures. Construction of the open reservoir and associated facilities would be constructed on private property and is not expected to disrupt public services. The potential location of the reservoir appears to have ample space to accommodate construction staging areas for equipment and temporary storage. Temporary construction impacts caused by traffic lane closures are addressed in Section 4.9, Transportation.

Mitigation: No mitigation is necessary.

**Impact: PS-3: Will the WREP conflict with wells, septic fields, or water or wastewater utilities?**

Analysis: *Project-Level Near-Term Conveyance Improvements – Less than Significant*

The recycled water storage tank would be constructed on privately-owned land currently used for grazing cattle or on undeveloped City-owned property. A site survey conducted on July 19, 2007 indicated no visible signs or markings to identify below ground utilities, wells or septic systems. Pipelines would be installed within existing public rights-of-ways along Washington Street and Browns Lane. The pipelines may result in potential conflicts with public or private utilities such as wells and septic systems. A review of the Department of Water Resources water well driller reports indicates the presence of domestic wells outside the public right-of-way but near the potential pipeline alignments.

However, implementation of Project Measure PD-14, Adjust Facility Design to Avoid Wells and Septic Systems, would avoid conflicts. The measure requires that the Project comply with Title 22 separation guidelines, including that recycled water irrigation areas and pipelines be separated from domestic wells by no less than 50 feet and 100 feet, respectively. Additional standards require that the horizontal distance between pressurized potable water and recycled water lines be at least 10 feet. Where potable and recycled water lines cross, potable water lines shall be at least one foot above recycled water lines. Project Measure PD-14 also requires that the City work with the Sonoma County PRMD Well and Septic Division to incorporate the Division's recommendations when addressing any septic issues. With these protections in place, impacts on wells, septic fields, and water utilities would be less than significant.

*Program-Level Improvements – Less than Significant*

The program-level improvements would occur in unincorporated Sonoma County and in the City of Petaluma. The pipelines would be installed within existing public rights-of-ways. The open reservoir could be installed on privately-owned property near Stage Gulch Road and Lakeville Highway. A new pump station would be located in the general vicinity of the Petaluma Golf and Country Club. The facilities may result in potential conflicts with public or private utilities such as wells and septic systems. However, implementation of Project Measure PD-14, as described for the project level near-term improvements, would avoid conflicts. With the PD-14 protections in place, impacts on wells, septic fields, and water utilities would be less than significant.

Mitigation: No mitigation is necessary.

## **CUMULATIVE IMPACTS**

**Impact: PS-C1 and C2: Will the WREP plus cumulative projects increase demand or disrupt facilities to such a degree that accepted service standards are not maintained based on criteria 1 and 2?**

Analysis: *Project-Level Near-Term Conveyance Improvements - No Impact*

The project-level near-term conveyance improvements would not result in an increased demand for water and sewer services since the project improvements are a conservation

effort to maximize existing potable water supplies by the better utilization of recycled water. Similarly, the project-level near-term conveyance improvements would not disrupt police or fire protection services.

*Program-Level Improvements - No Impact*

The program-level improvements would not increase demand for police and fire protection services given the adequate existing personnel, equipment and response times available within the WREP study area.

The program-level improvements would occur throughout the City in phases over an extended period of time. While construction of pipelines to these areas may cause temporary impacts, no disruption to police or fire protection services by these construction activities are anticipated to occur since traffic impacts would be of a short-term duration.

Mitigation: No mitigation is necessary.

**Impact: PS-C 3: Will the WREP plus cumulative projects conflict with wells, septic fields, or water or wastewater utilities?**

Analysis: *Project-Level Near-Term Conveyance Improvements and Program-Level Improvements - Less than Significant*

Project measure PD-14, Adjust Facility Design to Avoid Wells and Septic Systems, is incorporated as part of the project. The measure requires that the project comply with Title 22 separation guidelines and that the City work with the Sonoma County PRMD Well and Septic Division to incorporate the Division's recommendations when addressing any septic issues. This impact is project-specific and addressed by inclusion of PD-14, therefore the project would not contribute to cumulative impacts to public utilities.

Mitigation: No mitigation is necessary.

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# 5 ALTERNATIVES TO THE PROPOSED PROJECT

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## INTRODUCTION

The California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) (CEQA) and the CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.) require that an EIR “describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives” (CEQA Guidelines Section 15126.6(a)). If a project alternative would substantially lessen the significant environmental effects of a proposed project, the decision maker should not approve the proposed project unless it determines that specific technological, economic, social, or other considerations make the project alternatives infeasible (PRC Section 21002, CEQA Guidelines Section 15091(a)(3)). The EIR must also identify alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and should briefly explain the reasons underlying the lead agency’s determination (CEQA Guidelines Section 15126.6(c)).

One of the alternatives analyzed must be the “No Project” alternative. The “No Project” analysis must discuss the existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved and development continued to occur in accordance with existing plans and consistent with available infrastructure and community services (CEQA Guidelines Section 15126.6(e)(2)).

A description of the proposed project and the project objectives are provided in Chapter 2. This Chapter provides a description of the alternatives and also provides a summary of the impacts of the alternatives in Table 5-1.

## RELATIONSHIP TO CITY OF PETALUMA GENERAL PLAN 2025

The City of Petaluma certified an EIR for its Petaluma General Plan 2025 on April 7, 2008. It adopted the General Plan 2025 on May 19, 2008. The General Plan 2025 EIR analyzed the Water Recycling Expansion Program (WREP) improvements, use of recycled water and increased water conservation at a programmatic level as part of a detailed environmental analysis of water supply for General Plan 2025 buildout. This EIR tiers from the General Plan 2025 EIR and serves as both a project-level EIR for near-term improvements and a program-level EIR for later phases of the WREP.

It is important to note that many policy decisions made in the General Plan 2025 process impact the need for the WREP, its characteristics and the availability of alternatives to it. The WREP and new water conservation programs were the solution chosen by the City to deal with the uncertain availability of new water supply from the Sonoma County Water Agency and the potential negative environmental consequences of a substantial increase in groundwater pumping, all as analyzed in the General Plan 2025 water supply studies and EIR process. The WREP is itself a mitigating project which implements a water supply program that preserves potentially nonrenewable environmental resources and prevents environmental harm. As such, it serves the statutory purpose of CEQA.

This EIR reviews the WREP infrastructure at a more detailed level and discusses whether alternatives to the proposed infrastructure would reduce significant environmental impacts of that infrastructure.

However, this EIR does not and need not revisit the decisions and environmental review contained in the General Plan 2025 and its EIR regarding water supply, use of groundwater, overall capacity of the recycled water system or the means by which the City of Petaluma will provide public facilities for the level of controlled, sustainable growth allowed by General Plan 2025. See *Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal. App. 4th 477.

## **DEVELOPMENT OF ALTERNATIVES**

CEQA requires environmental analysis at the earliest practical stages, and the WREP was therefore analyzed at a programmatic level in the General Plan 2025 EIR process, including the Water Supply and Demand Analysis, General Plan 2025 Volume 2, Technical Appendix C. To this end, environmental considerations became an integral part of the WREP conceptualization, design and planning, as envisioned by CEQA Guidelines Section 15004(b).

The conclusions and environmental analysis on these points is contained in the General Plan EIR and its supporting Water Supply and Demand Analysis. As to the City's analysis and decisions on the amount of General Plan 2025 growth to be served by the WREP and water conservation program, which is a constraint on the required size and capacity of the WREP, see pages 33-36 of the Final EIR, General Plan 2025 Volume 6A, Technical Appendix G-2, incorporated herein by reference.

Because of the tiered nature of this EIR and the prior environmental analysis and conclusions about water supply and growth made in the General Plan 2025 EIR, the "reasonable range" of alternatives to the WREP required by CEQA in this case is narrowed. In addition to the No Project Alternative required by CEQA Guidelines Section 15126.6(e)(2), a reasonable range of alternatives in this case should include any alternatives to the WREP infrastructure which would reduce the significant environmental impacts of the WREP, which consist of two cumulative impacts.

As analyzed in the General Plan 2025 EIR, regulatory uncertainty and the current lack of ability to accurately quantify and measure the effectiveness of local, state and national greenhouse gas emissions ("GHG") reduction measures and their relationship to the effects of global climate change within Petaluma and the impact of any changes in Petaluma on global climate change have made it impossible to state that the cumulative buildout facilitated by the WREP and the General Plan 2025 water supply program will not make a cumulatively considerable contribution to a significant cumulative impact on climate change. This impact is not a direct impact of the WREP, or even of General Plan buildout in isolation. Modifying the WREP components and/or infrastructure will not affect this conclusion or reduce potentially significant and unavoidable cumulative GHG impacts to a level of insignificance.

The second impact which remains significant and unavoidable is a potential short-term impact on traffic resulting from construction activities of program-level improvements. For the improvements evaluated at a program level, the possibility exists that the pipeline construction may overlap with other construction and cause significant traffic congestion and delays.

Alternatives selected for study must be feasible and able to meet most of the objectives of the project while avoiding or substantially lessening any significant impacts of the project. The project objectives for the WREP (refer to Chapter 2, Project Description) require disposal of 1,025 to 1,070 MG of recycled water per year, as well as requiring potable water offset for a portion of that volume (approximately 464 MG). Refer to Appendix F, WREP Size Requirements, for a detailed examination of how the size of the WREP is determined by the two primary objectives which the project is designed to fulfill: disposal of recycled water produced at the Ellis Creek Water Recycling Facility, a requirement of the wastewater treatment system; and irrigation with recycled water to offset the use of potable water, a requirement of the water supply system. Although alternative means of recycled water disposal are available, for



example, increased discharge to the Petaluma River, other disposal alternatives do not provide for an offset to potable water use. Similarly, alternative means of obtaining additional potable water supplies exist, for example, increased groundwater pumping or increased supplies from the Sonoma County Water Agency, but these alternatives do not allow for increased disposal of recycled water. Additional potable water from water conservation has been adopted by the City in the 2025 General Plan and the Water Conservation Plan (Dodson 2008).

## DESCRIPTION OF ALTERNATIVES

### Alternatives Evaluated in EIR

The following alternatives to the WREP have been identified and are evaluated and compared to the environmental impacts of the project later in this chapter.

#### ***Alternative 1 – Manor Lane Alternative***

Under the Manor Lane Alternative the storage tank and East Washington Street pipeline would be sited near Manor Lane approximately 1-1/4 miles southeast of the project's tank location (refer to Figure 5-1 Manor Lane Alternative). The Browns Lane portion of the near-term improvements would remain the same. The characteristics of the Manor Lane Alternative would be similar to the project at Ielmorini Road and East Washington Street. A storage tank of the same dimensions and capacity as the tank proposed along Ielmorini Road would be constructed at an elevation of 280 feet above sea level northwest of the intersection of Manor Lane and Adobe Road. A new access road would be constructed off of Manor Lane to reach the tank site. A pipeline would be constructed from the tank east to Manor Lane, then south along Manor Lane, east along Adobe Road, and then south along either Casa Grande Road or Frates road where the pipeline would then connect to the existing recycled water system pipeline.

The Manor Lane Alternative would be located in a similar environmental setting and would require essentially the same amount of construction as the project. Therefore, development under the Manor Lane alternative would result in similar environmental impacts as the near-term improvements for several resource areas. These resource areas are discussed in more detail below.

- **Land Use.** Similar to the project, the Manor Lane tank site is located on land designated Land Extensive Agriculture. The site is not classified as MRZ-2. There would be no new significant environmental impacts as a result of this alternative.
- **Geology, Soils, and Seismicity.** The Manor Lane Alternative would be located in a similar topographic, geologic, and seismic setting as the near-term improvements and thus the general geotechnical constraints are expected to be similar. The Manor Lane Alternative would include the same project measures identified for the near-term improvements to address landslides, liquefaction, expansive soil, corrosive soil, strong ground shaking, and erosion. There would be no new significant environmental impacts as a result of this alternative.
- **Hydrology and Water Quality.** The Manor Lane Alternative would be similar to the project with relation to hydrology and water quality. Measure PD-3, adopted as part of the Project, would require development of a SWPPP, as applicable, for each construction area. In addition, Project Description Measure PD-2, Revegetate Temporarily Disturbed Sites, would require sites to be revegetated prior to the rainy season. There would be no new significant environmental impacts as a result of this alternative.

- **Air Quality.** The Manor Lane alternative would require essentially the same amount of construction as the project's near-term improvements. The Manor Lane alternative would include the same Project Measures to minimize impacts from construction air quality emissions as these are measures which the City as agreed to use in its construction and operation of the WREP. Operation of the Manor Lane alternative would not affect air pollutant levels and there would be no new significant environmental impacts as a result of this alternative. Greenhouse gas emissions are expected to be similar to those of the project.
- **Public Health and Safety.** Considering the setting and current use of the property on which the Manor Lane tank would be constructed, the site is not likely to be located on a property that is a known hazardous waste site. The Manor Lane Alternative would use the same Project Measures as the project to minimize impacts from hazardous materials, wildfires, flooding, and airport land use conflicts. There would be no new significant environmental impacts as a result of this alternative.
- **Transportation.** The Manor Lane Alternative would require essentially the same amount of construction as the project. As described in Chapter 4.9, both Casa Grande Road and Frates Road currently operate at a LOS A during the AM and PM peak hours and construction trips would not exceed the available capacity of 1,200 vehicles per lane along Adobe Road. Construction traffic during pipeline installation along Adobe Road may require lane closures during construction which could temporarily impact access to Petaluma Adobe State Historic Park.
- **Public Services, Utilities, and Energy.** The Manor Lane Alternative would be located in a similar setting for public services and utilities as the project. There would be no new significant environmental impacts as a result of this alternative.

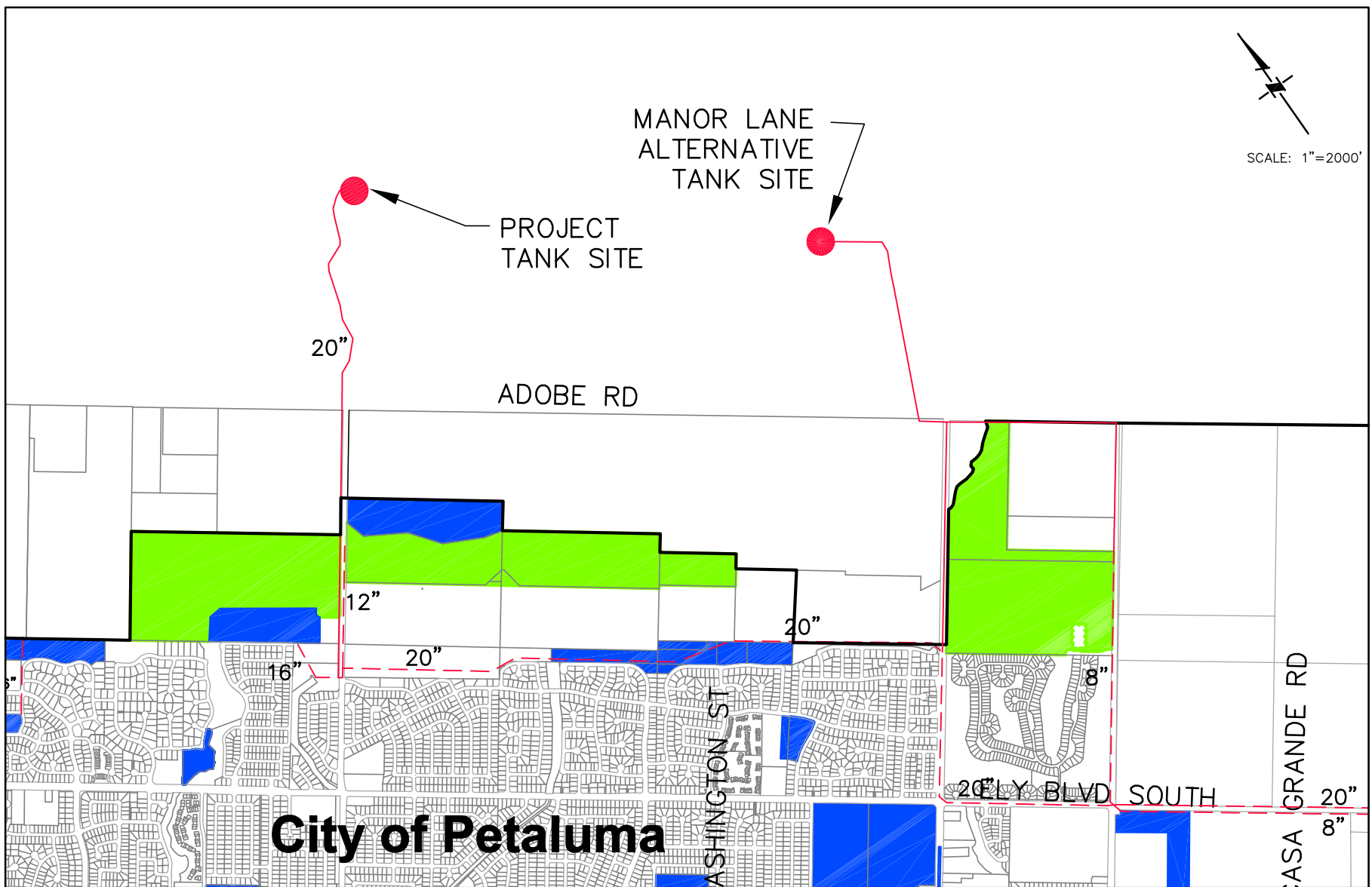
For some resource areas, development under the Manor Lane Alternative could result in new or more substantial environmental impacts than for the project. These resource areas are discussed in more detail below.

- **Agriculture and Soil Quality.** The Manor Lane tank, cross country pipeline, and access road would be located on property currently under a Williamson Act contract. This is a significant impact that would not occur with the project. This impact would require a new mitigation measure to reduce the impact to a less-than-significant level.
- **Noise.** Noise generated by the construction of the Manor Lane tank would result in a significant noise impact because construction noise levels would exceed 60 dBA Leq at the nearest receptor. The nearest receptor to the Manor Lane tank site is located approximately 1,000 feet away. Using the same noise contour developed for the project-level improvements, this receptor would be exposed to noise levels greater than 60 dBA during tank construction (60 dBA out to 1,120 feet). This is a significant impact that would not occur with the near-term improvements. In addition, construction noise from pipeline installation along Adobe Road may cause temporary impacts to the Petaluma Adobe State Historic Park, such as interfering with the relaxed, quiet setting typically found at the Park.
- **Biological Resources.** The Manor Lane Alternative would include a distribution pipeline that would cross Adobe Creek, which is known to support at least two special status species, steelhead and foothill yellow-legged frog, and may support others including western pond turtle and California red-legged frog. Aquatic habitat for these species may occur within 500 feet of the distribution pipeline along Manor Lane, Adobe Road, and

Casa Grande Boulevard. The distribution pipeline would cross Adobe Creek either along Adobe Road (if the pipeline is extended to Frates Road), or along Casa Grande Boulevard. Surveys along with informal USFWS and National Marine Fisheries Service consultation would be required to resolve potential impacts to California red-legged frog and steelhead. Mitigation measures could reduce this impact to a level below significance; however, the Manor Lane alternative has the potential to increase the overall impact to riparian areas and biological resources in comparison to the project.

- **Visual Resources.** Similar to the project's tank site, the Manor lane tank site would be visible from nearby residents. In addition, it is likely the tank would be visible from Adobe Road which is designated a Scenic Corridor in the Sonoma County General Plan. While the surrounding terrain may partially block views of the tank from certain viewsheds, it is anticipated that, in comparison to the project tank site, a larger portion of the Manor Lane tank would be visible by more viewsheds. Mitigation could be applied to reduce the impact to less than significant.
- **Cultural Resources.** No previously recorded cultural resources exist at the Manor Lane tank site (ESA, 2007). However, a number of large, significant historical resources may exist at or near the Petaluma Adobe (State Historical Landmark), located approximately one quarter-mile south of the alternative site and adjacent to the distribution pipeline. Mitigation measures could reduce impacts to a level below significance. There would be no new significant environmental impacts as a result of this alternative.

In summary, the Manor Lane Alternative is expected to potentially have greater impacts than the project relative to Agriculture (Williamson Act contract), Noise (closer sensitive receptors), Biological Resources (pipeline crossing of Adobe Creek), Cultural Resources (pipeline near Petaluma Adobe State Historical Landmark), and Visual Resources (tank visible from Adobe Road, a County-designated Scenic Corridor).



**City of Petaluma**

**LEGEND**

- EXISTING RECYCLED WATER USERS
- POTENTIAL RECYCLED WATER USERS
- EXISTING PIPELINE
- PROPOSED PIPELINE IN NEAR-TERM CONVEYANCE IMPROVEMENTS

NOTE:  
NEAR TERM IMPROVEMENTS ALSO  
INCLUDE PIPELINES IN BROWNS LANE  
(NOT SHOWN ON THIS FIGURE)

**Figure 5-1  
Manor Lane Alternative**

WREP EIR  
Petaluma, California



## **Alternative 2 – No Project Alternative**

Under the No Project Alternative, the City's existing recycled water system would continue to function, delivering secondary recycled water to agricultural users south and east of the City, as well as to golf courses within the City. Additional secondary water would be discharged to the Petaluma River, which would be in violation of the City's discharge permit. Tertiary recycled water would be produced for limited use at the Ellis Creek WRF for process water and fire protection, but would not be necessary to continue to support the existing irrigation system or for discharging to the Petaluma River (refer to the *Water Recycling Facility and Access Improvements EIR* (August 2002) for a discussion of secondary and tertiary treated water for discharge. This document can be reviewed at the Department of Water Resources and Conservation).

## **Alternatives Considered but Rejected**

Regarding the Near-Term Improvements, the City has examined several additional alternatives, but none were found that were feasible and would reduce environmental impacts compared to the project. Nevertheless, the Manor Lane Alternative was selected for study based on its feasibility and location in another sub-watershed.

The pipelines in Browns Lane are in the roadway and connect two existing pipes and replace an existing pipe. The pipelines do not cause any significant impacts. There are no alternative alignments for the pipelines that would be shorter, have less ground disturbance, or reduce impacts.

In the *Petaluma Recycled Water Master Plan Constraints Analysis* (ESA, February 2007) the City examined six potential tank sites, including the Manor Lane site analyzed above and the project's tertiary storage tank site. The Constraints Analysis looked at constraints related to land use, agriculture, visual resources, biological resources, cultural resources, hydrology, water quality, and geology. The Constraints Analysis found the project's tank site (identified as Alternative 1 in the Constraints Analysis) on Ielmorini Road to be the environmentally preferred site for implementation. No other feasible sites have been identified for the tank that would reduce environmental impacts.

The exact location of the Program-Level Improvements has not yet been determined. However, when the City began planning for its recycled water system, it did examine specific locations for pipelines, pump stations, and irrigation use, and produced a report entitled *Recycled Water Master Plan* (Dodson, June 2004). The *Recycled Water Master Plan* served as a feasibility report to determine that sufficient lands were available for recycled water irrigation use in a pattern that could be served cost effectively. The WREP will be implemented, however, over the course of the next 15 to 20 years, and specific land uses in need of recycled water for irrigation will change during that time. Therefore, the City of Petaluma has decided to prepare a Program EIR for the future improvements, and prepare project-specific subsequent environmental review when future phases of the recycled water system are ready to be designed and constructed. This approach will provide flexibility, as well as a broader analysis of environmental impacts for consideration by the decision makers.

Under the Program-Level Improvements, irrigation with recycled water takes place within a Recycled Water Service Area coincident with the City's Urban Growth Boundary (UGB), except where secondary recycled water is provided to agricultural users south and east of the City's UGB. No significant impacts have been identified from the use of recycled water or from distribution pipelines serving users. The City considered whether the Recycled Water Service Area should be larger or smaller, but chose to limit tertiary recycled water use to within its UGB and limit secondary recycled water use to areas close to the existing secondary uses which have been established since the 1980s. This area is sufficiently large to

enable the City to achieve its goal of 1,025 to 1,070 MG of reuse per year, and so there is not a need for a larger service area. The City also considered whether to reduce the size of the Recycled Water Service Area and restrict recycled water use to a portion of the City. However, to maintain flexibility into the future and equity among all potential users in the City, the City has chosen to retain the Service Area at the current size. In addition, reducing the service area would not eliminate the short-term traffic impact during construction of programmatic improvements. Road improvement, pipeline replacement, and utility projects are proposed throughout the City through 2025. It would be difficult to establish a service area that would avoid all potential future road construction projects. With regard to the near-term improvements, reducing the service area would not eliminate the need for the tertiary storage tank nor change its location. The tank is required to meet peak demand and the system requires a specific elevation in order to provide enough pressure to each anticipated user through 2025.

The Program-Level Improvements also include a potential pump station in the vicinity of the Petaluma Golf and Country Club. The pump station may be necessary to pump recycled water up to the elevation of the golf course. No significant impacts have been identified after mitigation from construction and operation of the pump station, so no different location or size or configuration need be considered as an alternative.

The Program-Level Improvements also include a 0.5-MG open reservoir east of Lakeville Highway and north of Stage Gulch Road within an area which is at an appropriate elevation. The reservoir would serve as storage for secondary recycled water being used by the existing and future agricultural customers. The reservoir also assists operation of the secondary system by providing surge protection for the pipeline and pump stations. This document identifies significant impacts of the reservoir relative to its location within the County's Scenic Landscape Unit, as well as being potentially visible from a Scenic Corridor and public roadway (Stage Gulch Road). These impacts, however, have been mitigated to a level below significance through Mitigation Measure VR-1, which provides that the City shall screen the reservoir with appropriate landscaping if indeed it is visible from Stage Gulch Road or Lakeville Highway. The applicability of mitigation will be determined when the City is ready for construction of the reservoir in future phases of the project, and it prepares site-specific environmental documentation. No alternative locations for the reservoir have been identified that are both feasible and reduce environmental impacts.

During the scoping period, comments were submitted suggesting that the WREP include additional types of recycled water use (refer to Appendix A for a copy of the letters received). One suggestion was that the WREP should include dual plumbing for residential uses. The City has determined that dual plumbing for residences is not cost effective relative to other recycled water use, would require a larger distribution system, and increased operational oversight. A site superintendent must be designated who is trained on the use of recycled water to ensure that it is used in accordance with Title 22 of the State Code and does not run off the site. This is a reasonable requirement for commercial or institutional uses, but it is difficult to achieve this same degree of oversight for numerous individual residences. The WREP is able to meet its objective of 1,025 to 1,070 MG of recycled water use per year without residential dual plumbing, and therefore, the City chooses not to include this in the program.

A scoping comment also suggested that solar power photovoltaic cells be installed to reduce greenhouse gas emissions. As identified in the Air Quality section, greenhouse gas emissions are not expected to increase substantially, if at all, as a result of this project. The Mitigation Measures assigned to Impact 3.10-6 in the General Plan 2025 EIR include the use of alternative sources of renewable energy (Policy 4-P-13C). This could include solar power photovoltaic cells. The General Plan 2025 EIR mitigation measures apply to the Project to the extent they are applicable and feasible. A complete list of the Mitigation Measures appears in Appendix E. For reasons described at length in the General Plan 2025 EIR, mitigation is considered insufficient to reduce the project's cumulative impacts to less-than-significant levels, and, therefore, the impact remains significant and unavoidable.

## ALTERNATIVES IMPACT COMPARISON

Table 5-1 compares the impacts of the Project with the impacts of the alternatives. See Chapter 6 for a discussion of the environmentally superior alternative.

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
<b>1. Land Use</b>			
LU-1. Will the WREP conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project?	No Impact	No Impact	No Impact
LU-2. Will the WREP be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	Project – No Impact	No Impact	No Impact
	Program – Less than Significant		
LU-3. Will the WREP introduce inappropriate uses in a Sonoma County Community Separator or a Petaluma Urban Separator?	Less than Significant	Less than Significant	No Impact
LU-4. Will the WREP increase potential for conflict as a result of incompatible land uses?	No Impact	No Impact	No Impact
LU-5. Will the WREP convert non-urban land to urban uses for Project facilities?	No Impact	No Impact	No Impact
LU-6. Will the WREP convert public open space for project facilities?	Project - No Impact	No Impact	No Impact
	Program - Less than Significant		
LU-7. Will the WREP result in loss of homes or businesses due to construction of facilities?	No Impact	No Impact	No Impact
LU-C1 and C4. Will the WREP plus cumulative projects conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project, or increase potential for conflict as a result of incompatible land?	No Impact	No Impact	No Impact

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
LU-C2. Will the WREP plus cumulative projects be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	Project – No Impact	No Impact	No Impact
	Program - Less than Significant		
LU-C3. Will the WREP plus cumulative projects introduce inappropriate uses in a Community Separator?	Less than Significant	Less than Significant	No Impact
LU-C5. Will the WREP plus cumulative projects convert non-urban land to urban uses for Project facilities?	No Impact	No Impact	No Impact
LU-C6. Will the WREP plus cumulative projects convert public open space for project facilities?	Project – No Impact	No Impact	No Impact
	Program - Less than Significant		
LU-C7. Will the WREP plus cumulative projects result in loss of homes or businesses due to construction of facilities?	No Impact	No Impact	No Impact
<b>2. Agriculture and Soil Quality</b>			
AG-1. Will the WREP cause loss of farmland?	No Impact	No Impact	No Impact
AG-2. Will the WREP cause Williamson Act contracts to be canceled?	No Impact	Less than Significant	No Impact
AG-3. Will the WREP reduce agricultural soil and non-agricultural soil productivity due to erosion of topsoil from application of recycled water?	Project – No Impact	No Impact	No Impact
	Program – Less than Significant		
AG-4. Will the WREP reduce agricultural soil and non-agricultural soil productivity due to build-up of trace elements and salinity?	Project – No Impact	No Impact	No Impact
	Program – Less than Significant		
AG-5. Will the WREP cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	Less than Significant	Less than Significant	No Impact



**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
AG-C1 thru C5. Will the WREP plus cumulative projects create impacts to agricultural resources based on evaluation criteria 1 through 5?	Less than Significant	Less than Significant	No Impact
<b>3. Geology, Soils and Seismicity</b>			
GS-1. Will the WREP be located on a geologic unit or an unstable area that could potentially result in on- or off-site landslides?	Less than Significant	Less than Significant	No Impact
GS-2. Will the WREP be located on a geologic unit or soil that is susceptible to liquefaction or lateral spreading during an earthquake?	Less than Significant	Less than Significant	No Impact
GS-3. Will the WREP be located on expansive soil, as defined in the Sonoma County soil survey?	Less than Significant	Less than Significant	No Impact
GS-4. Will the WREP be located on corrosive soil, as defined in the Sonoma County soil survey?	Less than Significant	Less than Significant	No Impact
GS-5. Will earthquake-induced strong ground shaking damage WREP facilities?	Less than Significant	Less than Significant	No Impact
GS-6. Will construction of the WREP cause off-site water-related erosion?	Less than Significant	Less than Significant	No Impact
GS-7. Will the WREP be subject to ground rupture due to location near a surface trace of an active fault?	Less than Significant	Less than Significant	No Impact
GS-C1 thru C7. Will the WREP plus cumulative projects create geologic or seismic impacts based on evaluation criteria 1 through 7?	Less than Significant	Less than Significant	No Impact
<b>4. Hydrology and Water Quality</b>			
HWQ-1. Will operation of the WREP cause a violation of any narrative or numeric water quality standard or result in non-attainment of established TMDLs?	No Impact	No Impact	No Impact, however the No Project Alternative would result in increased discharge volumes to the Petaluma River.
	Less than Significant		

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
HWQ-2. Will the construction and operation of the WREP result in a substantial degradation of surface water runoff quality?	Less than Significant	Less than Significant	No Impact
HWQ-3. Will the WREP alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation?	Less than Significant	Less than Significant	No Impact
HWQ-4. Will operation of the WREP cause flooding?	Less than Significant	Less than Significant	No Impact
HWQ-5. Will the WREP degrade groundwater quality at existing or future drinking water wells, resulting in a public health hazard?	Less than Significant	Less than Significant	No Impact
HWQ-6. Will the WREP cause groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment?	Less than Significant	Less than Significant	No Impact
HWQ-7. Will the WREP substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?	Less than Significant	Less than Significant	No Impact
HWQ-C1 thru C7. Will the WREP plus cumulative projects result in hydrologic or water quality impacts based on criteria 1 through 7?	Less than Significant	Less than Significant	No Impact
<b>5. Air Quality</b>			
AQ-1. Will construction of the WREP generate emissions that expose people to high levels of dust and equipment exhaust?	Less than Significant	Less than Significant	No Impact
AQ-2. Will the WREP emissions cumulatively exceed allowable limits?	Less than Significant	Less than Significant	No Impact
AQ-3. Will the WREP expose sensitive receptors to substantial levels of toxic air contaminants?	Less than Significant	Less than Significant	No Impact

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
AQ-4. Will the WREP violate or contribute to violation of ambient air quality standards?	Less than Significant	Less than Significant	No Impact
AQ-5. Will the WREP cause potential odors?	Less than Significant	Less than Significant	No Impact
AQ-6. Will the WREP increase greenhouse gas emissions levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?	Less than Significant	Less than Significant	No Impact
AQ-C1 thru C5. Will the WREP plus cumulative projects create impacts to air quality based on evaluation criteria 1 through 6?	Less than Significant	Less than Significant	No Impact
AQ-C6. Will the WREP plus cumulative projects increase greenhouse gas emissions levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?	Significant <sup>1</sup>	Significant <sup>1</sup>	No Impact
<b>6. Noise</b>			
NOI-1. Will construction of the WREP generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less than Significant	Significant	No Impact
NOI-2. Will construction of the WREP result in a substantial temporary or periodic increase in ambient noise levels above existing levels in the vicinity?	Less than Significant	Less than Significant	No Impact
NOI-3. Will operation of the WREP generate noise levels exceeding local regulatory criteria or cause a substantial permanent increase in ambient noise levels above existing levels at sensitive receivers in the vicinity?	Project - No Impact	No Impact	No Impact
	Program - Less than Significant		

<sup>1</sup> This impact is no greater than the cumulative greenhouse gas emissions impact which was studied in the General Plan 2025 EIR and made the subject of a Statement of Overriding Considerations.

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
NOI-C1 thru C3. Will the WREP plus cumulative projects disturb noise-sensitive receptors during or after construction based on evaluation criteria 1 through 3?	Less than Significant	Less than Significant	No Impact
<b>7. Public Health and Safety</b>			
PHS-1. Will the WREP expose the public to pathogenic viruses, bacteria, or other disease organisms at concentrations detrimental to human health?	Less than Significant	Less than Significant	No Impact
PHS-2. Will the WREP expose workers or the public to hazards from a known hazardous waste site?	Less than Significant	Less than Significant	No Impact
PHS-3. Will the WREP increase potential exposure of the public to hazardous materials due to a chemical release?	Less than Significant	Less than Significant	No Impact
PHS-4. Will the WREP expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?	Less than Significant	Less than Significant	No Impact
PHS-5. Will the WREP increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?	Project – No Impact	No Impact	No Impact
	Program - Less than Significant		
PHS-6. Will the WREP expose people or structures to a risk of loss, injury or death involving wildland fires?	Less than Significant	Less than Significant	No Impact
PHS-7. Will the WREP expose the public to a flooding hazard?	Less than Significant	Less than Significant	No Impact
PHS-8. Will the WREP create a safety hazard for people residing or working near a public or private airport or airstrip?	Less than Significant	Less than Significant	No Impact

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
PHS-C1 thru C8. Will the WREP plus cumulative projects have an impact on public health and safety based on criteria 1 through 8?	Less than Significant	Less than Significant	No Impact
<b>8. Biological Resources</b>			
BIO-1. Will the WREP result in the loss of any species identified as a threatened, endangered, candidate, sensitive or special-status species or its habitat?	Less than Significant	Less than Significant	No Impact
BIO-2. Will the WREP have a substantial adverse effect on any riparian habitat or other sensitive natural community?	Less than Significant	Less than Significant	No Impact
BIO-3. Will the WREP have a substantial adverse effect on protected wetlands or waters through direct removal, filling, or other means?	Less than Significant	Less than Significant	No Impact
BIO-4. Will the WREP interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?	Less than Significant	Less than Significant	No Impact
BIO-5. Will the WREP result in the loss of protected trees or Sonoma County designated critical habitat?	Project – No Impact	Less than Significant	No Impact
	Program - Less than Significant		
BIO-6. Will the WREP conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?	Less than Significant	Less than Significant	No Impact
BIO-7. Will the WREP expose organisms to hazardous levels of toxic substances?	Less than Significant	Less than Significant	No Impact
BIO-C1. Will the WREP cumulatively impact biological resources?	Less than Significant	Less than Significant	No Impact

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
<b>9. Transportation and Circulation</b>			
TR-1. Will the WREP traffic cause congestion along project area roadways?	Less than Significant	Less than Significant	No Impact
TR-2. Will lane closures due to WREP construction cause traffic delays, transit delays, restricted access, and rerouting of traffic, including emergency vehicles?	Less than Significant	Less than Significant	No Impact
TR-3. Will the WREP construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Less than Significant	Less than Significant	No Impact
TR-4. Will WREP construction traffic damage public or private roadbeds?	Less than Significant	Less than Significant	No Impact
TR-5. Will there be inadequate parking for WREP activities?	Less than Significant	Less than Significant	No Impact
TR-6. Will WREP construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Less than Significant	Less than Significant	No Impact
TR-C1 through C6: Will the WREP plus cumulative projects cause impacts to traffic based on evaluation criteria 1 through 6?	Project - Less than Significant	Less than Significant	No Impact
	Program - Significant		
<b>10. Cultural Resources</b>			
CR-1. Will the WREP cause a substantial adverse change in the significance of a historical or archeological resource as defined in Title 14, California Code of Regulations §15064.5 or have an adverse effect on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places?	Less than Significant	Less than Significant	No Impact

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
CR-2. Will the WREP disturb any human remains, including those interred outside of formal cemeteries or will the project disturb any Native American human remains, associated grave goods, or items of cultural patrimony?	Less than Significant	Less than Significant	No Impact
CR-3. Will the WREP directly or indirectly destroy a unique paleontological resource or site?	Less than Significant	Less than Significant	No Impact
CR-C1 and C2. Will the WREP have a cumulative potential to impact cultural resources?	Less than Significant	Less than Significant	No Impact
CR-C3. Will the WREP have a cumulative potential to impact paleontological resources?	Less than Significant	Less than Significant	No Impact
<b>11. Visual Resources</b>			
VR-1. Will the WREP be inconsistent with the Sonoma County General Plan regarding Community Separators or the Petaluma General Plan regarding Urban Separators?	Project – No Impact	No Impact	No Impact
	Program - Less than Significant		
VR-2. Will the WREP be inconsistent with the Sonoma County General Plan regarding Scenic Landscape Units?	Less than Significant	Less than Significant	No Impact
VR-3. Will the WREP be inconsistent with the Sonoma County or Petaluma General Plans regarding scenic corridors?	Less than Significant	Less than Significant	No Impact
VR-4. Will the WREP be inconsistent with the Petaluma General Plan goal to preserve scenic and natural resources of the open ridgelines and hillsides?	Less than Significant	Less than Significant	No Impact
VR-5. Will the WREP cause an adverse effect on foreground or middle-ground views from recreation area or other public use area, or private residence?	Less than Significant	Less than Significant	No Impact

**TABLE 5-1**  
**Comparison of Alternatives**

<b>Impact</b>	<b>WREP Project / Program</b>	<b>Alternative 1 – Manor Lane</b>	<b>Alternative 2 – No Project / Program</b>
VR-6. Will the WREP create a new source of substantial light and glare that would adversely affect day or nighttime views in the area?	Less than Significant	Less than Significant	No Impact
VR-C1: Will the WREP cumulatively impact Visual Resources?	Less than Significant	Less than Significant	No Impact
<b>12. Public Services, Utilities, and Energy</b>			
PS-1. Will the WREP increase demand for police, fire, water, sewage treatment and disposal, energy, or solid waste removal to such a degree that accepted service standards are not maintained?	No Impact	No Impact	No Impact, however, lack of implementation of the WREP would likely retard development at some point in the City's future due to lack of potable water supplies.
PS-2. Will WREP construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	No Impact	No Impact	No Impact
PS-3. Will the WREP conflict with wells, septic fields, or water or wastewater utilities?	Less than Significant	Less than Significant	No Impact
PS-C1 and C2. Will the WREP plus cumulative projects increase demand or disrupt facilities to such a degree that accepted service standards are not maintained based on criteria 1 and 2?	No Impact	No Impact	No Impact
PS-C3. Will the WREP plus cumulative projects conflict with wells, septic fields, or water or wastewater utilities?	Less than Significant	Less than Significant	No Impact



## REFERENCES

- City of Petaluma. 2002. Final Water Recycling Facility and River Access Improvements EIR. July.
- City of Petaluma. 2006. General Plan 2025 Technical Appendix G: Draft Environmental Impact Report. September.
- City of Petaluma, 2008. Water Conservation Plan. January.
- City of Petaluma, 2008. Final General Plan 2025. May.
- City Council Resolution No. 2008-058 N.C.S.
- City Council Resolution No. 2008-085 N.C.S.
- Dodson. 2001. Recycled Water Pipeline Final Project Report. November.
- Dodson. 2004. Recycled Water Master Plan. June 7.
- Dodson. 2006. Water Supply and Demand Analysis Report. June.
- Dodson. 2008. Water Conservation Plan. January.
- ESA. 2007. Petaluma Recycled Water Master Plan Constraints Analysis. February.

## 6 CEQA-REQUIRED SECTIONS

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### GROWTH-INDUCING IMPACTS OF THE PROJECT AND CUMULATIVE IMPACTS OF GENERAL PLAN BUILDOUT

Section 15126.2(d) of the CEQA Guidelines states that an EIR should discuss "...the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas)." Growth can be induced in a number of ways, including through the elimination of obstacles to growth or through the stimulation of economic activity within the region.

The WREP has been designed to provide the capacity necessary to accommodate growth consistent with the population growth projections of the City's General Plan 2025. The WREP will induce growth within the City by providing disposal/reuse of recycled water, as well as providing an offset for potable water use. The potential impact of induced growth has been discussed in the General Plan EIRs certified for both the City and County. These two General Plan EIRs are incorporated by reference and the impacts identified in them are summarized in Appendix E.

#### City of Petaluma General Plan 2025

The certified EIR for the General Plan 2025 concludes that the General Plan 2025 does not ultimately have growth inducing impacts. All possible growth-inducing impacts of the General Plan 2025 are identified, analyzed and evaluated in its EIR. That analysis is relied on for evaluation of the growth-inducing impacts of the WREP, which was included in the General Plan EIR at a programmatic level. The WREP would allow increases in wastewater capacity and water supply to facilitate the growth envisioned in the General Plan 2025. However, the rate of growth is less under General Plan 2025 than recent historic growth rates, and slightly less than would be permitted under the existing 1987 General Plan.

Because the General Plan 2025 is self-mitigating to the fullest extent possible, it contains goals, policies and programs designed to reduce the impacts of growth it envisions to less than significant levels, to the fullest extent possible. Projected population increase, housing, public services and infrastructure sufficient to serve that population are all identified and analyzed in the General Plan EIR as are job growth and jobs/housing balance. The City is expected to add 15,622 City residents and 13,380 new jobs by 2025. The number of employed residents is expected to grow by 14,750, slightly more than the number of new jobs, decreasing the city's current jobs/housing ratio of 1.12 to 1.05. The Plan proposes no expansion to the city's Urban Growth Boundary and emphasizes infill development and smart growth principles, including increases in mixed use development and multi-modal transportation.

The water and wastewater program identified to serve planned growth relies almost entirely on increased use of recycled water and water conservation, rather than increased use of local groundwater or additional supply from the Sonoma County Water Agency. All growth-inducing impacts of the General Plan have been analyzed in the General Plan EIR. The WREP provides an essential share of the water and wastewater capacity needed to serve planned General Plan 2025 growth, and its growth-inducing impacts are mitigated by the same policies and programs that mitigate effects of General Plan 2025 growth."

The EIR for the City's General Plan (SC#2004082065) discusses the environmental effects of General Plan buildout, and these effects are summarized in Appendix E.

### **Sonoma County General Plan**

The project would also allow a small amount of growth within the community of Penngrove, as the WREP disposes of recycled water from the Ellis Creek Water Recycling Facility which treats wastewater from Penngrove according to an agreement with the County. The EIR for the County's General Plan (Sonoma County 1986 SC#1986072919), identifies a number of unavoidable effects of growth across the County including Penngrove (refer to Appendix E).

The County's General Plan EIR also found that policies of the land use, public facilities, and circulation and transit elements encouraged mechanisms for phasing development with the orderly expansion of sewer and water supplies and traffic improvements. These policies were determined to limit the potential growth-inducing effects of public services and transportation improvements.

### **SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS**

Section 2100(b)(2)(A) of CEQA requires that an EIR identify any significant environmental effects that cannot be avoided if the project were implemented. Significant unavoidable impacts are identified in Section 4 of this EIR, as those impacts that remain significant after implementation of mitigation. Although the project has the potential to result in a number of significant environmental impacts, most can be avoided through the adoption of appropriate mitigation measures that will reduce those effects to a less-than-significant level. The following significant, unavoidable impacts have been identified:

- AQ-C6: The WREP plus cumulative projects may cause an increase in greenhouse gas emissions levels which exceed pre-project levels by a substantial margin or conflict with AB 32 and its governing regulations?
- TR-C1: The WREP plus cumulative projects may cause congestion along project area roadways.

### **ENVIRONMENTALLY SUPERIOR ALTERNATIVE**

The California Environmental Quality Act requires the identification of an Environmentally Superior Alternative; that is, the alternative which has no significant effect or has the least significant effect on the environment. For reference, significance is determined based on substantial or potentially substantial adverse changes of any of the physical environmental conditions due to the Project. The degree of change is evaluated against existing environmental conditions. Please refer to Chapter 5, Alternatives to the Proposed Project, for a comparison of the primary differences in environmental impacts among the basic alternatives.

The No Project Alternative is the Environmentally Superior Alternative, in that it requires no new construction. However, the No Project Alternative has impacts, because it discharges additional effluent to the Petaluma River and does not provide mitigation. It also has significant public services impacts, in that it does not accommodate the water supply needs for the growth projected in Petaluma's *General Plan 2025* and does not allow the necessary increase in wastewater treatment and disposal capacity needed for planned growth in Penngrove, as well as in Petaluma. The No Project Alternative does not meet the project objectives. When the No Project Alternative is selected as the Environmentally Superior Alternative, the CEQA Guidelines require that an environmentally superior alternative be selected from among the other alternatives. The only other alternative evaluated in this EIR is the proposed project, and

it is therefore, environmentally superior, in that no alternatives that meet most of the project objectives have been identified that reduce significant environmental impacts.

Agency and public comments to the City of Petaluma relative to the environmentally superior alternative are welcome. The City will consider and weigh the environmental effects against the benefits of the alternatives in achieving the project objectives prior to their approval of a project.

## 7 PREPARERS

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### **WINZLER & KELLY**

Pat Collins, Principal-in-Charge  
Kristine Gaspar, Project Manager  
Carol Kielusiak, Senior Planner  
Carrie Lukacic, Senior Planner  
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Cultural Resource, Anthropological Studies Center, Mike Newland and Hiedi Koenig  
Water Quality, Merritt Smith Consulting, Dave Smith and Marcie Commins  
Wetland Resources, Jane Valerius

**Appendix A**  
**Letters Received During Scoping Process**

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orig -> m. Ban  
x < -> m. Orr  
p. Collins (wjk)

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY

ARNOLD SCHWARZENBERGER, Governor

**DEPARTMENT OF TRANSPORTATION**

111 GRAND AVENUE  
P. O. BOX 23660  
OAKLAND, CA 94623-0660  
PHONE (510) 286-5505  
FAX (510) 286-5559  
TTY (800) 735-2929



*Flex your power!  
Be energy efficient!*

June 5, 2007

SON116519  
SON-116-39.65  
SCH# 2007052146

Mr. Mike Ban  
City of Petaluma  
202 North McDowell Boulevard  
Petaluma, CA 94954

Dear Mr. Ban:

**Water Recycling Expansion Project - Notice of Preparation (NOP)**

Thank you for including the California Department of Transportation (Department) in the environmental review process for the project referenced above. We have reviewed the NOP and have the following comments:

***Cultural Resources***

If construction activities are proposed within the State's right-of-way (ROW), the Department requires documented results of a current archaeological record search from the Northwest Information Center (NIC) of the California Historical Resources Information System before an encroachment permit can be issued. Current record searches must be no more than five years old. The Department requires the records search, and if warranted, a cultural resource study by a qualified, professional archaeologist, to ensure compliance with NEPA (if there is federal action on the project), CEQA, Section 5024.5 of the California Public Resources Code (for state-owned historic resources) and Volume 2 of the Department's Environmental Handbook (Caltrans Standard Environmental Reference (SER), available at <http://www.dot.ca.gov/hq/env/index.htm>). Work subject to these requirements includes, but is not limited to: lane widening, channelization, auxiliary lanes, and/or modification of existing features such as slopes, drainage features, curbs, sidewalks and driveways within or adjacent to State ROW.

***Encroachment Permit***

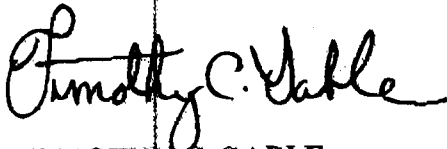
Please be advised that any work or traffic control within the State's ROW will require an encroachment permit from the Department. To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW to the following address:

Mr. Mike Ban/ City of Petaluma  
June 5, 2007  
Page 2

Michael Condie, District Office Chief  
Office of Permits  
California DOT, District 4  
P.O. Box 23660  
Oakland, CA 94623-0660

Should you require further information or have any questions regarding this letter, please call or email Ina Gerhard of my staff at (510) 286-5737 or [ina\\_gerhard@dot.ca.gov](mailto:ina_gerhard@dot.ca.gov).

Sincerely,



TIMOTHY C. SABLE  
District Branch Chief  
IGR/CEQA

c: State Clearinghouse



orig → M. Orr (Ale)  
xc → D. Eckerson, Pat Collins (wtk), Kristine Gasper (wtk)

Arnold Schwarzenegger, Governor

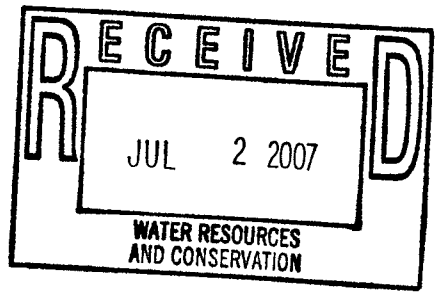
STATE OF CALIFORNIA

**NATIVE AMERICAN HERITAGE COMMISSION**

915 CAPITOL MALL, ROOM 364  
SACRAMENTO, CA 95814  
(916) 653-4082  
(916) 657-5390 - Fax



June 27, 2007



Mike Ban  
City of Petaluma  
202 North McDowell Boulevard  
Petaluma, CA 94954

RE: SCH#2007052146, Water Recycling Expansion Project; Sonoma County.

Dear Mr. Ban:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) regarding the above project. To adequately assess and mitigate project-related impacts on archaeological resources, the Commission recommends the following actions be required:

- Contact the appropriate Information Center for a record search to determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the NAHC for a Sacred Lands File Check.
  - **Check Completed with negative results, 06/27/07**  
The absence of specific site information in the Sacred Lands File does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites (see below).
- ✓ Contact the NAHC for a list of appropriate Native American Contacts for consultation concerning the project site and to assist in the mitigation measures.
  - **Native American Contacts List attached**  
The NAHC makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend other with specific knowledge. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received. If you receive notification of change of addresses and phone numbers from any these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information.
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.

- Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
- Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5 (e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,



Katy Sanchez  
Program Analyst  
(916) 653-4040

CC: State Clearinghouse

**Native American Contacts**  
Sonoma County  
June 27, 2007

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Wappo

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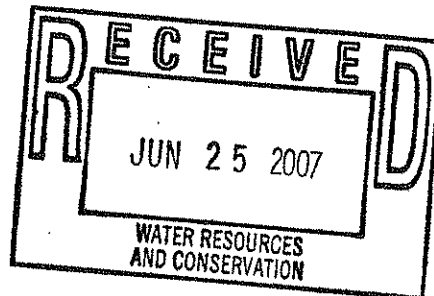
**This list is current only as of the date of this document.**

**Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.**

**This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2007052146, Water Recycling Expansion Project; Sonoma County.**

City of Petaluma  
Attention: Michael Ban  
PE Director  
202 North McDowell Blvd.  
Petaluma CA 94954

orig → M. O' →  
x c → K. Gaspar  
(with K)  
→ J. Bozsi



Dear Mr. Ban:

At the scoping session on Petaluma's Wrep project for urban reuse of treated wastewater, I expressed verbally my thoughts on what should be additionally addressed in the EIR.

Here are my thoughts in writing:

1. Compare two approaches to potable water conservation: the proposed Wrep project for reuse of wastewater compared to a project to retrofit houses to conserve potable water. Comparisons should include:
  - feasibility of each approach
  - capital costs to city
  - savings to ratepayers
  - economic impact on city budget in real numbers of reduced income to city when less volume of potable water is retailed if either project is put on line.
2. Describe how the peak flow demand during hot days is relieved by the Wrep project. Are there other means of providing for this yearly but temporary need?
3. Will storage in tanks of tertiary water containing nutrients over months at a time produce algae growth making water unsuitable for double plumbing installations? Will housing be able to hook up to tertiary pipelines to supply a double plumbed household? Will saving in treatment costs between secondary and tertiary justify maintaining secondary treated water for ag use??

If the Ielmorini storage pond site is too low in altitude to supply all of Petaluma with tertiary water, can a booster pump taking advantage of the hydrolic pressure of the lower Ielmorini storage pond elevation be a more economical design than the high cost of steel or concrete tanks at a higher elevation?

Sincerely,

A handwritten signature in cursive script that reads "Bill Kortum".

Bill Kortum  
June 21, 2007

**Appendix B**  
**Cumulative Projects List**

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**TABLE B-1**  
**Cumulative List**

Agency / Project Name	Expected Project Start Date
<b>PROJECTS</b>	
<b>Caltrans</b>	
<p>Highway 101 HOV Lane Widening and Improvement Project. The proposed project would widen Highway 101 for approximately 10.3 km (6.4 mi) from its current four lanes to six lanes by adding one HOV lane in each direction from Old Redwood Highway to the Rohnert Park Expressway. The project also would provide a northbound climbing lane over the Cotati Grade, auxiliary lanes, interchange modifications and ramp improvements. The schedule for the proposed project anticipates environmental approval in May 2007; design, utility relocation and right-of-way acquisition work beginning in 2007; and construction beginning in 2009 with completion by 2011.</p>	2009
<p>Route 116 Stage Gulch Road Curve Improvement and Realignment Project. Widening the roadway shoulder in each direction to the mandatory design standard width of 2.4 meters and horizontal curves increased to the mandatory design standard for the speed of 50 MPH (260 meter radius). A realignment of 400 meters of roadway to avoid Champlin Creek, allow for environmental restoration, provide safety improvements and retaining walls would occur to minimize impacts to oak and riparian woodlands.</p>	NA
<p>Marin-Sonoma Narrows HOV Lane Project. Upgrade to the "Novato Narrows" section of Highway 101 to freeway, providing interchanges and frontage roads to replace at-grade intersections and driveways, construct HOV lanes, and make ramp improvements. Environmental approval is anticipated in 2008; phased construction would begin in 2011.</p>	2011
<b>Sonoma County Transportation Authority</b>	
<p>Sonoma-Marin Area Rail Transit (SMART). Commuter-rail project to develop an existing publicly-owned rail corridor along the 101 corridor from Cloverdale to San Rafael, a distance of approximately 70 miles, would include 14 rail stations—nine in Sonoma County—and is sponsored by the Sonoma-Marin Area Rail Transit District (SMART). The environmental process for SMART Project began in November 2002; the environmental document was released in November 2005; and rail service was scheduled to begin by 2009.</p>	2009

**TABLE B-1  
Cumulative List**

<b>Agency / Project Name</b>	<b>Expected Project Start Date</b>
<b>Sonoma County Public Works</b>	
Adobe Road & East Washington Street Signalization and Widening	2009
Sonoma County Regional Parks, Canon Lane Signalization and Widening	2008
Stony Point Road & Roblar Road Signalization and Widening	2008
<b>Sonoma County Water Agency</b>	
Cotati-Kastania Pipeline Project. The location is approximately between Cotati and southern Petaluma near Kastania Road and US Highway 101. Construction would include 13 miles of steel pipes and appurtenances. Two to four steel water storage tanks, booster pump, motor, emergency generator, masonry building, connecting pipeline and related equipment.	Phased Construction in 2009 and 2010 Construction along Adobe would occur in 2010
<b>City of Petaluma</b>	
General Plan 2025	Adopted May 19, 2008
East Washington Park Improvements	2009
<b>GENERAL PLAN AMENDMENTS</b>	
<b>Sonoma County Permit &amp; Resource Management Department, General Plan Amendments</b>	
GPA003-005 / PLP03-0027 / MNS01-0040 1) General Plan Amendment and Zone Change on 24.98 acres.	2003
GPA004-0004 / PLP03-0046 General Plan Amendment, Specific Plan Amendment, Zone Change, Use Permit and Design Review for an asphalt plant, recycling facility and barge unloading facility.	2004
No GPA/SPA in watershed for 2005	NA
No GPA/SPA in watershed for 2006	NA
No GPA/SPA in watershed for 2007	NA

Notes: Caltrans-Greg Lockshaw, (916) 263-4993; Sonoma County Public Works, Rex Cummings (707) 565-2231; Sonoma County Water Agency-Cordell Stillman, (707) 547-1900; Sonoma County Permit & Resource Management Department, [www.sonoma-county.org/prmd](http://www.sonoma-county.org/prmd); City of Petaluma, Phil Boyle (707) 778-4301.

**Appendix C**  
**CRWQBC SF Bay Region Order 96-011**

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

ORDER 96-011

GENERAL WATER REUSE REQUIREMENTS FOR:

MUNICIPAL WASTEWATER AND WATER AGENCIES

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

**PURPOSE and APPLICABILITY**

1. This Order serves as a *General Water Reuse Order* authorizing municipal wastewater reuse by producers, distributors and users of non-potable recycled wastewater throughout the region. The intent of this Order is to streamline the permitting process and delegate the responsibility of administering water reuse programs to local agencies to the fullest extent possible.
2. This Order is intended to serve as a region-wide general permit for publicly owned wastewater and water agencies that recycle treated municipal wastewater. It is intended to replace individual reuse Orders and applies to the following suppliers of recycled water:
  - a. Producers of secondary and tertiary recycled water that meets CCR Title 22 water reuse criteria and is reused for a direct beneficial use or a controlled use that would not otherwise occur.
  - b. A Distributor of recycled water – who receives wastewater from a municipal wastewater facility, may or may not give it additional treatment to meet CCR Title 22 water reuse criteria for its intended use(s) and distributes it to users. In some cases, a written agreement (e.g., Joint Powers Agreement or equivalent contractual agreement) between a Producer and a Distributor may be preferable to issuing this Order to the Distributor.
  - c. Although the statewide criteria specified in Title 22 apply only to use of recycled water and not to the *disposal* of wastewater to land (e.g., to meet NPDES restrictions for receiving water discharge) those discharges to land may pose an identical degree of public exposure and risk.

Therefore, wastewater agencies that apply wastewater to land through irrigation for the primary purpose of disposal, but operate in accordance with these requirements, may also apply to be regulated under this Order.
  - d. It should be noted that a project that is very complex in nature (long-term, multi-phased projects, e.g., Zone 7/Livermore water reuse program) may best be served by an individual order.
3. A separate NPDES permit must be obtained from the Regional Board for projects involving the use of ephemeral or year-round streams or other waters of the State for recycled water conveyance or direct or indirect groundwater recharge.
4. Water reuse is an essential part of an overall program to manage local and regional water resources. Many local governing bodies have adopted resolutions establishing

their intent to proceed with the planning, permitting, and implementation of water reuse projects. These projects would provide important multiple water quality, water supply, and wastewater disposal benefits for communities including:

- augmentation and improved reliability of local water supplies.
- reduction of the mass of pollutants discharged to State waters
- reduction in size or deferral of the need for additional wastewater export facilities.

#### **REUSE FACILITIES AND THEIR RESPONSIBILITIES**

5. Most of the publicly owned wastewater treatment plants (POTWs) in the Region, hereinafter referred to as the Producers, produce treated wastewater of sufficient quality to allow its reuse for certain applications as prescribed in this Order. Water service agencies also have authority under the provisions set forth in this Order to distribute recycled water within their respective jurisdictions.
6. POTWs provide at least secondary treatment to Distributors or Users under written agreements with the participating Producers/Distributors respectively. The recycled water meets the quality criteria established by California Department of Health Services (DHS) and this Order. Additional treatment by the Producer, Distributor or User may be necessary to meet the intended use. The Producer or Distributor is responsible for insuring that water reuse is adequately monitored through an approved program.
7. Decisions regarding new treatment and distribution facility construction, operation, funding, cost-sharing and related aspects are the responsibility of the Producer, Distributor and affected Users.

#### **STATE RECLAMATION POLICIES AND REGULATIONS**

8. In July 1992 Section 13523.1 was added to the California Water Code, authorizing regional boards to issue master reclamation permits to a producer and/or distributor of recycled water in lieu of prescribing individual water reuse requirements for a user of recycled water. Section 13523.1 also removes the requirement, except upon written request of a regional board, that Users file a report with a regional board to use recycled water from a producer/distributor for whom a master reuse Order has been issued. Similarly, it exempts any such user of recycled water from the requirement to file a report with a regional board related to any material change in the character of the recycled water or its use.

For further discussion of State Policies and Regulations see Attachment G.

#### **State Health Regulations**

9. Section 13523 of the California Water Code provides that a Regional Board, after consultation with and upon receipt of recommendations from DHS, and if it determines such action to be necessary to protect the public health, safety, or welfare, shall prescribe water reuse requirements for water which is used or proposed to be used as recycled water.
10. This Order's requirements conform with and implement the Department of Health Services's water reuse criteria as set forth in Title 22, Division 4, Sections 60301 through 60355 of the California Code of Regulations (herein referred to as the DHS reuse criteria). Revisions to Title 22 shall become part of this Order automatically upon final adoption of those revisions by DHS.

## REGIONAL BOARD BASIN PLAN

11. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986 prescribing water quality objectives for ground and surface waters throughout the region. The Board amended its Basin Plan on June 21, 1995, and the State Water Resources Control Board (State Board) approved it on July 20, 1995, with approval from the State Office of Administrative Law on November 13, 1995. The Basin Plan supports water reclamation and further states that the disposal of wastewater to inland, estuarine, or coastal waters is not considered a permanent wastewater disposal solution where the potential exists for conservation and reclamation. The water quality goals to be used in regulating water quality factors as set forth in the Basin Plan include maximum feasible reuse of municipal, industrial, and agricultural wastewaters.

### **Beneficial Uses**

The Basin Plan identifies existing and potential beneficial uses of the region's underlying groundwaters as:

- Industrial service and Process supply
- Municipal and domestic supply
- Agricultural supply

The Basin Plan identifies beneficial uses of all surface waters of San Francisco Bay Region, including San Francisco Bay system and its tributaries, Tomales Bay and its tributaries, coastal waters and tributaries and all inland waters. The Basin Plan identifies beneficial uses of specified surface waters as:

- Municipal and Domestic Water Supply
- Water Contact Recreation
- Non-Contact Water Recreation
- Warm Fresh Water Habitat
- Cold Fresh Water Habitat
- Wildlife Habitat
- Fish Migration
- Fish Spawning

## REGIONAL BOARD'S LIMITED RECYCLING ORDER

12. Board Order No. 91-042 provides "blanket" authorization for tanker-truck distribution of recycled water and the expansion of existing fixed irrigation system projects already subject to water reuse requirements. Order 91-042 will be superseded by this Order for those agencies being regulated by this Order.

## CEQA AND PUBLIC NOTICE

13. The proposed uses of reclaimed water will maintain and enhance natural resources, and thus this Order is categorically exempt from the provisions of the California Environmental Quality Act in accordance with Title 14, California Administrative Code, Chapter 3, Section 15307.
14. The Board has notified the Producers, Distributors and interested agencies and persons of its intent to prescribe water reuse requirements and has provided them the opportunity for a public hearing and to submit their written views and recommendations.
15. The Board, in a public meeting, heard and considered all comments pertaining to this matter.

**IT IS HEREBY ORDERED**, that all agencies that file a **Notice of Intent (NOI)** indicating their intention to be regulated under the provisions of this general order and receive program authorization from this Board shall comply with the following:

**A. PROHIBITIONS**

1. The treatment, storage, distribution, or reuse of recycled water shall not create a nuisance as defined in Section 13050(m) of the California Water Code.
2. No recycled water shall be applied to irrigation areas during periods when soils are saturated.
3. Recycled water shall not be allowed to escape from the designated use area(s) as surface flow that would either pond and/or enter waters of the state.

Recycled secondary treated water as described under Section B shall not be allowed to escape from the designated use area(s) as an airborne spray that would visibly wet vegetation or any other surface.

4. Spray or runoff shall not enter a dwelling or food handling facility, and shall not contact any drinking water fountain, unless specifically protected with a shielding device. If the recycled water is of restricted quality as described under Section B, then spray or runoff shall not enter any place where the public may be present during irrigation.
5. Secondary recycled water shall not be applied so as to cause runoff or degradation of any water body or wetland.
6. Recycled water shall not be applied in groundwater recharge and wellhead protection areas (so designated by local agencies).
7. The use of recycled water shall not cause rising groundwater discharging to surface waters to impair surface water quality objectives or beneficial uses.
8. The incidental discharge of recycled water to waters of the State shall not unreasonably affect present and anticipated beneficial uses of water, and not result in water quality less than that prescribed in water quality control plans or policies.
9. No recycled water shall be discharged from treatment facilities, irrigation holding tanks, storage ponds, or other containment, other than for permitted reuse in accordance with this Order, other Board issued Waste Discharge Requirements or NPDES permits, contingency plan in an approved Water Reuse Program (NOI report), or for discharge to a municipal sewage treatment system.
10. Recycled water shall not be used as a domestic or animal water supply.
11. There shall be no cross-connection between potable water supply and piping containing recycled water. All users of recycled water shall provide for appropriate backflow protection for potable water supplies as specified in Title 17, Section 7604 of the California Code of Regulations or as specified by DHS.

**B. REUSE WATER QUALITY REQUIREMENTS AND LIMITATIONS:**

1. Reuse Water Quality Requirements and Limitations of this Order shall meet the most current CCR Title 22 regulations.
2. The Producer/Distributor shall discontinue delivery of recycled water for intended reuse projects during any period in which it has reason to believe that the limits for that use as specified below or the requirements of the DHS reuse criteria insofar as they relate to the quality of the recycled water, are not being met. The delivery of recycled water intended uses shall not be resumed until all conditions which caused the violations have been corrected.

**3. Minimum Recycled Water Quality**

Water to be recycled for reuse shall at a minimum be adequately oxidized and disinfected water that receives at least secondary level treatment and meets, at a minimum, the following limits:

- |                      |                  |
|----------------------|------------------|
| a. Dissolved Oxygen  | 1.0 mg/l minimum |
| b. Dissolved Sulfide | 0.1 mg/l maximum |
| c. Total Coliform    |                  |

All water recycled for reuse authorized under this permit must meet the total coliform limits specified below (at either the Producer's wastewater treatment plant or, if necessary, after additional treatment at a Distributor's plant).

**4. Secondary - 23 Recycled Water (Restricted Use)**

Secondary-23 recycled water shall meet the following total coliform limit prior to delivery for reuse purposes:

**a. Total coliform**

After adequate contact with disinfectant the number of total coliform organisms shall not exceed: (a) a median value of 23 MPN/100ml as determined from the bacteriological results of the last seven days for which sample analyses have been completed, and (b) a maximum value of 240 MPN/100ml in more than one sample in any 30 day period.

**b. Reuse Applications:**

Secondary recycled water may be used where the public has restricted access or exposure. See Attachment A for a list of reuse applications.

**5. Secondary-2.2 Recycled Water**

Secondary-2.2 recycled water shall meet the following total coliform limit prior to delivery for reuse purposes:

**a. Total coliform**

After adequate contact with disinfectant the number of total coliform organisms shall not exceed (a) a median value of 2.2 MPN/100ml as

determined from the bacteriological results of the last seven days for which sample analyses have been completed, and (b) a maximum value of 23 MPN/100ml in more than one sample in any 30 day period.

**b. Reuse Applications:**

See Attachment A for reuse applications.

**6. Tertiary Recycled Water**

Tertiary recycled water shall be coagulated (except as identified in Part C below), and filtered, and meet the following total coliform, disinfection process and turbidity limits prior to delivery for reuse purposes:

**a. Total coliform**

After adequate contact with disinfectant the number of total coliform organisms shall not exceed: (1) a median value of 2.2 MPN/100ml as determined from the bacteriological results of the last seven days for which sample analyses have been completed, and (2) a maximum value of 23 MPN/100ml in more than one sample in any 30 day period. No sample shall exceed a total coliform value of 240 MPN/100 ml.

**b. Disinfection Process**

- 1) A chlorine disinfection process that provides a CT (chlorine concentration times modal contact time) value of not less than 300 milligram-minutes per liter at all times with a *modal contact time* of at least 90 minutes, based on peak daily design flow (or an equivalent combination of chlorine concentration and contact time subject to Executive Officer approval); or
- 2) A disinfection process that, when combined with the filtration process, has been demonstrated to reduce the concentration of plaque-forming units of F-specific bacteriophage MS-2, or polio virus, per unit volume of water in the wastewater to one hundred thousandths (1/100,000) of the initial concentration in the filter influent throughout the range of qualities of wastewater that will occur during the recycled water treatment process. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration. The above demonstration must be approved by the DHS and the Executive Officer.

**c. Turbidity**

The turbidity of filtered recycled water shall not exceed any of the following:

- 1) 2 NTU daily average, 5 NTU more than 5 percent of the time, or 10 NTU at any time.

Coagulation need not be used as part of the treatment process provided the turbidity of the influent to the filters does not exceed 5 NTU more than 5 percent of the time.

d. **Reuse Applications:**

See Attachment A for reuse applications.

7. **Recycled Water Storage Limitations**

- a. Any storage facility containing recycled water for reuse applications shall be managed in a manner to control odor or nuisance conditions. Should such problems develop, a management plan shall be devised and implemented to monitor, correct, and control future occurrences.
- b. All wastewater storage ponds shall be adequately protected from erosion, washout and flooding from a 24-hour rainfall event having a predicted frequency of once in 100 years.

C. **REUSE PROGRAM PROVISIONS**

**Producer Responsibilities**

1. Producers wishing to be covered under this General Water Reuse Order shall submit a **Notice of Intent (NOI)** in accordance with Attachment B. Producers who are currently covered by an individual order, and do not submit an NOI, will continue to be covered by their individual orders and Order 91-042.

Producer responsibilities in this section may be required of or undertaken by the Distributor as appropriate. In such cases the Distributor shall submit the NOI or the Producer shall show evidence of an agreement with the Distributor to undertake the responsibilities. In any cases respective responsibilities shall be spelled out in the joint agreement.

2. This Order becomes effective upon written approval of the **NOI** report by the Executive Officer and supersedes any current Water Reuse Requirements. The Regional Board will coordinate with DHS to obtain their concurrence of NOI reports prior to approval by the Executive Officer.
3. Under this Order a Producer may authorize specific reuse projects on a case-by-case basis in accordance with a Producer designed permit-based program for Users of recycled water. The Producer shall develop administrative procedures specifying how the permit based system for regulating users will be implemented and how compliance with the DHS reuse criteria will be assured. Upon Board approval of the Producer's program, **which shall accompany the NOI**, the Producer may authorize specific reuse projects on a case-by-case basis once the administrative elements of the water reuse program are in place.
4. The Producer shall establish and enforce rules and regulations for recycled water uses governing the design and construction of reclaimed water use facilities and the use of recycled water in accordance with DHS reuse criteria.
5. The Producer or Distributor (as appropriate) shall submit to DHS for review and approval documentation of the proper installation of Title 22 mandated backflow prevention devices and the absence of cross connections prior to commencing use of recycled water at sites meeting any of the following criteria:

- a. Where the proposed use is a new use that is not covered in the DHS reuse criteria.
  - b. Dual plumbed systems (per Title 22 definition – within building plumbing and residential irrigation).
  - c. Large, high volume usage, or otherwise complex sites as defined in the Producer's Water Reuse Program (pursuant to Provision C.3.).
6. The Producer will be responsible for ensuring that recycled water meets the quality standards of this Order and for the operation and maintenance of major transport facilities and associated appurtenances. The Producer shall hold the Users responsible for the application and use of recycled water on their designated use areas and associated operations and maintenance in accordance with all applicable DHS reuse criteria requirements.
  7. The Producer shall conduct periodic inspections of the User's facilities and operations to monitor and assure compliance with conditions of the Producer's permit and this Order. The Producer shall take whatever actions are necessary, including the termination of delivery of recycled water to the User, to correct any User violations.
  8. The Producer shall comply with all applicable items of the attached Standard Provisions and Reporting Requirements, or any amendments thereafter.
  9. When additional site specific requirements and/or Provisions are applied to a reuse project as a condition of adoption of this Order, they shall be identified in the NOI and appended to this Order as Attachment E.

#### **Joint Responsibilities**

10. Each User shall demonstrate to the Producer the means by which all applicable use area requirements, as specified in DHS reuse criteria, will be complied with.
11. If someone other than the User (User's Agent) is responsible for applying the recycled water, e.g. a truck hauler, then the User shall inform them of these requirements in a written permit or other suitable manner. A User's Agent shall fill out a Recycled Water Release Form or equivalent tracking documentation when receiving recycled water from the Producer.
12. A copy of the Water Use Permit must be provided to the Users by the Producer. The Users must have these available at all times for inspection by Regional Board staff, the Producer, or State/County Health Officers.
13. The Producer shall comply with the self-monitoring program as adopted by the Board and as may be amended by the Executive Officer. The Producer is responsible for collecting reports from Users. Users are responsible for submitting on-site observation reports and use data to the Producer, who will compile and file an annual report with the Regional Board. The Producer, at its discretion, may assume the User's responsibility for on-site observation reports and use data.
14. The Producer shall assure that cross-connections between potable water and nonpotable water systems have not been created and that backflow prevention devices are in proper working order by conducting or requiring User testing, in



accordance with DHS reuse criteria and CCR Title 22 Section 7605. Reports of testing and maintenance shall be maintained by the Producer.


15. The Producer and Users shall maintain in good working order and operate as efficiently as possible any facility or control system installed by the Producer or Users, respectively, to achieve compliance with the water reuse requirements.
16. The Producer, Distributor and Users should receive appropriate employee training to assure proper operation of recycling facilities, worker protection, and compliance with this Order. In accordance with CCR Title 17, Section 7586, each Producer, Distributor and User shall designate a Recycled Water Supervisor responsible for compliance with a Producer's permit conditions.
17. The Producer and Users shall assure that all above ground equipment, including pumps, piping, storage reservoir, and valves, etc. which may at any time contain recycled water shall be adequately and clearly identified with appropriate warning signs. The Producer and Users shall make all necessary provisions to inform the public that the liquid being distributed is recycled water and is unfit for human consumption.

#### D. GENERAL PROVISIONS

1. The Producer will document compliance with all conditions of this Order and of water reuse criteria in Title 17 and Title 22 of the California Code of Regulations.
2. Current Water Reclamation Reuse Requirements that are superseded by this Order pursuant to Provisions C. 1 and 2, will be rescinded under a separate Order(s).
3. This Order provides authorization for tanker-truck distribution of recycled water, and supercedes Order No. 91-042 for those Producers pursuant to C.2. Order 91-042 stays in effect for those not under the General Order.
4. Each Producer should strive to investigate, as resources permit, all possible potential reuse strategies such as groundwater recharge, surface water augmentation, and dual water supply for new construction, in order to move towards achieving a goal of reusing the maximum possible amount of recycled water.
5. When directed by the Regional Board, in groundwater basins that are a significant source of drinking water where there is a likely potential for groundwater degradation from salt buildup from extensive water recycling irrigation, a Producer shall prepare and submit a Salt Management Program, acceptable to the Executive Officer, to insure that the overall impact of permitted water recycling projects does not degrade groundwater resources.
6. If any condition or criteria set forth in this Order conflicts or is inconsistent with any requirement set forth in any State regulation, the more stringent condition or criterion shall apply.
7. Regional Board staff will conduct an annual inspection/audit of each Producer's water reuse program and conduct periodic spot field inspections on reuse projects.
8. The Producer, User/Distributor shall permit the Board or its authorized representatives, in accordance with Section 13267(c) of the California Water Code:

- a. Entry upon premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order;
  - b. Access to and copy of, at reasonable times, any records that must be kept under the conditions of this Order;
  - c. Inspection, at reasonable times, of any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
  - d. To sample or monitor, at reasonable times, for the purpose of assuring compliance with this Order.
9. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
- a. Violation of any term or condition contained in this Order;
  - b. Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts;
  - c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized reuse;
  - d. Endangerment to public health or environment that can only be regulated to acceptable levels by Order modification or termination.
10. The Executive Officer may add additional Producers at any time, pursuant to conditions specified in Provisions C. 1 and C. 2.
11. The Executive Officer upon a finding of non-compliance with this Order, may revoke a Producer's authority to issue Water Reuse Permits.
12. The Board will review this Order periodically and may revise the requirements as deemed necessary.

I, Loretta K. Barsamian, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on January 17, 1996.

  
Loretta K. Barsamian  
Executive Office

Attachments:

- A. Summary Chart of Recycled Water Use
- B. Notice of Intent (NOI) – General Instructions
- C. Self-Monitoring Program
- D. Standard Provisions & Reporting Requirements for Water Reuse Orders
- E. Additional Site Specific Requirements
- F. Definition of Terms
- G. Summary State Water Reuse Policies & Regs
- H. Regulatory Agency Contacts

[Originator/RJC] [Reviewers BDA/RHW/TCW]  
File No.: 2107.00

**ATTACHMENT A**

**SUMMARY CHART OF RECYCLED WATER USE**

# Suitable Uses\* of Recycled Water

Use of Recycled Water	Treatment Level		
	Tertiary Recycled Water	Secondary-2.2 Recycled Water	Secondary-2.3 Recycled Water
<b>Irrigation of:</b>			
Food crops—contact with edible portion of crop	Allowed	Not Allowed	Not Allowed
Parks and playgrounds	Allowed	Not Allowed	Not Allowed
School yards	Allowed	Not Allowed	Not Allowed
Residential landscaping	Allowed	Not Allowed	Not Allowed
Unrestricted access golf courses	Allowed	Not Allowed	Not Allowed
Any other irrigation uses not prohib. by other prov. of CCR	Allowed	Not Allowed	Not Allowed
Food crops—edible portion above gd/not in contact w/ recl. Water	Allowed	Allowed	Not Allowed
Cemetaries	Allowed	Allowed	Allowed
Freeway landscaping	Allowed	Allowed	Allowed
Restricted access golf courses	Allowed	Allowed	Allowed
Ornamental nursery stock and sod farms	Allowed	Allowed	Allowed
Pasture for milk animals	Allowed	Allowed	Allowed
Any nonedible vegetation with access control to prevent use as if it were a park, playground or school yard.	Allowed	Allowed	Allowed
Orchards w/ no contact between edible portion and recl. water.	Allowed	Allowed	Allowed
Vineyards w/ no contact between edible portion and recl. water	Allowed	Allowed	Allowed
Non food-bearing trees not irrigated <14 days of harvest	Allowed	Allowed	Allowed
Fodder crops (e.g. alfalfa) and fiber crops (e.g. cotton)	Allowed	Allowed	Allowed
Seed crops not eaten by humans	Allowed	Allowed	Allowed
Food crops that undergo commercial pathogen-destroying processing before human consumption (e.g. sugar beets)	Allowed	Allowed	Allowed
<b>Supply for impoundments:</b>			
Nonrestricted rec. impound., w/ suppl. monit. for path. org.	Allowed**	Not Allowed	Not Allowed
Restricted rec. impound. and fish hatcheries	Allowed	Allowed	Not Allowed
Landscape impound. w/o decorative fountains	Allowed	Allowed	Allowed
<b>Supply for cooling or air cond.:</b>			
Ind. or comm. cooling or air cond. with cooling tower, evaporative condenser, or spraying that creates a mist	Allowed***	Not Allowed	Not Allowed
Ind. or comm. cooling or air cond. w/o cooling tower, evaporative condenser, or spraying that creates a mist	Allowed	Allowed	Allowed
<b>Other uses:</b>			
Flushing toilets and urinals	Allowed	Not Allowed	Not Allowed
Priming drain traps	Allowed	Not Allowed	Not Allowed
Industrial process water that may contact workers	Allowed	Not Allowed	Not Allowed
Structural fire fighting	Allowed	Not Allowed	Not Allowed
Decorative fountains	Allowed	Not Allowed	Not Allowed
Commercial laundries	Allowed	Not Allowed	Not Allowed
Consol. of backfill material around potable water pipelines	Allowed	Not Allowed	Not Allowed
Artificial snow making for commercial outdoor uses	Allowed	Not Allowed	Not Allowed
Industrial boiler feed	Allowed	Allowed	Allowed
Nonstructural fire fighting	Allowed	Allowed	Allowed
Backfill consol. around nonpotable piping	Allowed	Allowed	Allowed
Soil compaction	Allowed	Allowed	Allowed
Mixing concrete	Allowed	Allowed	Allowed
Dust control on roads and streets	Allowed	Allowed	Allowed
Cleaning roads, sidewalks and outdoor work areas	Allowed	Allowed	Allowed
Flushing sanitary sewers	Allowed	Allowed	Allowed

\* Refer to the full text of the latest version of Title-22

\*\* With "conventional tertiary treatment" additional monitoring may be necessary

\*\*\* Drift eliminators and/or biocides are required if public or employees can be exposed to mist

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

WATER REUSE

NOTICE OF INTENT (NOI) -- GENERAL INSTRUCTIONS

**Who May Apply**

This Order is intended to serve as a regional-wide general permit for publicly owned wastewater agencies that recycle wastewater. It is intended to replace individual reuse Orders and applies to the following:

- a. Producers of secondary and tertiary recycled water that meets Title 22 criteria and is reused for a direct beneficial use or a controlled use that would not otherwise occur.
- b. A major Distributor of recycled water: one who receives wastewater from a municipal facility, further treats it to meet Title 22 criteria for its intended use(s) and distributes it to users. In some cases, a written agreement (i.e. Joint Powers Agreement) between a Producer and a Distributor may be used in lieu of issuing this Order to the Distributor.
- c. Wastewater agencies that do not fall into categories a. and b. above but apply wastewater to land through irrigation for the primary purpose of disposal – to meet NPDES restrictions for receiving water discharge – but operate in accordance with these requirements, may also apply to be regulated under this Order.

Producers that have received an individual Order and previously submitted information equivalent to that required in the Water Reuse Program Report below, may submit a letter as a Notice of Intent without duplicating the material.

**Where to Apply**

The NOI should be mailed to the Regional Water Quality Control Board at the following address:

Regional Water Quality Control Board  
San Francisco Bay Region  
2101 Webster Street, Ste 500  
Oakland, CA 94612  
Attn: Watershed Protection Division

A copy of the NOI shall also be mailed to the California Department of Health at the following address:

California Department of Health Services  
Drinking Water Field Operations Branch  
North Coastal Region  
2151 Berkeley Way  
Berkeley, CA 94704

## When to Apply

An applicant should file the NOI within 120 days of the adoption of this Order for existing projects and/or NEW projects to start within 180 days. For subsequent projects, a supplemental or initial NOI (if not filed before) should be filed 60 days prior to project start.

## What to File

The NOI shall include a **Water Reuse Program** technical report, containing the following as a minimum:

### SECTION I – FACILITY /WASTE TREATMENT INFORMATION

Description of existing and/or proposed treatment, storage and transmission facilities for water reuse (much of this may be from current Orders/reports, but should be updated). This should include the type and level of wastewater treatment for reuse applications and estimated seasonal flows of recycled water.

### SECTION II – REUSE APPLICATIONS

Describe the types of applications recycled water will be used for. This should include:

- a) Agency owned/controlled uses (e.g. irrigation type/acreage/locations)
- b) Contracted User applications
  - 1) List of Users receiving or proposing to receive recycled water (including a list of uses of recycled water for each user)
  - 2) The estimated amount of recycled water flows to each User.
  - 3) Descriptions/maps of designated use areas.

### SECTION III – DESCRIPTION OF WATER REUSE PERMIT PROGRAM

The Agency's water reuse program should be fully described as follows:

- a) Copy of agency's authority and proposed rules and/or regulations
- b) Design and implementation of program
- c) Cross connection testing responsibilities and procedures
- d) Self-monitoring program
- e) User Inspection Program
- f) O&M program
- g) Compliance program
- h) Employee (user) Training
- i) Emergency procedures & notification

### SECTION IV – ADDITIONAL SITE SPECIFIC CONDITIONS

If existing Orders have additional site specific conditions and/or restrictions not covered in the General Order, they should be described here.

### SECTION V – REUSE PROGRAM ADMINISTRATION

Describe organization and responsibilities of pertinent personnel involved in the water reuse program. Provide the name(s), title(s) and phone number(s) of contact person(s) who are charged with operation/oversight of the water reuse program.

**ATTACHMENT C**

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**SELF-MONITORING PROGRAM**

**FOR**

**Order No. 96-011**

A. GENERAL

Reporting responsibilities of water recycling agencies are specified in Sections 13255(a), 13267(b), 13268, 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16.

The principal purposes of a monitoring program by water recyclers, also referred to as the self-monitoring program, are:

- 1) To document compliance with water quality requirements and prohibitions established by this Regional Board; and
- 2) To facilitate self-policing by the water recyclers.

B. RECYCLED WATER MONITORING

A Producer shall develop and implement a water reuse monitoring program. When the User(s) is other than the Producer, delegation of responsibilities must be clearly spelled out and included in the Producer's Water Use Permits.

**Recycled Water Effluent Quality – Producer Program**

The Producer's self-monitoring program is applicable during periods when recycled water is in use. The SMP program shall include the observations, sampling, measurements, and analyses prescribed in Table 1.

Description of Sampling and Observation Stations

a. Recycled Water

Station	Description
E-001	Location at the wastewater treatment plant where a representative sample of treated effluent being diverted for reuse can be obtained and total diverted flow can be measured.

**Monitoring of Recycled Water Users - Producer/User Program**

**Self-Monitoring Program**

The Producer will set individual user monitoring requirements based on the size, volume used, complexity, etc. of each use area. Producer conducted monitoring, or user self-monitoring if approved by the Producer, shall be conducted at least annually.

All recycled use areas, while recycled water is being used, shall be inspected at a frequency, specified by the Producer's Water Reuse Permit, for the following deficiencies or violations of use:

1. Standard Observations
  - a. Evidence of runoff of recycled water from the site (show affected area on a sketch, estimate volume).
  - b. Odor of wastewater origin from irrigation site. If present, indicate apparent source, characterization, and direction of travel.



- c. Evidence of ponding of recycled water, and evidence of mosquitoes breeding within the irrigation area due to ponded water.
- d. Warning signs properly posted to inform public that irrigation or water use is recycled water which is not safe for drinking.
- e. Evidence of leaks or breaks in the irrigation system pipelines or tubing.
- f. Evidence of broken, or otherwise faulty drip irrigation system emitters or spray irrigation sprinklers.
- g. Evidence of overflows, leaks, erosion of dikes, etc. of storage pond(s) or impoundment(s).

All violations shall be followed by a discussion of when and how deficiencies were corrected.

2. Description of Sampling and Observation Stations

a. Land Observation Stations

Station	Description
L-1 to L-n	Locations at a sufficient number of points at reuse areas in order to ensure compliance with water reuse requirements.

b. Impoundment Stations

Station	Description
P-1 to P-n	Locations at points along the periphery of each storage, ornamental, golf course, or other pond or impoundment.

**Inspection Program**

A Producer shall also conduct periodic random inspections of Users to ensure compliance with DHS reuse criteria and the Water Reuse Permit. Inspections shall be performed when recycled water is being used. Any significant repairs or modifications made to the system involving compliance with this Order shall be described in the Annual Report.

C. REPORTING REQUIREMENTS

1. Significant Violation Reporting

Violations of the DHS reuse criteria that impact or threaten to impact public health or water quality shall be reported to the Board by phone within 24 hours, followed by a written report within 15 days describing corrective actions taken.

2. Annual Report to the Regional Board

An annual report for each calendar year shall be submitted to the Board by the Producer by March 15 of each year. The report shall contain a statement by the reporting official, under penalty of perjury, that to the best of the signer's knowledge the report is true and correct.

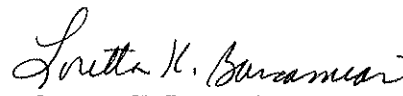
The report shall include:

- a. Tabulation of SMP recycled water analyses (see Table 1).
- b. A tabular summary of recycled water use by billing period by each User.
- c. A list of new authorized recycled water Users, including the name of customers, application, source and projected annual flow to be delivered.
- d. A summary of the total daily recycled water delivered by the Producer.
- e. Tabulation of User site inspections conducted by the Producer.
- f. A summary of effluent violations related to recycled water use, violations found during inspection of reuse sites, corrective actions taken and any changes to, or revoking of User authorizations by the Producer.

In addition there shall be a comprehensive discussion of the progress and results of the water recycling program. The discussion shall also include:

- g. An update regarding current and future development of the water recycling program, including planning, design and construction of facilities, preparation of required reports and technical documents and progress toward regulatory approvals.
- h. Progress and evaluation of any special studies or projects being undertaken related to the program.

I, Loretta Barsamian, Executive Officer, do hereby certify that the foregoing Self-Monitoring Program is effective on the date shown below and may be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the Producers. Revisions to the SMP will be authorized in writing by the Executive Officer.

  
Loretta K. Barsamian  
Executive Officer

Attachment:

Table 1 – Producer Schedule for Sampling, Measurements, and Analyses

File No. 2107.00

January 17, 1996

**Table 1: Producer's Schedule Sampling & Analyses**

	E-001		All L	All P
TYPE OF SAMPLE	Grab	Cont.	Obs.	Obs.
Flow Rate (gallons/day)		D	D*	D*
Total Coliform (MPN/100ml)	D**/#			
Turbidity (NTU)		D**/#		
Dissolved Oxygen (mg/l)	3/W**			
Dis. Sulfides (mg/l) (if DO <1mg/l)	3/W**			
Appl. Stand. Observations			A***	A***

**LEGEND FOR TABLE 1**

**Type of Sample**

Grab = Instantaneous grab sample  
 Cont. = Continuous monitoring (recorder)  
 Obs. = Observation

**Sampling Frequency**

D = Daily  
 3/W = Three times per week  
 A = Annually

- \* Records of recycled water use at each site may be compiled from billing period readings (divided by number of days to obtain daily flow) and submitted with the annual report.
- \*\* Equivalent routine effluent (NPDES/WDR) monitoring data collected on days and during times (grab samples) recycled water is being produced can be submitted in fulfillment of these requirements.
- \*\*\* User sites to be inspected a minimum of annually for "Applicable Standard Observations" based on the size and complexity of each site in accordance with the Producer's Water Reuse Program.
- # Unless current NPDES or WDR sampling frequency is less. Turbidity would apply to tertiary water only and is based on a 24-hour composite sample.

**ATTACHMENT D**  
**STANDARD PROVISIONS**  
**&**  
**REPORTING REQUIREMENTS**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

January 1996

STANDARD PROVISIONS AND REPORTING REQUIREMENTS

for

WATER REUSE ORDERS

A. GENERAL PROVISIONS

1. Duty to Comply

- a. A water recycler must comply with all of the conditions of this Order. Any Order noncompliance constitutes a violation of the Porter-Cologne Water Quality Control Act and/or Basin Plan and is subject to enforcement action.
- b. The filing of a request by the Producer for an Order modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition.

2. Duty to Mitigate

The Producer shall take all reasonable steps to minimize or prevent any discharge in violation of this Order which has a reasonable likelihood of adversely affecting public health or the environment, including such accelerated or additional monitoring as requested by the Board or Executive Officer to determine the nature and impact of the violation.

3. Property Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the discharger from liabilities under federal, state or local laws.

4. Duty to Provide Information

The Producer shall furnish, within a reasonable time, any information the Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the Order. The Producer shall also furnish to the Board, upon request, copies of records required to be kept by its Order.

5. Availability

A copy of this Order shall be maintained at Producer and distributor facilities and be available at all times to operating personnel.

B. TREATMENT RELIABILITY

1. The Producer shall, at all times, properly operate and maintain all facilities and systems of treatment disposal and control (and related appurtenances) which are installed or used by the Producer to achieve compliance with this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. All of these procedures shall be described in an Operation and Maintenance Manual. The Producer shall keep in a state of readiness all systems necessary to achieve compliance with the conditions of this Order. All systems, both those in service and reserve, shall be inspected and maintained on a regular basis. Records shall be kept of the tests and made available to the Board.
2. Recycled water treatment facilities subject to this Order shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Division 4, Chapter 14, Title 23 of the California Code of Regulations. (See Definition E. 4)

C. GENERAL REPORTING REQUIREMENTS

1. Signatory Requirements

- a. All reports required by the order and Order and other information requested by the Board shall be signed by a principal owner or operator, or by a duly authorized representative of that person.

Duly authorized representative is one whose:

- 1) Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as general manager in a partnership, manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and
- 2) Written authorization is submitted to the Board. If an authorization becomes no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements above must be submitted to the Board prior to or together with any reports, information, or applications to be signed by an authorized representative.

b. Certification

All reports signed by a duly authorized representative under Provision C.1.a. shall contain the following certification:

"I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

2. Should the responsible reporting party discover that it failed to submit any relevant facts or that it submitted incorrect information in any report, it shall promptly submit the missing or correct information.

3. False Reporting

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Order, including monitoring reports or reports of compliance or noncompliance shall be subject to enforcement procedures as identified in Section D of these Provisions.

D. ENFORCEMENT

1. The provision contained in this enforcement section shall not act as a limitation on the statutory or regulatory authority of the Board.

2. Any violation of the Order constitutes violation of the California Water Code and regulations adopted thereunder and is the basis for enforcement action, Order termination, Order revocation and reissuance, denial of an application for Order reissuance; or a combination thereof.

3. The Board may impose administrative civil liability, may refer a discharger to the State Attorney General to seek civil monetary penalties, may seek injunctive relief or take other appropriate enforcement action as provided in the California Water Code for violation of Board orders.

**ATTACHMENT E**

**Additional Site Specific Requirements**



## ATTACHMENT F

### DEFINITION OF TERMS

**Coagulated Wastewater:** Oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated upstream from a filter by the addition of suitable floc-forming chemicals.

**Conventional Tertiary Treatment:** A treatment chain that utilizes a sedimentation unit process between the coagulation and filtration processes and produces an effluent that meets the definition for disinfected tertiary recycled water.

**Disinfected Secondary-23:** Adequately disinfected, oxidized wastewater in which the median number of coliform organisms in the effluent does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of coliform organisms does not exceed 240 per 100 milliliters in more than one sample in any 30 day period.

**Disinfected Secondary-2.3:** Adequately disinfected, oxidized wastewater in which the median number of coliform organisms in the effluent does not exceed 2.3 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample in any 30 day period.

**Disinfected Tertiary** Adequately disinfected, oxidized, coagulated, clarified, filtered wastewater in which meets the following criteria:

- (a) A filtered wastewater which has been disinfected by either:
  - (1) A chlorine disinfection process that provides a CT (chlorine concentration times modal contact time) value of not less than 300 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak daily design flow (or an equivalent combination of chlorine residual concentration and contact time subject to Executive Officer approval); or
  - 2) A disinfection process that, when combined with the filtration process, has been demonstrated to reduce the concentration of plaque-forming units of F-specific bacteriophage MS-2, or polio virus, per unit volume of water in the wastewater to one hundred thousandths (1/100,000) of the initial concentration in the filter influent throughout the range of qualities of wastewater that will occur during the reuse process. A virus that is at least a resistant to disinfection as polio virus may be used for purposes of the demonstration.
- (b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed maximum an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

(c) The turbidity of filtered recycled water shall not exceed any of the following:

- 1) 2 NTU daily average, 5 NTU more than 5 percent of the time, or 10 NTU at any time.

Coagulation need not be used as part of the treatment process provided the turbidity of the influent to the filters does not exceed 5 NTU more than 5 percent of the time.

**Disinfected Wastewater:** Wastewater in which the pathogenic organisms have been destroyed by chemical, physical or biological means.

**Distributor:** A municipal or water service agency which receives recycled water from a Producer for the purpose of distribution to users. The Distributor may provide additional treatment to the water, depending upon the intended use.

**Dual Plumbed System:** A system that utilizes separate piping systems for recycled water and potable water within a facility and where the reclaimed water is used for either of the following purposes:

- a) To serve multiple plumbed outlets used by the public within a building.
- b) Landscape irrigation at individual residences.

**Filtered Wastewater:** An oxidized and coagulated wastewater which has been passed through natural undisturbed soils or filter media so that the turbidity does not exceed any of the following:

- (a) a daily average of 2 NTU
- (b) 5 NTU more than 5 percent of the time
- (c) 10 NTU at any time

**F-specific bacteriophage MS-2:** A strain of a specific type of virus that infects coliform bacteria that is traceable to the American Type Culture Collection (ATCC 15597B11) and is grown on lawns of E. Coli (ATCC 15597).

**Landscape Impoundment:** A body of water which is used for aesthetic enjoyment or landscape irrigation or which otherwise serves a similar function and is not intended to include public contact.

**Modal Contact Time:** The amount of time elapsed between the time a tracer, such as salt or dye, is injected into the effluent at the entrance to a chamber and the time that the highest concentration of the tracer is observed in the effluent from the chamber.

**Nonrestricted Recreational Impoundment:** An impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities.

**NTU (Nephelometric turbidity unit):** A measurement of turbidity as determined by the ratio of the intensity of light scattered by the sample to the intensity of incident light using approved laboratory methods.

**Oxidized Wastewater:** Wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen.

**Producer:** The entity which treats domestic wastewater to obtain reclaimed water.

**Reclaimed (Recycled) Water:** Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.

**Recycled Water Supervisor:** A person designated, by the Producer of recycled water, to discharge the responsibility of the Producer for: (a) acting as the supplier's coordinator and direct contact between the supplier and the owner or manager of the property upon which recycled water will be used; (b) proper operation of the system for transporting/distributing recycled water; (c) providing orientation to personnel involved in transporting/distributing recycled water; (d) implementing and complying with conditions of all Water Reuse Orders/Permits and associated documents relevant to use of recycled water; and (e) monitoring operations at the recycled water use area(s) for prevention of potential hazards.

**Restricted access golf course:** A golf course where public access is controlled so that areas irrigated with recycled water cannot be used as if they were part of a park, playground, or school yard and where irrigation is conducted only in areas and during periods when the golf course is not being used by golfers.

**Restricted Recreational Impoundment:** An impoundment of recycled water in which recreation is limited to fishing, boating, and other non-body-contact water recreational activities.

**Spray Irrigation:** The application of recycled water to crops to maintain vegetation or support growth of vegetation by applying it from sprinklers or orifices in piping. Spray irrigation does not include drip irrigation.

**Surface Irrigation:** Application of recycled water by means other than spraying such that contact between the edible portion of any food crop and recycled water is prevented (i.e., drip or flood irrigation).

**Use Site Area:** An area of recycled water use with defined boundaries. A **use site area** may contain one or more facilities.

**User Supervisor:** A person designated, by the owner or manager of the property upon which recycled water will be applied, to discharge the responsibility of the owner or manager of the property for: (a) installation, operation and maintenance of a system that enables recycled water to be used; (b) for prevention of potential hazards; (c) implementing and complying with conditions of all Water Reuse Orders/Permits and associated documents; and (d) coordination with the cross-connection control program of the supplier of drinking water and the local health/environmental health agency. (A Recycled Water Supervisor and User Supervisor may be one in the same in some instances).

## ATTACHMENT G

### STATE WATER REUSE POLICIES/REGULATIONS

#### California Water Code Summaries

California Water Code Section 13512 declares it is the intention of the Legislature that the State undertake all possible steps to encourage development of water reuse facilities so that reclaimed water may be made available to help meet the growing water demands of the State.

Section 13510 states that the people of the state have a primary interest in the development of facilities to reuse water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the State.

Section 13511 states that a substantial portion of the future water requirements of this state may be economically met by beneficial use of reclaimed water. Use of recycled water constitutes the development of "new basic water supplies".

Section 13550 states that the use of potable domestic water for non potable uses, including, but not limited to, cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses, is a waste or an unreasonable use of the water, if reclaimed water of adequate quality is available at reasonable cost.

Section 13551 states that a person or public agency shall not use water from any source of quality suitable for potable domestic use for non potable uses, including cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses, if suitable reclaimed water is available as provided in Section 13550.

Section 13241 states that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. Factors that the Board must consider when establishing or amending water quality objectives include, but are not limited to:

- (a) Past, present, and probable future beneficial uses of water.
- (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
- (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
- (d) Economic considerations.
- (e) The need for developing housing within the region.
- (f) The need to develop and use recycled water.

#### Regional Board Basin Plan – Reclamation Policy Summaries

##### Policy Statement

To date in this region, disposal of most municipal and industrial wastewater has primarily involved discharges into the Region's watersheds and the San Francisco estuary system. With growing awareness of the impacts of toxic discharges, the drought, future urbanization, and growth on the local aquatic habitat, there is an increasing need to look for other sources of water. Increasingly conservation and reclamation will be needed to deal with these long-term water issues. The Regional Board recognizes that the people of the San Francisco Bay Region are interested in developing the

capacity to conserve and reclaim water to supplement existing water supplies, meet future water requirements, and restore the region's watersheds and estuary system. Disposal of wastewater to inland, estuarine or coastal waters is not considered a permanent solution where the potential exists for conservation and reclamation.

California Water Code states that the State Water Resources Control Board shall take all appropriate proceedings or actions to prevent waste, unreasonable use, or unreasonable methods of use. ....Section 13225(i) mandates that the Regional Board encourage regional planning and action for water quality control.

### **Source Quality Control**

The quality of influent to a reclamation plant affects the quality of effluent production, particularly in those communities that import high-quality surface water from the Sierra Nevada. Reclamation treatment and costs are directly dependent on the quality of influent into the plant. The quality of this influent depends on the quality of the water supply and the quality of the waste discharges to the reclamation plant. Reclamation requires that industrial pretreatment and pollution prevention programs be sufficient to remove toxic constituents. Reclamation also requires adequate monitoring and enforcement. Additionally, maximum recycling and separate treatment of waste by industries should be encouraged where feasible.

### **Government Coordination**

Implementation of reclamation projects requires the involvement, approval, and support of a number of agencies, including state and local health departments, the Regional Board, local POTWs and water districts, and land use planning agencies. Interagency coordination must be a priority of all parties involved in reclamation. Failure to coordinate activities can result in the inability to carry out reclamation projects in a timely, consistent, and cost-effective manner. The Regional Board seeks cooperation and participation of professionals from the water reclamation industry and the water, health, and regulatory agencies to ensure the development of criteria that are both attainable and appropriate.

### **Regional Water Quality Control Board – Water Reuse Permits**

If a Regional Water Quality Control Board (Regional Board) determines that it is necessary to protect public health, safety, or welfare, it may prescribe water reclamation (*reuse*) requirements where reclaimed water is used or proposed to be used (Water Code Section 13523). Where regulatory reclamation criteria has been adopted by the Department of Health Services, no person may either reclaim water or use reclaimed water until the Regional Board has either issued reclamation requirements or waived the necessity for such requirements (Water Code Section 13524). In the process of issuing reclamation requirements, the Regional Board must consult with and consider recommendations of the Department (Water Code Section 13523). Any reclamation requirements which are issued by the Regional Board, whether applicable to the reclaimer or to the user of reclaimed water, must include or be in conformance with any regulatory reclamation criteria adopted by the Department.

## **Department of Health Services – Title 22 Wastewater Reclamation Criteria**

To assure protection of public health where water use is involved, the California Department of Health Services (Department) has been statutorily directed to establish statewide reclamation criteria for the various uses of reclaimed water (Water Code Section 13521). The Department has promulgated regulatory criteria, which are currently set forth in the California Code of Regulations, Title 22, Division 4, Section 60301 et seq. The Department's regulatory criteria include numerical limitations and requirements, treatment method requirements, and provisions and requirements related to sampling and analysis, engineering reports, design, operation, maintenance and reliability of facilities. The Department's regulations also permit the granting of exceptions to reclaimed water quality requirements in some cases, call for a case-by-case review of groundwater recharge projects, and allow use of alternative methods of treatment so long as the alternative methods used are determined by the Department to assure equivalent treatment and reliability. Many of the regulatory requirements related to sampling, analysis, engineering reports, personnel, operation and design are narrative in nature and leave room for discretionary decisions based on the individual situation in each case.

**ATTACHMENT H**  
**REGULATORY CONTACTS**

**REGIONAL WATER QUALITY CONTROL BOARD**

Surface Water Protection Division  
2101 Webster Street, Ste 500  
Oakland, CA 94612  
Fax (510) 286-1380 or (510) 286-1495

**General Water Reuse Order Coordinator**

Questions/suggestions regarding this Order:

Richard J. Condit  
Senior Environmental Specialist  
Watershed Division  
(510) 286-0456

**General information/policy for waste discharge requirement:**

Division Chief:  
Surface Water Management Division  
Dr. Teng-chung Wu  
(510) 286-0899

**Water Reuse Facility Contacts – Site Specific Contacts**

Refer to staff Permit/ County Area Engineer responsible for your NPDES/WDR facility

Section Managers (Supervise permit engineers)

North Bay Section (Marin, Sonoma, Napa, Solano & Contra Costa)  
Section Leader:  
Greg Walker  
(510) 286-4213

South Bay Section (Alameda, Santa Clara, San Mateo, San Francisco)  
Section Leader  
John Wolfenden  
(510) 286-0689

**CALIFORNIA DEPARTMENT OF HEALTH SERVICES (Title 22/Title 17)**

Drinking Water Field Operations Branch  
North Coast Region  
2151 Berkeley Way  
Berkeley, CA 94704  
(510) 540-2158

**Appendix D**  
**Special Status Species**

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**TABLE D-1**  
**Special-Status Plant Species Potentially Occurring within the Project Vicinity**

Species	Status			Habitat (Bold print represents habitat keyed in Figure 4 .8-1)	Occurrences
	Federal	State	CNPS		
Allium peninsulare var. franciscanum Franciscan onion	--	--	1B	Dry hillsides <b>Annual and Pastoral Grasslands, Oak Woodlands</b>	Suitable habitat may exist on annual and pastoral grasslands, and oak grasslands; floristically based surveys recommended. Bloom period March-June; elev. 0-300 m
Amorpha californica var. napensis Napa false indigo	--	--	1B	Openings in broadleaved upland forest, chaparral, and cismontane woodland <b>None</b>	No suitable habitat present; no additional surveys recommended. Bloom period March-June; elev. 150-2,000 m
Astragalus tener var. tener Alkali milk-vetch	--	--	1B	Alkali playa, valley and foothill grassland, and vernal pools <b>Annual and Pastoral Grasslands, Oak Woodlands, Lacustrine</b>	Suitable habitat may exist in valley and foothill grasslands; floristically based surveys recommended. Bloom period March-June; elev. 1-170 m
Blennosperma bakeri Sonoma sunshine	FE	SE	1B	Valley and foothill grassland and vernal pools <b>Annual and Pastoral Grasslands, Oak Woodlands, Lacustrine</b>	Suitable habitat may exist in valley and foothill grasslands; floristically based surveys recommended. Bloom period March-April; elev. Less than 100 m
Erodium macrophyllum Round-leaved filaree			1B	Cismontane woodlands, valley and foothill grasslands in clay soil <b>Annual and Pastoral Grasslands, Oak Woodlands</b>	Suitable habitat may exist in valley and foothill grasslands; floristically based surveys. Bloom period March-May; elev. 15-1200m
Chorizanthe valida Sonoma spineflower	FE	SE	1B	Coastal prairie in sandy soils, likely extinct in Sonoma County <b>None</b>	No suitable habitat with sandy soil present; no additional surveys recommended. Bloom period June-August; elev. 10-50 m

**TABLE D-1**  
**Special-Status Plant Species Potentially Occurring within the Project Vicinity**

Species	Status			Habitat (Bold print represents habitat keyed in Figure 4 .8-1)	Occurrences
	Federal	State	CNPS		
Cordylanthus maritimus ssp. palustris Point Reyes bird's-beak	--	--	1B	Coastal salt marshes and swamps <b>Saline Emergent Wetlands</b>	Suitable habitat may exist in saline emergent wetlands; floristically based surveys recommended. Bloom period June-October; elev. 0-10 m
Cordylanthus mollis ssp. mollis Soft bird's-beak	FE	SR	1B	Coastal salt marshes and swamps <b>Saline Emergent Wetlands</b>	Suitable habitat may exist in saline emergent wetlands; floristically based surveys recommended. Bloom period July-September; elev.0-3 m
Delphinium luteum Yellow larkspur	FE	SR	1B.1	North-facing rocky slopes in chaparral, coastal prairie, and coastal scrub <b>None</b>	No suitable habitat present; no additional surveys recommended. Bloom period March-May; elev. 0-100 m
Downingia pusilla Dwarf downingia	--	--	2	Valley and foothill grassland, roadside ditches, and vernal pools <b>Annual and Pastoral Grasslands, Oak Woodlands, Lacustrine</b>	Suitable habitat may exist in valley and foothill grasslands, roadside ditches, and possible vernal pools; floristically based surveys recommended Bloom period March-May; elev. Less than 150 m
Erigeron biolettii Streamside daisy	--	--	3	Broadleaved upland forest, cismontane woodland, and North Coast coniferous forest in rocky, mesic settings <b>None</b>	No suitable habitat present; no additional surveys recommended. Bloom period June-September; elev. 30-1,100 m

**TABLE D-1**  
**Special-Status Plant Species Potentially Occurring within the Project Vicinity**

Species	Status			Habitat (Bold print represents habitat keyed in Figure 4 .8-1)	Occurrences
	Federal	State	CNPS		
Fritillaria liliacea Fragrant fritillary	--	--	1B	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grasslands, often serpentinite <b>Annual and Pastoral Grasslands, Oak Woodlands</b>	Suitable habitat may exist in valley and foothill grasslands; floristically based surveys recommended. Bloom period February-April; elev. 3-410 m
Hesperolinon congestum Marin western flax	FT	ST	1B.1	Chaparral and valley and foothill grasslands in serpentine soils <b>Annual and Pastoral Grasslands, Oak Woodlands</b>	Suitable habitat may exist in valley and foothill grasslands; floristically based surveys recommended. Bloom period May-July; elev. 30-365 m
Lasthenia conjugens Contra Costa goldfields	FE		1B	Cismontane woodland, valley and foothill grasslands, and mesic meadows and vernal pools <b>Annual and Pastoral Grasslands, Oak Woodlands, Lacustrine</b>	Suitable habitat may exist in valley and foothill grasslands; floristically based surveys recommended. Bloom period April-June; elev. Less than 500 m
Legenere limosa Legenere	--	--	1B	Wet areas and vernal pools <b>Annual and Pastoral Grasslands, Oak Woodlands, Lacustrine</b>	Suitable habitat may exist in wet areas in pastoral grasslands; floristically based surveys recommended. Bloom period May-June; elev. Less than 150 m
Leptosiphon jepsonii Jepson's leptosiphon			1B	Chaparral, and cismontane woodlands usually in volcanic soils <b>None</b>	No suitable habitat present; no additional surveys recommended. Bloom period March-May; elev. 100-500 m

**TABLE D-1**  
**Special-Status Plant Species Potentially Occurring within the Project Vicinity**

Species	Status			Habitat (Bold print represents habitat keyed in Figure 4 .8-1)	Occurrences
	Federal	State	CNPS		
Plagiobothrys mollis var. vestitus Petaluma popcorn-flower	--	--	1A	Wet sites in valley and foothill grassland, possibly coastal salt marsh margins <b>Annual and Pastoral Grasslands, Oak Woodlands, Saline Emergent Wetlands, Lacustrine</b>	Suitable habitat may exist in valley and foothill grasslands and margins of saline emergent marsh; floristically based surveys recommended. Bloom period June-July 10-50 m
Polygonum marinense Marin knotweed	--	--	3	Coastal salt or brackish marshes and swamps <b>Saline Emergent Wetlands</b>	Suitable habitat may exist in saline emergent wetlands; floristically based surveys recommended. Bloom period June-August; elev. 0-10 m
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	--	--	1B	Freshwater marshes and swamps <b>Lacustrine</b>	Suitable habitat may exist in stock ponds and other potential wetlands in pastoral grasslands; floristically based surveys recommended Bloom period April-September; elev. 5-75 m
Symphotrichum lentum (Aster lentus) Suisun Marsh aster			1B	Freshwater and brackish marshes and swamps <b>Saline Emergent Wetlands, Lacustrine</b>	Suitable habitat may exist in saline emergent wetlands; floristically based surveys recommended. Bloom period May-November; elev. 0-3m
Trifolium amoenum Two-fork clover	FE	--	1B	Valley and foothill grasslands, often serpentine soils <b>Annual and Pastoral Grasslands, Oak Woodlands</b>	Suitable habitat may exist in valley and foothill grasslands; floristically based surveys recommended. Bloom period April-June; elev. 5-415 m

**TABLE B-2**  
**Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity**

Species	Status		Habitat Association	Occurrences
	Federal	State		
<b>Invertebrates</b>				
Syncaris pacifica California freshwater shrimp	FE	SE	Found in low elevation, low gradient streams where riparian cover is moderate to heavy. Associated with shallow pools away from main stream flow. Endemic to Marin, Napa and Sonoma counties. <b>Riverine</b>	Suitable habitat exists in riverine habitats.
<b>Fish</b>				
Oncorhynchus mykiss irideus Steelhead-Central California Coast ESU	FT	--	Requires beds of loose, silt-free, well-oxygenated coarse gravel for spawning. After hatching, juveniles spend at least one summer in the freshwater rearing areas, so the stream must have either perennial flow or cool intermittent pools with subsurface flow, shade, food, and shelter during the dry season. <b>Riverine</b>	Some riverine habitats in the project region provides suitable habitat. Steelhead are known to occur in Lynch Creek and Adobe Creek.
Pogonichthys macrolepidotus Sacramento splittail	--	CSC	Inhabits slow moving rivers, dead end sloughs, and low-salinity (up to 18 ppt.) estuarine areas. Requires submerged aquatic plants or flooded terrestrial vegetation for spawning and foraging for young. <b>Riverine</b>	Endemic to the Central Valley, Sacramento-San Joaquin delta, Napa River and Napa Marsh, and the Petaluma River and Petaluma Marsh. Adults and/or juveniles may be present in the Petaluma River and lower tributaries at any time of the year.

**TABLE B-2**  
**Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity**

Species	Status		Habitat Association	Occurrences
	Federal	State		
<b>Amphibians</b>				
Ambystoma californiense California tiger salamander	FT	CSC	Annual grasslands and grassy understory of valley-foothill hardwood communities in central and northern California. Adults spend most of the year in underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources lacking predatory fish and bullfrogs are required for breeding. <b>Riverine, Lacustrine, Annual and Pastoral Grasslands, Oak Woodlands, Croplands</b>	Suitable habitat exists in the irrigation and stock ponds and potential wetlands in the pastoral and annual grasslands.
Rana aurora draytonii California red-legged frog	FT	CSC	Occurs in a variety of ponds, sloughs, low-gradient streams, and low-salinity lagoons. Adults may forage in, and migrate through, terrestrial grasslands, riparian woodlands, and forests, but require weedy, slow moving or standing water that persists through most of the dry season for successful reproduction. Introduced bullfrogs and predatory fish are implicated in the decline of red-legged frogs throughout their range. <b>Riverine, Lacustrine, Annual and Pastoral Grasslands, Oak Woodlands, Croplands</b>	Currently known to occur in the Ledson Marsh (Sonoma Creek), Sears Point area, Stage Gulch Creek, Ellis Creek, and lower Petaluma River area. This species was also observed during surveys conducted for the 1995 EIR in the densely vegetated and wooded reach of Ellis Creek between the Petaluma Marsh and South Ely Road.
Rana boylei Foothill yellow-legged frog	--	CSC	Partly shaded, shallow streams with riffles and rocky substrates in a variety of vegetation communities. <b>Riverine</b>	Known from Adobe Creek, a tributary of the Petaluma River. Most of Ellis Creek, which largely lacks a rocky substrate, does not provide suitable habitat for this species. However, suitable habitat exists in a wooded reach just above the confluence with Higgins Creek.

**TABLE B-2**  
**Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity**

Species	Status		Habitat Association	Occurrences
	Federal	State		
<b>Reptiles</b>				
Actinemys marmorata Western pond turtle	--	CSC	Ponds, marshes rivers, streams, and irrigation ditches that have emergent or riparian vegetation and sunny basking sites. Upland nesting habitat consists of friable soil exposed to full sun. <b>Riverine, Lacustrine</b>	Streams with valley and foothill riparian corridors provide potential habitat for this species.
<b>Birds</b>				
Rallus longirostris obsoletus California clapper rail	FE	SE	Salt water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. <b>Saline Emergent Wetlands</b>	Saline emergent marsh may provide habitat for this species.
Laterallus jamaicensis coturniculus California black rail	--	ST Fully protected	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. <b>Saline Emergent Wetlands</b>	Saline emergent marsh may provide habitat for this species.
Coccyzus americanus occidentalis Western yellow-billed cuckoo	FSC	SE	Require large blocks of riparian habitat 25 acres or more of dense understory vegetation for nesting. <b>Valley Foothill Riparian</b>	No large tracts of Riparian Vegetation in the project region.
Strix occidentalis caurina Northern spotted owl	FT	--	Old growth forest or mixed stand of old growth and mature trees with high, multistory canopies and trees with cavities or hollows. <b>None</b>	No suitable habitat is present on the project site.
Athene cunicularia Burrowing owl	--	CSC	Open grasslands, agricultural fields, open shrublands, open woodlands. <b>Annual and Pastoral Grasslands, Oak Woodlands, Croplands</b>	Pastoral and annual grasslands may provide habitat for this species.

**TABLE B-2**  
**Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity**

Species	Status		Habitat Association	Occurrences
	Federal	State		
Geothlypis trichas sinuosa Saltmarsh common yellowthroat	--	CSC	Fresh and saltwater marshes in San Francisco Bay <b>Saline Emergent Wetlands</b>	Saline emergent marsh may provide habitat for this species.
Melospiza melodia samuelis San Pablo song sparrow	--	CSC	Salt marshes along the north side of San Francisco and San Pablo Bays <b>Saline Emergent Wetlands</b>	Saline emergent marsh may provide habitat for this species.
<b>Mammals</b>				
Corynorhinus townsendii townsendii Townsend's big-eared bat		CSC	Occupies the humid, coast regions of northern and central California. Roosts in caves, old buildings and mine tunnels hanging from the walls and ceiling. <b>Old buildings in all keyed habitats</b>	Old buildings may provide habitat for this species.
Antrozous pallidus Pallid bat	--	CSC	Roosts in caves, mine tunnels, crevices in rocks, bridges, buildings, and hollowed trees. <b>Old buildings, bridges and rock outcrops in all keyed habitats</b>	Large dead trees within the riparian corridors may provide suitable habitat. Bridges may also provide habitat. Pre-construction surveys are recommended if tree removal is necessary.
Taxidea taxus American badger	--	CSC	Dry open stages of most shrub, forest and herbaceous habitats with friable soils. <b>Annual and Pastoral Grassland, Croplands</b>	Croplands, pastoral and annual grasslands may provide suitable habitat.
Reithrodontomys raviventris Salt marsh harvest mouse	FE	SE	Occur only in the saline emergent wetlands of San Francisco Bay and its tributaries. Pickleweed is primary habitat. Requires higher areas in order to escape flood. <b>Saline Emergent Wetlands</b>	Saline emergent marsh may provide habitat for this species.



**Appendix E**  
**Table ES-5: Summary of Impacts and**  
**Proposed/Final General Plan Policies and**  
**Programs that Reduce the Impact of the**  
**General Plan 2025**  
**and**  
**Sonoma County General Plan EIR**  
**Unavoidable Effects of Growth**

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Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>		<i>Draft Proposed General Plan Policies and Programs that Reduced the Impact</i>		<i>Signifi- cance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>	
3.1-1	<i>The proposed General Plan may result in the conversion of some farmland to non-agricultural uses.</i>	2-P-1	Promote a range of land uses at densities and intensities to serve the community needs within the Urban Growth Boundary (UGB). A. Update the city's Development Code for consistency with the General Plan, including: <ul style="list-style-type: none"> <li>• Establishment of new base districts, consistent with the land use classifications in the General Plan.</li> <li>• Continue the identification of overlay districts, such as the Floodplain and Historic Districts.</li> <li>• Creation of the Petaluma River Corridor.</li> <li>• Maintain both minimum and maximum development intensities as stipulated in the General Plan Land Use Classifications.</li> <li>• Opportunities for infill without land division.</li> <li>• Design Guidelines, where applicable.</li> </ul>	Less than Significant	Map 1-P-1	The General Plan Land Use Map retains 77 acres within the UGB designated as Agriculture. Promote a range of land uses at densities and intensities to serve the community needs within the Urban Growth Boundary (UGB). A. Update the city's Development Code for consistency with the General Plan, including: <ul style="list-style-type: none"> <li>• Establishment of new base districts, consistent with the land use classifications in the General Plan.</li> <li>• Continue the identification of overlay districts, such as the Floodplain and Historic Districts.</li> <li>• Creation of the Petaluma River Corridor.</li> <li>• Maintain both minimum and maximum development intensities as stipulated in the General Plan Land Use Classifications.</li> <li>• Opportunities for infill without land division.</li> <li>• Design Guidelines, where applicable.</li> </ul>
		2-P-2	Use land efficiently by promoting infill development, at equal or higher density and intensity than surrounding uses.		1-P-2	Use land efficiently by promoting infill development, at equal or higher density and intensity than surrounding uses.
		2-P-16	Maintain a permanent open space around the city by the continuation of the Urban Separator and the use of an Urban Separator Pathway, where appropriate.		1-P-16	Maintain a permanent open space around the city by the continuation of the Urban Separator and the use of an Urban Separator Pathway, where appropriate.
		2-P-23	Support designation of land uses in the unincorporated area beyond the Urban Growth Boundary as rural, agricultural and/or open space. A. Work with local, state and federal funding sources to acquire open space outside of the Urban Separator and/or beyond the Urban Growth Boundary where community-wide benefit is achieved.		1-P-23	Support designation of land uses in the unincorporated area beyond the Urban Growth Boundary as rural, agricultural and/or open space. A. Work with local, state and federal funding sources to acquire open space outside of the Urban Separator and/or beyond the Urban Growth Boundary where community-wide benefit is achieved.

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>		<i>Draft Proposed General Plan Policies that Reduced the Impact</i>		<i>Significance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>	
		2-P-25	<p>It is the policy of the City to build within the agreed upon Urban Growth Boundary. No urban development shall be permitted beyond the Urban Growth Boundary. "Urban development" shall mean development requiring one or more basic municipal services including, but no limited to, water service, sewer, improved storm drainage facilities, fire hydrants and other physical public facilities and services, but shall not mean providing municipal or public services to open space uses, public or quasi-public uses such as schools or public safety facilities. Said municipal or public services or facilities can be developed beyond the UGB to provide services within the UGB.</p> <p>A. Maintain a time certain and parcel-specific Urban Growth Boundary around the city, beyond which urban development will not take place.</p> <p>B. Use the growth management system, design review, or other project review methods to assure that the density of new residential development is greatest within and adjoining existing urbanized areas and gradually and logically lessens as it approaches the urban edge.</p> <p>C. Encourage the County to continue to promote agricultural land use and to strictly limit further residential infilling on lands beyond the Urban Growth Boundary within the Petaluma Planning Referral Area.</p>		1-P-24	<p>Support regulatory measures and work with other jurisdictions and agencies to maintain and expand the existing Community Separators in agreement with Sonoma and Marin Counties.</p> <p>The Urban Growth Boundary measure, adopted in 1998, is set forth in Policies 1-P-25 through 1-P-32, verbatim.</p>
3.2-1	<i>Increased motor vehicle traffic would result in unacceptable level of service (LOS) at study</i>	5-P-1	<p>Develop an interconnected mobility system that allows travel on multiple routes by multiple modes.</p> <p>A. Develop a network that categorizes streets according to function and type, considering the surrounding land use context.</p> <p>B. Develop a network for off-street paths and</p>	Significant and Unavoidable	5-P-1	<p>Develop an interconnected mobility system that allows travel on multiple routes by multiple modes.</p> <p>A. Develop a network that categorizes streets according to function and type, considering the surrounding land use context.</p> <p>B. Develop a network for off-street paths and routes</p>

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>	<i>Draft Proposed General Plan Policies that Reduced the Impact</i>	<i>Significance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>
<i>intersections.</i>	<p>routes according to function and type, considering the intensity of use and purpose.</p> <p>C. Review and update the City's Street Design Standards to be consistent with street function and typology, using Figure 5-2 as a guide.</p> <p>D. Explore the redesign of designated main and mixed use streets to potentially reduce the width and/or number of travel lanes, improve the multimodal function of intersections, and introduce amenities such as wider sidewalks, special paving treatments, bus priority treatments, landscaped medians, and street trees within parking lanes.</p> <p>E. Evaluate the feasibility of road diets on streets with projected excess capacity at buildout.</p>		<p>according to function and type, considering the intensity of use and purpose.</p> <p>C. Review and update the City's Street Design Standards to be consistent with street function and typology, using Figure 5-2 as a guide.</p> <p>D. Explore the redesign of designated main and mixed use streets to potentially reduce the width and/or number of travel lanes, improve the multimodal function of intersections, and introduce amenities such as wider sidewalks, special paving treatments, bus priority treatments, landscaped medians, and street trees within parking lanes.</p> <p>E. Evaluate the feasibility of road diets on streets with projected excess capacity at buildout</p>
	<p>5-P-2</p> <p>Ensure the identified mobility system is provided in a timely manner to meet the needs of the community.</p> <p>A. Ensure new developments pay a fair share of mobility improvements and that those improvements are undertaken in context with that development.</p> <p>B. Review City transportation impact fees to insure that necessary citywide improvements are funded.</p> <p>C. Allocation of mitigation funds shall be designated to the specific capital improvement project for which it was exacted.</p>		<p>5-P-2</p> <p>Ensure the identified mobility system is provided in a timely manner to meet the needs of the community by updating the City's transportation impact fee program to insure that necessary citywide improvements are funded.</p> <p>A. Transportation impact fees will be determined based on each project's fair share of the aggregate costs of roadway improvements identified within the Mobility Element and EIR.</p> <p>B. The fee program is intended to ensure that new developments pay its proportionate share of traffic infrastructure improvements to mitigate direct traffic impacts from new development.</p> <p>C. Some portion(s) of the identified mobility system improvements will be constructed as part of project related frontage improvements.</p> <p>D. Allocation of mitigation funds shall be designated to the capital improvement project for which it was exacted.</p>

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>		<i>Draft Proposed General Plan Policies that Reduced the Impact</i>		<i>Significance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>	
		5-P-3	<p>Ensure public improvements are constructed and maintained in a manner that is economically feasible to the budgetary constraints of the City.</p> <p>A. Establish priorities for transportation improvements and prepare an action program to implement identified street improvements.</p> <p>B. Investigate innovative means to fund the design, construction, and maintenance of both neighborhood and community-wide mobility infrastructure.</p>		5-P-3	<p>Ensure public improvements are constructed and maintained in a manner that is economically feasible to the budgetary constraints of the City.</p> <p>A. Establish priorities for transportation improvements and prepare an action program to implement identified street improvements.</p> <p>B. Investigate innovative means to fund the design, construction, and maintenance of both neighborhood and community-wide mobility infrastructure.</p>
		5-P-4	<p>New development and/or major expansion of change of use may require construction of off-site mobility improvements to complete appropriate links in the network necessary for connecting new with existing neighborhoods and land uses.</p>		5-P-4	<p>New development and/or major expansion of change of use may require construction of off-site mobility improvements to complete appropriate links in the network necessary for connecting new with existing neighborhoods and land uses.</p>
		5-P-5	<p>Consider impacts on overall mobility and travel by multiple travel modes when evaluating transportation impacts.</p>		5-P-5	<p>Consider impacts on overall mobility and travel by multiple travel modes when evaluating transportation impacts.</p>
		5-P-8	<p>The priority of mobility is focused on the movement of people within the community including the preservation of quality of life and community character.</p> <p>A. Develop formal transportation impact analysis guidelines that consider multi-modal impacts of new developments.</p> <p>B. Develop and adopt multi-modal level of service (LOS) standards that examine all modes and vary the standards by facility type to imply a preference to selected modes based upon the context (including street type and location).</p> <p>C. LOS analysis data shall utilize the peak period rather than the peak hour for determining intersection LOS.</p>		5-P-8	<p>The priority of mobility is focused on the movement of people within the community including the preservation of quality of life and community character.</p> <p>A. Develop formal transportation impact analysis guidelines that consider multi-modal impacts of new developments.</p> <p>B. Develop and adopt multi-modal level of service (LOS) standards that examine all modes and vary the standards by facility type to imply a preference to selected modes based upon the context (including street type and location).</p> <p>C. LOS analysis data shall utilize the peak period rather than the peak hour for determining intersection LOS.</p>
		5-P-10	<p>Maintain a level of service (LOS) standard for motor vehicle circulation that ensures efficient traffic flow</p>		5-P-	<p>Policy 5-P-10: Maintain an intersection level of service (LOS) standard for motor vehicle circulation that ensures efficient traffic</p>

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>		<i>Draft Proposed General Plan Policies that Reduced the Impact</i>		<i>Significance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>
			and supports multi-modal mobility goals. LOS should be maintained at Level D or better for motor vehicles due to traffic from any development project.		10 flow and supports multi-modal mobility goals. LOS should be maintained at Level D or better due to traffic from any development A. A lower Level of Service may be deemed acceptable, by the City, in instances where the City finds that potential vehicular traffic mitigations (such as adding additional lanes or modifying signal timing) would conflict with the Guiding Principles of the General Plan, particularly with regard to: <ul style="list-style-type: none"> <li>▪ Guiding Principal #2. Preserve and enhance Petaluma's historic character.</li> <li>▪ Guiding Principal #6. Provide a range of attractive and viable transportation alternatives, such as bicycle, pedestrian, rail and transit.</li> <li>▪ Guiding Principal #7. Enhance Downtown by preserving its historic character, increasing accessibility, and ensuring a broad range of business and activities and increasing residential activities.</li> </ul> <p>The above does not relieve any need to mitigate development related impacts, which may include multi-modal improvements to reduce identified impacts.</p>
		5-P-11	Require proposed development to assist, in addition to seeking other funding sources, in the funding and construction of the following improvements: <ul style="list-style-type: none"> <li>• Washington Street/Highway 101 interchange improvements</li> <li>• Rainier Avenue extension and interchange</li> <li>• Caulfield Lane extension to Petaluma Boulevard South (southern crossing)</li> <li>• Old Redwood Highway interchange widening</li> <li>• Copeland Street extension to Petaluma Boulevard North</li> </ul>		5-P-11 Require proposed development to assist, in addition to seeking other funding sources, in the funding and construction of the following improvements: <ul style="list-style-type: none"> <li>• Washington Street/Highway 101 interchange improvements</li> <li>• Rainier Avenue extension and interchange</li> <li>• Caulfield Lane extension to Petaluma Boulevard South (southern crossing)</li> <li>• Old Redwood Highway interchange widening</li> <li>• Copeland Street extension to Petaluma Boulevard North</li> <li>• Caulfield Lane/Payran Street Intersection Improvements</li> </ul>

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	<ul style="list-style-type: none"> <li>• Caulfield Lane/Payran Street Intersection Improvements</li> <li>• Petaluma Boulevard/Magnolia Avenue Payran Street Intersection.</li> </ul>		<ul style="list-style-type: none"> <li>• Petaluma Boulevard North/Magnolia Avenue Payran/Street Intersection.</li> </ul>
	<p>5-P-13 Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak-period trip generation.</p> <p>A. Study the feasibility of a citywide TDM program that would be funded by annual fees or assessments on new development.</p> <p>B. Assign a proportion of TDM fees to Petaluma Transit for expansion of service and future fare reductions or fare elimination.</p> <p>C. As part of the development code, require TDM measures for all new non-residential development.</p> <p>D. Assign trip reduction credits and reduced transportation impact fees for demonstrated commitment to TDM strategies.</p> <p>E. Reduce parking requirements for mixed-use developments and for developments providing shared parking or a TDM program.</p> <p>F. Establish a TDM program for City of Petaluma employees.</p> <p>G. Collaborate with Santa Rosa Junior College to minimize the impact of future enrollment growth on local traffic and parking demand, such as through TDM measures, limitations on parking near the College and on-campus parking management.</p>	5-P-13	<p>Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak-period trip generation.</p> <p>A. Study the feasibility of a citywide TDM program that would be funded by annual fees or assessments on new development.</p> <p>B. If developed, assign a proportion of TDM fees to Petaluma Transit for expansion of service and future fare reductions or fare elimination.</p> <p>C. Assign trip reduction credits and reduced transportation impact fees for demonstrated commitment to TDM strategies.</p> <p>D. Reduce parking requirements for mixed-use developments and for developments providing shared parking or a TDM program.</p> <p>E. Consider establishing a TDM program for City of Petaluma employees.</p> <p>F. Continue to collaborate with Santa Rosa Junior College to minimize the impact of future enrollment growth on local traffic and parking demand, such as through TDM measures, limitations on parking near the College and on-campus parking management.</p> <p>G. Encourage provision of preferential parking in selected areas for designate carpools, motorcycles, bikes and alternative fuel vehicles.</p> <p>NOTE: While adoption of the Trip Reduction Ordinance is identified as a potential mitigation to help decrease levels of traffic, through voluntary participation, the Ordinance itself is not relied on to mitigate the conditions to "less than significant" levels at any of the falling intersections, since those</p>

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						intersections have been identified as having significant and unavoidable impacts.
3.2-2	<i>Implementation of the proposed General Plan could cause increased demand for transit service.</i>	5-P-40	Expand the bus transit system so that it is convenient and provides frequent, regular service along major City corridors serving shopping and employment destinations. A. Identify increased funding sources for local transit service and improvements.	Less than Significant	5-P-40	Expand the bus transit system so that it is convenient and provides frequent, regular service along major City corridors serving education, shopping and employment destinations. A. Identify increased funding sources for local transit service and improvements.
		5-P-41	Support efforts for transit oriented development around the Petaluma Depot and along the Washington Street and Petaluma Boulevard transit corridors. A. Reserve and plan for future bus stop enhancement and transit priority along Washington Street and Petaluma Boulevard.		5-P-41	Support efforts for transit oriented development around the Petaluma Depot and along the Washington Street, Petaluma Boulevard, McDowell Boulevard, Lakeville Street and other transit corridors. A. Reserve and plan for future bus stop enhancement and transit priority along Washington Street and Petaluma Boulevard. B. Enhance the use of the Park and Ride facility at the Fairgrounds through education and marketing.
		5-P-42	Maintain a transit system of nominal cost to riders. A. Investigate the creation of subsidies for designations such as education, significant employment, and/or recreation destinations. B. Collaborate with Santa Rosa Junior College to promote measures to enhance transit access and service at the Petaluma Campus.		5-P-42	Maintain a transit system of nominal cost, or no cost, to riders. A. Investigate the creation of subsidies for designations such as education, significant employment, and/or recreation destinations. B. Collaborate with Santa Rosa Junior College to promote measures to enhance transit access and service at the Petaluma Campus.
		5-P-43	Coordinate transit improvement efforts between Petaluma Transit, Sonoma County Transit, Golden Gate Transit, and SMART.		5-P-43	Coordinate transit improvement efforts and schedules among Petaluma Transit, Sonoma County Transit, Golden Gate Transit, paratransit, commuter rail, and schools.
		5-P-44	Consider benefits to the possible consolidation of transit serving agencies.		5-P-44	Consider benefits to the possible consolidation of transit serving agencies.
3.2-3	<i>Provision of secure and safe bicycle parking</i>	5-P-31	Make bicycling and walking more desirable by providing or requiring development to provide necessary support facilities throughout the city.	Less than Signifi	5-P-31	Make bicycling and walking more desirable by providing or requiring development to provide necessary support facilities



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	<i>may be inadequate.</i>		A. Provide secure, protected parking facilities and support services for bicycles at locations with high bicycle-parking demands such as multi-family housing and shopping and employment centers.	cant		throughout the city. A. Provide secure, protected parking facilities and support services for bicycles at locations with high bicycle-parking demands such as multi-family housing and shopping and employment centers. B. Install drinking fountains serving people and their pets in strategic locations to make it easier and healthier for pedestrians and bicyclists to be outdoors and travel long distances. C. Provide easily accessible and aesthetically pleasing public restrooms wherever feasible. D. Require projects subject to discretionary approval to install public benches where appropriate. E. Install non-glare lighting along multi-use paths that serve as commuter routes.
3.2-4	<i>Implementation of the proposed General Plan could result in increased demand for motor vehicle parking.</i>	5-P-14	To the extent deemed feasible and appropriate by the City, maximize shared parking opportunities and support the construction of additional structured parking in Central Petaluma.	Less than Significant	5-P-14	To the extent deemed feasible and appropriate by the City, maximize shared parking opportunities and support the construction of additional structured parking in Central Petaluma.
3.3-1	<i>Future development may result in a decrease of parkland per 1,000 residents.</i>	6-P-1	Develop additional parkland in the city, particularly in areas lacking these facilities and where new growth is proposed, to meet the standards of required park acreage. A. Develop and implement a Parks Master Plan. B. Work with local, regional, and state agencies to acquire and fund further park-land acquisition and improvements. C. Undertake a proactive program to acquire necessary land and develop new parks in the locations shown in Figure 6-1, prioritizing areas where new development may occur and park opportunities may be lost, and in underserved	Less than Significant	6-P-1	Develop additional parkland and recreational facilities in the city, particularly in areas lacking these facilities and where new growth is proposed, to meet the standards of required park acreage. A. Develop and implement a Parks Master Plan, including the reevaluation of existing resources to determine best uses for the benefit of the community (e.g. Lucchesi Park Pond). B. Through the Parks Master Plan process and the park design process, determine the make-up of any given park (e.g. passive/active and the level and type of park features). <ul style="list-style-type: none"><li>Active Parks: emphasis on athletic fields, aquatics,</li></ul>

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	<p>neighborhoods.</p> <p>D. As part of the City's Development regulations establish common open space requirements for multi-family development. Such open space shall NOT to be counted toward public park dedication/in lieu fee requirements.</p> <p>E. Require land development along designated trails and pathway corridors to provide sufficient right-of-way and to ensure that adjacent new development does not detract from the scenic and aesthetic qualities of the corridor.</p> <p>F. Encourage and support the use of public land for community gardens.</p>		<p>courts, etc.</p> <ul style="list-style-type: none"> <li>• Passive Parks: emphasis on pathway, tot lots, informal playfields, etc.</li> <li>• The provision of amenities (e.g. restrooms) based on intensity of use.</li> </ul> <p>C. Work with local, regional, and state agencies to acquire and fund further parkland acquisition and improvements.</p> <p>D. Undertake a proactive program to acquire necessary land and develop new parks in the locations shown in Figure 6-1, prioritizing areas where new development may occur and park opportunities may be lost, and in underserved neighborhoods.</p> <p>E. As part of the City's Development regulations establish common open space requirements for multi-family development. Such open space shall NOT to be counted toward public park dedication/in lieu fee requirements for meeting neighborhood and/or community park needs.</p> <p>F. Require land development along designated trails and pathway corridors to provide sufficient right-of-way for trails and amenities and to ensure that adjacent new development does not detract from the scenic and aesthetic qualities of the corridor.</p> <p>G. Encourage and support the collaboration of local school districts, non-profit organizations and private parties in the use of public lands for outdoor education opportunities such as: community gardens, riparian or wetland enhancement projects, wildlife study/protection areas, etc.</p> <p>H. Improve community health and unity by providing community-wide, family-oriented special events that bring the community together (e.g. Movies in the Park, family festivals, etc.).</p> <p>I. Where feasible, acquire and/or restore, maintain and use for the community's benefit, local historic assets (e.g. Steamer Landing Livery Stable, McNear Channel, Polly</p>

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						<p>Hannah Klaas Performing Arts Center, etc.).</p> <p>J. Work collaboratively with affected property owners to dredge the McNear Channel and utilize this protected body of water for small boating in concert with local organizations, including the development of a small boating facility that can house instructional and/or historical programs relating to the Petaluma River and Petaluma's historical heritage.</p> <p>K. Explore opportunities for the development of a public multi-use, small-craft center providing a venue for recreational and competitive small boaters (e.g. rowing shells, outrigger canoes, kayaks, traditional wooden boats, and other human and sail powered watercraft) on the Petaluma River.</p>
		6-P-2	<p>Provide a comprehensive and integrated network of parks and open space and improve access to existing facilities where feasible.</p> <p>A. Provide public access and recreational opportunities along the length of the Petaluma River and its tributaries, to every extent possible.</p>		6-P-2	<p>Provide a comprehensive and integrated network of parks and open space and improve access to existing facilities where feasible.</p> <p>A. Provide public access and recreational opportunities along the length of the Petaluma River and its tributaries, to every extent possible.</p> <p>B. Identify missing links to connect parks and open spaces with neighborhoods and community destinations. Develop prioritization and funding to complete these links.</p>
					6-P-3	<p>Connect city parks with other public facilities, open spaces, employment centers, and residential neighborhoods by locating new recreation facilities in proximity to these uses and by fully integrating the parks system with the city's pedestrian, bicycle, and transit systems.</p>
		6-P-3	<p>Proposed parks, and proposed expansion of existing parks, as designated on the General Plan Land Use Map, are parcel specific, and shall be dedicated as a condition of development entitlements.</p>		6-P-4	<p>Proposed parks, and proposed expansion of existing parks, as designated on the General Plan Land Use Map, are parcel specific, and shall be dedicated as a condition of development entitlements, consistent with federal, state and local law. Dedication requirements for development subject to the Quimby Act (Government Code Sec. 66477) shall be consistent with the</p>

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			requirements of that Act.
			6-P-5 New parkland or recreation facilities, beyond those identified in the General Plan, may be required as part of any development review and entitlement process.
	6-P-5 Maintain a park standard of 5 acres per 1,000 residents, in order to enhance the physical environment of the city and to meet the recreation needs of the community A. Revise the City's park in lieu fees/dedication requirements to match the General Plan standard of 5 acres per 1,000 residents.		6-P-6 Achieve and maintain a park standard of 5 acres per 1,000 residents (community park land at 3 acres per 1,000 population and neighborhood park land at 2 acres per 1,000 population) and an open space/urban separator standard of 10 acres per 1,000 population, in order to enhance the physical environment of the city and to meet the recreation needs of the community. A. Revise the City's park in lieu fees/dedication requirements to match the General Plan standard of 5 acres per 1,000 residents (community park land at 3 acres per 1,000 population and neighborhood park land at 2 acres per 1,000 population).
	6-P-6 Neighborhood parks are donated, constructed, and maintained within the developing property(ies). In addition to the donation and improvements, park impact fees shall be paid to offset costs associated with developing, upgrading, and maintaining community parks. Transfer of density from the donated park acreage may be considered where deemed appropriated by the City Council. A. Revise the City's Municipal Code to require dedication of neighborhood park land, and construction of associated neighborhood park improvements, in addition to the payment of park impact fees, eliminating the reimbursement component for neighborhood parks. B. Establish a transfer of development rights (TDR) program that allows project proponents on whose sites new parkland locations are designated, to transfer development rights from portions of the site dedicated as public open		6-P-7 Neighborhood parks are donated, constructed, and maintained within the developing property(ies). The formation of landscape assessment districts to offset costs associated with developing, upgrading, and maintaining community parks may be imposed as a condition of development. Transfer of density within a project site from donated acreage in excess of dedication/in lieu requirements may be considered where deemed appropriate by the City Council. Park impact fees shall also be required prior to issuance of building permits in all cases where they can be legally imposed pursuant to City ordinance. A. Review and, if necessary, revise the City's Municipal Code regarding the payment of community park impact fees to maximize all opportunities for funding community and neighborhood parkland, park improvements and park operation and maintenance through the development entitlement process. B. Establish a transfer of development rights (TDR) program that allows project proponents on whose sites new

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			<p>space/park beyond required dedication/in lieu requirements (5 acres per 1,000 residents) to the remainder of the site at a ratio of 1.5 x base land use designation on the site, subject to approval by the City Council and provided the following criteria are met:</p> <ul style="list-style-type: none"> <li>• The resulting park area meets the minimum size and location requirements shown in Table 6.1-8 and Figure 6-1;</li> <li>• The park/open space is useful for recreational use, and not just leftover acreage;</li> <li>• The park/open space is physically and perceptually available to the community-at-large, and not internal to the development;</li> <li>• The resulting transfer will not unduly impact the character of the neighborhood where the development is located; and</li> <li>• The park/open space is not at the city's edge, adjacent to an urban separator.</li> </ul>			<p>neighborhood parkland locations are designated, to transfer development rights from portions of the site dedicated as public open space/park beyond required dedication/in lieu requirements (2 acres of neighborhood park per 1,000 residents) to the remainder of the site at the base land use designation on the site, subject to approval by the City Council and provided the following criteria are met:</p> <ul style="list-style-type: none"> <li>• The resulting park area meets the minimum size and location requirements shown in Table 6.1-8 and Figure 6-1;</li> <li>• The park/open space is useful for recreational use, and not just leftover acreage;</li> <li>• The park/open space is physically and perceptually available to the community-at-large, and not internal to the development;</li> <li>• The resulting transfer will not unduly impact the character of the neighborhood where the development is located; and</li> <li>• The park/open space is not at the city's edge, adjacent to an urban separator.</li> </ul>
					6-P-9	<p>Recognizing that schools are community assets, continue to actively promote and coordinate joint use of school properties as neighborhood parks and recreation program sites to help meet the community's demand for additional recreational facilities while realizing the cost benefits from the shared use of publicly-owned land.</p> <p>A. Create a program for shared renovation and maintenance of all recreational facilities (city and school district lands) through a possible city-wide assessment which will be in addition to current funding provided for renovation and maintenance of those facilities by the responsible agency or authority.</p>
		6-P-9	Continue to coordinate joint use of school properties		6-P-	Continue cooperating, and pursue expansion, with the local

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			as neighborhood parks and recreation program sites with school districts, which will help meet the community's demand for additional recreational facilities while realizing the cost benefits from the shared use of publicly-owned land.	10	school districts to allow public use of school open space, playfields and facilities to achieve a ratio of 1 acre per 1,000 residents, to augment the City owned recreational facilities.
		6-P-12	Maintain the existing Petaluma Swim Center and Skate Park until new, comparable sites are identified, acquired and construction funding secured for these uses.	6-P-13	<p>Recognize, maintain, and improve aquatics programs as a key element of Petaluma's Parks and Recreation Services.</p> <p>A. If the existing Petaluma Swim Center should be slated for replacement, retain the existing facility until a new, comparable site is identified, acquired, funding secured, and construction completed.</p> <p>B. Maintain and improve the current level of aquatics programming in Petaluma by operating Petaluma swim facilities with a season extending from March 1 to October 30, and with the goal of year-round operation. • A. A. B. Use an enhanced program mix based on consumer preference, and with continuing efforts to increase patronage at the Swim Center through marketing, advertising and by promoting website access.</p> <p>C. Produce an Aquatic Plan to ensure that a full range of aquatic programs are provided in Petaluma.</p> <ul style="list-style-type: none"> <li>• The Aquatic Plan shall analyze the projected population and demographic changes in Petaluma and the anticipated impact of those changes on the future demand for aquatic facilities and programs.</li> <li>• The Aquatic Plan shall evaluate the current capacity of Petaluma's aquatic facilities, taking into consideration the impact of proposed development adjacent to the Petaluma Swim Center site and beyond, and project the viability of those facilities to meet the projected demand. The Aquatic Plan shall also recognize that the Petaluma pool is a unique recreational facility in the North Bay and should be considered in terms of potential programming and economic sustainability.</li> </ul>

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					<ul style="list-style-type: none"> <li>Based on that evaluation, the Aquatic Plan shall identify improvements, enhancements or replacement of existing facilities, including considerations of disabled access in selecting the location, design and capacity of new facilities.</li> <li>The Aquatic Plan shall address the potential for leveraging resources from the Petaluma School District, local services agencies, Santa Rosa Junior College District, local employers and other governmental entities to address the project demand.</li> <li>The Aquatic Plan shall propose the method and strategy for financing the changes necessary to meet the projected programming demand, with separate provisions for capital replacement, routine capital financing and annual maintenance costs.</li> </ul>
		6-P-13	Work with the Sonoma County Regional Parks Department to encourage the development of Tolay Lake and Lafferty Ranch as an open space and passive use assets for the residents of Petaluma and southern Sonoma County.		6-P-14 Work with the Sonoma County Regional Parks Department and the Sonoma County Board of Supervisors to encourage the development of Tolay Lake as an open space asset for the residents of Petaluma and southern Sonoma County, and to provide regional active parks (athletic fields) in close proximity to Petaluma.
		6-P-14	Work with the Sonoma County Regional Park Department, the Sonoma County Open Space Authority, the Sonoma County Agricultural Preservation and Open Space District, the Sonoma County Water Agency, the Sonoma Land Trust, the Sonoma County Watershed Council, the California State Parks Department, and the California State Coastal Conservancy to develop common goals for open space beyond the Urban Growth Boundary, and coordinate acquisition efforts and priorities.		6-P-15 Work with the Sonoma County Regional Park Department, the Sonoma County Open Space Authority, the Sonoma County Agricultural Preservation and Open Space District, the Sonoma County Water Agency, the Sonoma Land Trust, the Sonoma County Watershed Council, the California State Parks Department, and the California State Coastal Conservancy and other entities to develop common goals for open space beyond the Urban Growth Boundary, and coordinate acquisition efforts and priorities.  A. Continue to maintain Lafferty Ranch as City-owned open space for possible future passive public use.
		6-P-15	Should expansion beyond the 1998 Urban Growth Boundary occur, priority shall be given to		6-P-16 Should expansion beyond the 1998 Urban Growth Boundary occur, priority shall be given to identification and development of

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			identification and development of adequate park lands to meet identified standards and community needs.			adequate park lands to meet identified standards and community needs.
		6-P-16	<p>The City shall work with citizens, businesses, schools, organizations, and public agencies to fund an acceptable level of maintenance for all city-owned park and recreational facilities.</p> <p>A. Create opportunities and incentives, such as public acknowledgements plaques and signs, for other agencies, non-profits, private businesses, and user groups to participate in the provision, development and maintenance of parks, open space, and recreation facilities.</p> <p>B. Establish a program to work with adjacent neighborhoods to take responsibility for their neighborhood parks and urban separators, including the possibility of assuming maintenance needs or costs. Neighborhood parks 'adopted' by the residents shall remain publicly owned and accessible by the community.</p>		6-P-17	<p>Recognizing that the maintenance of City assets is a matter of civic pride, priority and safety, the City shall work with citizens, businesses, schools, organizations, and public agencies to fund an acceptable level of maintenance for all city-owned park and recreational facilities.</p> <p>A. Create opportunities and incentives, such as public acknowledgements plaques and signs, for other agencies, non-profits, private businesses, and user groups to participate in the provision, development and maintenance of parks, open space, and recreation facilities.</p> <p>B. Establish a program to work with adjacent neighborhoods to take responsibility for their neighborhood parks and urban separators, including the possibility of assuming maintenance needs or costs. Neighborhood parks 'adopted' by the residents shall remain publicly owned and accessible by the community.</p>
		6-P-17	Development that occurs adjacent to designated trails and pathway corridors shall be required to install and maintain the publicly owned and accessible trail, in perpetuity.		6-P-18	Development that occurs adjacent to designated trails and pathway corridors shall be required to install and maintain the publicly owned and accessible trail, in perpetuity.
3.4-1	<i>New development may generate additional elementary and secondary school enrollment within all the school districts serving Petaluma.</i>	7-P-12	<p>Work with school districts to ensure availability of appropriate sites for all schools needs and to identify alternative short or long term uses for school facilities and sites that may not be needed because of decreased enrollment.</p> <p>A. Work with the Petaluma school districts to undertake a comprehensive, long-range (10 – 20 years) assessment of enrollment, school sites, and capacities.</p>	Less than Significant	7-P-12	<p>Work with school districts to ensure availability of appropriate sites for all schools needs and to identify alternative short or long term uses for school facilities and sites that may not be needed because of decreased enrollment.</p> <p>A. Work with the Petaluma school districts to undertake a comprehensive, long-range (10 – 20 years) assessment of enrollment, school sites, and capacities.</p>



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					7-P-16	Should expansion of the UGB occur a priority shall be given to analyzing whether new school sites are needed; and if needed, land for future school sites shall be set aside or designated for future school development.
3.4-2	<i>New development under the proposed General Plan requires police and fire protection that exceeds current staffing and facilities.</i>	7-P-17	Achieve and maintain a minimum ratio of one fire suppression personnel per 1,000 population served. A. Fund additional staff to insure minimum ratio is maintained as population increases occur.	Less than Significant	7-P-17	Achieve and maintain a minimum ratio of one fire suppression personnel per 1,000 population served or a similar level of response service to meet increased call volumes. A. Fund additional staff to insure minimum ratio is maintained as population increases occur.
		7-P-18	Ensure facilities, equipment and personnel are adequate to maintain quality of service demands of the community, including but not limited to: fire suppression, Advanced Life Support (ALS), rescue, fire prevention, education, CUPA, and disaster preparedness and management. A. Expand Fire staffing to provide a Training Officer and Emergency Medical Services (EMS) Manager to insure maintaining compliance to Federal and State safety mandates. B. Continue education and training programs to maintain technical proficiency. C. Maintain and modernize emergency response facilities, including fire stations, as needed to accommodate population growth. D. Expand, as needed, staffing in the Fire Prevention Bureau to keep pace with increasing development and fire safety inspection impacts. E. Maintain safety department responsiveness to changes in community demographics (i.e. age, ethnicity). F. Retain a current computed-based records management system to allow monitoring and		7-P-18	Ensure facilities, equipment and personnel are adequate to maintain quality of service demands of the community, including but not limited to: fire suppression, Advanced Life Support (ALS), rescue, fire prevention, education, CUPA, and disaster preparedness and management. A. Expand Fire staffing to provide a Training Officer to insure maintaining compliance to Federal and State safety mandates. B. Continue education and training programs to maintain technical proficiency. C. Maintain and modernize emergency response facilities, including fire stations, as needed to accommodate population growth. D. Expand, as needed, staffing in the Fire Prevention Bureau to keep pace with increasing development and fire safety inspection impacts. E. Maintain safety department responsiveness to changes in community demographics (i.e. age, ethnicity). F. Retain a current computed-based records management system to allow monitoring and evaluation of program performance. G. Continue to upgrade means of communication between

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			evaluation of program performance.			<p>emergency response personnel and emergency service facilities.</p> <p>H. Continue to upgrade communication systems to maintain responsiveness to wireless calls for service.</p> <p>I. Encourage communication compatibility between local and regional systems.</p>
		7-P-19	<p>Maintain a four minute travel time for a total of 6-minute response time for emergencies within the City.</p> <p>A. Require that properties outside of the four-minute (travel) response radii utilize fire-resistant materials and maintain fire breaks surrounding residences.</p> <p>B. Ensure that transportation improvements are provided for additional development so as not to adversely impact emergency response times.</p>		7-P-19	<p>Maintain a four minute travel time for a total of 6-minute response time for emergencies within the City.</p> <p>A. Require that properties outside of the four-minute (travel) response radii utilize fire-resistant materials and maintain fire breaks surrounding residences.</p> <p>B. Ensure that transportation improvements are provided for additional development so as not to adversely impact emergency response times.</p>
		7-P-21	<p>Maintain and expand the Ambulance Enterprise System to meet continued needs in the District.</p> <p>A. Provide a third ALS ambulance within the Petaluma Fire Department.</p> <p>B. Establish and implement an ambulance replacement program.</p> <p>C. Maintain current EMS training to meet industry standards.</p>		7-P-21	<p>Maintain and expand the Ambulance Enterprise System to meet continued needs in the District.</p> <p>A. Provide a third ALS ambulance within the Petaluma Fire Department.</p> <p>B. Establish and implement an ambulance replacement program.</p> <p>C. Maintain current EMS training to meet industry standards.</p>
		7-P-25	<p>Reduce the potential for a catastrophic fire event in the historic Downtown area.</p> <p>A. Complete the fire sprinkler retrofit installation within the historic Downtown business area.</p> <p>B. Maintain and update the business fire safety inspections and pre-incident planning documents (Pre-Plans).</p>		7-P-25	<p>Reduce the potential for a catastrophic fire event in the historic Downtown and other areas.</p> <p>A. Complete the fire sprinkler retrofit installation within the historic Downtown business area.</p> <p>B. Maintain and update the business fire safety inspections and pre-incident planning documents (Pre-Plans).</p> <p>C. Explore requirements and opportunities for direct-link fire alarms.</p>
		7-P-31	Maintain a minimum standard of 1.4 police officers		7-P-	Maintain a minimum standard of 1.3 police officers per 1,000 population or a similar level of coverage to meet increased

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			per 1,000 population. A. Consider funding additional staff to ensure the minimum ratio is maintained as the population increases.		31	service calls.. A. Provide additional staff to ensure the minimum ratio is maintained as the population increases.
		7-P-32	Develop and use the City's Computer Aided Dispatch System (CAD) and Records Management System (RMS) for analysis of issues, crime trends and response times.		7-P-32	Develop and use the City's Computer Aided Dispatch System (CAD) and Records Management System (RMS) for analysis of issues, crime trends and response times.
		7-P-33	Pursue a long-term strategy for funding education and crime prevention programs recognizing that the costs of education and prevention are more effective in reducing crime than the costs of apprehending, prosecuting and incarcerating criminals.		7-P-33	Pursue a long-term strategy for funding education and crime prevention programs recognizing that the costs of education and prevention are more effective in reducing crime than the costs of apprehending, prosecuting and incarcerating criminals.
		7-P-34	Plan for expanding or replacing the police station with a facility of sufficient size to accommodate police operations, community requirements and the anticipated population growth.		7-P-34	Plan for expanding or replacing the police station with a facility of sufficient size to accommodate police operations, community requirements and the anticipated population growth. Funding of expanded facilities should be addressed through the implementation of adequate Public Facilities fees as identified in the Implementation Plan.
		7-P-35	Incorporate into new development, to the extent deemed appropriate and feasible, the Development Code Urban Design Standards for crime prevention.		7-P-35	Incorporate into new development, to the extent deemed appropriate and feasible, the Development Code Urban Design Standards for crime prevention.
		7-P-36	Ensure adequate police staff to provide rapid and timely response to all emergencies and maintain the capability to have minimum average response times. Actions that could be taken to ensure rapid and timely response to all emergencies include: A. Analyze and monitor factors affecting response time (population growth, police staffing, and community policing programs) and average response times as guide-lines based on past experience. B. Maintain, train, and equip special response teams for extraordinary or extremely hazardous emergency incidents.		7-P-36	Ensure adequate police staff to provide rapid and timely response to all emergencies and maintain the capability to have minimum average response times. Actions that could be taken to ensure rapid and timely response to all emergencies include: A. Analyze and monitor factors affecting response time (population growth, police staffing, and community policing programs) and average response times as guide-lines based on past experience. B. Maintain, train, and equip special response teams for extraordinary or extremely hazardous emergency incidents.

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3.4-3	<i>New development under the proposed General Plan requires emergency preparedness that may exceed the capabilities of the existing programs.</i>	7-P-22	<p>Ensure emergency response equipment and personnel training are adequate to follow the procedures contained within the Emergency Operations Plan for a major event, through maintaining and updating, as appropriate, the City's emergency preparedness programs, plans, and procedures to ensure the health and safety of the community in the event of an earthquake or other disaster.</p> <p>A. Review and update City department Disaster Operation Guides (DOGs) as needed.</p> <p>B. Provide training to all City personnel to remain current with all State and Federal mandated training for disaster preparedness (i.e. NIMS).</p> <p>C. Conduct training exercises for city personnel to simulate man-made or natural disasters.</p> <p>D. Consider the need, and fiscal feasibility, of providing a dedicated Disaster Coordinator.</p> <p>E. The Fire Department should provide the training and organization for community based volunteers who can provide localized assistance within their neighborhoods during an emergency.</p>	Less than Significant	7-P-22	<p>Ensure emergency response equipment and personnel training are adequate to follow the procedures contained within the Emergency Operations Plan for a major event, through maintaining and updating, as appropriate, the City's emergency preparedness programs, plans, and procedures to ensure the health and safety of the community in the event of an earthquake or other disaster.</p> <p>A. Review and update City department Disaster Operation Guides (DOGs) as needed.</p> <p>B. Provide training to all City personnel to remain current with all State and Federal mandated training for disaster preparedness (i.e. NIMS).</p> <p>C. Conduct training exercises for city personnel to simulate man-made or natural disasters.</p> <p>D. Consider the need, and fiscal feasibility, of providing a dedicated Disaster Coordinator.</p> <p>E. The Fire Department should provide the training and organization for community based volunteers who can provide localized assistance within their neighborhoods during an emergency.</p>
		7-P-23	<p>Continue to utilize the Emergency Operations Center (EOC) to provide early warning of and response to all life-threatening hazards, such as earthquakes, floods, landslides, severe storms, and hazardous materials incidents.</p> <p>A. Evaluate the effectiveness of the EOC facility and consider relocation to other city facilities to improve emergency operations and coordination.</p>		7-P-23	<p>Continue to utilize the Emergency Operations Center (EOC) to provide early warning of and response to all life-threatening hazards, such as earthquakes, floods, landslides, severe storms, and hazardous materials incidents.</p> <p>A. Evaluate the effectiveness of the EOC facility and consider relocation to other city facilities to improve emergency operations and coordination.</p> <p>B. Support the establishment of, and publicize a low power FM radio station with links to the Emergency Alert system and the Petaluma Emergency Operations Center to keep the public informed during emergencies and disasters. Coordinate operation of this station with KPCA.</p>

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		7-P-24	Ensure that critical facilities, including medical centers, school facilities, and other structures that are important to protecting health and safety in the community, remain operative during emergencies. A. Work with local hospitals and school districts to coordinate planning, communication and response.		7-P-24	Ensure that critical facilities, including medical centers, school facilities, and other structures that are important to protecting health and safety in the community, remain operative during emergencies. A. Work with local hospitals and school districts to coordinate planning, communication and response.
		7-P-28	Expand the capability of the Fire Department to respond to River related emergencies. A. With revitalization of the Downtown and the Petaluma River corridor, along with increased river activities, purchase a new rescue/fire boat and relocate it on the River for better response times and increased opportunities for emergency response.		7-P-28	Expand the capability of the Fire Department to respond to River related emergencies. A. With revitalization of the Downtown and the Petaluma River corridor, along with increased river activities, purchase a new rescue/fire boat and relocate it on the River for better response times and increased opportunities for emergency response.
3.4-4	<i>Development near the Urban Growth Boundary may increase risk from wild land fires due to the proximity of development to open areas of grassland or chaparral.</i>	7-P-19	Maintain a four minute travel time for a total of 6-minute response time for emergencies within the City. A. Require that properties outside of the four-minute (travel) response radii utilize fire-resistant materials and maintain fire breaks surrounding residences. B. Ensure that transportation improvements are provided for additional development so as not to adversely impact emergency response times.	Less than Significant	7-P-27	Reduce the impacts of wildland fires. A. Develop a program and standards to address the increased fire risk associated with development within the Urban Interface areas to the West. B. Continue the annual Weed Abatement Program. C. Continue the regulation of fireworks city wide, D. Consider the prohibition of the sale and use of fireworks within the City, with the exception of city sanctioned and permitted events with appropriate City standards in place.
3.5-1	<i>New development that would result from the proposed General Plan may increase water demand that may exceed available supply.</i>	8-P-1	Optimize the use of imported water from the SCWA to provide adequate water for present and future uses. A. Prepare, implement, and maintain long-term, comprehensive water supply plans and options in cooperation with the appropriate state and federal agencies, regional authorities, water utilities, and local governments. B. Support regional efforts towards ensuring that imported water is reliable, cost-effective, and is of high quality.	Less than Significant	8-P-1	Optimize the use of imported water from the SCWA to provide adequate water for present and future uses. A. Prepare, implement, and maintain long-term, comprehensive water supply plans and options in cooperation with the appropriate state and federal agencies, regional authorities, water utilities, and local governments. B. Support regional efforts towards ensuring that imported water is reliable, cost-effective, and is of high quality.

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		8-P-2	Work toward development and execution of new water supply agreements with SCWA to ensure adequate potable water.		8-P-2	Continue to work to maintain water supply agreements with SCWA to ensure adequate potable water.
		8-P-3	Work with Sonoma County Water Agency on the South Transmission System Project to develop the parallel aqueduct along the City's preferred eastside alignment in order to improve reliability of water supplies.		8-P-3	Work with Sonoma County Water Agency on the South Transmission System Project to develop the parallel aqueduct along the City's preferred eastside alignment in order to improve reliability of water supplies.
		8-P-4	<p>The City shall routinely assess its ability to meet demand for potable water.</p> <p>A. The City shall continue to monitor the demand for water for projected growth against actual use, and ensure that adequate water supply is in place prior to, or in conjunction with, project entitlements.</p> <p>B. The City planning staff will discuss water supply with the developer for each new development early in the planning process and inform Water Resources staff of upcoming demands as provided by the applicant.</p> <p>C. The Community Development Department shall maintain a tiered development record to monitor pending and projected developments to allow a reasonable forecast, by the Water Resources Department, of projected water demand.</p> <p>D. The City shall upgrade utility billing software as necessary to provide the ability to efficiently track and project water demand trends including, but not limited to, the following parameters:</p> <ul style="list-style-type: none"> <li>• Land use categories</li> <li>• Customer classifications</li> </ul>		8-P-4	<p>The City shall routinely assess its ability to meet demand for potable water.</p> <p>A. The City shall continue to monitor the demand for water for projected growth against actual use, and ensure that adequate water supply is in place prior to, or in conjunction with, project entitlements.</p> <p>B. The City planning staff will discuss water supply with the developer for each new development early in the planning process and inform Water Resources staff of upcoming demands as provided by the applicant.</p> <p>C. The Community Development Department shall maintain a tiered development record to monitor pending and projected developments to allow a reasonable forecast, by the Water Resources Department, of projected water demand.</p> <p>D. The City shall upgrade utility billing software as necessary to provide the ability to efficiently track and project water demand trends including, but not limited to, the following parameters:</p> <ul style="list-style-type: none"> <li>• Land use categories</li> <li>• Customer classifications</li> </ul>
		8-P-5	<p>Develop alternative sources of water to supplement imported supply.</p> <p>A. Expand the use of recycled water to offset potable demand.</p>		8-P-5	<p>Develop alternative sources of water to supplement imported supply.</p> <p>A. Expand the use of recycled water to offset potable demand.</p> <p>B. Expand water conservation to further improve the efficient</p>

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			<p>B. Expand water conservation to further improve the efficient use of potable water.</p> <p>C. Continue to use groundwater to meet emergency needs.</p>			<p>use of potable water.</p> <p>C. Continue to use groundwater to meet emergency needs.</p>
		8-P-6	The City shall utilize the Water Demand and Supply Analysis Report, June 2006 and any amendments thereto, for monitoring, assessing, and improving the City's municipal water supply.		8-P-6	<p>The City shall utilize the Water Demand and Supply Analysis Report, June 2006 and any amendments thereto, for monitoring, assessing, and improving the City's municipal water supply.</p> <p>A. Require implementation of adopted Water Master Plan through conditions of approval for all public and private development.</p>
		8-P-7	Limit the provision of potable water service to lands within the Urban Growth Boundary with the exception of the provisions outlined in the Urban Growth Boundary measure and incorporated into Chapter 2 Land Use, Growth Management, and the Built Environment.		8-P-7	Limit the provision of potable water service to lands within the Urban Growth Boundary with the exception of the provisions outlined in the Urban Growth Boundary measure and incorporated into Chapter 2 Land Use, Growth Management, and the Built Environment.
3.5-2	<i>New development may result in the need to expand new wastewater treatment facilities, the construction of which may cause significant environmental effects.</i>	8-P-9	<p>Provide tertiary recycled water for irrigation of parks, playfields, schools, golf courses and other landscape areas to reduce potable water demand.</p> <p>A. The City will expand the Ellis Creek Water Recycling Facility to provide tertiary and secondary recycled water as outlined in the Recycled Water Master Plan.</p> <p>B. Operate and maintain the Ellis Creek Water Recycling Facility to produce recycled water to regulatory standards.</p>	Less than Significant	8-P-9	<p>Provide tertiary recycled water for irrigation of parks, playfields, schools, golf courses and other landscape areas to reduce potable water demand.</p> <p>A. Expand the Ellis Creek Water Recycling Facility to provide tertiary and secondary recycled water as outlined in the Recycled Water Master Plan.</p> <p>B. Operate and maintain the Ellis Creek Water Recycling Facility to produce recycled water to meet or exceed current regulatory standards.</p>
		8-P-10	<p>The City may require the use of recycled water through the City entitlement process.</p> <p>A. New development may be required to install a separate recycled water system as deemed necessary and appropriate by the City to offset potable demand.</p> <p>B. The City will evaluate where the most</p>		8-P-10	<p>The City may require the use of recycled water through the City entitlement process.</p> <p>A. New development may be required to install a separate recycled water system as deemed necessary and appropriate by the City to offset potable demand.</p> <p>B. Evaluate where the most appropriate potable water offset</p>

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			<p>appropriate potable water offset improvements can be implemented through the City's entitlement process.</p> <p>C. The City shall determine the appropriate means of potable offset, individual project systems may be required in addition to City-required improvements and/or fees relating to the recycled water offset system.</p>		<p>improvements can be implemented through the City's entitlement process.</p> <p>C. Determine the appropriate means of potable offset. Individual project systems may be required in addition to City-required improvements and/or fees relating to the recycled water offset system.</p>
		8-P-11	The City may continue to work with agricultural users to reuse secondary recycled water. In addition, the City may purchase land as a backup reuse site, if deemed necessary and appropriate to meet system needs.		8-P-11 Continue to work with agricultural users to reuse secondary recycled water. In addition, the City may purchase land as a backup reuse site, if deemed necessary and appropriate to meet system needs.
		8-P-12	The City will provide water of adequate quality and quantity to meet customer needs. The City, at its sole discretion, will determine whether a given customer's supply will be potable water, tertiary recycled water, secondary recycled water, groundwater, or a combination of these.		8-P-12 Provide water of adequate quality and quantity to meet customer needs. The City, at its' sole discretion, during the environmental review and entitlement process, will determine whether a given customer's supply will be potable water, tertiary recycled water, secondary recycled water, groundwater, or a combination of these.
		8-P-13	The City will work to convert existing potable water customers identified under the City's Recycled Water Master Plan to tertiary recycled water as infrastructure and water supply becomes available.		8-P-13 Work to convert existing potable water customers identified under the City's Recycled Water Master Plan to tertiary recycled water as infrastructure and water supply becomes available.  A. Require implementation of adopted Recycled Water Program improvements through conditions of approval for all public and private development.
		8-P-14	The water recycling facility shall be operated and maintained in compliance with all State and Federal permit requirements.		8-P-14 The water recycling facility shall be operated and maintained in compliance with all State and Federal permit requirements.
		8-P-15	Capacity of the water recycling facility shall be maintained, and expanded as necessary, to keep pace with the city's growth.		8-P-15 Capacity of the water recycling facility shall be maintained, and expanded as necessary, to keep pace with the city's growth.  A. Require implementation of adopted Water Recycling Facility master Plan and distribution program improvements through conditions of approval for all public



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						and private development.
		8-P-16	Comply with the current Statewide General Waste Discharge Requirements concerning the operation and maintenance of the City's sanitary sewer collection system A. Perform condition assessment of existing facilities. B. Survey facilities and maintain current system maps. C. Perform regular cleaning and inspection to help eliminate sanitary sewer overflows. D. Fund collection system infrastructure replacement on a 100-year life cycle. E. Regularly update the sanitary sewer flow model and make improvements necessary to support development.		8-P-16	Comply with the current Statewide General Waste Discharge Requirements concerning the operation and maintenance of the City's sanitary sewer collection system A. Perform condition assessment of existing facilities. B. Survey facilities and maintain current system maps. C. Perform regular cleaning and inspection to help eliminate sanitary sewer overflows. D. Fund collection system infrastructure replacement on a 100-year life cycle. E. Regularly update the sanitary sewer flow model and make improvements necessary to support development.
		8-P-17	Maintain and expand public access and educational opportunities at the Ellis Creek Water Recycling Facility.		8-P-17	Maintain and expand public access and educational opportunities at the Ellis Creek Water Recycling Facility.
3.5-3	<i>The proposed General Plan could result in wasteful, inefficient, or unnecessary consumption of energy by residential, commercial, industrial, or public uses.</i>	4-P-14	Develop and adopt local energy standards that would result in less energy consumption than standards set by the California Energy Commission's (CEC) Title 24. <i>The State of California addresses energy conservation through Title 24 "Energy Efficiency Standards for Residential and Nonresidential Buildings." Whereas Title 24 applies to new buildings, much of the City west of Highway 101 was developed prior to 1953 and there is a tremendous opportunity to encourage greater energy efficiency in Petaluma's older structures. Energy-efficient air conditioners, high-efficiency lighting, photocell dimming, higher insulation levels, and reflective rooftops are examples of standards that could reduce energy consumption in new and existing</i>	Less than Significant	4-P-18	Develop and adopt local energy standards that would result in less energy consumption than standards set by the California Energy Commission's (CEC) Title 24. <i>The State of California addresses energy conservation through Title 24 "Energy Efficiency Standards for Residential and Nonresidential Buildings." Whereas Title 24 applies to new buildings, much of the City west of Highway 101 was developed prior to 1953 and there is a tremendous opportunity to encourage greater energy efficiency in Petaluma's older structures. Energy-efficient air conditioners, high-efficiency lighting and glass, automatic controls for lighting, photocell dimming, higher insulation levels, and reflective rooftops are examples of standards that could reduce energy consumption in new and existing buildings.</i> A. Identify and implement energy conservation measures

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	<p><i>buildings.</i></p> <p>A. Identify and implement energy conservation measures that are appropriate for public buildings.</p> <p>B. Identify energy conservation measures appropriate for retrofitting existing structures. Work with local energy utility to encourage incentive programs for retrofitting. Consider the use of alternative transportation fuels among City-owned vehicles and the Petaluma Transit system to reduce dependence on petroleum-based fuels and improve local air quality. In 2002, the City of Petaluma adopted a Clean City Fleets resolution. The Clean Fleets Program, sponsored by the American Lung Association, directs local government staff to purchase the cleanest vehicle for municipal fleets</p>		<p>that are appropriate for public buildings and facilities, such as:</p> <ul style="list-style-type: none"> <li>• Schedule energy efficiency “tune-ups” of existing buildings and facilities.</li> <li>• Institute a lights-out-at-night policy in all public buildings where feasible.</li> <li>• Continue to retrofit older lighting fixtures in City facilities until all buildings have been upgraded.</li> <li>• Where new traffic signals or crosswalk signals are installed, or existing signals are upgraded, continue to use LED bulbs or other equivalent efficient technology that may develop.</li> <li>• Evaluate the possibility of decreasing the average daily time streets lights are on.</li> <li>• Periodically evaluate the efficiency of potable and sewer pumping facilities and identify measures to improve pumping efficiency.</li> <li>• Encourage the County of Sonoma to upgrade existing, inefficient facilities which serve Petaluma (e.g. potable water pumping facilities).</li> </ul> <p>B. Identify energy conservation measures appropriate for retrofitting existing structures. Work with local energy utility to encourage incentive program for retrofitting. Consider the use of alternative transportation fuels among City-owned vehicles and the Petaluma Transit system to reduce dependence on petroleum-based fuels and improve local air quality. Continue to replace traditional fuel vehicles in the City’s fleet with alternative fuel vehicles and/or zero/low emission vehicles, as appropriate. When selecting alternative fuel vehicles consider the “full cycle” of emissions for the different fuel types.</p> <p><i>In 2002, the City of Petaluma adopted a Clean City Fleets</i></p>

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					<p><i>resolution. The Clean Fleets Program, sponsored by the American Lung Association, directs local government staff to purchase the cleanest vehicle available for municipal fleets.</i></p> <p>C. Investigate and implement alternative sources of renewable power (e.g. solar photovoltaic) to supply City facilities, solar water heating at the Petaluma Swim Center, and cogeneration at the Ellis Creek Water Recycling Facility.</p>
		4-P-15	<p>Encourage use and development of renewable or nontraditional sources of energy.</p> <p>A. Participate in state and local efforts to develop appropriate policies and review procedures for the institution of renewable energy sources such as solar, wind, geothermal, and hydroelectric power.</p> <p><i>One such effort began in August 2005, when the City adopted a resolution requiring developers of residential projects of 5 or more units to wire all units for future photo voltaic arrays.</i></p> <p><i>In addition, the State's Emerging Renewables Buydown Program provides rebates to consumers who install qualifying energy systems, such as photo voltaic wind turbines, and fuel cells. As of July 2005, nearly 80 participants from within Petaluma have been involved with the program through the use of solar energy systems.</i></p> <p>B. Adopt green building code to allow use of alternative building materials and methods, under a discretionary review process.</p> <p>C. Work with the Petaluma Area Chamber of Commerce and PG&amp;E in encouraging local businesses to undertake energy audits and implement energy reduction improvements.</p>	4-P-19	<p>Encourage use and development of renewable or nontraditional sources of energy.</p> <p>A. Participate in state and local efforts to develop appropriate policies and review procedures for the institution of renewable energy sources such as solar, wind, geothermal, and hydroelectric power.</p> <p><i>One such effort began in August 2005, when the City adopted a resolution requiring developers of residential projects of 5 or more units to wire all units for future photo voltaic arrays.</i></p> <p><i>In addition, the State's Emerging Renewables Buydown Program provides rebates to consumers who install qualifying energy systems, such as photo voltaic, wind turbines, and fuel cells. As of July 2005, nearly 80 participants from within Petaluma have been involved with the program through the use of solar energy systems.</i></p> <p>B. Implement green building code to allow use of alternative building materials and methods, under a discretionary review process.</p> <p>C. Work with the Petaluma Area Chamber of Commerce and PG&amp;E in encouraging local businesses to undertake energy audits and implement energy reduction improvements.</p> <p>D. Consider the feasibility of requiring a percentage of new development to meet 50% of their energy needs from fossil fuel alternatives (e.g. solar panels, etc.).</p>

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			D. Consider the feasibility of requiring a percentage of new development to meet 50% of their energy needs from fossil fuel alternatives (e.g., solar panels, etc.).			
3.5-4	<i>The proposed General Plan could require the need for additional energy facilities, the construction of which could have significant environmental impacts.</i>	NA		Less than Significant		See 4-P-19, above.
3.5-5	<i>The proposed General Plan could cause a substantial increase in transportation energy consumption due to the projected increases in trips associated with future population and employment growth.</i>	5-P-13	Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak-period trip generation. <ul style="list-style-type: none"> <li>A. Study the feasibility of a citywide TDM program that would be funded by annual fees or assessments on new development.</li> <li>B. Assign a proportion of TDM fees to Petaluma Transit for expansion of service and future fare reductions or fare elimination.</li> <li>C. As part of the development code, require TDM measures for all new non-residential development.</li> <li>D. Assign trip reduction credits and reduced transportation impact fees for demonstrated commitment to TDM strategies.</li> <li>E. Reduce parking requirements for mixed-use developments and for developments providing shared parking or a TDM program.</li> </ul>	Less than Significant	5-P-1	See Impact 3.10-1, policy 5-P-13

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			<p>F. Establish a TDM program for City of Petaluma employees.</p> <p>G. Collaborate with Santa Rosa Junior College to minimize the impact of future enrollment growth on local traffic and parking demand, such as through TDM measures, limitations on parking near the College and on-campus parking management.</p>			
3.5-6	<i>New development may result in increased demand for solid waste disposal at the County landfill.</i>	4-P-16	Continue to work toward reducing solid waste and increasing recycling, in compliance with the Countywide Integrated Waste Management Plan (CoIWMP).	Less than Significant	4-P-21	<p>Reduce solid waste and increase recycling, in compliance with the Countywide Integrated Waste Management Plan (CoIWMP).</p> <p>A. Work with Sonoma County to identify environmental and economical means to meet the need for solid waste disposal.</p> <p>B. Require new or remodeled multifamily residential and all non-residential development to incorporate sufficient, attractive, and convenient interior and exterior storage areas for recyclables and green waste.</p> <p>C. Continue to encourage waste reduction and recycling at home and in businesses through public education programs, such as informational handouts, on recycling, yard waste, wood waste, and hazardous waste.</p> <p>D. Develop a residential and commercial food waste composting program.</p> <p>E. Purchase goods containing recycled materials for City use.</p> <p>F. Continue to cooperate, require, and/or support the operation of resource recovery facilities by the City waste hauler and the disposal site operators.</p> <p>G. Investigate and replace bottled water in City offices with alternate source of drinking water.</p> <p>H. Ensure that all public facilities have adequate and accessible depositories for recyclables.</p>
		4-P-17	Work with Sonoma County to identify environmental and economical means to meet the need for solid			See 4-P-21.A.

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			waste disposal.			
		4-P-18	Require new or remodeled multifamily residential and all non-residential development to incorporate attractive and convenient interior and exterior storage areas for recyclables.			See 4-P-21.B.
		4-P-19	Continue to encourage waste reduction and recycling at home and in businesses through public education programs, such as information handouts on recycling, yard waste, wood waste, and hazardous waste.			See 4-P-21.C.
		4-P-20	Consider development of a residential and commercial food waste composting program.			See 4-P-21.D.
		4-P-21	Purchase goods containing recycled materials for City use, to the extent possible.			See 4-P-21.E.
					4-P-22	Require future waste contract negotiations to include the following: A. Disposal of City waste products at a site with the least potential for environmental impacts. B. Discussion on resource recovery services for Petaluma waste. C. The identification of recycling and waste stream diversion goals.
3.6-1	<i>Buildout of the General Plan 2025 may degrade water quality.</i>	8-P-37	Due to potential positive impact to increased water discharge, all development activities shall be constructed and maintained in accordance with Phase 2 National Pollutant Discharge Elimination System (NPDES) permit requirements. A. The Water Resources and Conservation Department shall review, and have the authority to conditionally approve; all development permits to insure compliance with NPDES Phase 2 requirements (adopted 2003 or thereafter amended). B. Maintain, update as needed, and implement the City's Storm Water Management Plan to retain	Less than Significant	8-P-39	All development activities shall be constructed and maintained in accordance with Phase 2 National Pollutant Discharge Elimination System (NPDES) permit requirements. A. The Water Resources and Conservation Department shall review, and have the authority to conditionally approve, all development permits to insure compliance with NPDES Phase 2 requirements. B. Maintain, update as needed, and implement the City's Storm Water Management Plan to retain a current storm water discharge permit with the California Regional Water Quality Control Board. C. A funding mechanism, such as a storm water utility fee connected to the waste water collection fee, shall be

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			a current storm water discharge permit with the California Regional Water Quality Control Board.			implemented by the City to insure a dedicated source of funds is available for all surface water drainage system maintenance and improvement needs.
3.6-2	<i>Buildout of the General Plan 2025 may increase depletion of groundwater supply or substantially interfere with groundwater recharge.</i>	8-P-20	<p>Manage groundwater as a valuable and limited shared resource by protecting potential groundwater recharge areas and stream sides from urban encroachment within the Petaluma watershed.</p> <p>A. The City will use discretionary permits to control construction of impervious surfaces in groundwater recharge areas. Potential recharge area protection measures at sites in groundwater recharge areas include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Restrict coverage by impervious materials;</li> <li>• Limit building or parking footprints;</li> <li>• Require construction of percolation ponds on site;</li> <li>• Require surface drainage swales.</li> </ul> <p>B. Urge the County when receiving development applications to examine the combined impacts of new septic tanks placed in proximity to wells. The County should examine the cumulative impacts of the allowed development densities in the West Petaluma Specific Plan area and compare the results to established water quality standards. Test wells should be required prior to issuing any building permits.</p>	Less than Significant	8-P-20	<p>Manage groundwater as a valuable and limited shared resource by protecting potential groundwater recharge areas and stream sides from urban encroachment within the Petaluma watershed.</p> <p>A. The City will use discretionary permits to control construction of impervious surfaces in groundwater recharge areas. Potential recharge area protection measures at sites in groundwater recharge areas include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Restrict coverage by impervious materials;</li> <li>• Limit building or parking footprints;</li> <li>• Require construction of percolation ponds on site;</li> <li>• Require surface drainage swales.</li> </ul> <p>B. Urge the County when receiving development applications to examine the combined impacts of new septic tanks placed in proximity to wells and the ability to maintain adequate protection of groundwater resources. The County should examine the cumulative impacts of the allowed development densities in the West Petaluma Specific Plan area and compare the results to established water quality standards. Test wells should be required prior to issuing any building permits.</p>
3.6-3	<i>Buildout of the proposed General Plan may increase drainage flows as a result of</i>	8-P-28	The area upstream of the Corps weir, and below the confluence to Willowbrook Creek with the Petaluma River, located within the 1989 FEMA floodplain (and any amendments thereto) and adjacent to the Petaluma River, shall include a Petaluma River Corridor (PRC) set aside for the design and	Less than Significant	8-P-28	The area upstream of the Corps weir, and below the confluence to Willowbrook Creek with the Petaluma River, located within the 1989 FEMA floodplain (and any amendments thereto) and adjacent to the Petaluma River, shall include a Petaluma River Corridor (PRC) set aside for the design and construction of a flood terrace system to allow the River to accommodate a 100-

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<p><i>impervious surfaces, thereby altering the existing drainage patterns.</i></p>		<p>construction of a flood terrace system to allow the River to accommodate a 100-year storm event within a modified River channel.</p> <p>A. The Water Resources and Conservation Department shall work with the Community Development Department, through the project entitlement process, to insure the PRC is implemented at the cost of the development.</p> <p>B. Maintenance, in perpetuity, of the PRC and applicable flood terrace, storm water flow capacity, environmental habitat and public access improvements shall be maintained, through a funding mechanism approved by the City, as a condition of project entitlement.</p>			<p>year storm event within a modified River channel, to the extent feasible given existing physical and natural constraints.</p> <p>A. The Water Resources and Conservation Department shall work with the Community Development Department, through the project entitlement process, to insure the PRC is implemented at the cost of the development.</p> <p>B. Maintenance, in perpetuity, of the PRC and applicable flood terrace, storm water flow capacity, environmental habitat and public access improvements shall be maintained, through a funding mechanism approved by the City, as a condition of project entitlement.</p>
	8-P-29	<p>Working with SCWA and the Sonoma County Board of Supervisors, the City shall identify the necessary setbacks for the Willowbrook, Marin, and Liberty Creek corridors within the Petaluma Planning Referral Area to include a Creek Corridor set aside for the design and construction of a flood terrace system to allow the Creeks to accommodate a 100 year storm event within a modified creek channel.</p> <p>A. The City Water Resources and Conservation Department shall work with the SCWA to implement the Petaluma River Watershed Master Drainage Plan (SWCA, June 2003 or future update).</p> <p>B. The City Water Resources and Conservation Department shall work with the SCWA to study the feasibility, and subsequently implement, a regional serving detention/retention basin system to reduce localized flooding, provide seasonal agricultural water sources, and offer</p>		8-P-29	<p>The City of Petaluma, SCWA, Sonoma County and other responsible agencies shall be encouraged to work together in order to create and adopt a flood management plan, or plan amendment to the Petaluma River Watershed Master Drainage Plan (SCWA, June 2003), for the Petaluma River watershed implementing the following regional surface water solutions:</p> <p>A. Establish a creek corridor Creek setback for the design and construction of a flood terrace system to allow Willowbrook, Marin, and Liberty Creeks to accommodate a 100 year storm event within a modified creek channel, to the extent possible given natural and physical constraints.</p> <p>B. Within a 200' setback from centerline of the River (outside of City limits) and Willowbrook, Marin, and Liberty Creeks the City shall work with Sonoma County to create interim development standards for that setback area until such time as studies are concluded and approved by Sonoma County, the SCWA, the City of Petaluma, and other responsible agencies. Thereafter all lands affected shall set aside the necessary river and/or creek corridor areas</p>



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			<p>opportunities to enhance recharge of the Petaluma aquifers.</p> <p>C. The City shall, in accordance with the XP-SWMM analysis of the Petaluma River corridor, work with the regulatory and advisory agencies and property owners along the River to implement the identified physical improvements to accommodate the 100-year storm event within a modified River channel.</p> <p>D. The City shall, in accordance with the SCWA, undertake a study to assess and define the corridor section widths necessary to quantify the volume and dimension of a creek corridor system necessary to allow the W, M, and L creeks to accommodate the 100-year storm event.</p> <p>E. Setbacks beyond the creek to allow additional peak flows shall be considered on a reach by reach basis. Alternative land uses for seasonal use may be considered within this additional setback area.</p>			<p>and, as development occurs, shall undertake the identified surface water containment enhancement improvements to accommodate improvements envisioned in Program A, above.</p> <p>C. The City will work with the County to ensure that zero net fill policies are enforced within the unincorporated area for areas within the regulatory floodplain of the Petaluma River and its tributaries.</p> <p>D. Working with Sonoma County, the City shall develop a plan and identify funding opportunities to acquire and remove existing structures within the regulatory floodway of the Petaluma River and its tributaries. The Plan shall be updated as needed to maintain consistency with changes in regulatory mapping of the floodway.</p> <p>E. Participate with the County in implementation of the regional components of the Petaluma River Watershed Master Drainage Plan (SCWA, June 2003), Petaluma River Floodplain Management Plan (City of Petaluma, October 2001, Petaluma River Access and Enhancement Plan (City of Petaluma, May 1006, Sonoma County General Plan 2020 (Public Safety Element) and the City of Petaluma General Plan 2025.</p>
		8-P-30	<p>Within a 200' setback from centerline of the River and creeks referenced in Policies 3-P-28 and 2-P-29, stated above [in the General Plan], no development shall be permitted on lands within that 400' wide corridor until such time as the study is concluded and approved by the SWCA and City of Petaluma. Thereafter all lands affected shall set aside the necessary river and/or creek corridor areas and, as development occurs, shall undertake the identified surface water containment enhancement improvements.</p> <p>A. The watershed model, XP-SWMM or updates thereto, shall be maintained, in</p>		8-P-30	<p>Within a 200' setback from centerline of the Petaluma River, within the UGB, no additional development shall be permitted on lands within that 400' wide corridor, given natural and physical constraints, until such time as the study is concluded and approved by the SCWA and City of Petaluma. Thereafter all lands affected shall set aside the necessary river and/or creek corridor areas and, as development occurs, shall undertake the identified surface water containment enhancement improvements.</p> <p>A. The watershed model, XP-SWMM or updates thereto, shall be maintained, in cooperation between the City and SCWA, to assist in the evaluation of development</p>

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			<p>cooperation between the City and SCWA, to assist in the evaluation of development proposals and in the design of regional watershed improvements to reduce flood elevations.</p> <p>B. Proposed development applications may be charged a model update fee to cover costs associated with evaluating a specific proposal for project specific and cumulative impacts to the regional surface water system.</p> <p>C. On-site and off-site improvements, deemed necessary by the City of Petaluma, to reduce the surface water impacts associated with a specific development proposal shall be designed, constructed, and maintained in perpetuity at the cost of the development associated with said impacts.</p>			<p>proposals and in the design of regional watershed improvements to reduce flood elevations.</p> <p>B. Proposed development applications may be charged a model update fee to cover costs associated with evaluating a specific proposal for project specific and cumulative impacts to the regional surface water system.</p> <p>C. On-site and off-site improvements, deemed necessary by the City of Petaluma, to reduce the surface water impacts associated with a specific development proposal shall be designed, constructed, and maintained in perpetuity at the cost of the development associated with said impacts.</p>
		8-P-31	<p>In accordance with the studies undertaken for the Corps Flood Protection Project, existing areas subject to periodic surface water inundation and containment, within the Corona and Denman Reaches (Lynch Creek confluence with the Petaluma River upstream to the Old Redwood Highway over-crossing of Willowbrook Creek), shall be preserved and enhanced where feasible to reduce localized flooding.</p> <p>A. The Department of Water Resources and Conservation shall work with the SWCA and the Community Development Department to insure that reduction of the protection afforded by the Payran Corps Flood Protection Project is not compromised or reduced by proposed development.</p>		8-P-31	<p>In accordance with the studies undertaken for the Corps Flood Protection Project, existing areas subject to periodic surface water inundation and containment, within the Corona and Denman Reaches (Lynch Creek confluence with the Petaluma River upstream to the Old Redwood Highway over-crossing of Willowbrook Creek), shall be preserved and enhanced where feasible to reduce localized flooding.</p> <p>A. The Department of Water Resources and Conservation shall work with the SCWA and the Community Development Department to insure that reduction of the protection afforded by the Payran Corps Flood Protection Project is not compromised or reduced by proposed development.</p> <p>B. Continue to work with SCWA for the on-going efforts to maintain or improve historic channel capacity for flood waters.</p>
		8-P-32	Areas within the Petaluma watershed, outside of the		8-P-	Areas within the Petaluma watershed, outside of the City of

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			<p>City of Petaluma, which are subject to periodic surface water inundation and containment, should not be modified in any manner to reduce the historic storage characteristics and capacity.</p> <p>The City shall work with the County of Sonoma to prohibit placement of fill materials within those areas identified as having historic storage capacity, which have a detrimental impact on downstream flows, including the increase in peak discharge volumes in the downstream areas.</p>		32	<p>Petaluma, which are subject to periodic surface water inundation and containment, should not be modified in any manner to reduce the historic storage characteristics and capacity.</p> <p>A. Department of Water Resources &amp; Conservation shall work with Sonoma County, SCWA, and other responsible agencies to preserve and expand detention basin capacity within the Petaluma River watershed and maintain or reduce peak discharge volumes from Willowbrook, Marin, Liberty and Lichau Creeks.</p> <p>B. The City shall work with the County of Sonoma to establish a zero net fill policy for detention basins and areas within the regulatory floodplain within the Petaluma River watershed in order to preserve and enhance basin capacity and to ensure no detrimental impact to downstream flows, including the increase in peak discharge volumes in the downstream areas.</p>
		<p>Mitigation Measure</p> <p>3.6(a) Use flood terracing in the Corona and Denman Reaches, maintain surface water drainage swales along Highway 101, install flap gates or valves to eliminate the backflow of surface waters from the east side of Highway 101 to the west side, which adversely impact residential areas, and increase berm heights that presently protect residential areas such as Leisure Lake and along Corona Creek between Youngstown and Petaluma Estates Mobilehome Parks. Understanding the out-of-bank impacts associated with the lower intensity storms (10, 25, and 50) may allow incremental enhancements of the River corridor to increase capacity without adversely impacting peak flows, while enhancing riparian habitats and providing public access amenities.</p>				
3.6-4	<i>New development may overload storm drain</i>	8-P-33	Work with SWCA to insure maintenance of the engineered channels, natural creeks, and enclosed surface water system.	Less than Significant	8-P-36.A.	Work with SCWA, regulatory agencies, and/or property owners, as appropriate given maintenance authority, to insure maintenance of the engineered channels, natural creeks, and enclosed surface water system.

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	<i>system capacity or require expansion of existing or construction of new facilities.</i>				
		8-P-34	Work with regulatory and advisory agencies to facilitate preservation and environmental enhancement of the natural corridor for species of importance and native to the area.		See Policy 8-P-32, above
		8-P-35	Promote public education and stewardship of the riparian corridor.	8-P-36.C.	Promote public education and stewardship of the riparian corridor.
		8-P-36	Work with the U.S. Army Corps of Engineers to dredge the river channel downstream of the constriction weir to maintain the 100-year designed conveyance capacity and navigable channel.	8-P-36.D and E	D. Work with the U.S. Army Corps of Engineers to dredge the river channel downstream of the transition weir to maintain the 100-year design conveyance capacity and navigable channel.  E. Initiate the formation of an Assessment District, or other funding mechanism, to ensure periodic dredging occurs and the dredge materials disposal site is maintained.
		Mitigation Measure 3.6(b) The continuation of zero-net fill and when appropriate, zero-net runoff, within the Development Code will be utilized to assess site-specific impacts and identify mitigations associated with storm drain pipe capacities. In addition, creation of flood terrace improvements shall be used to enhance the riparian corridor for wildlife habitats and improve public access, education and stewardship of the River and creek corridors.			
3.6-5	<i>Buildout of the proposed General Plan 2025 may expose people or structures to risk of existing</i>		Policies 8-P-28 through 8-P-32 (see Impact 3.6-3)	Less than Significant	See Impact 3.6-3 and applicable policies and programs, as well as policies below.

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<p><i>flooding hazards, or may place structures which could impede or redirect flood flows.</i></p>			
	<p>Mitigation Measure 3.6(c) Include the following policy and programs in the proposed General Plan. Policy 8-P-X. No new inhabited structure or development shall be entitled within the 100-year General Plan buildout flood boundary until such time as data is available to provide a 100-year base flood elevation, utilizing the current hydrologic information from the City's XP-SWMM, for the specific site to determine minimum floor elevations.</p> <ul style="list-style-type: none"> <li>A. The City shall create and maintain a 2-D model of the Petaluma River within the City of Petaluma and work with SCWA to achieve a 2-D model for the Petaluma Watershed.</li> <li>B. Utilizing the 2-D model, the City of Petaluma will work with SCWA to identify, design, fund, and construct regional solutions to minimize the flooding impacts associated with historic and increasing out-of-bank flows which occur from increasing storm flow and velocity from out-of-City areas into the City.</li> <li>C. Working with Sonoma County, the City will continue to ensure that zero net fill policies are enforced within the unincorporated area for areas encumbered by the regulatory floodplain of the Petaluma River.</li> <li>D. Utilizing an approved modeling tool, the City shall diligently pursue the remapping of the regulatory Floodway and Floodplain, through the Corps of Engineers, following the completion of the Payran Reach Corps project.</li> <li>E. Working with Sonoma County, the City shall pursue State and Federal funding opportunities to acquire</li> </ul>		<p>Policy 8-P-37. No new inhabited structure or development shall be entitled within that portion of properties containing areas of water depths exceeding one foot as illustrated in Figure 3.6-5 (<i>FEIR Figure reference will be amended to correspond with Chapter 8 Water Resources within the General Plan</i>).</p> <ul style="list-style-type: none"> <li>A. The City shall maintain a 2-D model of the Petaluma River within the City of Petaluma and continue to work with SCWA to achieve a 2-D model for the Petaluma Watershed.</li> <li>B. Utilizing the 2-D model, the City of Petaluma will work with SCWA to identify, design, fund, and construct regional solutions to minimize the flooding impacts associated with historic and increasing out-of-bank flows which occur from increasing storm flow and velocity from out-of-City areas into the City.</li> <li>C. Working with Sonoma County, the City will continue to ensure that zero net fill policies are enforced within the unincorporated area for areas encumbered by the regulatory floodplain of the Petaluma River.</li> <li>D. Utilizing an approved modeling tool, the City shall diligently pursue the remapping of the regulatory Floodway and Floodplain, through the Corps of Engineers, following the completion of the Payran Reach Corps project.</li> <li>E. Working with Sonoma County, the City shall pursue State and Federal funding opportunities to acquire and demolish housing, which remain located within the regulatory Floodway, once remapping occurs.</li> <li>F. Until remapping of the regulatory floodplain occurs,</li> </ul>

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		and demolish housing, which remain located within the regulatory Floodway, once remapping occurs.				<p>new residential development in the 100-year flood boundary area, with depths of less than one foot of water during a 100-year storm event will be required to elevate the lowest floor two feet (2') above the BFE as determined by the City 2-D model.</p> <p>G. New non-residential development in the 100-year flood boundary area with less than one foot of water depth during a 100-year storm event will be required to provide flood protection at least 1 foot above the BFE, or elevate the lowest floor two feet above the BFE.</p> <p>H. Residential development shall be prohibited on the first floor of structures within the regulatory floodplain.</p>
3.6-6	<i>Buildout of the General Plan 2025 may require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.</i>		Policy 8-P-29 (see Impact 3.6-3).	Less than Significant		See Policy 8-P-30 (Impact 3.6-3)
3.7-1	<i>Buildout of the proposed General Plan would expose people or structures to strong seismic groundshaking or seismic-related ground failure.</i>	10-P-1	<p>Require geotechnical studies prior to development approval in geologic and/or seismic hazard areas. Require or undertake comprehensive geologic and engineering studies for critical structures regardless of location.</p> <p><i>Critical structures are those most needed following a disaster or those that would pose hazards of their own if damaged. They include utility centers and substations, water reservoirs, hospitals, fire stations, police and emergency communications facilities, and</i></p>	Less than Significant	10-P-1	<p>Require geotechnical studies prior to development approval in geologic and/or seismic hazard areas. Require or undertake comprehensive geologic and engineering studies for critical structures regardless of location.</p> <p><i>Critical structures are those most needed following a disaster or those that would pose hazards of their own if damaged. They include utility centers and substations, water reservoirs, hospitals, fire stations, police and emergency communications facilities, and bridges and overpasses.</i></p>

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			<i>bridges and overpasses.</i>			
		10-P-4	Adopt and amend as needed updated versions of the California Building Code (CBC) so that optimal earthquake-protection standards are used in construction and renovation projects. <i>Earthquake-resistant design and materials must meet or exceed the current seismic engineering standards of the CBC Seismic Zone 4 requirements.</i>		10-P-4	Adopt and amend as needed updated versions of the California Building Code (CBC) so that optimal earthquake-protection standards are used in construction and renovation projects. <i>Earthquake-resistant design and materials must meet or exceed the current seismic engineering standards of the CBC Seismic Zone 4 requirements.</i>
		10-P-5	Explore programs that would encourage, assist, or provide incentives to property owners to retrofit their buildings for seismic safety.		10-P-5	Explore programs that would encourage, assist, or provide incentives to property owners to retrofit their buildings for seismic safety.
					10-P-6	Protect the community from risks associated with seismically induced surface ruptures, ground-shaking, ground failure, slope instability leading to mudslides and landslides, subsidence, liquefaction, and other seismic, geologic, and fire hazards. A. Adopt and maintain a Hazard Mitigation Plan (HMP) in compliance with applicable state and federal regulations.
3.7-2	<i>Development under the proposed General Plan would be subject to risk from settlement and/or subsidence of land, lateral spreading, or expansive soils, creating substantial risks to life or property.</i>	NA		Less than Significant		
3.7-3	<i>Buildout of the proposed General Plan</i>	10-P-2	On sites with slopes greater than 30 percent, require all development to be clustered outside of the 30 percent slope areas (and preferably on land less	Less than Signifi	10-P-2	On sites with slopes greater than 30 percent, require all development to be clustered outside of the 30 percent slope areas (and preferably on land less than 15 percent in slope)

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<i>would result in soil erosion.</i>	than 15 percent in slope) where possible.	cant	where possible.
	<p>10-P-3 Regulate the grading and development of hillside areas for new urban land uses, by instituting a Hillside Overlay or other similar mechanism in the Development Code. Ensure that new development on hillsides is constructed to reduce erosion and land-slide hazards:</p> <ul style="list-style-type: none"> <li>• Limit cut slopes to 3:1, except where an engineering geologist can establish that a steeper slope would perform satisfactorily over the long term.</li> <li>• Encourage use of retaining walls or rock-filled crib walls as an alternative to high cut slopes.</li> <li>• Ensure revegetation of cut-and-fill slopes to control erosion. Plant materials for revegetation should not be limited to hydro-seeding and mulching with annual grasses. Trees add structure to the soil and take up moisture while adding color and diversity.</li> <li>• Ensure blending of cut-and-fill slopes within existing contours, and provision of horizontal variation, in order to mitigate the artificial appearance of engineered slopes.</li> <li>• Ensure structural integrity of sites previously filled before approving redevelopment.</li> </ul> <p>See also [General Plan] Chapter 2: Land Use, Growth Management and the Built Environment and [General Plan] Chapter 3: Community Design Character and Sustainable Building for additional</p>		<p>10-P-3 Regulate the grading and development of hillside areas for new urban land uses, by instituting a Hillside Overlay or other similar mechanism in the Development Code. Ensure that new development on hillsides is constructed to reduce erosion and landslide hazards and in compliance with any City hillside regulations, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Limit cut slopes to 3:1, except where an engineering geologist can establish that a steeper slope would perform satisfactorily over the long term.</li> <li>• Encourage use of retaining walls or rock-filled crib walls as an alternative to high cut slopes.</li> <li>• Ensure revegetation of cut-and-fill slopes to control erosion. Plant materials for revegetation should not be limited to hydro-seeding and mulching with annual grasses. Trees add structure to the soil and take up moisture while adding color and diversity.</li> <li>• Ensure blending of cut-and-fill slopes within existing contours, and provision of horizontal variation, in order to mitigate the artificial appearance of engineered slopes. Ensure structural integrity of sites previously filled before approving redevelopment.</li> </ul> <p><i>See also General Plan Chapter 2: Land Use, Growth Management, and the Built Environment and Chapter 3: Community Design Character and Sustainable Building for additional hillside policies and programs.</i></p>



Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>		<i>Draft Proposed General Plan Policies that Reduced the Impact</i>		<i>Significance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>	
			hillside policies and programs.			
3.8-1	<i>Implementation of the proposed General Plan could result in substantial adverse effects on special status fish species or their habitat.</i>	4-P-1	<p>Protect and enhance the Petaluma River and its tributaries through a comprehensive river management strategy of the following programs:</p> <p>Implement the Petaluma River Access and Enhancement Plan including expanded improvements identified through project specific environmental assessment.</p> <p>A. Institute and maintain public access to and along the entire length (on one or both sides), of the river while ensuring that natural resources and river dependent industry are protected.</p> <p>B. Require design review to address the relationship and stewardship of that project to the river or creek for any development on sites with frontage along the river and creeks, identified on Figure 1-3 (of the General Plan).</p> <p>C. Create setbacks for tributaries extending a minimum of 50 feet outward from the top of each bank, with extended buffers where significant habitat areas, vernal pools, or wetlands exist. Development shall not occur within this setback, except as part of greenway enhancement (for example, trails and bikeways). Where there is degradation within the zone, restoration of the natural creek channels and riparian vegetation is mandatory.</p> <p>D. Facilitate compliance with Phase II standards of the National Pollutant Discharge Elimination System (NPDES) to improve the water quality and aesthetics of the river and creeks.</p> <p>E. Work with the State Lands Commission, State Department of Fish and Game, the Sonoma County Water Agency, and other jurisdictional agencies on preservation/enhancement of the</p>	Less than Significant	4-P-1	<p>Protect and enhance the Petaluma River and its tributaries through a comprehensive river management strategy of the following programs:</p> <p>A. Implement the Petaluma River Access and Enhancement Plan including expanded improvements identified through project specific environmental assessment.</p> <p>B. Institute and maintain public access to and along the entire length (on one or both sides), of the river while ensuring that natural resources and river dependent industry are protected.</p> <p>C. Require design review to address the relationship and stewardship of that project to the river or creek for any development on sites with frontage along the river and creeks.</p> <p>D. Create setbacks for all tributaries to the Petaluma River extending a minimum of 50 feet outward from the top of each bank, with extended buffers where significant habitat areas, vernal pools, or wetlands exist. Development shall not occur within this setback, except as part of greenway enhancement (for example, trails and bikeways). Where there is degradation within the zone, restoration of the natural creek channels and riparian vegetation is mandatory at time of adjacent development.</p> <p>E. Facilitate compliance with Phase II standards of the National Pollutant Discharge Elimination System (NPDES) to improve the water quality and aesthetics of the river and creeks.</p> <p>F. Work with the State Lands Commission, State Department of Fish and Game, the Sonoma County Water Agency, and other jurisdictional agencies on preservation/enhancement of the Petaluma River as a component of reviewing major development along the River.</p>

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	<p>Petaluma River as a component of reviewing major development along the River.</p> <p>F. Expand the planting and retention of trees along the upper banks of the river and creeks to reduce ambient water temperature and shade out invasive, non-native species.</p>		<p>G. Expand the planting and retention of trees along the upper banks of the river and creeks to reduce ambient water temperature and shade out invasive, non-native species.</p> <p>H. Revise the Development Code to include:</p> <ul style="list-style-type: none"> <li>• Standards for the four management zones that run the entire length of the river: 1) Restoration Zone, 2) Buffer Zone, 3) Preservation Zone, and 4) River Oriented Development Zone. These standards shall be based on the River Plan's text and sections A-A through O-O as augmented by the cross-section needs identified through the XP-SWMM analyses;</li> <li>• Design review requirements as articulated in the River Plan for any development on sites with frontage along the river or within 100 ft. of the river;</li> <li>• The use of transfer of development rights (TDR) from portions adjacent to the river to elsewhere on the parcel by allowing property owners an increase in residential densities or in allowable Floor-to-Area-Ratio (FAR) and/or smaller/clustered lots to compensate for the loss of development opportunity on land within the Restoration, Buffer, or Preservation zones of the River Plan. The overall development potential on a site shall be consistent with the General Plan. TDRs shall not be applied to lands within the Floodway as there is no development potential within the Floodway.</li> </ul> <p>I. Develop a consistent design for site furniture, a wayfinding system, and educational signage in the PRC and along the creeks and tributaries leading to it to heighten the recognition and value of the river and its ecosystem.</p> <p>J. Utilize the Parks and Recreation, Water Resources &amp; Conservation, Public Works departments, and/or property owners (i.e. Landscape Assessment Districts) to manage</p>

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						<p>the long term operations, maintenance responsibilities, and stormwater capacity associated with the river and tributary greenways.</p> <p>K. Prohibit placement of impervious surfaces in the Floodway (i.e. Parking lots, roadways, etc.) with the exception of pathways and emergency access improvements.</p> <p>L. Continue to implement, where appropriate, flood terrace improvements to reduce localized flooding in concert with habitat enhancement projects.</p> <p>M. Cooperate with State and Federal agencies to address and/or eradicate issues and environmental problems associated with possible infestation of the Midden Crab into the Petaluma River and adjacent tributaries.</p>
		4-P-3	<p>Conserve wildlife ecosystems and sensitive habitat areas in the following order of protection preference: 1) avoidance, 2) on-site mitigation, and 3) off-site mitigation.</p> <p>A. Utilize Technical Memorandum 3: Biological Resources Review as a baseline document, expanding to address project specific impacts.</p>		4-P-2	<p>Conserve wildlife ecosystems and sensitive habitat areas in the following order of protection preference: 1) avoidance, 2) on-site mitigation, and 3) off-site mitigation.</p> <p>A. Utilize Technical Memorandum 3: Biological Resources Review as a baseline document, expanding to address project specific impacts.</p>
		4-P-4	<p>Protect special status species and supporting habitats within Petaluma, including species that are State or Federal listed as endangered, threatened, or rare (shown in Table 4.1-1 of the General Plan).</p> <p>A. As part of the development review process, site-specific biological resource assessments are required to consider the impacts on riparian and aquatic resources and the habitats they provide for invertebrates, fish, amphibians, reptiles, birds, mammals, and plants. If development is located outside these ecologically sensitive regions, no site-</p>		4-P-3	<p>Protect special status species and supporting habitats within Petaluma, including species that are State or Federal listed as endangered, threatened, or rare (shown in Table 4.1-1 of the General Plan).</p> <p>A. As part of the development review process, site-specific biological resource assessments are required to consider the impacts on riparian and aquatic resources and the habitats they provide for invertebrates, fish, amphibians, reptiles, birds, mammals, and plants. If development is located outside these ecologically sensitive regions, no site-specific assessment of biological resources may be necessary. Appropriate mitigation measures to reduce impacts to sensitive habitats and special status species</p>

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			<p>specific assessment of biological resources may be necessary. Appropriate mitigation measures to reduce impacts to sensitive habitats and special status species would be imposed on a project-by-project basis according to Petaluma's environmental review process.</p> <p>B. Review all development proposals along the navigable portion of the river to determine that they are designed to encourage long-term retention of river-dependent uses to the extent feasible.</p>		<p>would be imposed on a project-by-project basis according to Petaluma's environmental review process.</p> <p>B. Review all development proposals along the navigable portion of the river to determine that they are designed to encourage long-term retention of river-dependent uses to the extent feasible.</p>
		4-P-5	<p>Continue to support rural land use designations and Agricultural Best Management Practices within the Sonoma County General Plan.</p> <p>A. Coordinate with Sonoma County's Agricultural Preservation and Open Space District, Permit and Resource Management Department, and Water Agency to protect riparian corridors and critical biological habitats as well as to reduce cumulative impacts on sensitive watershed areas outside of the city limits.</p> <p>B. Work with County, State and federal agencies to ensure that development within the Planning Referral Area does not substantially affect State or federally listed rare, endangered, or threatened species or their habitats. Require assessments of biological resources prior to approval of any development in or within 300 feet of ecologically sensitive areas.</p>		<p>4-P-4</p> <p>Continue to support rural land use designations and Agricultural Best Management Practices within the Sonoma County General Plan.</p> <p>A. Coordinate with Sonoma County's Agricultural Preservation and Open Space District, Permit and Resource Management Department, and Water Agency to protect riparian corridors and critical biological habitats as well as to reduce cumulative impacts on sensitive watershed areas outside of the city limits.</p> <p>B. Work with County, State and federal agencies to ensure that development within the Planning Referral Area does not substantially affect State or federally listed rare, endangered, or threatened species or their habitats. Require assessments of biological resources prior to approval of any development in or within 300 feet of ecologically sensitive areas.</p>
					<p>4-P-5</p> <p>Support wetland mitigation and oak woodlands restoration in the unincorporated areas outside the UGB.</p>
					<p>Table</p> <p><b>Table 4.1-1: Special Status Species Known to Occur or</b></p>

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						Potentially Occurring within the Petaluma Planning Area.
3.8-2	<i>Implementation of the proposed General Plan could result in substantial adverse effects on California Brackishwater Snail or its habitat.</i>	NA		Less than Significant		
3.8-3	<i>Implementation of the proposed General Plan could result in substantial adverse effects on the salt marsh harvest mouse or its habitat.</i>		Policies 4-P-3, 4-P-4, and 4-P-5 (see Impact 3.8-1).	Less than Significant		See impact 3.8-1 and related policies and programs.
3.8-4	<i>Implementation of the proposed General Plan could result in substantial adverse effects on special status bat species or their habitat.</i>		Policies 4-P-3, 4-P-4, and 4-P-5 (see Impact 3.8-1).	Less than Significant		See impact 3.8-1 and related policies and programs.
3.8-5	<i>Implementation of the proposed General Plan could result in substantial adverse effects</i>		Policies 4-P-3, 4-P-4, and 4-P-5 (see Impact 3.8-1).	Less than Significant		See impact 3.8-1 and related policies and programs.

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	<i>on American badger or its habitat.</i>					
3.8-6	<i>Implementation of the proposed General Plan could result in substantial adverse effects on western pond turtle, California tiger salamander, foothill yellow-legged frog, California red-legged frog, or their habitat.</i>		Policies 4-P-3, 4-P-4, and 4-P-5 (see Impact 3.8-1).	Less than Significant		See impact 3.8-1 and related policies and programs.
3.8-7	<i>Implementation of the proposed General Plan could result in substantial adverse effects on nesting raptor species or their habitat.</i>		Policies 4-P-1, 4-P-3, 4-P-4, and 4-P-5 (see Impact 3.8-1).	Less than Significant		See impact 3.8-1 and related policies and programs.
		4-P-6	<p>Improve air quality through required planting of trees along streets and within park and urban separators, and retaining tree and plant resources along the river and creek corridors.</p> <p>A. Require planting of trees at a ratio of five (24" box or larger) for every significant tree removed at a project site. Replacement planting may occur on the project site or on a publicly owned area, with long-term maintenance assured.</p>		4-P-6	<p>Improve air quality through required planting of trees along streets and within park and urban separators, and retaining tree and plant resources along the river and creek corridors.</p> <p>A. Require planting of trees for every significant tree removed at a project site. Replacement planting may occur on the project site or on a publicly owned area, with long-term maintenance assured.</p> <ul style="list-style-type: none"> <li>• Encourage the use of trees which provide biogenic benefits to air quality and are suitable to the local</li> </ul>

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					environment. <ul style="list-style-type: none"> <li>• Establish ratio and size of replacement trees as part of the development code update.</li> </ul>
3.8-8	<i>Implementation of the proposed General Plan could result in substantial adverse effects on California black rail bird, San Pablo song sparrow, Saltmarsh common yellow throat or other special status bird species.</i>		Policies 4-P-1, 4-P-3, 4-P-4, 4-P-5, and 4-P-6 (see Impact 3.8-7).	Less than Significant	See impact 3.8-7 and related policies and programs.
3.8-9	<i>Implementation of the proposed General Plan could result in substantial adverse effects on oak woodland and special status plant species or their habitat.</i>		Policies 4-P-1, 4-P-3, 4-P-4, 4-P-5, and 4-P-6 (see Impact 3.8-7).	Less than Significant	See impact 3.8-7 and related policies and programs.
3.8-10	<i>Implementation of the General Plan could adversely affect riparian areas, wetlands and/or</i>		Policies 4-P-1, 4-P-3, 4-P-4, and 4-P-5 (see Impact 3.8-1).	Less than Significant	See impact 3.8-1 and related policies and programs.

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	<i>“other waters of the United States.”</i>					
3.8-11	<i>Implementation of the proposed General Plan would not interfere with the movement of fish or wildlife species.</i>	NA		Less than Significant	4-P-1	See impact 3.8-1, policy 4.P-1 and related programs.
3.8-12	<i>Implementation of the proposed General Plan may conflict with the provisions of the Draft Santa Rosa Plain Conservation Strategy.</i>	NA		Less than Significant		
3.9-1	<i>At buildout, implementation of the proposed General Plan would generate increased local traffic volumes in the Planning Area that would result in a substantial increase to existing exterior noise levels that are currently</i>	10-P-6	Continue efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.	Less than Significant	10-P-7	Continue efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.



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	<i>above the City standards.</i>					
		10-P-7	Discourage location of new noise-sensitive uses, primarily homes, in areas with projected noise levels greater than 65 dB CNEL. Where such uses are permitted, require incorporation of mitigation measures to ensure that interior noise levels do not exceed 45 dB CNEL.		10-P-8	Discourage location of new noise-sensitive uses, primarily homes, in areas with projected noise levels greater than 65 dB CNEL. Where such uses are permitted, require incorporation of mitigation measures to ensure that interior noise levels do not exceed 45 dB CNEL.
		10-P-9	Continue to require control of noise or mitigation measures for any noise-emitting construction equipment or activity. <i>The City's Noise Ordinance establishes controls on construction-related noise.</i>		10-P-10	Continue to require control of noise or mitigation measures for any noise-emitting construction equipment or activity. <i>The City's Noise Ordinance establishes controls on construction-related noise.</i>
		10-P-10	As part of development review, use [General Plan] Figure 10-2: Land Use Compatibility Standards to determine acceptable uses and installation requirements in noise-impacted areas.		10-P-11	As part of development review, use [General Plan] Figure 10-2: Land Use Compatibility Standards to determine acceptable uses and installation requirements in noise-impacted areas.
		10-P-11	NWPRA corridor, without findings that such walls will not be detrimental to community character. When sound walls are deemed necessary integrate them into the streetscape, whenever possible.		10-P-12	NWPRA corridor, without findings that such walls will not be detrimental to community character. When sound walls are deemed necessary integrate them into the streetscape, whenever possible.
		10-P-12	In making a determination of impact under the California Environmental Quality Act (CEQA), consider an increase of four or more dBA to be "significant" if the resulting noise level would exceed that described as normally acceptable for the affected land use in General Plan Figure 10-3: Land Use Compatibility for Community Noise Environments.		10-P-13	In making a determination of impact under the California Environmental Quality Act (CEQA), consider an increase of four or more dBA to be "significant" if the resulting noise level would exceed that described as normally acceptable for the affected land use in General Plan Figure 10-3: Land Use Compatibility for Community Noise Environments.
3.9-2	<b><i>Implementation of the proposed General Plan would add new stationary sources of noise, but would not exceed the City</i></b>		Policies 10-P-7 and 10-P-12 (see Impact 3.9-1).	Less than Significant		See Impact 3.9-1, policies 10-P-8 and 10-P-13.

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	<i>noise standards.</i>					
		10-P-8	<p>Ensure that the City's Noise Ordinance and other regulations:</p> <ul style="list-style-type: none"> <li>• Require that applicants for new noise-sensitive development in areas subject to noise levels greater than 65 dB CNEL obtain the services of a professional acoustical engineer to provide a technical analysis and design of mitigation measures.</li> <li>• Require placement of fixed equipment, such as air conditioning units and condensers, inside or in the walls of new buildings or on roof-tops of central units in order to reduce noise impacts on any nearby sensitive receptors.</li> <li>• Establish appropriate noise-emission standards to be used in connection with the purchase, use, and maintenance of City vehicles.</li> </ul>		10-P-9	<p>Ensure that the City's Noise Ordinance and other regulations:</p> <ul style="list-style-type: none"> <li>• Require that applicants for new noise-sensitive development in areas subject to noise levels greater than 65 dB CNEL obtain the services of a professional acoustical engineer to provide a technical analysis and design of mitigation measures.</li> <li>• Require placement of fixed equipment, such as air conditioning units and condensers, inside or in the walls of new buildings or on roof-tops of central units in order to reduce noise impacts on any nearby sensitive receptors.</li> <li>• Establish appropriate noise-emission standards to be used in connection with the purchase, use, and maintenance of City vehicles.</li> </ul>
3.9-3	<i>Construction activities associated with implementation of the proposed General Plan would generate and expose persons nearby to excessive groundborne vibration or groundborne noise levels.</i>		Policy 10-P-9 (see Impact 3.9-1).	Less than Significant		See Impact 3.9-1, policy 10-P-10.
3.9-4	<i>Construction activities</i>		Policy 10-P-9 (see Impact 3.9-1).	Less than		See Impact 3.9-1, policy 10-P-10.

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	<i>associated with implementation of the proposed General Plan could generate noise levels that exceed the City standards.</i>			Significant		
		<p>Although not required to avoid a significant impact, the following mitigation measure would further reduce noise levels. Mitigation Measure</p> <p>3.9(a) Project developers shall require by contract specifications that the following construction best management practices (BMPs) be implemented by contractors to reduce construction noise levels:</p> <ul style="list-style-type: none"> <li>• Two weeks prior to the commencement of construction, notification must be provided to surrounding land uses disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period;</li> <li>• Ensure that construction equipment is properly muffled according to industry standards;</li> <li>• Place noise-generating construction equipment and locate construction staging areas away from residences, where feasible;</li> <li>• Schedule high noise-producing activities between the hours of 8 a.m. and 5 p.m. to minimize disruption on sensitive uses; and</li> <li>• Implement noise attenuation measures to the extent feasible, which may include, but are not limited to, noise barriers or noise blankets.</li> </ul>			4-P-16	<p>To reduce combustion emissions during construction and demolition phases, the contractor of future individual projects should include in construction contracts the following requirements or measures shown to be equally effective:</p> <ul style="list-style-type: none"> <li>• Maintain construction equipment engines in good condition and in proper tune per manufacturer's specification for the duration of construction;</li> <li>• Minimize idling time of construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment;</li> <li>• Use alternative fuel construction equipment (i.e., compressed natural gas, liquid petroleum gas, and unleaded gasoline);</li> <li>• Use add-on control devices such as diesel oxidation catalysts or particulate filters;</li> <li>• Use diesel equipment that meets the ARB's 000 or newer certification standard for off-road heavy-duty diesel engines;</li> <li>• Phase construction of the project;</li> <li>• Limit the hours of operation of heavy duty equipment.</li> </ul>
3.10-1	<i>Buildout of the proposed General Plan</i>	4-P-8	<p>Reduce motor vehicle related air pollution.</p> <p>A. Enforce land use and transportation strategies described in Chapter 2: Land Use</p>	Significant and	4-P-7	<p>Reduce motor vehicle related air pollution.</p> <p>A. Enforce land use and transportation strategies described in Chapter 1: Land Use and Chapter 5: Mobility that</p>

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	<i>would result in population levels that could conflict with the Bay Area 2005 Ozone Strategy.</i>		and Chapter 5: Mobility that promote use of alternatives to the automobile for transportation, including walking, bicycling, bus transit, and carpooling.	Un-avoidable		<p>promote use of alternatives to the automobile for transportation, including walking, bicycling, bus transit, and carpooling.</p> <p><i>Motor vehicles, regulations of whose emissions by local agencies is preempted by State law, are the major source of criteria air pollutants in the Bay Area Air Basin, accounting for the vast majority of carbon monoxide and particulate matter and over a quarter of the reactive oxygen gas and nitrogen dioxide in the region. Increased use of transit and carpooling, coupled with land use and circulation patterns that promote walking and bicycling, can lead to a decrease in daily trips, less emissions, and improved air quality.</i></p>
					4-P-8	Support, where feasible, the development of alternative fuel stations.
					4-P-9	Require a percentage of parking spaces in large parking lots or garages to provide electrical vehicle charging facilities.
					4-P-10	Require electric vehicle charging and alternative fuel facilities at all new and remodeled gas stations.
					4-P-11	Promote ride-sharing and car-sharing programs.
					4-P-12	Prohibit new and significant expansion of existing drive-thru food and service facilities.
					4-P-14	Require development of traffic roundabouts, where feasible, as an alternative to a traffic signal, to reduce idling vehicles.
					4-P-15	Develop and integrate Intelligent Transportation Technologies, as applicable, into Petaluma's transportation system.
		4-P-11	Improve air quality by reducing emissions from stationary point sources of air pollution (e.g. equipment at commercial and industrial facilities)		4-P-16	Improve air quality by reducing emissions from stationary point sources of air pollution (e.g. equipment at commercial and industrial facilities) and stationary area sources (e.g. wood-

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	<p>and stationary area sources (e.g. wood-burning fireplaces &amp; gas powered lawnmowers) which cumulatively emit large quantities of emissions.</p> <p>A. Work with the Bay Area Air Quality Management District to achieve emissions reductions for non attainment pollutants; including carbon monoxide, ozone, and PM-10, by implementation of air pollution control measures as required by State and federal statutes.</p> <p>B. The BAAQMD's CEQA Guidelines should be used as the foundation for the City's review of air quality impacts under CEQA.</p> <p>C. Use Petaluma's development review process and the California Environmental Quality Act (CEQA) regulations to evaluate and mitigate the local and cumulative effects of new development on air quality.</p> <p>D. Require development projects to abide by the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines. These measures would reduce exhaust and particulate emissions from construction and grading activities.</p> <p>E. Reduce emissions from residential and commercial uses by requiring the following:</p> <ul style="list-style-type: none"> <li>• Use of high efficiency heating and other appliances, such as cooking equipment, refrigerators, and furnaces, and low NOx water heaters in new and existing residential units. Require the Building Division to maintain standards for these;</li> <li>• Compliance with or exceed</li> </ul>		<p>burning fireplaces &amp; gas powered lawnmowers) which cumulatively emit large quantities of emissions.</p> <p>A. Continue to work with the Bay Area Air Quality Management District to achieve emissions reductions for non attainment pollutants; including carbon monoxide, ozone, and PM-10, by implementation of air pollution control measures as required by State and federal statutes. <i>The BAAQMD's CEQA Guidelines should be used as the foundation for the City's review of air quality impacts under CEQA.</i></p> <p>B. Continue to use Petaluma's development review process and the California Environmental Quality Act (CEQA) regulations to evaluate and mitigate the local and cumulative effects of new development on air quality.</p> <p>C. Continue to require development projects to abide by the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines. <i>These measures would reduce exhaust and particulate emissions from construction and grading activities.</i></p> <p>D. Reduce emissions from residential and commercial uses by requiring the following:</p> <ul style="list-style-type: none"> <li>• Use of high efficiency heating and other appliances, such as cooking equipment, refrigerators, and furnaces, and low NOx water heaters in new and existing residential units;</li> <li>• Compliance with or exceed requirements of CCR Title 4 for new residential and commercial buildings;</li> <li>• Incorporation of passive solar building design and landscaping conducive to passive solar energy use for both residential and commercial uses, i.e., building orientation in a south to southeast direction, encourage planting of deciduous trees on west</li> </ul>

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	<p>requirements of CCR Title 24 for new residential and commercial buildings;</p> <ul style="list-style-type: none"> <li>• Incorporation of passive solar building design and landscaping conducive to passive solar energy use for both residential and commercial uses, i.e., building orientation in a south to southeast direction, encourage planting of deciduous trees on west sides of structures, landscaping with drought resistant species, and use of groundcovers rather than pavement to reduce heat reflection;</li> <li>• Use of battery-powered, electric, or other similar equipment that does not impact local air quality for non-residential maintenance activities;</li> <li>• Provide natural gas hookups to fireplaces or require residential use of EPA-certified wood stoves, pellet stoves, or fireplace inserts.</li> </ul> <p><i>Current building code standards generally ban the installation of open-hearth, wood-burning fireplaces and wood stoves in new construction. It does, however, allow for the use of low-polluting wood stoves and inserts in fireplaces approved by the federal Environmental Protection Agency, as well as fireplaces fueled by natural gas.</i></p>		<p>sides of structures, landscaping with drought resistant species, and use of groundcovers rather than pavement to reduce heat reflection;</p> <ul style="list-style-type: none"> <li>• Use of battery-powered, electric, or other similar equipment that does not impact local air quality for non-residential maintenance activities;</li> <li>• Provide natural gas hookups to fireplaces or require residential use of EPA-certified wood stoves, pellet stoves, or fireplace inserts.</li> </ul> <p><i>Current building code standards generally ban the installation of open-hearth, wood-burning fireplaces and wood stoves in new construction. It does, however, allow for the use of low-polluting wood stoves and inserts in fireplaces approved by the federal Environmental Protection Agency, as well as fireplaces fueled by natural gas.</i></p>
			<p>4-P-17</p> <p>To avoid potential health effects and citizen complaints that may be caused by sources of odors, dust from agricultural uses, or toxic air contaminants the following measures may be considered:</p> <ul style="list-style-type: none"> <li>• Locate new stationary sources of air pollutants, such as industrial facilities, at sufficient distances away from residential areas and facilities that serve sensitive receptors to avoid significant impacts caused by odors,</li> </ul>

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			<p>dust, and toxic air contaminants.</p> <ul style="list-style-type: none"> <li>• Include buffer zones within new residential and sensitive receptor site plans to separate those uses from potential sources of odors, dust from agricultural uses, and stationary sources of toxic air contaminants.</li> </ul>
	<p>5-P-13 Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak-period trip generation.</p> <ul style="list-style-type: none"> <li>A. Study the feasibility of a citywide TDM program that would be funded by annual fees or assessments on new development.</li> <li>B. Assign a proportion of TDM fees to Petaluma Transit for expansion of service and future fare reductions or fare elimination.</li> <li>C. As part of the development code, require TDM measures for all new non-residential development.</li> <li>D. Assign trip reduction credits and reduced transportation impact fees for demonstrated commitment to TDM strategies.</li> <li>E. Reduce parking requirements for mixed-use developments and for developments providing shared parking or a TDM program.</li> <li>F. Establish a TDM program for City of Petaluma employees.</li> <li>G. Collaborate with Santa Rosa Junior College to minimize the impact of future enrollment growth on local traffic and parking demand, such as though TDM measures, limitations on parking near the</li> </ul>		<p>5-P-13 Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak-period trip generation.</p> <ul style="list-style-type: none"> <li>A. Study the feasibility of a citywide TDM program that would be funded by annual fees or assessments on new development.</li> <li>B. If developed, assign a proportion of TDM fees to Petaluma Transit for expansion of service and future fare reductions or fare elimination.</li> <li>C. Assign trip reduction credits and reduced transportation impact fees for demonstrated commitment to TDM strategies.</li> <li>D. Reduce parking requirements for mixed-use developments and for developments providing shared parking or a TDM program.</li> <li>E. Consider establishing a TDM program for City of Petaluma employees.</li> <li>F. Continue to collaborate with Santa Rosa Junior College to minimize the impact of future enrollment growth on local traffic and parking demand, such as through TDM measures, limitations on parking near the College and on-campus parking management.</li> <li>G. Encourage provision of preferential parking in selected areas for designate carpools, motorcycles, bikes and alternative fuel vehicles.</li> </ul> <p>NOTE: While adoption of the Trip Reduction Ordinance is identified as a potential mitigation to help decrease levels of traffic, through voluntary participation, the Ordinance itself is not relied on to mitigate the conditions to "less than significant"</p>

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			College and on-campus parking management. H. Encourage provision of preferential parking in selected areas for designated carpools.		levels at any of the failing intersections, since those intersections have been identified as having significant and unavoidable impacts.
					4-P-23 Fund and/or designate a Green Program Manager to oversee implementation of all Greenhouse Gas Emissions policies and programs identified in the Greenhouse Gas Emissions section as well as the City's Climate Action Plan. The policies and programs will need to be reviewed and updated periodically as new information, regulatory standards, and technologies develop. A report shall be provided to the City Council biannually, reporting on the status of the City's efforts to reduce green house gases, and recommendations for any changes that are deemed necessary.
					4-P-24 Comply with AB 32 and its governing regulations to the full extent of the City's jurisdictional authority.
					4-P-25 To the full extent of the City's jurisdictional authority, implement any additional adopted State legislative or regulatory standards, policies and practices designed to reduce greenhouse gas emissions, as those measures are developed.
					4-P-26 Implement all measures identified in the municipal Climate Action Plan to meet the municipal target set in Resolution 2005-118 (20% below 2000 levels by 2010).
					4-P-27 The City shall prepare a Community Climate Action Plan to identify and prioritize programs, projects, and procedural policies that will help the City achieve the community greenhouse gas emission goals of Resolution 2005-118 (25% below 1990 levels by 2015).
					4-P-28 Prepare a feasibility report for the City of Petaluma forming a Community Choice Aggregation (through AB 117, permits any city or county to aggregate the electric loads of residents,



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					businesses and municipal facilities to facilitate the purchase and sale of electrical energy) as a way of supplying renewable energy to the community.
				4-P-29	Train appropriate City staff on new technology and look for opportunities to improve energy efficiency in public facilities.
				4-P-30	Continue to monitor new technology and innovative sustainable design practices for applicability to insure future development minimizes or eliminates the use of fossil fuel and GHG-emitting energy consumption.
				4-P-31	Provide information and tips on reducing greenhouse gas emissions to the community. A. Advertise "Green Tip" in the local newspaper. B. Work with utilities to offer Green Tips with the utility bills. C. Continue sponsoring Petaluma's green programs, including, but not limited to, the Going Green Expo. D. Create a program of on-going community education. E. Support the efforts of the Sonoma Green Business Program.
				4-P-32	Develop and implement a municipal Environmentally Preferable Purchasing Program.
3.10-2	<i>Implementation of the proposed General Plan may contribute substantially to an existing air quality violation.</i>		Policies 4-P-8 and 4-P-11 (see Impact 3.10-1).	Less than Significant	See Impact 3.10-1 and related policies and programs.
		4-P-12	To reduce combustion emissions during construction and demolition phases, the contractor of future individual projects shall include in construction contracts the following requirements		4-P-16 To reduce combustion emissions during construction and demolition phases, the contractor of future individual projects should include in construction contracts the following

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		<p>or measures shown to be equally effective:</p> <ul style="list-style-type: none"> <li>• Maintain construction equipment engines in good condition and in proper tune per manufacturer's specification for the duration of construction;</li> <li>• Minimize idling time of construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment;</li> <li>• Use alternative fuel construction equipment (i.e., compressed natural gas, liquid petroleum gas, and unleaded gasoline);</li> <li>• Use add-on control devices such as diesel oxidation catalysts or particulate filters;</li> <li>• Use diesel equipment that meets the ARB's 2000 or newer certification standard for off-road heavy-duty diesel engines;</li> <li>• Phase construction of the project;</li> <li>• Limit the hours of operation of heavy duty equipment.</li> </ul>		<p>requirements or measures shown to be equally effective:</p> <ul style="list-style-type: none"> <li>• Maintain construction equipment engines in good condition and in proper tune per manufacturer's specification for the duration of construction;</li> <li>• Minimize idling time of construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment;</li> <li>• Use alternative fuel construction equipment (i.e., compressed natural gas, liquid petroleum gas, and unleaded gasoline);</li> <li>• Use add-on control devices such as diesel oxidation catalysts or particulate filters;</li> <li>• Use diesel equipment that meets the ARB's 000 or newer certification standard for off-road heavy-duty diesel engines;</li> <li>• Phase construction of the project;</li> <li>• Limit the hours of operation of heavy duty equipment.</li> </ul>
			4-P-17	<p>To avoid potential health effects and citizen complaints that may be caused by sources of odors, dust from agricultural uses, or toxic air contaminants the following measures may be considered:</p> <ul style="list-style-type: none"> <li>• Locate new stationary sources of air pollutants, such as industrial facilities, at sufficient distances away from residential areas and facilities that serve sensitive receptors to avoid significant impacts caused by odors, dust, and toxic air contaminants.</li> <li>• Include buffer zones within new residential and sensitive receptor site plans to separate those uses from potential</li> </ul>

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						sources of odors, dust from agricultural uses, and stationary sources of toxic air contaminants.
3.10-3	<i>Implementation of the proposed General Plan may result in a cumulatively considerable net increase of criteria pollutants for which the region is in nonattainment under an applicable national or State ambient air quality standard.</i>	NA		Less than Significant		See Impacts 3.10-1 and 3.10-2 and related policies and programs.
3.10-4	<i>CO emissions associated with buildout of the proposed project may result in exposure of sensitive receptors to CO emissions.</i>		Policy 4-P-8 (see Impact 3.10-1).	Less than Significant		See Impacts 3.10-1 and 3.10-2 and related policies and programs.
3.10-5	<i>Development and occupation of the proposed General Plan could result in placement of sensitive land uses near potential sources</i>		See Impact 3.10-1	Less than Significant		See Policy 3-P-17 under Impact 3.10-1.

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	<i>of objectionable odors, dust, or toxic air contaminants.</i>					
3.10-6	<i>Implementation of the proposed GP may result in a cumulatively considerable incremental contribution to the significant cumulative impact of Global Climate Change</i>		See Table A-1 in Revised Draft EIR – Air Quality, Greenhouse Gas Emissions for revisions to Policies and Programs included within Final EIR and General Plan 2025.	Significant and Unavoidable	4-P-23	Fund and/or designate a Green Program Manager to oversee implementation of all Greenhouse Gas Emissions policies and programs identified in the Greenhouse Gas Emissions section as well as the City's Climate Action Plan. The policies and programs will need to be reviewed and updated periodically as new information, regulatory standards, and technologies develop. A report shall be provided to the City Council biannually, reporting on the status of the City's efforts to reduce greenhouse gases, and recommendations for any changes that are deemed necessary.
					4-P-24	Comply with AB 32 and its governing regulations to the full extent of the City's jurisdictional authority.
					4-P-25	To the full extent of the City's jurisdictional authority, implement any additional adopted State legislative or regulatory standards, policies and practices designed to reduce greenhouse gas emissions, as those measures are developed.
					4-P-26	Implement all measures identified in the municipal Climate Action Plan to meet the municipal target set in Resolution 2005-118 (20% below 2000 levels by 2010).
					4-P-27	The City shall prepare a Community Climate Action Plan to identify and prioritize programs, projects, and procedural policies that will help the City achieve the community greenhouse gas emission goals of Resolution 2005-118 (25% below 1990 levels by 2015).
					4-P-28	Prepare a feasibility report for the City of Petaluma forming a Community Choice Aggregation (through AB 117, permits any city or county to aggregate the electric loads of residents, businesses and municipal facilities to facilitate the purchase and sale of electrical energy) as a way of supplying renewable energy to the community.

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					4-P-29	Train appropriate City staff on new technology and look for opportunities to improve energy efficiency in public facilities.
					4-P-30	Continue to monitor new technology and innovative sustainable design practices for applicability to insure future development minimizes or eliminates the use of fossil fuel and GHG-emitting energy consumption.
					4-P-31	Provide information and tips on reducing greenhouse gas emissions to the community. A. Advertise "Green Tip" in the local newspaper. B. Work with utilities to offer Green Tips with the utility bills. C. Continue sponsoring Petaluma's green programs, including, but not limited to, the Going Green Expo. D. Create a program of on-going community education. E. Support the efforts of the Sonoma Green Business Program.
					4-P-32	Develop and implement a municipal Environmentally Preferable Purchasing Program
3.11-1	<i>New development may block views of Sonoma Mountain and ridgelines and/or alter the visual character of the hillsides.</i>	2-P-14	Allow development in hillside areas that preserve ridgelines and are site sensitive. A. Establish development and design standards related to residential development in hillside areas that address: <ul style="list-style-type: none"> <li>• Location of hillside residential units, including preserving ridgelines.</li> <li>• Clustering provisions to preserve open space, natural assets (woodlands, creeks, etc.).</li> <li>• Building development and design in a clustered format, including standards for building height and massing.</li> <li>• Provisions for clustered development, including amount of bonus, alternate development forms, common recreational facilities, phasing, etc.</li> </ul> A. Enhance the hillside development regulations	Less than Significant	1-P-15	Allow development in hillside areas that preserve ridgelines and are site sensitive. A. Establish development and design standards related to residential development in hillside areas that address: <ul style="list-style-type: none"> <li>• Location of hillside residential units, including preserving ridgelines.</li> <li>• Specific provisions to preserve open space, natural assets (woodlands, creeks, etc.).</li> <li>• Standards for building height and massing.</li> <li>• Appropriate forms of clustered development, including amount of bonus, alternate development forms, common recreational facilities, phasing, etc.</li> </ul> B. Enhance the hillside development regulations in the Development Code to include: <ul style="list-style-type: none"> <li>• Regulating development density by degree of hillside slope.</li> </ul>

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			<p>in the Development Code to include:</p> <ul style="list-style-type: none"> <li>Regulating development density by degree of hillside slope.</li> <li>Protecting unique natural features, including landforms, mature trees, and ridge lines, by requiring location of structures away from these assets.</li> <li>Encouraging architectural design that reflects the natural form of the hillside setting, in order to minimize visual and environmental impacts.</li> <li>Preventing the significant alteration of hillside topography through grading and paving.</li> <li>Use of visually unobtrusive building materials.</li> </ul>		<ul style="list-style-type: none"> <li>Protecting unique natural features, including landforms, mature trees and their surrounding habitat, and ridge lines, by requiring location of structures away from these assets.</li> <li>Requiring architectural design that reflects the natural form of the hillside setting, in order to minimize visual and environmental impacts.</li> <li>Preventing the significant alteration of hillside topography through grading and paving.</li> <li>Use of visually unobtrusive building materials.</li> </ul>
		2-P-15	Retain ridgelines and prominent hillsides as open space through clustering and transfer of density to other parts of a development site (applies to Rural and Very Low Residential areas within the West Hills, South Hills and Petaluma Boulevard North subareas only).		1-P-16 Retain ridgelines and prominent hillsides as open space through appropriate clustering and/or transfer of density to other parts of a development site (applies to Rural and Very Low Residential areas within the West Hills, South Hills and Petaluma Boulevard North subareas only).
					2-P-8 Require single-loaded streets along the Urban Separator and riparian corridors to ensure the creation of linear open space corridors with maximum public accessibility, visibility, and opportunities for stewardship.
					2-P-65 Require dedication of the Urban Separator along the western and southern boundaries of the UGB.
		3-P-63	<p>Extend the Urban Separator.</p> <ul style="list-style-type: none"> <li>To the extent feasible, provide an area up to 300-feet in width along the eastern boundary of the South Hills subarea by requiring dedication of land as Urban Separator, while allowing density transfers from the Urban Separator to</li> </ul>		2-P-69 <p>Extend the Urban Separator.</p> <ul style="list-style-type: none"> <li>To the extent feasible, provide an area up to 300-feet in width along the eastern boundary of the South Hills subarea by requiring dedication of land as Urban Separator, while allowing density transfers from the Urban Separator to the developable portion of individual sites.</li> </ul>

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	<p>the developable portion of individual sites.</p> <ul style="list-style-type: none"> <li>• Develop a strong gateway at I Street with landscape treatment and views of the Petaluma Valley.</li> <li>• Preserve the existing public viewsheds featuring the Petaluma community.</li> </ul>		
			<p>2-P-70</p> <p>Develop a strong gateway at I Street with landscape treatment and views of the Petaluma Valley. Maintain the rural character and interface of the adjacent outlying areas of the UGB when designing gateway improvements.</p>
			<p>2-P-71</p> <p>Preserve the existing public viewsheds featuring the Petaluma community.</p>
	<p>10-P-3</p> <p>Regulate the grading and development of hillside areas for new urban land uses, by instituting a Hillside Overlay or other similar mechanism in the Development Code. Ensure that new development on hillsides is constructed to reduce erosion and landslide hazards:</p> <ul style="list-style-type: none"> <li>• Limit cut slopes to 3:1, except where an engineering geologist can establish that a steeper slope would perform satisfactorily over the long term.</li> <li>• Encourage use of retaining walls or rock-filled crib walls as an alternative to high cut slopes.</li> <li>• Ensure revegetation of cut-and-fill slopes to control erosion. Plant materials for revegetation should not be limited to hydro-seeding and mulching with annual grasses. Trees add structure to the soil and take up moisture while adding color and diversity.</li> </ul>		<p>10-P-3</p> <p>Regulate the grading and development of hillside areas for new urban land uses, by instituting a Hillside Overlay or other similar mechanism in the Development Code. Ensure that new development on hillsides is constructed to reduce erosion and landslide hazards and in compliance with any City hillside regulations, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Limit cut slopes to 3:1, except where an engineering geologist can establish that a steeper slope would perform satisfactorily over the long term.</li> <li>• Encourage use of retaining walls or rock-filled crib walls as an alternative to high cut slopes.</li> <li>• Ensure revegetation of cut-and-fill slopes to control erosion. Plant materials for revegetation should not be limited to hydro-seeding and mulching with annual grasses. Trees add structure to the soil and take up moisture while adding color and diversity.</li> <li>• Ensure blending of cut-and-fill slopes within existing contours, and provision of horizontal variation, in order to</li> </ul>

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			<ul style="list-style-type: none"> <li>• Ensure blending of cut-and-fill slopes within existing contours, and provision of horizontal variation, in order to mitigate the artificial appearance of engineered slopes.</li> <li>• Ensure structural integrity of sites previously filled before approving redevelopment.</li> </ul>			<p>mitigate the artificial appearance of engineered slopes.</p> <ul style="list-style-type: none"> <li>• Ensure structural integrity of sites previously filled before approving redevelopment.</li> </ul> <p>See also Chapter 1: Land Use, Growth Management, and the Built Environment and Chapter 3: Community Design Character and Green Building for additional hillside policies and programs.</p>
3.11-2	<i>New development and intensification along the Petaluma River could adversely affect the visual character of this natural resource.</i>	2-P-36	An area shown as the Petaluma River Corridor (PRC), along the Petaluma River, shall be set aside for the creation of flood terraces where appropriate, preservation, expansion, and maintenance of flood storage capacity of the floodplain, habitat conservation, and public access.	Less than Significant	1-P-39	An area shown as the Petaluma River Corridor (PRC), along the Petaluma River, shall be set aside for the creation of flood terraces where appropriate, preservation, expansion, and maintenance of flood storage capacity of the floodplain, habitat conservation, and public access.
		3-P-37	<p>The Petaluma River Corridor (PRC) shall be dedicated to the City, improved and maintained in perpetuity by the development as adjacent development occurs.</p> <p>A. Design Standards shall be developed for the Petaluma River Corridor.</p> <p>B. Maintenance of the PRC shall be assured through the creation of a funding mechanism such as citywide surface water utility fee or Landscape Assessment District.</p> <p>C. All development within the PRC shall be subject to a discretionary review process.</p>		1-P-40	<p>The Petaluma River Corridor (PRC) shall be irrevocably offered for dedication to the City, improved and maintained in perpetuity by the development as adjacent development occurs.</p> <p>A. Design Standards shall be developed for the Petaluma River Corridor.</p> <p>B. Maintenance of the PRC, not covered by maintenance in perpetuity by adjacent development, may be assured through the creation of a funding mechanism such as citywide surface water utility fee or Landscape Assessment District.</p>
					1-P-41	All development on lands affected by the PRC designation shall be subject to a discretionary review process beyond that required by CEQA.
		2-P-38	Development shall incorporate the River as a major design focal point, orienting buildings and		1-P-42	Development shall incorporate the River as a major design focal point, orienting buildings and activities toward the River and



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		activities toward the River.			providing water access, to the extent deemed environmentally responsible.
	2-P-39	Develop the Petaluma River as a publicly-accessible green ribbon, fronted by streets, paths, and open spaces, by implementing the Petaluma River Access and Enhancement Plan within the context of the PRC Design Standards.		1-P-43	Develop the Petaluma River as a publicly-accessible green ribbon, fronted by streets, paths, access points, and open spaces, by implementing the Petaluma River Access and Enhancement Plan within the context of the PRC Design Standards.
	3-P-28	Foster connections to the river from surrounding areas and ensure that new development adjacent to the river is oriented toward it.		2-P-33	Foster connections to the river from surrounding areas and ensure that new development adjacent to the river is oriented toward it.
				1-P-44	Development along the River shall include the creation and maintenance, in perpetuity, of public access sites. Amenities provided may include ramps, steps, docks or other means of access to the water.
				1-P-45	New development shall acknowledge, preserve, protect, and enhance the ecological and biological health and diversity of the Petaluma River.
	3-P-32	Promote greater accessibility to the Petaluma River and vacant lands through road extensions, bikeways, and trails, including: <ul style="list-style-type: none"> <li>• Extending Burlington Drive northward across Lynch Creek, and consider other options to extend streets through to new developments.</li> <li>• Requiring new development to be oriented to the river, and providing continuous public access to the riverfront.</li> </ul>		2-P-37	Promote greater accessibility to the Petaluma River and vacant lands through road extensions, bikeways, and trails, including: <ul style="list-style-type: none"> <li>• Extending Burlington Drive northward across Lynch Creek, and consider other options to extend streets through to new developments.</li> <li>• Requiring new development to be oriented to the river, and providing continuous public access to the riverfront.</li> </ul>
	3-P-35	Provide gateway improvements both east and west of the Highway 101 overcrossing of the Petaluma River. <p>A. East of Highway 101, undertake a streetscape improvement program that incorporates new</p>		2-P-40	Provide gateway improvements both east and west of the Highway 101 overcrossing. <p>A. East of Highway 101, undertake a streetscape improvement program that recognizes existing trees, incorporates new trees and vegetation, while reinforcing a</p>

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>		<i>Draft Proposed General Plan Policies that Reduced the Impact</i>		<i>Signifi- cance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>
			<p>trees and vegetation, while maintaining a visual and physical connection to the Petaluma River.</p> <p>B. Preserve and expand river-dependent industrial uses, while improving appearance and screening from Petaluma Boulevard South.</p> <p>C. Develop the terminus of the Caulfield Lane “southern crossing” with Petaluma Boulevard South as an emphatic gateway, with methods—such as a roundabout and more defined lane widths—to slow traffic and define entrance into the community and new neighborhoods.</p>		<p>visual and physical connection to the Petaluma River and estuary.</p> <p>B. Preserve and expand river-dependent industrial uses, while improving appearance from Petaluma Boulevard South with landscaping.</p> <p>C. Develop the terminus of the Caulfield Lane “southern crossing” with Petaluma Boulevard South as a gateway, with methods—such as a roundabout, tree-lined median, reduced lane widths, or other traffic calming/design treatments—to slow traffic and define an entrance into the community and new neighborhoods.</p> <p>D. With or without the southern crossing develop traffic calming measures to address traffic speeds.</p>
		3-P-36	Provide vistas eastward to the Petaluma River and across toward Sonoma Mountain.		2-P-41 Provide vistas eastward to the Petaluma River and across toward Sonoma Mountain.
		3-P-50	Develop the Petaluma River as a publicly-accessible green ribbon, fronted by streets, paths, and open spaces, by implementing the Natural Environment and Water Resources elements and the Petaluma River Access and Enhancement Plan.		1-P-43 Develop the Petaluma River as a publicly-accessible green ribbon, fronted by streets, paths, access points, and open spaces, by implementing the Petaluma River Access and Enhancement Plan within the context of the PRC Design Standards.
		3-P-51	Foster connections to the river from surrounding areas and ensure that new development adjacent to the river is oriented toward it.		2-P-33 and 2-P-56 Foster connections to the river from surrounding areas and ensure that new development adjacent to the river is oriented toward it.
		3-P-52	Use the Petaluma River Access and Enhancement Plan as the tool to implement the Petaluma River Corridor by maintaining setbacks, creating flood terraces where appropriate, and preserving floodplain and habitat conservation areas and other open spaces along the river.		2-P-58 Use the Petaluma River Access and Enhancement Plan as the tool to implement the Petaluma River Corridor by maintaining setbacks, creating natural flood terraces where appropriate, and enhancing floodplain and habitat conservation areas and other open spaces along the river utilizing an ecologically-based design approach.
		3-P-53	Promote greater accessibility and views to Petaluma River through road extensions,		2-P-59 Promote greater accessibility and views to Petaluma River through road extensions, bikeways, and trails, including:

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>		<i>Draft Proposed General Plan Policies that Reduced the Impact</i>		<i>Signifi- cance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>	
			bikeways, and trails, including: <ul style="list-style-type: none"> <li>• Requiring new development to be oriented to the river, and provide continuous public access parallel to the riverfront.</li> <li>• Extending Industrial Avenue south of Corona Road.</li> <li>• Requiring a new pedestrian/bicycle connection to the river east of Jessie Lane and intersecting with Petaluma Boulevard North.</li> <li>• Requiring a new street connection to the river at, or near, the intersection of Gossage Avenue.</li> <li>• Requiring paths from the area of Jessie Lane southwest toward Magnolia Avenue to link with existing neighborhoods.</li> </ul>			<ul style="list-style-type: none"> <li>• Requiring new development to be oriented to the river, and provide continuous public access parallel to the riverfront.</li> <li>• Extending Industrial Avenue south of Corona Road.</li> <li>• Requiring a new pedestrian/bicycle connection to the river east of Jessie Lane and intersecting with Petaluma Boulevard North.</li> <li>• Requiring a new street connection to the river at, or near, the intersection of Gossage Avenue.</li> <li>• Requiring paths from the area of Jessie Lane southwest toward Magnolia Avenue to link with existing neighborhoods.</li> <li>• Enhancing the ecological diversity of the riparian corridor.</li> <li>• Requiring development to enhance the natural ecology along the river.</li> </ul>
3.11-3	<i>New development and redevelopment activities may potentially degrade the existing visual quality of the city through incompatibilities with existing development in scale and/or character.</i>	2-P-3	Preserve the overall scale and character of established residential neighborhoods. <p>A. In addition to density standards, establish building intensity (floor area ratio) standards for residential development in the Diverse Low and Medium Density Residential districts, to prevent development out of scale with existing neighborhood context.</p> <p><i>Actual standards are to be developed and maintained in the City's Development Code.</i></p>	Less than Significant	1-P-3	Preserve the overall scale and character of established residential neighborhoods. <p>A. In addition to density standards, establish building intensity (floor area ratio) standards for residential development in the Diverse Low and Medium Density Residential districts, to prevent development out of scale with existing neighborhood context.</p> <p><i>Actual standards are to be developed and maintained in the City's Development Code.</i></p>
		3-P-42	Maintain the rural character to the west of this corridor [Petaluma Boulevard North, north of Shasta Avenue] by limiting density to primarily		2-P-47	[Petaluma Boulevard North, north of Cinnabar Avenue subarea] Maintain the rural character to the west of this corridor by limiting density:

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

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			Rural Residential uses west and north of Gossage Avenue, and Low Density Residential uses south.		<ul style="list-style-type: none"> <li>To primarily Rural Residential uses west and north of Gossage Avenue.</li> <li>A combination of Rural and Low Density Residential uses south of Gossage Avenue.</li> <li>Limiting the mixed use of the KOA site to allow continuation and possible expansion of the variety of uses on the site (i.e. recreation/camping, support commercial, RV storage, outdoor recreational activities, seasonal events, etc.).</li> </ul>
		3-P-56	Preserve the rural aspect of the area by maintaining the existing density (Rural, Very Low and Low Residential) and land use patterns. A decrease in density through minimum lot sizes within the Development Code can achieve the desired transition.		2-P-62 [West Hills subarea] Preserve the rural aspect of the area by maintaining the existing density (Rural, Very Low and Low Residential) and land use patterns. A decrease in density through minimum lot sizes within the Development Code can achieve the desired transition.
		3-P-99	Allow lot consolidation in residential areas only when finding that this will not negatively impact the existing neighborhood character.		2-P-114 [West subarea] Allow lot consolidation in residential areas only when finding that this will not negatively impact the existing neighborhood character.
		6-P-6	<p>Neighborhood parks are donated, constructed, and maintained within the developing property(ies). In addition to the donation and improvements, park impact fees shall be paid to offset costs associated with developing, upgrading, and maintaining community parks. Transfer of density from the donated park acreage may be considered where deemed appropriate by the City Council.</p> <p>A. Revise the City's Municipal Code to require dedication of neighborhood park land, and construction of associated neighborhood park improvements, in addition to the payment of park impact fees, eliminating the reimbursement component for neighborhood parks.</p> <p>B. Establish a transfer of development</p>		6-P-7 Neighborhood parks are donated, constructed, and maintained within the developing property(ies). The formation of landscape assessment districts to offset costs associated with developing, upgrading, and maintaining community parks may be imposed as a condition of development. Transfer of density within a project site from donated acreage in excess of dedication/in lieu requirements may be considered where deemed appropriate by the City Council. Park impact fees shall also be required prior to issuance of building permits in all cases where they can be legally imposed pursuant to City ordinance.  A. Review and, if necessary, revise the City's Municipal Code regarding the payment of community park impact fees to maximize all opportunities for funding community and neighborhood parkland, park improvements and park operation and maintenance through the development

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

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			<p>rights (TDR) program that allows project proponents on whose sites new parkland locations are designated, to transfer development rights from portions of the site dedicated as public open space/park beyond required dedication/in lieu requirements (5 acres per 1,000 residents) to the remainder of the site at a ratio of 1.5 x base land use designation on the site, subject to approval by the City Council and provided the following criteria are met:</p> <ul style="list-style-type: none"> <li>• The resulting park area meets the minimum size and location requirements shown in Table 6.1-8 and Figure 6-1;</li> <li>• The park/open space is useful for recreational use, and not just leftover acreage;</li> <li>• The park/open space is physically and perceptually available to the community-at-large, and not internal to the development;</li> <li>• The resulting transfer will not unduly impact the character of the neighborhood where the development is located; and</li> <li>• The park/open space is not at the city's edge, adjacent to an urban separator.</li> </ul>			<p>entitlement process.</p> <p>B. Establish a transfer of development rights (TDR) program that allows project proponents on whose sites new neighborhood parkland locations are designated, to transfer development rights from portions of the site dedicated as public open space/park beyond required dedication/in lieu requirements (2 acres of neighborhood park per 1,000 residents) to the remainder of the site at the base land use designation on the site, subject to approval by the City Council and provided the following criteria are met:</p> <ul style="list-style-type: none"> <li>• The resulting park area meets the minimum size and location requirements shown in Table 6.1-8 and Figure 6-1;</li> <li>• The park/open space is useful for recreational use, and not just leftover acreage;</li> <li>• The park/open space is physically and perceptually available to the community-at-large, and not internal to the development;</li> <li>• The resulting transfer will not unduly impact the character of the neighborhood where the development is located; and</li> <li>• The park/open space is not at the city's edge, adjacent to an urban separator.</li> </ul>
3.12-1	<i>New development proposed under the General Plan has the potential</i>	3-P-7	<p>Protect significant historic and archaeological resources for the aesthetic, educational, economic, and scientific contribution they make to Petaluma's identity and quality of life.</p> <p>A. Maintain the character of the Petaluma</p>	Less than Significant	3-P-1	<p>Protect significant historic and archaeological resources for the aesthetic, educational, economic, and scientific contribution they make to Petaluma's identity and quality of life.</p> <p>A. Maintain the historical integrity of the Petaluma Historic</p>

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

<i>Impact</i>	<i>Draft Proposed General Plan Policies that Reduced the Impact</i>	<i>Significance</i>	<i>Final General Plan Policies, Programs or Map Exhibits that Reduce the Impact</i>
<p><i>to disrupt undiscovered archaeological resources.</i></p>	<p>Historic Commercial District, which is listed on the National Register of Historic Places, by adhering to the city's Historic Commercial District Design Guidelines.</p> <p>B. Maintain the Oak Hill-Brewster Historic and "A" Street Historic districts as local architectural preservation districts.</p> <p>C. Develop floor area ratio and other design standards that relate overall building size and bulk to site area for Downtown, the Oak Hill-Brewster Historic District, and "A" Street neighborhoods.</p> <p>D. Develop historic preservation guidelines or standards for protecting historic quality structures that are not located within an existing historic district through initiating, requiring and/or encouraging formation of additional historic districts.</p> <p>E. The loss of existing and potential historic structures shall be minimized through strict enforcement of City policies requiring proposed demolition be reviewed by the Historic and Cultural Preservation Committee. All means shall be used to encourage preservation and/or adaptive reuse or restoration of structures built in 1945 or earlier (Resolution 2005-198 N.C.S. as thereafter amended).</p> <p>F. Ensure the protection of known archaeological resources in the city by requiring a records review for any development proposed in areas that are considered archaeologically sensitive for Native American and/or historic remains.</p> <p>G. In accordance with CEQA and the State Public Resources Code, require the</p>		<p>Commercial District, which is listed on the National Register of Historic Places, by adhering to the city's Historic Commercial District Design Guidelines.</p> <p>B. Maintain the historical integrity within the Oak Hill-Brewster and "A" Street Historic districts as adopted local historic districts.</p> <p>C. Develop floor area ratio and other design standards that relate overall building size and bulk to site area for Downtown, the Oak Hill-Brewster, and "A" Street Historic District neighborhoods.</p> <p>D. Conduct a comprehensive, city-wide survey of historic and cultural resources for the purpose of creating an historic resource inventory.</p> <ul style="list-style-type: none"> <li>• Include updated surveys of existing Historic Districts as well as their adjacent areas.</li> <li>• Identify individual resources for designation as local, state or nationally designated landmarks.</li> <li>• The historic resource inventory shall be updated on a regular basis, per national standards. Inventories should be phased by prioritizing critical areas.</li> </ul> <p>E. Develop historic preservation guidelines or standards for protecting historic quality structures that are not located within an existing historic district through initiating, requiring and/or encouraging formation of additional historic districts or expanding the boundaries of existing districts and identifying local landmarks.</p> <p>F. Pursue Certified Local Government (CLG) status through the California Office of Historic Preservation.</p> <p>G. Create a central repository for historic surveys, reports, guidelines, ordinances etc.</p> <p>H. The loss of existing and potential historic structures shall be minimized through strict enforcement of City policies requiring proposed demolition to be reviewed by the</p>

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

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			preparation of a resource mitigation plan and monitoring program by a qualified archaeologist in the event that archaeological remains are discovered.		<p>Historic and Cultural Preservation Committee. All means shall be used to encourage preservation and/or adaptive reuse or restoration of structures built in 1945 or earlier (Resolution 005-198 N.C.S. as thereafter amended).</p> <ul style="list-style-type: none"> <li>• Reconsider defining structures/resources 45 years or older as the standard for review to be consistent with the State of California, CEQA, and the National Register criteria.</li> </ul> <p>I. Prepare a salvage ordinance that requires an inventory of usable materials, in cases where demolition is the only alternative, prior to demolition of historic structures.</p> <p>J. Ensure the protection of known archaeological resources in the city by requiring a records review for any development proposed in areas that are considered archaeologically sensitive for Native American and/or historic remains.</p> <p>K. In accordance with CEQA and the State Public Resources Code, require the preparation of a resource mitigation plan and monitoring program by a qualified archaeologist in the event that archaeological remains are discovered.</p> <p>L. Consider the creation of an historic preservation planner on staff.</p>
					<p>3-P-5</p> <p>Recognize that historical and archaeological resources are irreplaceable and consequently their protection shall be a key consideration in the development review process.</p> <p>A. Encourage historic resource reports and similar background materials be submitted to Historic SPARC during preliminary review of projects involving historic or cultural resources in order to resolve potential conflicts between preservation and proposed development early in the planning process.</p>

Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

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						<p>B. Ensure that future plans, ordinances, and City programs are complimentary to the historic preservation goals and policies contained within this plan.</p> <p>C. Develop standards for historical review.</p>
3.12-2	<i>New infill development within previously built up areas in the City has the potential to impact sites of local historic importance and the overall historic setting of downtown.</i>	3-P-7	See Policy 3-P-7 above	Less than Significant		See Policies 3-P-1 and 3-P-5 above
3.13-1	<i>Buildout of the proposed General Plan could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.</i>	10-P-13	Require compliance with Sonoma County's Integrated Waste Management Plan (CoIWMP) as well as the Consolidated Unified Protection Agency (CUPA) program elements.	Less than Significant	10-P-13	Require compliance with Sonoma County's Integrated Waste Management Plan (CoIWMP) as well as the Consolidated Unified Protection Agency (CUPA) program elements.
		10-P-14	Prepare and maintain an inventory of environmentally contaminated sites to educate future landowners about contamination from previous uses. Work directly with landowners in the cleanup of these sites, particularly in areas with redevelopment potential. <i>The U.S. Environmental Protection Agency (EPA)</i>		10-P-14	Prepare and maintain an inventory of environmentally contaminated sites to educate future landowners about contamination from previous uses. Work directly with landowners in the cleanup of these sites, particularly in areas with redevelopment potential. <i>The U.S. Environmental Protection Agency (EPA) in 2005 awarded the City of Petaluma two grants to address potential</i>



Table ES-5: Summary of Impacts and Proposed/Final General Plan Policies and Programs that Reduce the Impact

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			<i>in 2005 awarded the City of Petaluma two grants to address potential brownfield properties within the city. In addition, the City has applied to the EPA for a revolving loan fund grant to help developers, non-profits, and the City clean up brownfield sites.</i>			<i>brownfield properties within the city. In addition, the City has applied to the EPA for a revolving loan fund grant to help developers, non-profits, and the City clean up brownfield sites.</i>
		10-P-15	Establish special zoning designations and environmental review processes that limit the location of industry, research, and business facilities using hazardous materials. Require safe distances between these sites and residential areas, groundwater recharge areas (see General Plan Chapter 8: Water Resources), and waterways.		10-P-15	Establish special zoning designations and environmental review processes that limit the location of industry, research, and business facilities using hazardous materials. Require safe distances between these sites and residential areas, groundwater recharge areas (see General Plan Chapter 8: Water Resources), and waterways.
3.13-2	<i>Buildout of the proposed General Plan could create a significant hazard to the public or the environment through reasonably foreseeable accidental release of hazardous materials into the environment.</i>	NA		Less than Significant		

Please refer to the General Plan 2025 document for many more goals, policies and programs relative to the preservation and enhancement of community assets.

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## **Sonoma County General Plan (1986) EIR Unavoidable Effects of Growth**

- Increased exposure to geologic hazards
- Change in ground surface relief
- Conversion of soils to non-resource uses
- Erosion and sedimentation of streams
- Reduced groundwater supply
- Reduced water supplies
- Adverse effects on water quality
- Increased runoff, flooding and sedimentation
- Changes in natural vegetative cover
- Loss of wildlife habitat
- Pollution of aquatic communities
- Increased exposure to wildland fire hazards
- Increased need for fire suppression services
- Deterioration of air quality
- Increased traffic noise
- Increased demand for energy
- Increased need for housing, especially affordable housing
- Change in land use character of underdeveloped areas
- Loss of agricultural land
- Conflicts between agricultural and non-agricultural uses
- Increased demand for public services
- Increased traffic and demand for transit
- Potential impacts on archaeological sites
- Change in scenic vistas as a result of development

**Appendix F**  
**WREP Size Requirements**

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## WREP SIZE REQUIREMENTS

The size of the WREP is determined by the two primary objectives which the project is designed to fulfill: disposal of recycled water produced at the Ellis Creek Water Recycling Facility, which is a requirement of the wastewater treatment system (ie: the City’s NPDES Permit); and irrigation with recycled water to offset the use of potable water, a requirement of the water supply system. The demand from both systems is described below.

The following approach is consistent with the Court of Appeal’s decision in *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931. That decision held that growth decisions must be made in the first instance by cities and counties when they adopt their general plans, and agencies that provide essential infrastructure necessary to serve that growth must base their planning efforts on growth authorized by approved general plans.

The WREP EIR analyzes the environmental impacts of providing adequate, reliable capacity to accommodate future recycled water flows at buildout of the Petaluma General Plan and at buildout of Penngrove per Petaluma’s agreement with the Sonoma County Water Agency to provide the community of Penngrove with wastewater service. This WREP EIR does not analyze the impacts of development authorized by the General Plan. The impacts of development are analyzed in the EIRs for the Petaluma General Plan 2025 and the Sonoma County General Plan relative to growth in Penngrove. Information on potential growth inducement associated with the WREP is provided in the General Plan EIRs and is summarized in Chapter 6 of the EIR (see Table F-1).

**TABLE F-1**  
**Population and Non-residential uses served by the WREP**

Jurisdiction	General Plan Horizon Year	Projected Population	Non-residential Square Footage
Petaluma	2025 <sup>a</sup>	73,690 <sup>c</sup>	22,983,000 <sup>d</sup>
Penngrove	<sup>b</sup>	3,000 <sup>b</sup>	Small
Total		76,690	22,983,000

Source: Petaluma General Plan 2025; Agreement with SCWA 1977

Notes:

- a. Petaluma General Plan 2025 has a horizon year of 2025, however, buildout may occur later than 2025.
- b. 1977 Joint Powers Agreement with Sonoma County Water Agency to provide wastewater service to Penngrove for up to 3,000 population.
- c. Petaluma General Plan 2025, adopted May 19, 2008, p. 1-11 Table 1.3-4 population of 72,707; plus dwelling units in Tier 9. Tier 9 units calculated as the difference between Water Supply and Demand Analysis (WSDA) dwelling units and General Plan dwelling units (28,613 – 27, 949) less 300 dwelling units for existing water customers in WSDA, but not in GP, who will not receive wastewater service. See p. 1-17 through 19 of the General Plan for an explanation of Tier 9 units.
- d. Petaluma General Plan 2025, p. 1-11, Table 1.3-3.

## **Wastewater Treatment Flows**

The future flow was projected on the basis of a 30-day average dry weather flow (ADWF), which is defined as the minimum daily flow occurring over a period of 30 consecutive days. Flows in July and August are the lowest of the year.

Future recycled water flows are projected based upon historical flow factors and projected population and non-residential uses. The flow factors are estimated using historical wastewater flows, with current or historical data for population and square footage of non-residential uses.

Based on monthly flow reports, under Petaluma's 1987 General Plan and at the time the Ellis Creek Water Recycling Facility (WRF) was designed in 2000, the 30-day ADWF was computed to be approximately 6.7 mgd. Since that time, the Petaluma General Plan 2025 has been adopted (May 19, 2008), and the Petaluma Water Conservation Plan has been adopted (January 2008). Projected wastewater flows for the Ellis Creek WRF have been recalculated to account for the growth projected by the new General Plan and the reduction in flows projected for the Water Conservation Plan.

Flows were split into residential and non-residential commercial/industrial/institutional (CII) contributions, and the flow factors were estimated. The resulting estimated future flow to accommodate the General Plan 2025 and the demand from Penngrove is 7.3 mgd, as shown in Table F-2, an increase of 0.6 mgd compared to the demand under Petaluma's 1987 General Plan (see Table F-2). The reduction in wastewater flows into the WRF from adoption of the Water Conservation Plan is estimated to be a range of 0.86 to 1.04 mgd. Taken together, the new General Plan and the Water Conservation Plan result in an ADWF of 6.3 to 6.4 mgd.

**TABLE F-2**  
**Projected Wastewater Flows for Ellis Creek Water Recycling Facility**

Member Entity	Residential			Commercial/Industrial/Institutional (CII)			Total ADWF (mgd)
	Buildout Population	Gallons per Capita per Day	ADWF (mgd)	Historical Flow	Increase at Buildout	ADWF (mgd)	
Petaluma	73,690 <sup>a</sup>	86.0 <sup>c</sup>	6.3	0.46 <sup>d</sup>	50% <sup>f</sup>	0.7	7.0
Penngrove	3,000 <sup>b</sup>	86.0	0.3	0 <sup>e</sup>	0%	0	0.3
Total	76,690		6.6	0.46		0.7	7.3

Source: Carollo 2008

Notes:

- a. Petaluma General Plan 2025, adopted May 19, 2008, p. 1-11 Table 1.3-4 population of 72,707; plus dwelling units in Tier 9. Tier 9 units calculated as the difference between Water Supply and Demand Analysis (WSDA) dwelling units and General Plan dwelling units (28,613 – 27, 949) less 300 dwelling units for existing water customers in WSDA, but not in GP, who will not receive wastewater service. See p. 1-17 through 19 of the General Plan for an explanation of Tier 9 units.
- b. 1977 Joint Powers Agreement with Sonoma County Water Agency to provide wastewater service to Penngrove for up to 3,000 population.
- c. Project Report, November 2000, Carollo, p. 2-4
- d. Loc. cit., Table 2-4, average of 1996 through 1999
- e. CII flows from Penngrove are small, and no data exist to calculate them.
- f. Petaluma General Plan 2025, p. 1-10, estimate of 36% increase in CII flows over 2005; however historical flow is for 1998 (on average), and for limited industrial flows only, so a factor of 50% has been used.

A water balance model was constructed to simulate daily inflows and outflows for the Ellis Creek WRF. The model was used to simulate the amount of recycled water to be produced at the Ellis Creek WRF that is not discharged or stored, and therefore must be reused. These volumes are independent of whether the recycled water is secondary treated or tertiary treated.

Table F-3 shows the current estimate of total volume of flows that needs to be managed at buildout of the General Plan (see Carollo exhibit at the end of this appendix).

**TABLE F-3**  
**Annual Recycled Water Volumes that Need to be Managed by the WREP**

Year Type <sup>1</sup>	Annual Volumes of Recycled Water that Need to be Managed by the WREP (MG per year)		
	Under 1987 General Plan	Under General Plan 2025 with Maximum Water Conservation	Under General Plan 2025 with Expected Water Conservation
Median Flows in normal weather year (50 <sup>th</sup> percentile)	985	1,025	1,070

Source: Carollo, 2008

The size of the recycled water system to fulfill the objective of disposal of recycled water from the Ellis Creek WRF is therefore estimated at a range of 1,025 to 1,070 MG per year.

### **Water Supply System**

The future demand for water was calculated in the Water Supply and Demand Analysis, General Plan 2025, Volume 2, Technical Appendix C, and is summarized in Table F-4.



**TABLE F-4**  
**Projected Water Demand for Petaluma General Plan 2025**

Category	Dwelling Units	Square feet	Students	Acres	Gallons per unit per day	Vacancy Adjustment Factor	Total (mgd)
SFD existing	16,962				317.4		5.4
SFD new	3,156				418.0		1.3
MFD	8,495				192.4		1.6
Commercial		7,083,745			98.3	101%	0.7
Industrial		5,249,528			95.1	111%	0.6
Office		8,362,537			77.7	113%	0.7
Landscaping				1,772	493.2		0.9
Tier 9							0.4
Institutional		1,061,649			76.0		0.1
Educational			25,125		16.0		0.4
Parks, Open space, Golf Courses				586	1,507.0		0.9
Lost Water							1.1
Credit for Plumbing Code							<0.4>
Coast Guard Facility							0.2
Ellis Creek WRF							0.2
Total (mgd)							14.1 mgd
Total (MG per year)							5,139 MG per year

Source: Petaluma General Plan 2025, Water Supply and Demand Analysis

As shown in Table 2-4, the Water Supply and Demand Analysis projected that 14.1 mgd or 5,139 MG of potable water would be needed per year at buildout of the Petaluma General Plan 2025. At the same time, the WSDA identified that existing sources of water from the Sonoma County Water Agency would be limited to 4,366 MG per year per the 11<sup>th</sup> Amended Agreement, and therefore and calculated that an additional 5.0 mgd or 773 MG per year of potable water would be needed to meet the demand at buildout (see WSDA page 3-2). The WSDA proposed that the shortfall be supplied as follows (see WSDA page 3-21):

**TABLE F-4**  
**Sources of Water Supply Proposed by the General Plan**

	<b>Annual Water Demand (MG per year)</b>	<b>Average Day Maximum Month Water Demand (mgd)</b>
Recycled Water Potable Offset	464	3.57
Water Conservation	255	1.3
Groundwater	61	0.5
Total	780	5.37

Subsequent to the WSDA report, the City adopted its Water Conservation Plan in January 2008 which proposed additional water conservation savings. When the City adopted the Plan, it chose to close the water supply shortfall by water conservation and recycled water use and deleted use of groundwater for future water supply. The Water Conservation Plan identifies a range of water savings that would occur from implementation of the plan during the course of buildout of the General Plan. Estimated water savings from the adopted Plan is 315 MG per year (see Table 6-4 in the Water Conservation Plan) and 1.98 mgd (prorated from Table 6-3 in the Water Conservation Plan plus building code increment) at buildout.

Therefore, the size of the recycled water reuse system that is needed for potable offset has stayed approximately the same at 464 MG per year and 3.57 mgd.

**TABLE 2-2**  
**Projected Wastewater Flows for Ellis Creek Water Recycling Facility**

Member Entity	Residential			Commercial/Industrial/Institutional (CII)			Total ADWF (mgd)
	Buildout Population	Gallons per Capita per Day	ADWF (mgd)	Historical Flow	Increase at Buildout	ADWF (mgd)	
Petaluma	73,690 <sup>a</sup>	86.0 <sup>c</sup>	6.3	0.46 <sup>d</sup>	50% <sup>f</sup>	0.7	7.0
Penngrove	3,000 <sup>b</sup>	86.0	0.3	0 <sup>e</sup>	0%	0	0.3
Total	76,690		6.6	0.46		0.7	7.3

Source: Carollo 2008

Notes:

- a. Petaluma General Plan 2025, adopted May 19, 2008, p. 1-11 Table 1.3-4 population of 72,707; plus dwelling units in Tier 9. Tier 9 units calculated as the difference between Water Supply and Demand Analysis (WSDA) dwelling units and General Plan dwelling units (28,613 – 27, 949) less 300 dwelling units for existing water customers in WSDA, but not in GP, who will not receive wastewater service. See p. 1-17 through 19 of the General Plan for an explanation of Tier 9 units.
- b. 1977 Joint Powers Agreement with Sonoma County Water Agency to provide wastewater service to Penngrove for up to 3,000 population.
- c. Project Report, November 2000, Carollo, p. 2-4
- d. Loc. cit., Table 2-4, average of 1996 through 1999
- e. CII flows from Penngrove are small, and no data exist to calculate them.
- f. Petaluma General Plan 2025, p. 1-10, estimate of 36% increase in CII flows over 2005; however historical flow is for 1998 (on average), and for limited industrial flows only, so a factor of 50% has been used.

A water balance model was constructed to simulate daily inflows and outflows for the Ellis Creek WRF. The model was used to simulate the amount of recycled water to be produced at the WRF that is not discharged or stored, and therefore must be reused. These volumes are independent of whether the recycled water is secondary treated or tertiary treated.

Table 2-3 shows the current estimate of total volume of flows that needs to be managed at buildout of the General Plan (see Carollo exhibit at the end of this appendix).

**TABLE 2-3**  
**Annual Recycled Water Volumes that Need to be Managed by the WREP**

<b>Year Type<sup>1</sup></b>	<b>Annual Volumes of RW That Need to be Managed by the WREP (MG per year)</b>		
	<b>Under 1987 General Plan</b>	<b>Under General Plan 2025 with Maximum Water Conservation</b>	<b>Under General Plan 2025 with Expected Water Conservation</b>
Median Flows in normal weather year (50 <sup>th</sup> percentile)	985	1,025	1,070

Source: Carollo

The size of the recycled water reuse system to fulfill the need for offset of potable water is, therefore, estimated as a range from 1,025 to 1,070 MG per year.

**Appendix G**  
**Flow Projection - General Plan 2025**

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May 20, 2008  
7310A.20

Ms. Pat Collins  
WINZLER & KELLY  
495 Tesconi Circle  
Santa Rosa, CA 94501

Subject: City of Petaluma  
Ellis Creek Water Recycling Facility  
Flow Projection - General Plan 2025

Dear Pat:

The purpose of this letter is to summarize updated projections for build out Average Dry Weather Flow (ADWF) for the new Ellis Creek Water Recycling Facility (WRF) based on updated General Plan population information and water conservation estimates prepared by others. In addition, a storage pond water balance summary and graphical updates were prepared. Also estimates for required recycled water usage were developed for different water conservation measures.

**Average Dry Weather Flow Projections:** The ADWF projections for build-out were updated based on the 2008 Petaluma General Plan 2025. The original ADWF projections for build-out were based on the 1987 General Plan. These projections were included in the 2000 Project Plan Report for the WRF prepared by Carollo Engineers. The updated projections based on the new general plan are included in Attachment No. 1. The residential ADWF projection increased based on the General Plan population data increase, using the per capita contribution developed in the 2000 Project Plan Report. The commercial / industrial contribution was revised by the expected increase in these types of dischargers over the 2000 historical baseline. The total updated ADWF was estimated at 7.29 million gallons per day (mgd) before adjusting for water conservation. The ADWF projection was reduced using a range and target values for water conservation, which reduced ADWF projections. The updated ADWF based on the target water conservation goal is projected to be 6.43 mgd, which is within four percent of the original projection of 6.7 mgd.

**Water Balance Model and Reuse Projections:** A water balance model for the Petaluma storage pond system was developed by Carollo for the WRF Predesign in 2002. The water balance included influent flow projections, storage pond volumes, effluent discharge projections for river discharge and reuse and precipitation / evaporation data, for the pond system. The water balance used 3 cases: normal precipitation, above average or wet year precipitation and below average or dry year precipitation. The water balance was revised based on the updated flow projections and target water conservation goals described above. New discharge projections were developed for the system including estimates of river discharge and reuse, included in Attachments 2A, 2B, and 2C. The 2025 discharge projections based on the water balance model is also shown graphically on the charts included in Attachment No. 3.

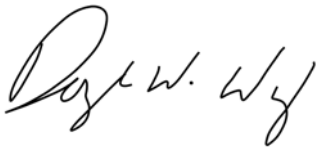
The water balance included an updated storage pond volume calculation based on using ponds No. 2 through No. 8 for storage. The pond volume for the storage ponds can go from a low of 2 feet of depth to a maximum level with 2 feet of free board. The updated storage volume is a total of 1200 acre feet (AF), a usable volume of 880 AF, and a minimum storage volume of 320 AF. The useable storage volume is about 8 percent more than the estimate used in the original evaluation.

The water balance is based on the assumption that river discharge is adjusted for any precipitation case, so that maximum available storage is available as of May 1, each year. The model also is based on matching the reuse flows to influent flows during July / August time frame. The estimate of reuse in other months is adjusted to match historical flows. Finally it should be noted the projected reuse volumes includes both secondary and tertiary reuse.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

CAROLLO ENGINEERS, P.C.

A handwritten signature in black ink, appearing to read "Douglas W. Wing". The signature is fluid and cursive, with the first name being the most prominent.

Douglas W. Wing, P.E.

DW:jl

Attachments: No. 1 - 2025 Average Dry Weather Flow Projections  
No. 2 - Discharge Summary - Target, Minimum and Maximum Water Conservation Levels  
No. 3 - Water Balance Charts - Target, Minimum and Maximum Water Conservation Levels

cc: Margaret Orr, City of Petaluma  
Tom Patten

Ellis Creek ADFW needed with adoption of 2008 <i>Petaluma General Plan 2025</i>										
Residential				Commercial/Industrial/Institutional				Total		
	Buildout Population	Gallons per capita per day	ADWF (mgd)	Historical Flow	Percent Increase at Buildout	ADWF (mgd)	ADWF (mgd)	Reduction for Water Conservation	ADWF (mgd)	
Petaluma	73,690 <i>(a)</i>	86.0 <i>(c)</i>	6.34	0.46 <i>(d)</i>	50% <i>(f)</i>	0.69	7.03	0.00	7.03	
Penngrove	3,000 <i>(b)</i>	86.0 <i>(c)</i>	0.26	0.00 <i>(e)</i>	0.00	0.00	0.26	0.00	0.26	
	76,690		6.60	0.46		0.69	7.29	0.00	7.29	
								Minimum Conservation Level	0.73 <i>(g)</i>	6.56
								Maximum Conservation Level	1.04 <i>(h)</i>	6.25
								Target Conservation Level	0.86 <i>(i)</i>	6.43

(a) 2008 Petaluma General Plan 2025, p. 1-11, Table 1.3-4 PLUS dwelling units (DU) in Tier 9. Tier 9 du calculated: difference between WSDA DU and GP DU (28613-27949) less 300 DU for existing water customers in Water Supply and Demand Analysis (WSDA) not in GP who will never get WW

(b) 1977 Joint Powers Agreement with Sonoma County Water Agency

(c) Project Report, November 2000, Carollo, p. 2-4

(d) Project Report, November 2000, Carollo, p. 2-4, Table 2-4, average of 1996 through 1999

(e) Project Report, November 2000, Carollo, p. 2-4

(f) 2008 Petaluma General Plan 2025, p. 1-10, est. 36% increase over 2005; historical flow is avg for 1998, so increase is 50%

(g) WSDA, July 2006, Psomas-Dodson, Appendix W, Table W-2; WC savings of 0.29 for WC Adj and .44 for Plumbing Code

(h) Water Conservation Plan, January 2008, City/Psomas-Dodson, Appendix L, Table L-2; WC savings of .45 WCP and .59 for Plumbing Code

(i) Target Water Conservation, 60% of 0.45 from WCP + 0.59 for Plumbing Code



Attachment No. 2-A  
2025 Buildout Summary

Target Conservation  
ADWF = 6.43 mgd

	Dry			Normal			Wet		
	Total Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)	Total Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)	Total Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)
Jan-2025	273.53	0.00	310.00	286.50	0.00	310.00	365.96	0.00	372.00
Feb-2025	202.56	0.00	290.00	269.38	0.00	290.00	316.45	0.00	348.00
Mar-2025	267.01	0.00	279.00	261.36	0.00	310.00	293.17	0.00	372.00
Apr-2025	217.64	60.00	165.00	215.11	60.00	210.00	220.36	30.00	225.00
May-2025	208.25	108.50	0.00	209.32	108.50	0.00	235.69	108.50	0.00
Jun-2025	200.79	165.00	0.00	195.28	165.00	0.00	195.71	165.00	0.00
Jul-2025	199.33	201.50	0.00	200.14	201.50	0.00	199.33	201.50	0.00
Aug-2025	199.33	201.50	0.00	200.62	201.50	0.00	199.33	201.50	0.00
Sep-2025	211.78	165.00	0.00	197.50	165.00	0.00	193.16	165.00	0.00
Oct-2025	218.70	108.50	0.00	221.40	108.50	0.00	204.82	108.50	0.00
Nov-2025	246.44	60.00	270.00	248.74	60.00	270.00	229.62	60.00	270.00
Dec-2025	229.90	0.00	279.00	260.56	0.00	279.00	266.11	0.00	279.00
TOTAL	2675.26	1070.00	1593.00	2765.90	1070.00	1669.00	2919.71	1040.00	1866.00

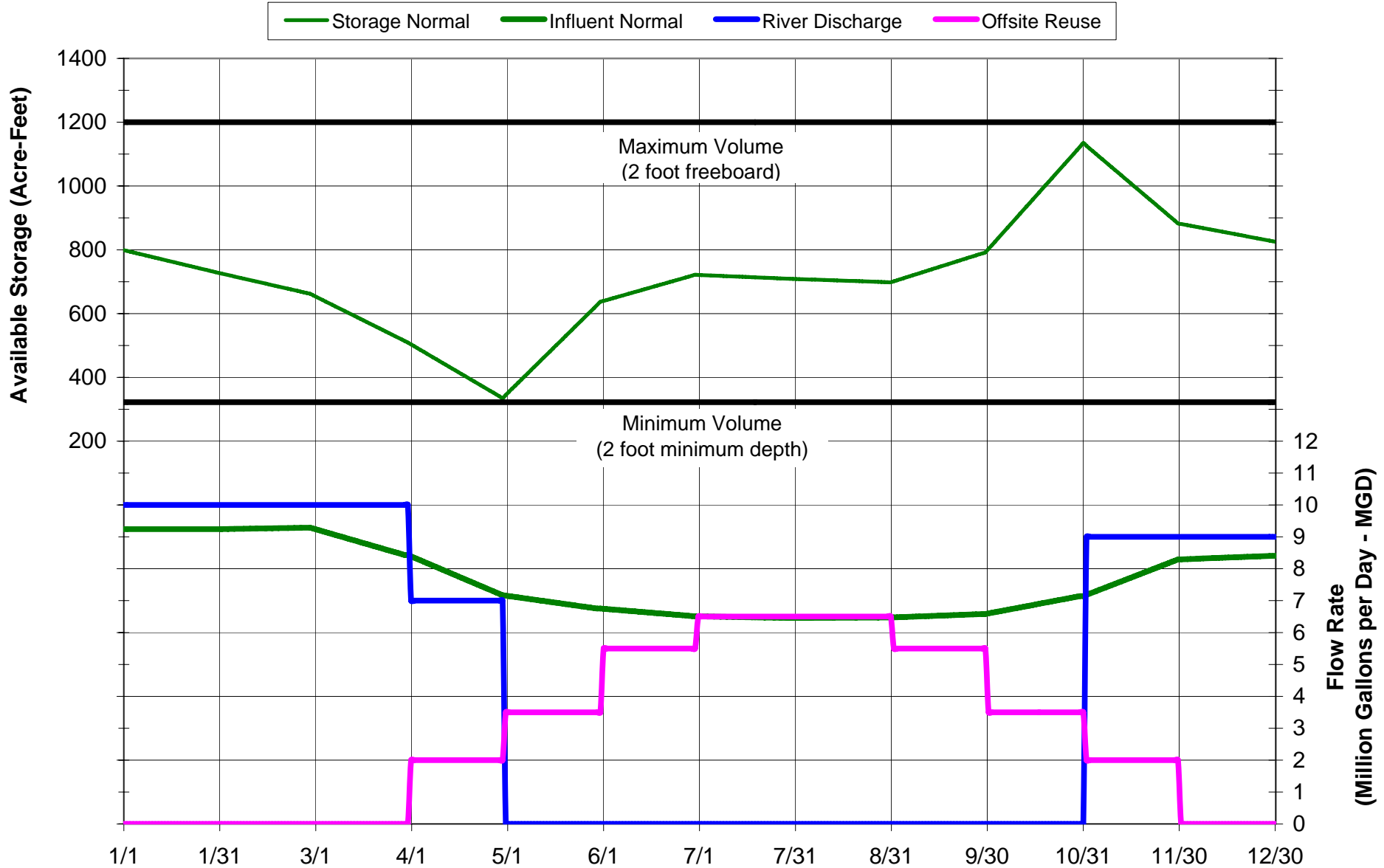
	Dry			Normal			Wet		
	Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)	Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)	Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)
Jan-2025	266.68	0.00	310.00	279.75	0.00	310.00	358.75	0.00	372.00
Feb-2025	197.07	0.00	290.00	263.09	0.00	290.00	310.02	0.00	348.00
Mar-2025	260.26	0.00	279.00	254.95	0.00	310.00	286.67	0.00	372.00
Apr-2025	211.82	60.00	150.00	209.42	60.00	187.50	214.70	30.00	195.00
May-2025	202.52	108.50	0.00	203.61	108.50	0.00	229.76	108.50	0.00
Jun-2025	195.26	150.00	0.00	189.85	150.00	0.00	190.28	150.00	0.00
Jul-2025	193.75	193.75	0.00	194.54	193.75	0.00	193.75	193.75	0.00
Aug-2025	193.75	193.75	0.00	195.02	193.75	0.00	193.75	193.75	0.00
Sep-2025	206.06	150.00	0.00	192.04	150.00	0.00	187.75	150.00	0.00
Oct-2025	212.78	108.50	0.00	215.53	108.50	0.00	199.19	108.50	0.00
Nov-2025	240.13	60.00	270.00	242.60	60.00	270.00	223.87	60.00	270.00
Dec-2025	223.80	0.00	263.50	254.15	0.00	279.00	259.88	0.00	279.00
<b>TOTAL</b>	<b>2603.88</b>	<b>1024.50</b>	<b>1562.50</b>	<b>2694.55</b>	<b>1024.50</b>	<b>1646.50</b>	<b>2848.36</b>	<b>994.50</b>	<b>1836.00</b>

	Dry			Normal			Wet		
	Total Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)	Total Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)	Total Influent (MG)	Offsite Reuse (MG)	River Discharge (MG)
Jan-2025	278.49	0.00	310.00	291.37	0.00	310.00	371.17	0.00	372.00
Feb-2025	206.53	0.00	290.00	273.93	0.00	290.00	321.10	0.00	348.00
Mar-2025	271.88	0.00	279.00	265.99	0.00	310.00	297.87	0.00	372.00
Apr-2025	221.85	60.00	187.50	219.22	60.00	232.50	224.45	30.00	240.00
May-2025	212.39	108.50	0.00	213.45	108.50	0.00	239.98	108.50	0.00
Jun-2025	204.79	165.00	0.00	199.20	165.00	0.00	199.63	165.00	0.00
Jul-2025	203.36	201.50	0.00	204.17	201.50	0.00	203.36	201.50	0.00
Aug-2025	203.36	201.50	0.00	204.66	201.50	0.00	203.36	201.50	0.00
Sep-2025	215.91	180.00	0.00	201.44	165.00	0.00	197.06	165.00	0.00
Oct-2025	222.97	124.00	0.00	225.65	124.00	0.00	208.89	124.00	0.00
Nov-2025	250.99	60.00	270.00	253.17	60.00	270.00	233.77	60.00	270.00
Dec-2025	234.31	0.00	279.00	265.18	0.00	279.00	270.61	0.00	279.00
<b>TOTAL</b>	<b>2726.82</b>	<b>1100.50</b>	<b>1615.50</b>	<b>2817.43</b>	<b>1085.50</b>	<b>1691.50</b>	<b>2971.25</b>	<b>1055.50</b>	<b>1881.00</b>

# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

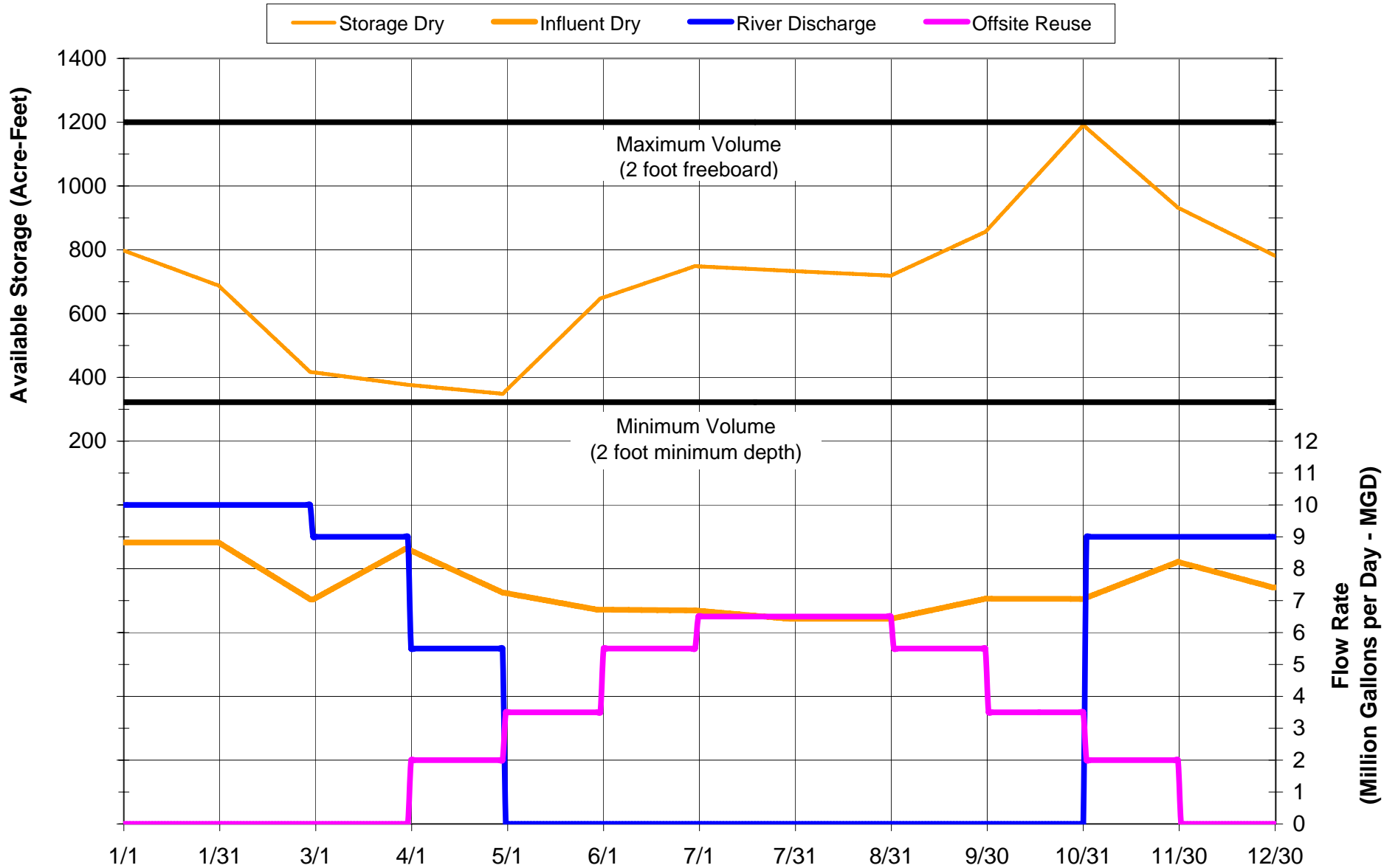
Target Conservation ADWF = 6.43 MGD



# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

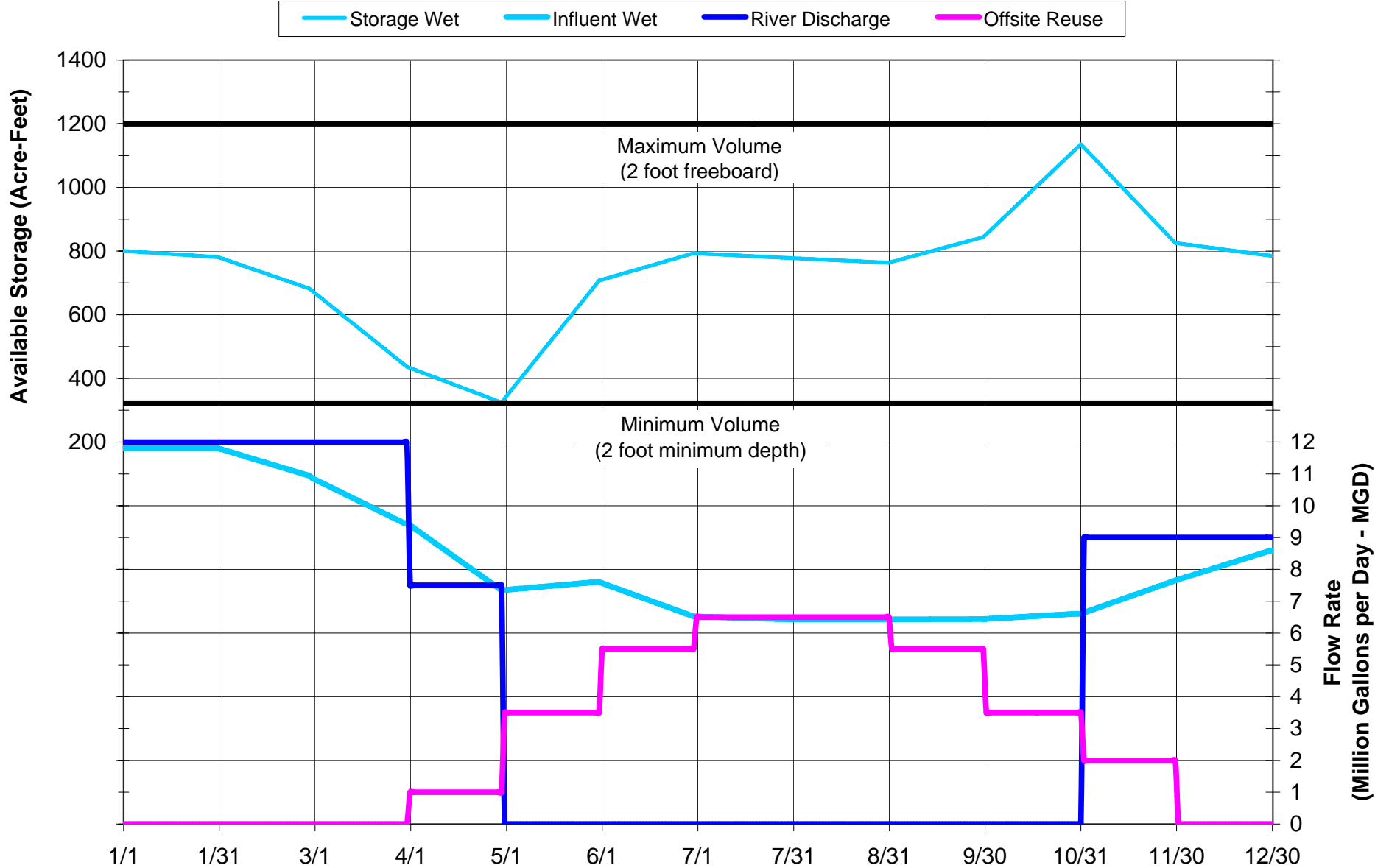
### Target Conservation ADFW = 6.43 MGD



# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

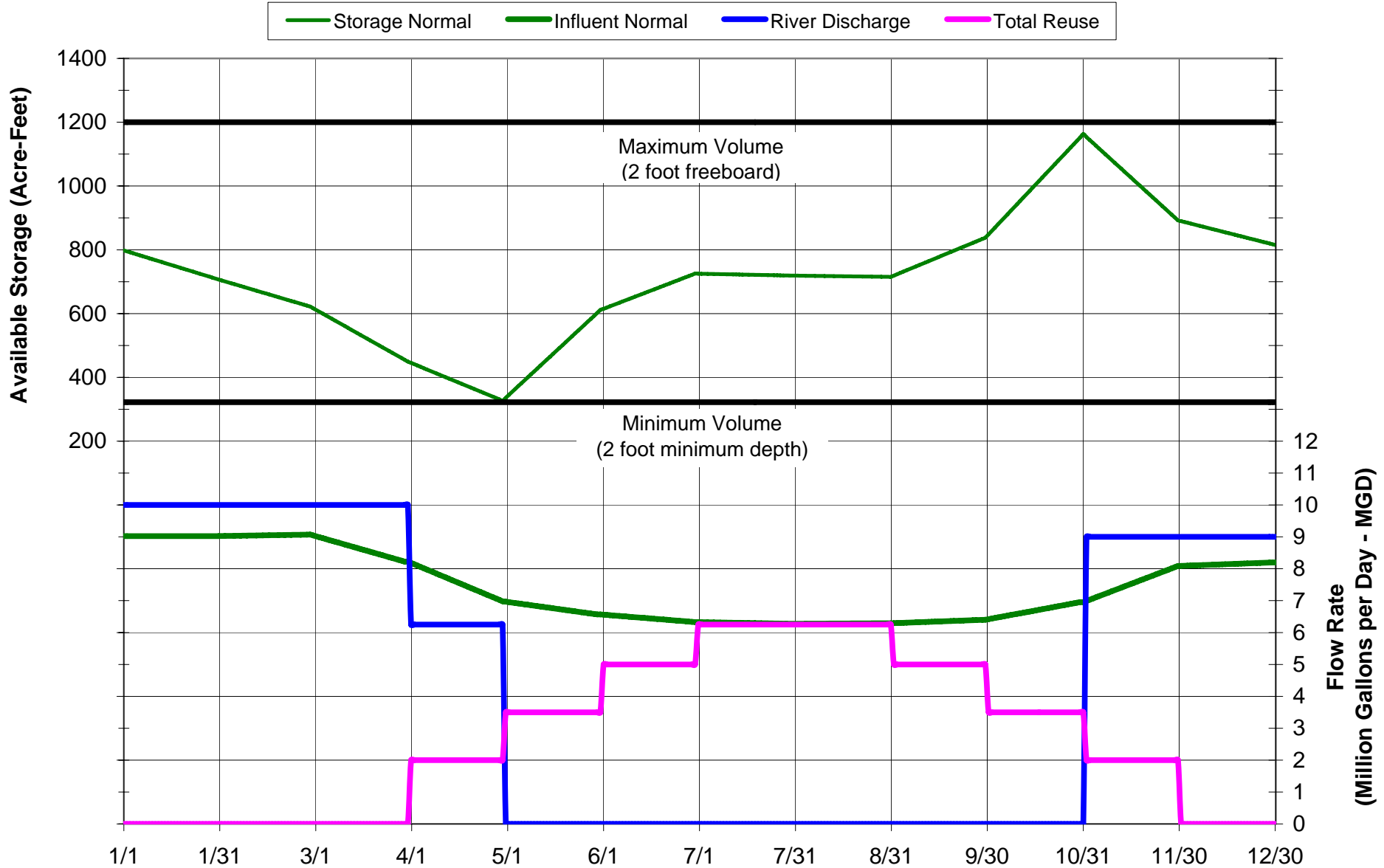
Target Conservation ADWF = 6.43 MGD



# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

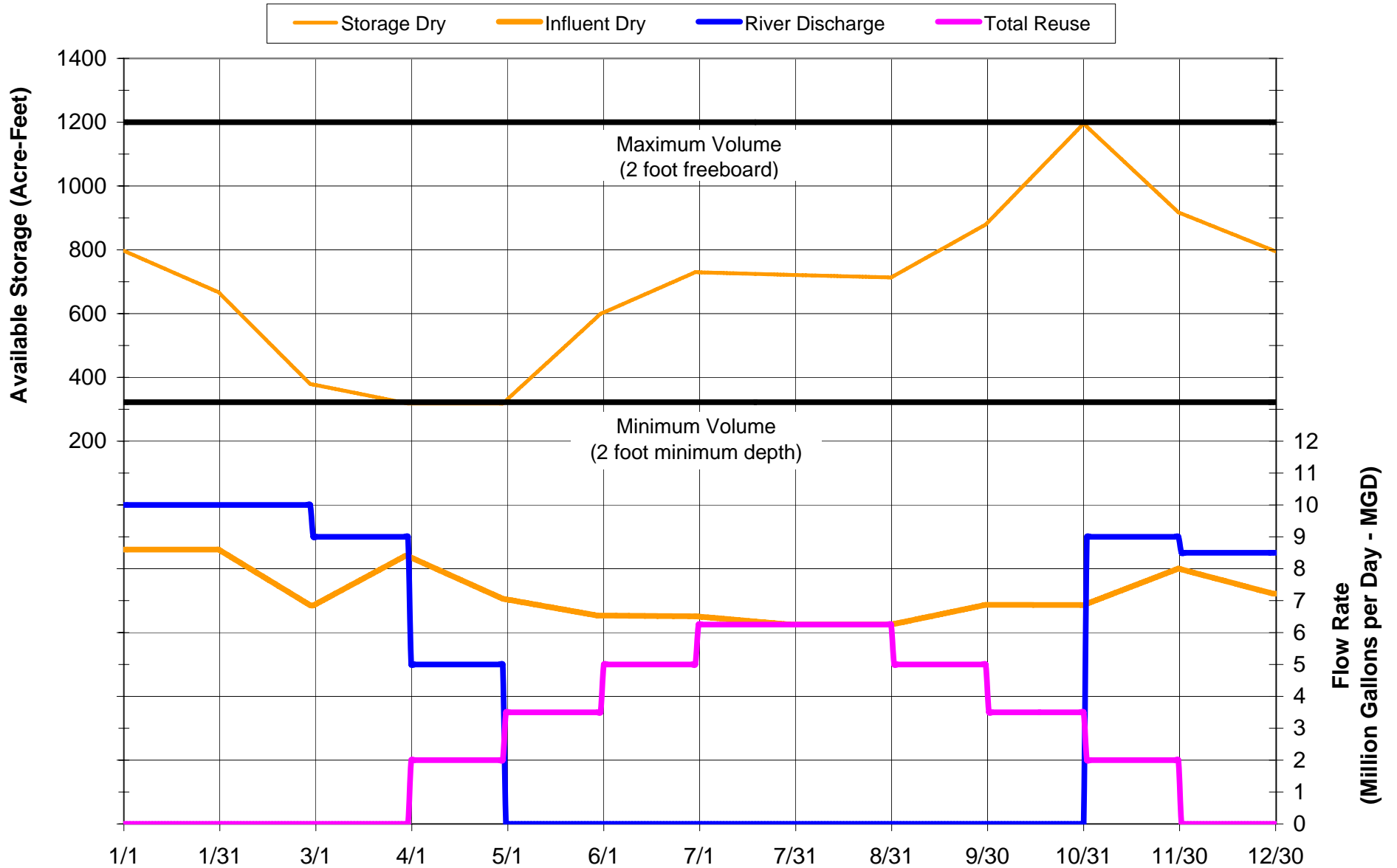
### Maximum Conservation ADFW = 6.25 MGD



# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

### Maximum Conservation ADWF = 6.25 MGD

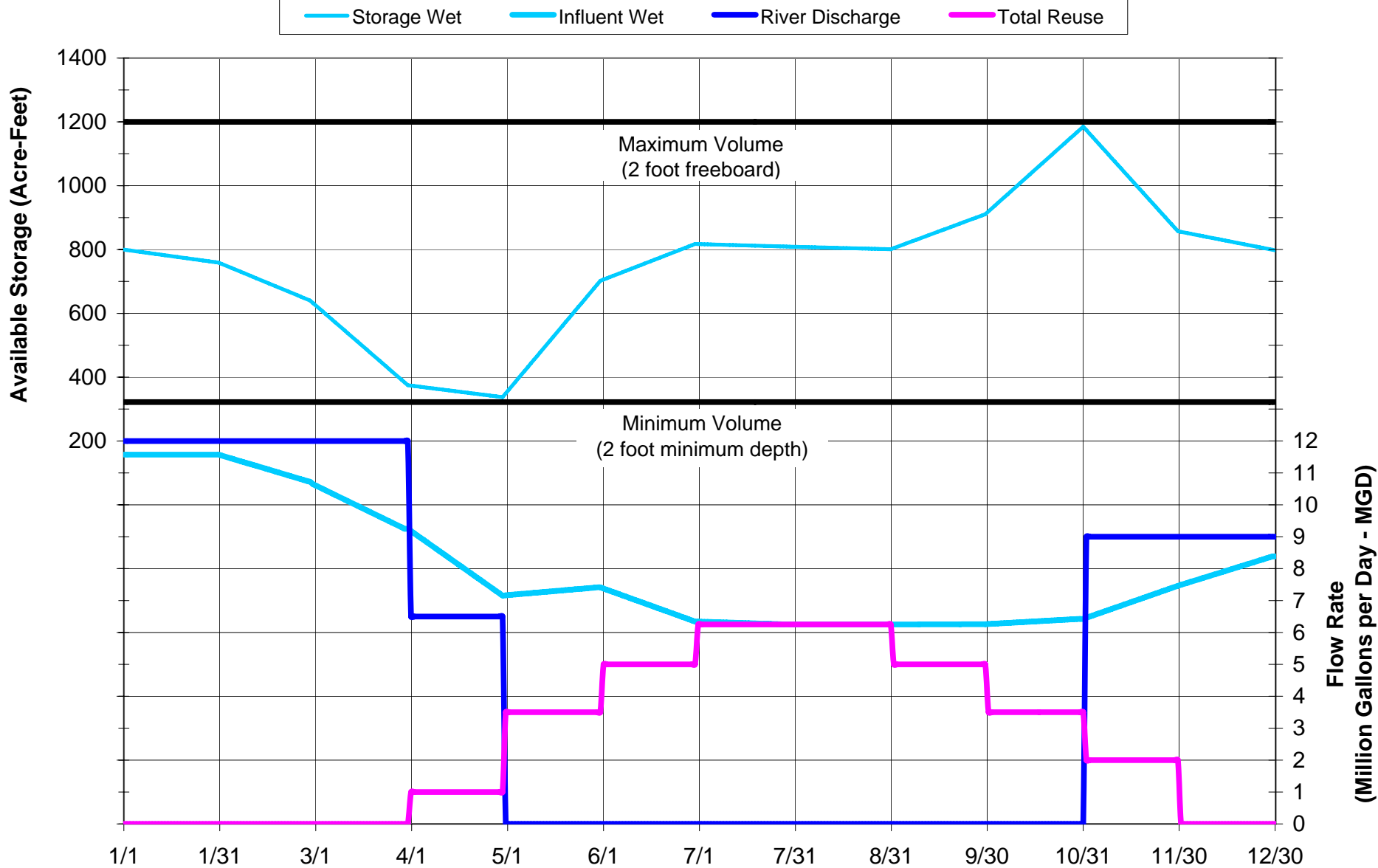




# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

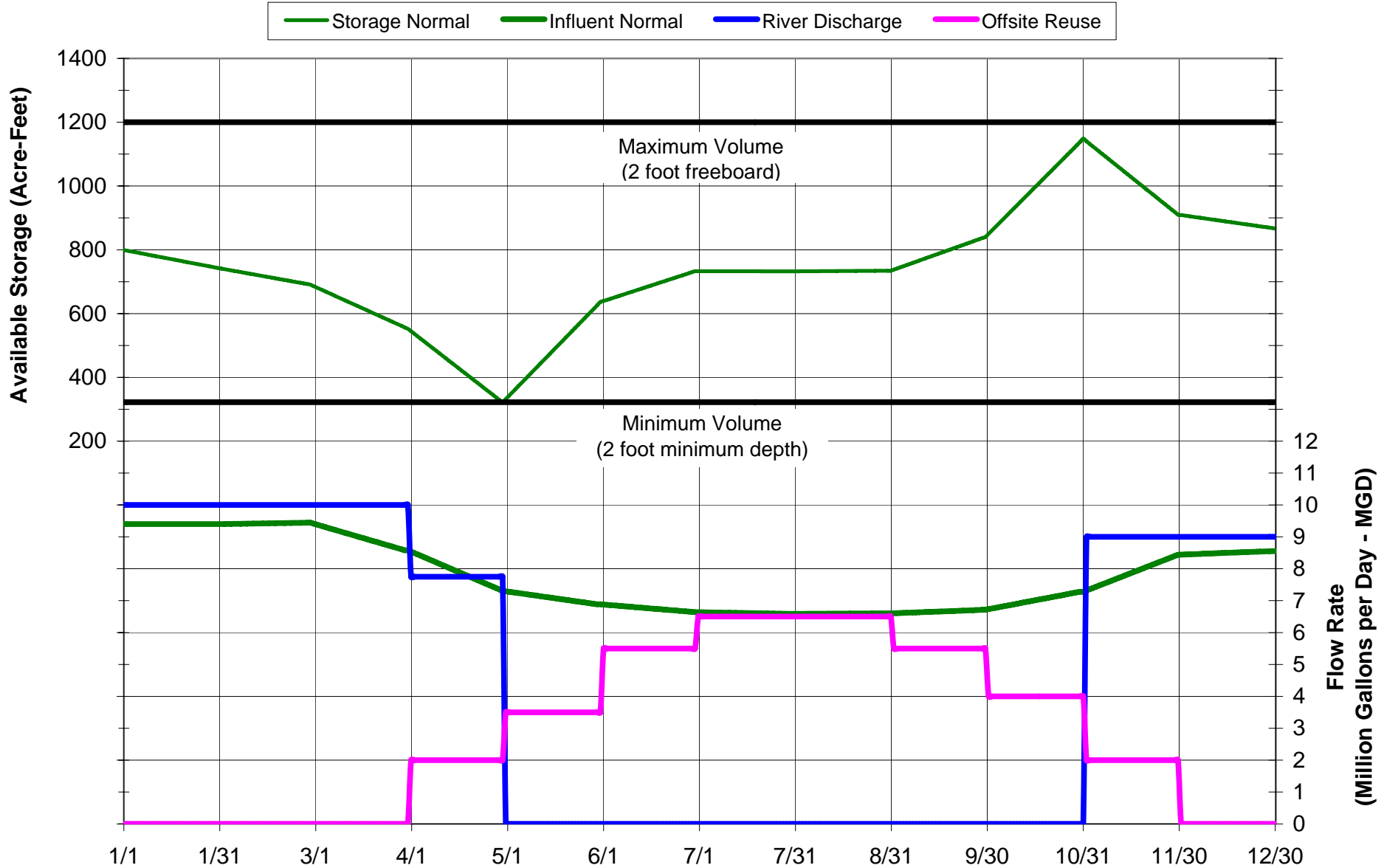
Maximum Conservation ADFW = 6.25 MGD



# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

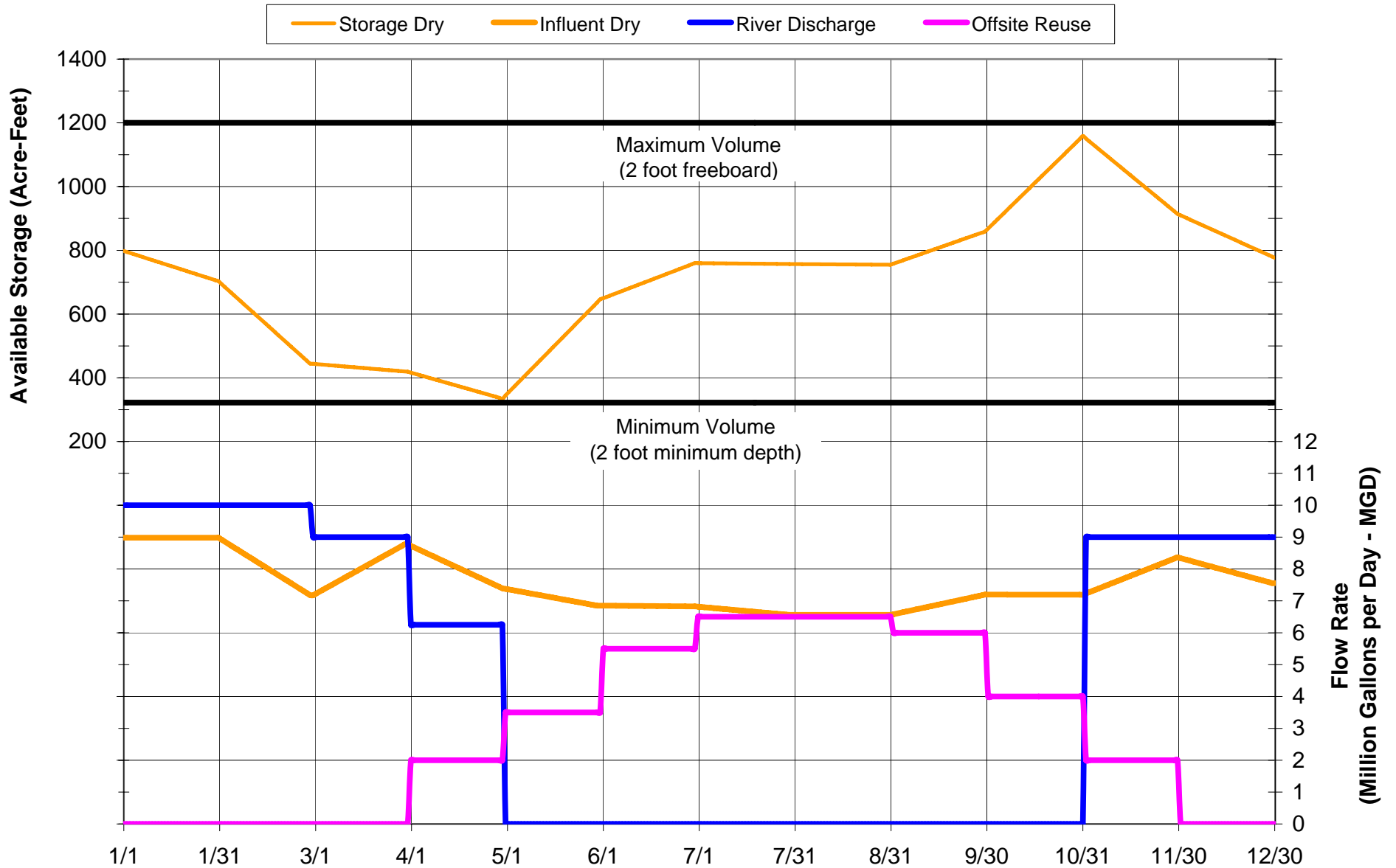
Minimum Conservation ADWF = 6.56 MGD



# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

### Minimum Conservation ADWF = 6.56 MGD



# Ellis Creek WRF

## DRAFT Water Balance, 2025 Buildout

Minimum Conservation ADWF = 6.56 MGD

