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2 MITIGATION AND MONITORING PROGRAM

INTRODUCTION

This Chapter presents the Mitigation and Monitoring Program for the Santa Rosa Subregional Long-Term Wastewater Project. The purpose of placing the Mitigation and Monitoring Program at the front end of the EIR/EIS is to make clear to the reader the responsibilities of the City in implementing a Long-Term Project. The mitigation measures listed herein are required by law or regulation (Section 2.1); are adopted by the City as part of the Project (Section 2.2); or are recommended by the Harland Bartholomew & Associates consultant team

Mitigation is defined by both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) as a measure which:

- Avoids the impact altogether by not taking a certain action or parts of an action.
- Minimizes impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifies the impact by repairing, rehabilitating, or restoring the impacted environment.
- Reduces or eliminates the impact over time by preservation and maintenance operations during the life of the Project
- Compensates for the impact by replacing or providing substitute resources or environments.

Mitigation measures discussed below have been identified in Chapter 4, Affected Environment and Environmental Consequences, 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 both the California Environmental Quality Act and the National Environmental Policy Act. CEQA Sections 21002 and 21002.1 state:

- 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. The program must be designed to ensure compliance with mitigation measures during project implementation to mitigate or avoid significant environmental effects.

NEPA 40 CFR Sections 1502.14f, 1502.16h, and 1505.2c require the following:

- Agencies shall include appropriate mitigation measures not already included in the proposed action or alternatives.
- An Environmental Impact Statement must include a discussion of the means to mitigate adverse environmental impacts.
- The Record of Decision must state whether all applicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation.

Chapter Format

Section 2.1 Compliance with Existing Programs

This section presents the applicable federal, state, regional, county, and local policies and regulations that which the Project must comply. Procedures for compliance with these policies and regulations are presented in the *Permitting Report* (Harland Bartholomew & Associates Inc. 1995). Compliance with these policies and regulations will result in avoidance and/or minimization of adverse environmental impacts.

Section 2.2 Measures Included in the Project

This section presents a listing and description of measures and standards which have been incorporated into the Project Description. 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 geotechnical, biological, cultural, and hydrological surveys in order to avoid or minimize potential impacts.

Because these measures are part of the Project, they do not fit 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 Santa Rosa.

Section 2.2 includes measures to be implemented in all phases of the Project, including planning and design, construction, and system operation and maintenance. Compliance with these measures will result in avoidance and/or minimization of adverse environmental impacts.

Section 2.3 Planning Measures

This section contains mitigation measures to be implemented during the final planning and detailed design of the Project. These measures often require the refinement of the final Project

design to accommodate particular environmental constraints. Compliance with these mitigation measures would result in avoidance and/or minimization of adverse environmental impacts.

Mitigation measures listed in Sections 2.3, 2.4, and 2.5 are recommended by the consultant team to avoid or reduce environmental impacts. As described above under Legal Basis, 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 effectual and feasible.

Section 2.4 Construction 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.

Section 2.5 Operation and Maintenance Measures

This section contains mitigation measures to be implemented during operation of the Project. These measures generally require monitoring of system operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with these measure would result in the reduction of adverse environmental impacts.

Section 2.6 Summary of Mitigation Measures by Alternative

This section provides a summary of all mitigation measures and which alternatives they apply to.

Mitigation Measure Format

Table 2.0-1 presents the format for each mitigation measure and the information that each measure will contain.

Program Implementation and Monitoring

Implementation

The Santa Rosa Utilities Department shall be responsible for overall implementation and administration of the Mitigation and Monitoring Program for the Project. The Utilities Department shall designate a staff person to serve as coordinator of all mitigation monitoring among the various government agencies, construction contractors, and interested residents. This person (Coordinator) will oversee all mitigation measures and ensure they are completed to the standards specified in the EIR/EIS. The Coordinator will also ensure that the mitigation measures are completed in a timely manner and be responsible for the Mitigation Monitoring Checklist (see Table 2.03).

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 Utilities Department where 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.

Table 2.0-1

Mitigation Measure Format

2.X.X Mitigation Measure Title

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

Description: Brief description of the Mitigation Measure.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
A list of impacts, by number and text, to which the mitigation measure applies. <i>This list directly corresponds to the impact numbers and impact statements presented in Chapter 4.</i>	The level to which the impact is anticipated to be mitigated. <i>Generally listed as Less than Significant or Significant</i>

The Impacts Mitigated and discussion of Level of Significance After Mitigation are not included for Section 2.2 measures because they are part of the Project.

Alternative/Component: The alternatives or components for which this measure is recommended.

Lead Agency: The agency or individual that has the responsibility for insuring that the measure is carried out.

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

The implementation of mitigation measures shall be monitored at two levels. The first level of monitoring is done through the use of a Verification Report. A sample Report is shown as Table 2.0-2. This report is to be completed for each mitigation measure by the in-field monitor, responsible agency, or construction manager (whichever is appropriate for the given action and mitigation measure). Frequency of report completion will vary based on the type of mitigation measure. For example, measures that require modification of final design drawings will only require that the Verification Report be completed at the time the Final drawings are completed and again when they are approved. However, in-field monitoring for activities such as pipeline construction through a stream may require that a Verification Report be completed daily.

Once a mitigation measure has been completed and the measure needs no further monitoring or follow-up, the in-field monitor, responsible agency, or construction manager shall notify the Coordinator that the measure has been completed. This notification shall be done by sending a final Verification Report along with evidence that the measure has been completed, such as final engineering drawing or a photograph of field activities. The Coordinator shall be responsible for collecting and maintaining completed Verification Reports. Copies of these Reports shall be maintained at the Utilities Department.

If the in-field monitor, responsible agency, or construction manager determines that non-compliance has occurred, a written notice shall be delivered to the Coordinator describing the non-compliance and requiring compliance within a specified period of time. If non-compliance still exists at the expiration of the specified period of time, construction may be halted and fines may be imposed upon the party responsible for implementation, at the discretion of the Utilities Department.

The second level of monitoring shall be done through the completion of the Mitigation Monitoring Checklist, Table 2.0-3. The purpose of the Checklist is to provide a summary of the status of all adopted mitigation measures for the Utilities Department, other public officials, and concerned citizens. The Coordinator shall update the Checklist quarterly (four times a year). The Coordinator shall update the Checklist by reviewing all of the Verification Reports and contacting all of the in-field monitors, responsible agencies, and the construction manager to review the status of their respective mitigation measures. A copy of the most current Mitigation Monitoring Checklist shall be maintained at the Utilities Department.

Mitigation Monitoring Status Reporting

The Utilities Department shall compile a Mitigation Monitoring Status Report on an annual basis. The report shall be prepared by the Coordinator and contain the following:

- Mitigation Monitoring Checklist to provide the status of every mitigation measure

- List of all completed mitigation measures
- List of all non-compliance incidences with action taken or required;
- Evaluation of Irrigation Conservation and Management Programs
- Evaluation of the effectiveness of the mitigation measures
- Recommendations for modifications to the Mitigation and Monitoring Program to improve 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).

The Report shall be presented and discussed at a meeting of the Board of Utilities. The meeting shall be noticed in local newspapers and shall be open to the public. The meeting shall be open for the public to speak and present written evidence as to the effectiveness of mitigation measures. It is recommended that the meeting be held in October so that effectiveness of Irrigation Conservation and Management Programs can be evaluated and changes can be made and implemented in advance of the next irrigation season.

Table 2.0-2

Verification Report

Date: _____

Compliance: ☐ Acceptable ☐ Unacceptable

Location: _____ _____ _____ Construction Sheet No: _____	Mitigation Measure: _____ Discipline: <input type="checkbox"/> Land Use/Agriculture <input type="checkbox"/> Public Health/Services <input type="checkbox"/> Geology <input type="checkbox"/> Noise/Air <input type="checkbox"/> Water <input type="checkbox"/> Transportation <input type="checkbox"/> Biology <input type="checkbox"/> Cultural/Paleontol.								
Activity: _____ _____ _____ _____ _____									
Observations: _____ _____ _____ _____ _____									
Recommendations: _____ _____ _____ _____ _____									
<table style="width: 100%;"> <tr> <td style="width: 50%;">By: _____</td> <td style="width: 50%;">Approved By: _____</td> </tr> <tr> <td>Copies to: _____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> </table>		By: _____	Approved By: _____	Copies to: _____	_____	_____	_____	_____	_____
By: _____	Approved By: _____								
Copies to: _____	_____								
_____	_____								
_____	_____								
Anticipated Completion Date: _____ Method of Compliance: _____ <div style="display: flex; justify-content: space-between;"> Date Closed: _____ Authorized By: _____ </div>									

Table 2.0-3

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
2.2 Measures Included in the Project				
2.2.1 Irrigation Conservation and Management Programs	City of Santa Rosa	City of Santa Rosa		
2.2.2 Irrigation Site Resource Maps	City of Santa Rosa	City of Santa Rosa		
2.2.3 Restrict Surface and Subsurface Irrigation Water Runoff	Individual Irrigators/City of Santa Rosa	City of Santa Rosa		
2.2.4 Restrict Soil Erosion and Sediment Movement	Individual Irrigators/City of Santa Rosa	City of Santa Rosa		
2.2.5 Avoid Sensitive Biological Resources	Individual Irrigators/City of Santa Rosa	City of Santa Rosa		
2.2.6 Agrochemical and Fertilizer Best Management Practices	City of Santa Rosa	City of Santa Rosa		
2.2.7 Prohibit Creation of Mosquito Habitat	Individual Irrigators	City of Santa Rosa/Marin Sonoma Mosquito Abatement District		
2.2.8 Revegetate Temporarily Disturbed Sites	City of Santa Rosa/Construction Manager	City of Santa Rosa/Corps		
2.2.9 Retain Stripped Topsoil	Construction Manager	City of Santa Rosa		
2.2.10 Storm Water Pollution Prevention Plan	City of Santa Rosa	RWQCB		
2.2.11 Protect Creeks from Toxic Discharge	Construction Manager	City of Santa Rosa		
2.2.12 Concrete Waste Management	Construction Manager	City of Santa Rosa/CDFG		
2.2.13 Pipeline Features in Active Fault Zones	City of Santa Rosa	City of Santa Rosa		

Table 2.0-3

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
2.2.14 Dam Safety	City of Santa Rosa	Office of Emergency Services		
2.2.15 Standard Traffic Control Procedures	City of Santa Rosa	City of Santa Rosa		
2.2.16 Emergency Response Vehicles Will Not be Impeded	City of Santa Rosa	City of Santa Rosa		
2.2.17 Maintain Maximum Number of Open Lanes on Roadways	City of Santa Rosa	City of Santa Rosa		
2.2.18 Jack and Bore Construction at Major Highways	City of Santa Rosa	City of Santa Rosa		
2.2.19 Fence or Cover Trenches	City of Santa Rosa/Construction Manager	City of Santa Rosa		
2.2.20 Access to Businesses and Residences	City of Santa Rosa/Construction Manager	City of Santa Rosa		
2.2.21 Repair Road Damage	City of Santa Rosa	City of Santa Rosa		
2.2.22 Park Within Construction Easements	City of Santa Rosa/Construction Manager	City of Santa Rosa		
2.2.23 Limit Delivery Hours	Construction Manager	City of Santa Rosa		
2.2.24 Limit Ingress/Egress of Construction Equipment	Construction Manager	City of Santa Rosa		
2.2.25 Minimize/Reduce Fossil Fuel Consumption	Construction Manager	City of Santa Rosa		
2.2.26 Odor Control for Sludge Handling	Laguna Treatment Plant Operators	City of Santa Rosa		

Table 2.0-3

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
2.2.27 Uniform Relocation Assistance	City of Santa Rosa	City of Santa Rosa		
2.3 Planning Measures				
2.3.1 Replacement of Open Space Easements	City of Santa Rosa	City of Santa Rosa/Sonoma County Agriculture Preservation and Open Space District		
2.3.2 Restrict Approval of Agricultural Irrigation Contracts	City of Santa Rosa	City of Santa Rosa		
2.3.3 Agricultural Irrigation Demonstration Programs	City of Santa Rosa	City of Santa Rosa		
2.3.4 Slope Stabilization Design	City of Santa Rosa	City of Santa Rosa/Division of Safety of Dams		
2.3.5 Liquefaction Stabilization Design	City of Santa Rosa	City of Santa Rosa		
2.3.6 Standard Engineering Methods for Corrosive Soils	City of Santa Rosa	City of Santa Rosa		
2.3.7 Slope Monitoring and Response System	City of Santa Rosa	City of Santa Rosa		
2.3.8 Earthquake Preparedness and Emergency Response Program	City of Santa Rosa	City of Santa Rosa		
2.3.9 Adjust Pipeline Alignments	City of Santa Rosa	City of Santa Rosa		
2.3.10 Limit Construction Disturbance	City of Santa Rosa	City of Santa Rosa		
2.3.11 Sensitive Resource Conservation Program	City of Santa Rosa	City of Santa Rosa/CDFG/USFWS/Corps		
2.3.12 Provide Replacement Water Supply for Affected Wells	City of Santa Rosa	City of Santa Rosa		

Table 2.0-3

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
2.3.13 Monitor Groundwater Levels	City of Santa Rosa	City of Santa Rosa		
2.3.14 Update Existing Hazardous Materials Management Plan	City of Santa Rosa	City of Santa Rosa Fire Department		
2.3.15 Construction Management Program	City of Santa Rosa/Construction Manager	City of Santa Rosa/Cal-OSHA		
2.3.16 Mosquito Prevention Program	City of Santa Rosa	City of Santa Rosa/Marin-Sonoma Mosquito Abatement District		
2.3.17 Pump Station Noise Control	Qualified Noise Engineer/City of Santa Rosa	City of Santa Rosa		
2.3.18 Identification and Evaluation of Cultural Resources	City of Santa Rosa	City of Santa Rosa/Corps/State Historic Preservation Officer		
2.4 Construction Measures				
2.4.1 Removal of Aggregate Resources Prior to Construction	City of Santa Rosa/Construction Manager	City of Santa Rosa		
2.4.2 Remove Weak Surficial Deposits from Reservoir Footprint	Construction Manager	City of Santa Rosa		
2.4.3 Standard Engineering Methods for Expansive Soils	Construction Manager	City of Santa Rosa		
2.4.4 California Red-legged Frog Capture and Relocation Program	City of Santa Rosa	City of Santa Rosa		

Table 2.0-3

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
2.4.5 Active Raptor Nest Location and Monitoring Program	City of Santa Rosa	City of Santa Rosa/CDFG		
2.4.6 Screen Concrete Diversion Channels, Pump Stations And Other Facilities	Construction Manger	City of Santa Rosa		
2.4.7 Establish Tree Screening	City of Santa Rosa	City of Santa Rosa		
2.4.8 Revegetate Face of the Reservoir Dam	Construction Manager	City of Santa Rosa		
2.4.9 Construction Noise Control Measures	City of Santa Rosa/Construction Manager	City of Santa Rosa		
2.4.10 Vehicle and Equipment Exhaust Control Program	City of Santa Rosa	City of Santa Rosa		
2.4.11 Dust Control Program	City of Santa Rosa	City of Santa Rosa/AQMD or APCD		
2.4.12 Protect Undiscovered Cultural Resource Sites	City of Santa Rosa	City of Santa Rosa/Corps/State Historic Preservation Officer		
2.4.13 Protect Vertebrate Paleontologic Resources	Project Paleontologist	City of Santa Rosa		
2.4.14 Coordinate Alternative Fire Response Service	City of Santa Rosa/Construction Manager	City of Santa Rosa		
2.4.15 Sensitive Plant Relocation Program	City of Santa Rosa	City of Santa Rosa		
2.4.16 Ecological Risk Monitoring and Source Control Program	City of Santa Rosa	City of Santa Rosa		

Table 2.0-3

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
2.5 Operation and Maintenance Measures				
2.5.1 Pesticides Control Program	City of Santa Rosa	City of Santa Rosa/RWQCB		
2.5.2 Control Program for Dissolved Copper Levels	City of Santa Rosa	City of Santa Rosa/RWQCB		
2.5.3 Control Program for Hydrogen Sulfide, Ammonia, and Dissolved Oxygen	City of Santa Rosa	City of Santa Rosa/RWQCB		
2.5.4 Discharge Operations	City of Santa Rosa	City of Santa Rosa/RWQCB		
2.5.5 Cyanide Monitoring and Source Control Program	City of Santa Rosa	City of Santa Rosa/RWQCB		
2.5.6 Total and Ammonia Nitrogen Source Control Program	City of Santa Rosa	City of Santa Rosa/RWQCB		
2.5.7 Toxicity Control Program	City of Santa Rosa	City of Santa Rosa/RWQCB		
2.5.8 Monitor Seismic Events and Adjust Injection Rate	City of Santa Rosa	City of Santa Rosa		
2.5.9 Implement Septic System Monitoring Program	City of Santa Rosa	City of Santa Rosa/Sonoma County Environmental Health Department		
2.5.10 Discharge Prohibition During Flood Stage	City of Santa Rosa	City of Santa Rosa		

Source: Harland Bartholomew & Associates Inc., 1996

Notes:

1. APCD: Air Pollution Control District

2. AQMD: Air Quality Management District
3. Cal-OSHA: California Office of Safety and Health Administration
4. CDFG: California Department of Fish and Game
5. Corps: U.S. Army Corps of Engineers
6. RWQCB: Regional Water Quality Control Board
7. USFWS: U.S. Fish and Wildlife Service

2.1 COMPLIANCE WITH EXISTING PROGRAMS

This section presents the applicable federal, state, regional, county, and local policies and regulations that the Project components are required to comply with. Procedures for compliance with these policies and regulations are presented in the *Permitting Report* (Harland Bartholomew & Associates, Inc. 1995). Compliance with these policies and regulations will result in avoidance and/or minimization of adverse environmental impacts.

2.1.1 Federal

Archaeological and Historic Data Preservation Act of 1974

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

Coastal Zone Management Act of 1972

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 1973as amended

Mining Law of 1872, amended 1988

National Environmental Policy Actof 1969

National Historic Preservation Actof 1972, Sections 106 and 110

Marine Protection, Research and Sanctuaries Act of 1972

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

2.1.2 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 Stream Bed Alteration Agreement (Fish and Game Code Section 1601-1603)

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

California Division of Safety of Dams Permit

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

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)

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

2.1.3 Regional

Bay Area Clean Air Plan

Bay Area Air Quality Management District Risk Management Policy

Bay Area Air Quality Management District Rules and Regulations

Northern Sonoma Air Pollution Control District Rules and Regulations

North Coast Regional Water Quality Control Board

Basin Plan

Wastewater Discharge Requirements

Stormwater Pollution Prevention Plan (construction sites)

San Francisco Bay Regional Water Quality Control Board

Basin Plan

Waste Discharge Requirements

2.1.4 County and City

Sonoma County

Sonoma County Aggregate Resource Management Plan

Sonoma County Coastal Plan

Sonoma County General Plan

Planning Areas - Countywide, Cloverdale/N.E. County Planning Area, Healdsburg and Environs, Santa Rosa and Environs, Rohnert Park - Cotati and Environs, Petaluma and Environs

Sonoma County Tree Ordinance (No. 4014)

Sonoma County Zoning Ordinance

Building Codes

Marin County

Marin County Countywide Plan

Marin County Local Coastal Program

Marin County Zoning Ordinance

Building Codes

City of Santa Rosa

Building and Grading Regulations

Santa Rosa City Code: Historic and Cultural Preservation

Santa Rosa General Plan

Santa Rosa Zoning Ordinance

City of Sebastopol

Building and Grading Regulations

Sebastopol General Plan

Sebastopol Zoning Ordinance

City of Petaluma

Building and Grading Regulations

Petaluma General Plan

Petaluma Zoning Ordinance

2.2 MEASURES INCLUDED IN THE PROJECT

This section presents a listing and description of measures and standards which have been incorporated into the Project Description. 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 that were identified during the preliminary planning and scoping phases of the Project. 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 geotechnical, biological, cultural, and hydrological surveys in order to avoid or minimize potential impacts.

Because these measures are part of the Project Description, they do not fit 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 to assist the reader in understanding the commitments made by the City of Santa Rosa.

Section 2.2 includes measures to be implemented in all phases of the Project, including planning and design, construction, and system operation and maintenance. Compliance with these measures will result in avoidance and/or minimization of adverse environmental impacts.

2.2.1 Irrigation Conservation and Management Programs

Description:

The City of Santa Rosa will control the application of reclaimed water for agricultural uses and the types of agricultural lands eligible to receive reclaimed water through individual Irrigation Conservation and Management Programs (ICMPs). ICMPs will be prepared and implemented for every new agricultural irrigation site. The reclaimed water contracts between the City and the landowners shall require a commitment from the landowners to implement the ICMPs.

Each ICMP will contain measures which control the application of irrigation water and integrate irrigation with other resource management needs. At a minimum, the individual Irrigation Conservation and Management Programs prepared by the City of Santa Rosa will incorporate procedures and restrictions presented in Mitigation Measures 2.2.2 through 2.2.7. Other guidelines for the development of individual Irrigation Conservation and Management Programs are provided in *the Irrigation Management Guidelines Technical Memorandum* (Questa 1996).

Alternative/Component

All Agricultural Irrigation Components

Lead Agency:

City of Santa Rosa

Implementing Agency:

City of Santa Rosa

Timing:

Start: ICMPs will be developed prior to the delivery of reclaimed water to any parcel.

Complete: ICMPs will be updated annually, until the landowner no longer utilizes reclaimed water.

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

Contracts between landowners and the City will require conformance to the ICMP. The City will maintain a copy of the current ICMP in their files. ICMPs will be reviewed annually for determination of compliance with the Long-term Wastewater Project Mitigation and Monitoring Program

2.2.2 Irrigation Site Resource Maps

Description:

The City will utilize Irrigation Site Resource Maps to delineate soil constraints and sensitive areas such as wetlands, stream corridors, erosive soils, and gullied lands. During design of the agricultural irrigation system, the City of Santa Rosa will update the resource map for each irrigation site (mapping will be restricted to the potential irrigation site and 100 feet beyond). These maps will be developed by verifying and updating, as necessary, previous biological, natural resource, and soil studies. Where irrigation sites have not had biological, natural resource, and soil studies, such studies will be conducted in conformance with State and Federal protocols. Resources to be verified and the required resource specialist are shown in the table below. These resource maps will serve as the foundation of each Irrigation Conservation and Management Program.

Resource	Resource Expert
Soils	Certified professional soil scientist
Wetlands	Qualified wetlands scientist
Botanical resources	Qualified botanist
Wildlife Resources	Qualified wildlife biologist
Trees	Certified arborist
Other	Advisors
Agricultural Cultivation Practices	Agronomist
Irrigation	Agricultural Engineer
Fertilizer/Pesticide Application Practices	Agronomist/Pest Control Advisor

Alternative/Component

Agricultural Irrigation Components

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

City of Santa Rosa Utilities Department

Timing:

Start: During design of the agricultural irrigation system.

Complete: Resource maps will be completed prior to completion of ICMPs.

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

The City will maintain a copy of the current resource map in their files. Copies of the resource map will also be contained in the individual Irrigation Conservation and Management Program.

2.2.3 Restrict Surface and Subsurface Irrigation Water Runoff

Description:

The City of Santa Rosa will require that lands irrigated with reclaimed water are managed such that surface runoff of reclaimed water to adjacent waterways does not occur; and so that the percolation of applied reclaimed water through the root zone is minimized (as defined below). To obtain the surface and subsurface water runoff performance criteria, the following Best Management Practices are recommended for inclusion in the ICMP:

Use sprinkler or drip irrigation methods. Follow sprinkler irrigation and drip irrigation design criteria provided in Section 4.4 of the Irrigation Management Guidelines. These criteria establish that for sprinkler irrigation, the design rate of application will be within a range established by the minimum practical application rate under local climatic conditions and the maximum rate consistent with the intake rate of the soil and the individual parcel's ICMP. For drip irrigation the design rate of application will be within a range established by the minimum practical discharge rate of the applicators (orifices, emitters, perforated pipe) and the maximum rate consistent with the intake rate of the soil and the individual parcel's program.

In the West County, practice deficit irrigation management on all drought tolerant crops. Deficit irrigation management is a method by which excess water from irrigation lost to runoff and subflow is reduced. Methods that may be used are: 1) increasing uniformity through good design; and 2) reducing irrigation applications (essentially under- irrigating). Drought tolerant crops include many of the hay, forage and pasture grasses.

In the South County, practice high efficiency irrigation management on all drought intolerant crops, such as lettuce and strawberries. High efficiency irrigation management methods include scheduling irrigation and operating the irrigation system to minimize runoff and deep percolation losses. Scheduling is generally accomplished using real-time weather data, soil moisture monitoring data, and computer assisted scheduling systems.

Deficit irrigation and high efficiency irrigation management procedures are based on Chapter 17 of *American Society of Agronomy Monograph on Irrigation Management* and *United Nations Food and Agriculture Organization Irrigation and Drainage Paper No. 33*.

Other Best Management Practices which may be implemented to ensure the surface and subsurface water runoff performance criteria are met include the following:

Existing very poorly drained areas and areas with shallow restrictive layers may be considered unsuitable for irrigation.

Over-irrigation, or application of irrigation water in excess of crop consumptive water demand may not be allowed, except on Reyes soils

Water levels in fields may be closely monitored by the irrigator and irrigation scheduling adjusted accordingly.

Where monitoring indicates that drainage problems are developing, occasional summer fallowing (growing a dry-land hay crop, or crop with greatly reduced irrigation application) of problem parcels may be implemented.

Small scale drainage improvements (ditches and the drain systems) may be considered for portions of fields where the above management practices are insufficient to preclude localized development of drainage problems (wetlands are excluded).

Landowners with parcels comprised of Reyes soils may over-irrigate to maintain a high water content and anoxic conditions in the subsoils. Landowners would ensure that surface ponding is avoided for purposes of mosquito control. Drainage ditches will also be closely monitored for mosquito control.

Landowners with parcels comprised of Reyes soils may apply lime to the soil to increase the pH. The lime application frequency would be established in the Irrigation Conservation and Management Program.

Alternative/Component	All Agricultural Irrigation Components
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	Individual Irrigators/City of Santa Rosa Utilities Department
Timing:	<p>Start: During design of the agricultural irrigation system.</p> <p>Complete: Throughout the life of the Project or until the landowner no longer utilizes reclaimed water for irrigation.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	<p>To ensure that the listed Best Management Practices are successful in restricting surface runoff and subsurface flow, as stated in the performance criteria, the City will continuously monitor and record the volume of water delivered to each reclaimed water user and calculate the application rate. The City of Santa Rosa will also monitor evaporation and calculate evapotranspiration in each irrigation region. By monitoring these factors the City will be able to compare irrigation application rates and evapotranspiration to verify that the application of reclaimed water is being managed in accordance with the Irrigation Conservation and Management Program for each irrigation site. In addition, the City will establish continuous streamflow recording gauges at key watershed locations to characterize flow.</p> <p>The City of Santa Rosa will develop a standard monitoring form/checklist for use by individual irrigators and the City will require that irrigators monitor all locations of potential runoff from sites daily to determine if surface runoff is resulting in overflow of the control</p>

facilities. The City will conduct spot checks of irrigators on at least a weekly basis to ensure that daily monitoring is occurring.

If monitoring data indicate that the performance criteria are not being met, the City will adjust application rates and implement additional Best Management Practices (from the list above). If none of the Best Management Practices are effective in restricting surface and subsurface irrigation water runoff, the City will cease delivery of project water.

All Best Management Practices to be implemented to meet the surface and subsurface water runoff performance criteria will be listed in the ICMP. Monitoring logs will be maintained of each site visit and findings will be summarized in an annual monitoring report, along with management recommendations.

2.2.4 Restrict Soil Erosion and Sediment Movement (Irrigation Sites)

Description:

The City of Santa Rosa will require lands irrigated with reclaimed water be managed so that no net increase in sediment movement or soil erosion occurs over existing conditions. To ensure the sediment movement and soil erosion performance criteria are met, the City will implement the following Best Management Practices (unless expert opinion and studies indicate probable compliance with the performance criteria):

The City of Santa Rosa will place restrictions on the kinds of crops that can be grown using project reclaimed water, based on slope, to minimize the potential for soil erosion and sediment movement. These restrictions are:

Slopes 0-5%: Eligible for reclaimed water with no crop choice restrictions or restrictions on urban irrigation application

Slopes 6-9%: Eligible for reclaimed water to grow irrigated hay, forage, and silage crops; orchards and vineyards (with cover crops); and permanent pasture. No restrictions on urban irrigation application.

Slopes 10-15%: Eligible for reclaimed water to grow permanent irrigated pasture and orchards and vineyards (sprinkler irrigation and establishment and maintenance of a permanent cover crop required). No restrictions on urban irrigation application.

Slopes 16%+: Ineligible for reclaimed water except for small areas within an existing area of flatter slopes.

Where sediment has the potential to reach a stream or other body, the City of Santa Rosa will implement filter strips in accordance with design criteria and procedures outlined in US Department of Agriculture Conservation Reserve Program. Filter strips consist of strips of land located alongside stream courses or water bodies that are designed to passively filter sediment, nutrients and pesticides from runoff water.

For irrigated pastures on slopes ranging from 10 % to 15 %, the Irrigation Conservation and Management Program will include a pasture management plan that may provide for, but not be limited to, cross-fencing to provide for post-irrigation dry-down period, proper stocking rates and grazing periods, maintenance of correct amount of plant residue, and rest-rotation or other similar management. Rest-rotation management requires that animals are regularly rotated through fields allowing a period when pastures are irrigated, dried down and regrown (rested) between grazing.

Alternative/Component

All Agricultural Irrigation Components

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:	Individual Irrigators/City of Santa Rosa Utilities Department
Timing:	<p>Start: The City of Santa Rosa will implement slope restrictions during design of the irrigation system.</p> <p>Complete: Throughout the life of the Project or until the landowner no longer utilizes reclaimed water for irrigation.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	<p>The City of Santa Rosa will monitor the success of the Best Management Practices in meeting the sediment movement and soil erosion performance criteria through visual inspection of irrigated fields, and collection, analysis and comparison of suspended sediment in rainfall runoff samples.</p> <p>Individual irrigators will conduct a daily visual inspection of irrigated fields to check for evidence of accelerated erosion and excessive surface sediment transport to receiving waters.</p> <p>The City of Santa Rosa will conduct a paired analysis and comparison of rainfall runoff from representative irrigation and non-irrigation sites to determine if the suspended solids content in irrigation runoff is comparable to non-irrigation runoff. The City will conduct the rainwater runoff analysis after every rainfall event during the irrigation season (which would be expected to be infrequent, with little or no runoff) and after the first two rainfall events of the winter rainy season. The City of Santa Rosa will also perform monthly, visual spot checks of irrigation parcels.</p> <p>If monitoring data indicates that the sediment movement criteria performance criteria are not being met, the City of Santa Rosa will adjust irrigation application rates and implement additional Best Management Practices (from Measure 2.2.3). If none of the measures are effective in restricting sediment movement, the City will cease delivery of project water.</p> <p>All Best Management Practices to be implemented to meet the sediment movement performance criteria will be listed in the ICMP. Monitoring logs will be maintained of each site visit and findings will be summarized in the annual monitoring report</p>

2.2.5 Avoid Sensitive Biological Resources (Irrigation Areas, Pipelines, Pump Stations, and Electrical Support Systems)

Description:

The City of Santa Rosa will avoid impacts to sensitive biological resources in the design, construction, operation and maintenance of new irrigation areas, pipelines, pump stations, geysers storage tanks, access roads, and equipment staging areas.

Sensitive biological resources are defined as:

Jurisdictional waters of the U.S. including wetlands, streams, creeks and channels;

Plants and animals that are legally protected, proposed, or candidates for protection under the California Endangered Species Act (CESA) and Federal Endangered Species Act (FESA);

Animals designated as “species of special concern” by the California Department of Fish and Game ;

Animals listed as “fully protected” in the Fish and Game Code of California (Sections 3511, 4700, 5050, and 5515);

Plants listed in the California Native Plant Society’s (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 1994) Lists 1b-4;

Sensitive Plant Communities as identified by the California Department of Fish and Game in the California Natural Diversity Data Base (Department of Fish and Game);

Protected trees as defined in the Sonoma County and Marin County tree ordinances; and

Raptor nests, as protected in Fish and Game Code of California (Section 3503.5).

The City of Santa Rosa will retain a qualified biologist to conduct pre-construction biological surveys prior to the project-level siting of pipelines, pump stations, geysers storage tanks, and equipment staging areas. For irrigation areas, these surveys will be conducted as part of the resource map development (Measure 2.2.2, Irrigation Site Resource Maps). The purpose of these surveys will be to identify and map the above sensitive resources within and 100 feet adjacent to proposed construction zones. Potential raptor nest trees within 0.25 miles of the irrigation areas or construction zone will be visually surveyed with binoculars to determine occupancy during the nesting season prior to construction.

The following measures will be implemented during design, construction and operation of the proposed Project to avoid impacts to sensitive biological resources:

Irrigation Areas

The City will meet the following irrigation-related setbacks and buffer objectives. These objectives may be altered if future studies conducted by the City should verify that lesser buffer widths are adequate to avoid impacts:

A minimum 50-foot setback from irrigation application and a minimum 30-foot setback from new cultivation and construction around any identified sensitive plant species habitat.

No activity within the dripline of protected trees.

A minimum 30-foot setback from construction, new cultivation or irrigation application from jurisdictional wetland boundaries or the top of the bank of linear waterways (including isolated wetlands, excluding irrigation ditches and excavated drainages).

A minimum 50-foot setback from irrigation application and new cultivation around the upland riparian corridor (outer most dripline) of all linear waterways, including streams, creeks, and rivers. All linear waterways passing through irrigated pasture lands will be fenced to prevent livestock from accessing the stream corridor.

A minimum 100-foot setback from the edge of upland riparian corridors from construction and cultivation

A minimum 500-foot setback from irrigation application, new cultivation, or construction around all known breeding sites of state of federally listed, proposed or candidate avian or amphibian species.

A minimum 500-foot setback from irrigation application, new cultivation, or construction around all known dens of state of federally listed, proposed or candidate mammalian species (none are currently identified in the Project area).

Restoration procedures for gullied lands, irrigation ditches, and excavated drainages. These procedures may include, but not be limited to: fencing (10-foot setback fence) and stabilization/restoration, such as installing check dams and willow cuttings.

Pipelines, Pump Stations, Geysers Storage Tanks, and Staging Areas Design

The pipelines, pump stations, geysers storage tanks, and staging areas will be sighted to avoid impacts to sensitive resources. The following siting criteria will be employed to ensure avoidance of these resources:

The designated construction zone for pipelines, pump stations, geysers storage tanks, and staging areas will be designed to provide an exclusionary buffer from sensitive plant resources (recommend a minimum 30-foot).

The City of Santa Rosa will design pipeline stream crossings that are oriented as close to perpendicular (90 degree angle) as practicable.

Pipeline construction corridors shall be limited to 30 feet from the roadway centerline.

Where potential jurisdictional wetlands and waters of the United States or riparian areas parallel existing roadways and no bridge or culvert structure is crossed, pipeline construction activities shall be confined to within 10 feet of the roadway centerline or the existing road right-of-way or nearby suitable upland location, and shall not be located within wetlands or other sensitive biological resource areas.

Postpone grading of the right-of-way through riparian zones or wetlands until in-stream work is ready to commence.

Limit grading to the minimum area necessary to allow for movement of construction machinery and subsequent ditching and pipe installation operations.

Cut vegetation off at ground level, leaving existing root systems intact.

The City of Santa Rosa will design pipelines that cross perennial streams to be constructed using jack and bore. Additional staging areas would be required for bore and jack crossings. Additional temporary workspace for staging or pad area for bore and jack crossings shall be limited to a maximum 5,000 square foot pipeline construction staging area, typically 50' by 100'. Pads for bore and jack operations and construction staging areas for pump stations and geysers storage tanks shall be located outside of the limits of potential jurisdictional wetlands and other waters of the United States and riparian or native vegetation.

The following stream crossings will use jack and bore (crossings are identified by stream name and approximate location of pipeline crossing):

Big Sulphur Creek - Geysers property
Cobb Creek - Geysers property
Squaw Creek - Geysers property
Anna Belcher Creek (or tributary) - Pine Flat Road
Anna Belcher Creek - Pine Flat Road
Hurley Creek - Pine Flat Road

Little Sulphur Creek - Pine Flat Road
Sausal Creek (1) - Pine Flat Road
Sausal Creek (2) - Highway 128
Maacama Creek - Chalk Hill Road
Franz Creek - Chalk Hill Road
Mark West Creek - Slusser Road
Santa Rosa Creek - Willowside Road
Santa Rosa Creek - Madison Street
Santa Rosa Creek - Olive Street
Spring Creek - Franquette Avenue
Matanzas Creek - Farmers Lane
Matanzas Creek - Hoen Avenue
Mark West Creek - Trenton Healdsburg Road
Mark West Creek - River Road (1)
Mark West Creek - River Road (2)
Atascadero Creek - Green Valley Road
Green Valley Creek - Green Valley Road
Purrrington Creek - Graton Road
Atascadero Creek - Occidental Road
Blucher Creek - Gravenstein Highway
Laguna de Santa Rosa - Llano Road
Atascadero Creek - Mills Station Road
Atascadero Creek tributary - Ferguson Road
Atascadero Creek - Bodega Highway
Atascadero Creek - Water Trough Road
Americano Creek - Highway 1
Americano Creek - Marsh Road
Adobe Creek - Adobe Road
Estero Americano - Franklin School Road
Ebabias Creek - Highway 1

Pipelines, Pump Stations, Geysers Storage Tanks, and Staging Areas Construction

The pipelines, pump stations, geysers storage tanks, and staging areas will be constructed to avoid effects to the above sensitive resources. The following construction measures will be employed to ensure avoidance of these resources:

A mesh fence will be installed at the boundary of exclusionary buffer zones established for sensitive biological resources, with the exception of raptor nest trees.

The construction manager will ensure that vegetation removed in the right of way will be removed in a manner that leaves the edges of the right of way with a feathered and tapered appearance. This vegetation removal method

prevents leaving a construction area with a clear-cut “swath” appearance. Cleared vegetation, tree trimmings, and other plant material are either chipped and composted on-site or taken to a compost processing facility. Plant material will not be: buried, pushed into a creek or stream; left in the roadway; disposed of in trash dumpsters; or mixed with other wastes (except as authorized by an approved compost facility).

Where pipeline construction crosses a seasonal stream, the City of Santa Rosa will regulate timing of construction to ensure that no construction occurs in a live stream. See *Wetland Determination and Mitigation for Proposed Pipeline Alignments* Technical Memorandum (Parsons Engineering Science, Inc. 1996) for additional detail on identified sites. Construction in a seasonal stream will be scheduled during the low flow period generally from June 1 through October 15.

For streams crossed by pipelines using open trench construction, the top layer of the streambed will be stockpiled and preserved during construction. After the pipeline has been installed, the stockpiled material will be placed back in the streambed to minimize the potential for sediment to be suspended when rainfall creates streamflow, and to return the streambed substrate to its original composition.

Construction of a Russian River outfall will be restricted to the low flow period when the water level is below the construction area (generally between June 1 and October 15).

Construction around or involving protected trees will follow standards adopted by the Sonoma County (Tree Protection and Replacement Ordinance), Marin County (Draft Tree Preservation Plan) and the City of Santa Rosa. These ordinances establish standards for “protected” (oaks, madrone, redwood, and California bay) and “protected trees of special significance” (valley oak). These standards are as follows:

Protected trees, their protected perimeters and whether they are to be retained or removed are to be clearly shown on all improvement plans. A note will be placed on the construction plans that ‘Construction is subject to requirements established to protect certain trees’.

Before the start of any clearing, excavation, construction or other work on the site, every tree designated for protection on the approved site plan will 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 will remain in place for the duration of all work.

Limbing of trees is to be conducted by a certified arborist and only when necessary as a means of protecting the tree from damage or removal.

All trees to be removed will be clearly marked. Where proposed development or other site work must encroach upon the protected perimeter of a protected tree, special measures will be incorporated to avoid compaction and allow the roots to obtain oxygen, water, and nutrients. Tree wells or other techniques may be used where advisable. No changes in existing ground level will occur within the protected perimeter unless a drainage and aeration scheme approved by a certified arborist is utilized. No burning or use of equipment with an open flame will occur near or within the protected perimeter (except for authorized controlled burns).

Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	City of Santa Rosa Utilities Department
Timing:	<p>Start: Design measures. During component design. Construction Measures. At the start of construction. Irrigation buffers will be maintained until the landowner no longer utilizes reclaimed water for irrigation.</p> <p>Complete: At the completion of construction.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	Irrigation setbacks and buffers will be incorporated into each ICMP during the preparation of each ICMP. The City will review Final Engineering Drawings and ICMPs to verify that appropriate setbacks and buffers have been established to protect sensitive biological resources.

2.2.6 Agrochemical and Fertilizer Best Management Practices

Description:

The City of Santa Rosa will require that individual Irrigation Conservation and Management Programs incorporate State Water Resources Control Board Technical Advisory Committee management recommendations for Irrigated Agriculture and Pesticides to minimize offsite movement of pesticides. These include, but are not limited to, the following:

Control pollutants at their source through the verification of the need and amount of pesticides and fertilizer through soil and plant tissue testing, utilization of Integrated Pest Management procedures, utilization of the least toxic, least soluble, least persistent agrochemical, and careful evaluation and application of the lowest amount of agrochemical that will achieve the management goal

Reduce the mobilization of pollutants through control of soil erosion, irrigation runoff and subflow

Capture pollutants that are mobilized through the utilization of vegetated filter strips and grassed waterways and the utilization of on-farm sediment detention structures where necessary. Detention structures will be placed outside of buffers for sensitive biological resources.

Utilize, dilute, detoxify, or dispose of excess pollutants correctly through proper handling (mixing and storage) and disposal practices

The City of Santa Rosa will require that all individual Irrigation Conservation and Management Programs for irrigated pasture lands will have a nutrient and manure management component that takes into account the individual problems and needs for disposal of solids and liquid wastes. This component of the Irrigation Conservation and Management Program will be based on the knowledge and experience gained by the Resource Conservation Districts in part from their 319H Manure Management Implementation Grant from the State Water Resources Control Board.

Alternative/Component

All Agricultural Irrigation Components

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

City of Santa Rosa Utilities Department

Timing:

Start: During development of the ICMPs. The City will conduct spot-checks at least once a month to ensure that landowners are implementing the nutrient and manure management component of the ICMP.

Complete: Throughout the life of the Project or until the landowner no longer utilizes reclaimed water for irrigation.

Monitoring Agency: City of Santa Rosa Utilities Department

Validation: The nutrient and manure management component of the ICMP will be developed prior to delivery of reclaimed water to any parcel.

2.2.7 Prohibit Creation of Mosquito Habitat

Description:	The City of Santa Rosa will not allow sites irrigated with reclaimed water to have water ponding deeper than one inch for a period greater than four days
Alternative/Component	All Urban and Agricultural Irrigation Components
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	Individual Irrigators
Timing:	<p>Start: Individual irrigators will begin monitoring on the first day irrigation is applied. Monitoring will continue on a daily basis throughout the irrigation season.</p> <p>Complete: Until the landowner no longer utilizes reclaimed water for irrigation.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department and Marin/Sonoma Mosquito Abatement District
Validation:	All Best Management Practices required to ensure that sites irrigated with reclaimed water do not have water ponding greater than a period of four days will be incorporated into each individual ICMP. The City of Santa Rosa, with assistance from Marin/Sonoma Mosquito Abatement District, will perform spot-checks of sites receiving reclaimed water at least once a week. Potential problem areas such as Bay Flats, or other areas with Reyes soils which require over-irrigation, will be monitored by the City three times per week. Checks will occur throughout the life of the Project or until the landowner no longer utilizes reclaimed water for irrigation

2.2.8 Revegetate Temporarily Disturbed Sites

Description:

The City will implement a Revegetation Program that will revegetate all sites disturbed or scarred by construction activities. The Revegetation Program will require the following:

Streams and other Waters of the U.S.

1. Remove any sediments deposited in stream channels due to construction activities.
2. Restore original contours and drainage patterns.
3. Implement immediate stream bank stabilization measures such as revegetation with willow wattles at woody crossings and covering disturbed herbaceous stream banks with a biodegradable fiber (jute) cloth or coconut fiber rolls or another similar erosion control fabric.
4. Collect seed stock or cuttings for any riparian revegetation as near to the stream crossing as possible (taking into consideration microclimate and time of year for propagation) and preferable from vegetation removed at the stream crossing.
5. Limit artificial seeding and avoid use of soil amendments such as lime or fertilizers.
6. Encourage natural regeneration of native herbaceous vegetation from surrounding areas/wetlands.
7. Spread a cover of straw, rice straw if available, over all areas of disturbed soils and use a straw punch to work into soil.
8. Apply an organically based tackifier on disturbed areas to reduce air and water erosion of soils.

Upland Sites

1. Upon completion of construction of a Project component, the construction manager shall restore the site to pre-existing 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.
2. The Revegetation Plan shall provide measures to ensure that trenching scars associated with pipeline construction are revegetated with drought tolerant plant species common to the disturbed area.
3. Seed material of woody and herbaceous plants shall be collected from the construction corridor and/or adjacent undisturbed vegetation during a suitable season for each group of plants. Potted plant materials will be used to replace woody vegetation (i.e., trees and shrubs).

4. Dried seed material collected as specified earlier shall be applied evenly to the finish-graded topsoil surface. Seed material shall be used on the construction site from which it was collected.

Monitoring

1. Revegetated areas shall be monitored annually for five years following construction.

Alternative/Component: Alternatives 2, 3, 4, and 5a

Lead Agency: City of Santa RosaU.S. Army Corps of Engineers

Implementing Agency: City of Santa Rosa and construction manager

Timing: **Start:** During construction ofProject components.

Complete: Revegetation will be completed within one year of completion of a Project component. Monitoring reports should be submitted annually to the Corps, the California Department of Fish and Game, and any other responsible agency for at least five years or until it is demonstrated thatsucccess criteria have been met.

Monitoring Agency: City of Santa Rosa

Validation: Review annual reports beginning with end of first growing season following construction. Conduct field monitoring on yearly basis or as deemed appropriate. Review annual reports and conduct monitoring annually for five years.

2.2.9 Retain Stripped Topsoil

Description:	The construction manager will ensure that the first six inches of topsoil is stripped from all areas to be occupied by structures, and all areas to be excavated, graded, or filled. The stripped topsoil will be stockpiled on-site, in areas designated on project maps, and will not be mixed. Topsoil will be stockpiled free from vegetation, trash, large stones, and other extraneous materials, to the extent possible. Stockpiled topsoil will be protected from disturbance, rainfall, and erosion until it can be placed as final grade in its original location.
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	Construction manager
Timing:	<p>Start: During construction. The City of Santa Rosa will monitor the construction manager's compliance on a daily basis during construction.</p> <p>Complete: At the completion of construction.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City of Santa Rosa will monitor the construction manager's compliance on a daily basis at the end of each work day.

2.2.10 Storm Water Pollution Prevention Plan

Description:

The City of Santa Rosa will implement a project Storm Water Pollution Prevention Plan (SWPPP). The Prevention Plan is required by the State Water Resources Control Board NPDES General Construction Activity Storm Water Permit (discussed in Section 4.3, under Regulatory Framework). The Prevention Plan will include, at a minimum, the following elements:

Jack and bore construction of live streams (refer to Measure 2.2.5).

Construction will be performed to minimize soil exposure. This should include measures to limit construction during the rainy season.

New cut and fill slopes and soil stockpiles will be revegetated, mulched, or otherwise protected immediately upon completion of permanent or temporary winter slopes.

Runoff will be diverted away from construction areas that have been denuded or otherwise disturbed.

Sediment will be retained on site by the proper use of silt fences, hay bales, sedimentation basin, or other structures.

Erosion and sediment control facilities will be inspected and maintained through the construction phase of the Project.

Minimize cut and fill along streams through the use of steepened side slopes, retaining walls and extended culverts.

Cut vegetation off at ground level, leaving existing root systems intact.

Pulling of tree stumps will be limited to the graded area directly over the pipeline trench. Tree stumps or root systems from the rest of the right of way in wetlands will not be removed unless safety-related construction constraints require such.

A site-specific Storm Water Pollution Prevention Plan shall be prepared for each construction area, and if special measures are necessary for a site, these measures will be incorporated into the Prevention Plan.

Alternative/Components:

Alternatives 2, 3, 4, and 5a

Lead Agency:

City of Santa Rosa

Implementing Agency:

City of Santa Rosa

Timing:

Start: During the Project design phase

Complete: At the end of construction

Monitoring Agency:

North Coast or San Francisco Bay Regional Water Quality Control Board must approve the Storm Water Pollution Prevention Plan

Validation:

The Board will review the adequacy of the prevention Plan prior to the issuance of the NPDES General Construction Activity Storm Water Permit.

The City will monitor compliance with the Prevention Plan throughout construction

2.2.11 Protect Creeks from Toxic Discharge

Description:

During construction, the construction manager will 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 will include:

- 1) Construction byproducts and pollutants such as oil, cement, and washwater will be prevented from discharging into streams and will be collected and transported to a landfill authorized to accept hazardous wastes
- 2) No construction vehicles or equipment may be parked within the upland riparian corridor of any stream channel.
- 3) Equipment may only be refueled and serviced at the designated construction staging area.
- 4) Building material storage areas containing hazardous or potentially toxic materials will be bermed to prevent the discharge of pollutants to runoff water. These materials will be stored under cover at all times (even during the work day)
- 5) 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
- 6) Construction vehicles and equipment will be maintained to prevent contamination of soil (from leaking hydraulic fluid, fuel, oil, and grease).

Alternative/Component

Alternatives 2, 3, 4, and 5a

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

Construction Manager

Timing:

Start: At the start of construction. The City of Santa Rosa will monitor the construction manager’s compliance on a daily basis during construction.

Complete: At the completion of construction.

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

The City of Santa Rosa will monitor the construction manager’s compliance on a daily basis at the end of each work day.

2.2.12 Concrete Waste Management

Description:	<p>The construction manager will designate concrete washout areas for vehicles carrying concrete. Designated areas will be approved by the California Department of Fish and Game and the Sonoma County Environmental Health Department prior to the start of construction.</p> <p>The construction manager will restrict wash-out of concrete vehicles and equipment to designated areas only.</p> <p>The construction manager will brief all employees and sub-contractors in concrete waste management procedures.</p>
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	Construction Manager
Timing:	<p>Start: At the start of construction.</p> <p>Complete: At the end of construction.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department and California Department of Fish and Game
Validation:	The City of Santa Rosa will monitor the construction manager's compliance on a daily basis at the end of each work day.

2.2.13 Pipeline Features in Active Fault Zones

Description:

Isolation Valves

The City of Santa Rosa will design pipelines crossing the Rogers Creek/Healdsburg and Maacama faults with manually operated isolation valves. The isolation valves will be on both sides of the pipeline crossing, located a distance of one thousand feet from the fault zone.

High Pressure Pipeline

The City of Santa Rosa will design pipelines crossing the Rogers Creek/Healdsburg and Maacama faults to be high pressure class pipe that can accommodate some surface offset. The high pressure pipeline will extend two thousand feet on both sides of the fault zone.

Alternative/Component

Alternative 4

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

City of Santa Rosa Utilities Department

Timing:

Start: During design.

Complete: Prior to certification of Final Engineering Drawings

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

The City will comply with this measure prior to certifying the Final Engineering Drawings.

2.2.14 Dam Safety

Description:

The State of California requires that an inundation map be prepared for any dam which either is 25 feet or more in height or impounds 50 acre feet or more of water (California Water Code, §6002 and California Government Code §8589.5). The City has prepared an inundation map for each potential reservoir site. The map for the proposed reservoir site will be submitted by the City of Santa Rosa to the Office of Emergency Services (OES) for review and approval. Following approval, OES will transmit the map back to the City who will then produce evacuation plans within six months. These plans, which are also subject to OES review may be required to include:

Traffic control measures

Shelters for evacuees

Movement of people without their own transportation and from "unique" institutions

Perimeter security for the evacuation area and

Reentry of the evacuation area

Alternative/Component

Alternatives 2 and 3

Lead Agency:

City of Santa Rosa

Implementing Agency:

City of Santa Rosa

Timing:

Start: Upon certification of the EIR.

Complete: The City will develop and submit an evacuation plan to the Office of Emergency Services within six months of receiving the approved inundation map.

Monitoring Agency:

Office of Emergency Services (OES)

Validation:

The City will maintain a copy of the OES approved inundation map and evacuation plan at the Laguna Wastewater Treatment Plant Library and at other administrative offices.

2.2.15 Standard Traffic Control Procedures

Description:	Prior to construction of a Project component, the City of Santa Rosa will implement standard traffic control measures to avoid potential impacts to roads and traffic congestion. At a minimum, the procedures to be implemented by the City of Santa Rosa will contain Measures 2.2.16 through 2.2.24, discussed below.
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	City of Santa Rosa Utilities Department
Timing:	Start: During construction of each Project component. Complete: Implementation will continue throughout construction.
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City will comply with this measure prior to starting construction of a Project component.

2.2.16 Emergency Response Vehicles Will Not be Impeded

Description:

The City will ensure that construction of the Project does not impede emergency response vehicles. For each Project component, the City will inventory the locations of emergency response providers (hospitals, police, fire, and ambulance) and their primary response routes.

Where Project facilities or pipelines have been sited along emergency response routes, the City will recommend and obtain approval of alternate emergency response routes from the affected service, at a minimum of one week prior to construction.

During construction, the City will notify the emergency services on a weekly basis of the timing, location, and duration of construction activities throughout the Project for that week and a schedule of construction activities by area and date.

A copy of the construction activity schedule will be maintained at selected public libraries and City offices.

Alternative/Component

Alternatives 2, 3, 4, and 5a

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

City of Santa Rosa Utilities Department

Timing:

Start: The inventory will be started during component design. Notification of construction activities will occur on a weekly basis.

Complete: At the completion of the construction period.

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

The City will comply with this measure prior to starting construction of a Project component.

2.2.17 Maintain Maximum Number of Open Lanes on Roadways

Description:

Where Project construction occurs in or along roadways, the maximum number of through traffic lanes will be kept open. A minimum of one lane of through traffic will be maintained at all times.

Where single-lane, one-way operation is required, the construction manager will mark construction zones and provide traffic control in accordance with Caltrans "Manual of Traffic Controls for Construction and Maintenance of Work Zones" (Caltrans 1990). This will include, but not be limited to, appropriate signage marking all construction zones and flag persons or electronic signal control at each end of the restricted lanes.

Where construction of an open trench 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 will be developed by the construction manager and submitted to, and approved by, the Traffic Engineer of the affected jurisdiction, at least four weeks prior to scheduled road closure. The temporary road closure plan will include:

- Road name and closure location
- Duration of road closure
- Length of road to be closed
- Alternate detour routing
- Notification of local fire and police departments

Alternative/Component

Alternatives 2, 3, 4, and 5a

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

City of Santa Rosa Utilities Department and Construction Manager

Timing:

Start: Road closure plans will be submitted at least four weeks prior to scheduled closure.

Complete: At the completion of construction.

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

The City will comply with this measure prior to starting construction of a Project component.

2.2.18 Jack and Bore Construction at Major Highways

Description:

The City of Santa Rosa will design pipelines crossing high volume roadways, all railroads, and Sonoma County Water Authority Aqueducts to utilize the jack and bore construction method so as not to disrupt the flow of traffic and commerce. The following crossings will be constructed using jack and bore:

Highways

State Hwy 128 at Pine Flat Rd
Old Redwood Hwy at Pleasant Ave
Hwy 101 at Conde Ln
River Rd at Olivet Rd
Guerneville Rd at Willowside Rd
Hwy 101 at N. Santa Rosa Flood Channel
Old Redwood Hwy at N. Santa Rosa Flood Channel
Hopper Rd at N. Santa Rosa Flood Channel
Old River Rd near Denner Rd
Hwy 116 at Green Valley Rd
Occidental Rd at Barlowe Rd
Yalupa Ave at Bennett Valley Rd
Hwy 116 at Llano Rd
Roblar Rd near Orchard Station Rd
Bodega Ave at Spring Hill Rd
Fallon Two Rock Rd at Twin Bridge Rd
Fallon Two Rock Rd at Alexander Rd
Valley Ford Rd at Roblar Rd
Valley Ford Rd at Bloomfield Rd
Bodega Hwy at Ferguson Rd
Valley Ford Rd at Shoreline Hwy
Valley Ford Rd at Walker Rd
Meecham Rd at Pepper Rd
Stony Pt at Meecham Rd
Stony Pt at Pepper Rd
Stony Pt at Thomas Rd
Old Redwood Hwy at Railroad Ave

Railroads

Northwestern Pacific Railroad at Copeland Creek
Northwestern Pacific Railroad at Shiloh Rd
Northwestern Pacific Railroad at 3rd St.
Northwestern Pacific Railroad at Piner Creek

SCWA Aqueducts

Hwy 101 at Sonoma Ave
Eastside Rd at Trenton -Healdsburg Rd
Slusser Rd near Mark West Creek
Guerneville Rd near Delta Ponds
Hwy 116 near Stony Pt Rd
Stony Pt Rd near Madrone Rd
Copeland Creek near NWP Railroad

Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa of Santa Rosa Utilities Department
Implementing Agency:	City of Santa Rosa of Santa Rosa Utilities Department
Timing:	Start: Design phase of each component. Complete: Upon certification of Final Engineering Drawings
Monitoring Agency:	City of Santa Rosa of Santa Rosa Utilities Department
Validation:	The City will comply with this measure prior to certifying the Final Engineering Drawings.

2.2.19 Fence or Cover Trenches

Description:	<p>During construction, the construction manager will require all trenches to be backfilled within four hours of completion of component installation.</p> <p>While under construction, the construction manager will cover all open trenches with steel plating where the trench crosses roadways or prevents access to businesses or residences, if feasible.</p> <p>When possible, the construction manager will not leave trenches uncovered overnight. All trenches left uncovered will be fenced and marked with appropriate signage in accordance with Caltrans “Manual of Traffic Controls for Construction and Maintenance of Work Zones” (Caltrans 1990).</p>
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	City of Santa Rosa Utilities Department and Construction Manager
Timing:	<p>Start: At the beginning of component construction. The City of Santa Rosa will monitor the construction managers compliance on a daily basis at the end of each work day.</p> <p>Complete: At the completion of construction.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City will check compliance with this measure daily, throughout construction.

2.2.20 Access to Businesses and Residences

Description:

Ninety days prior to construction of a Project component, the City of Santa Rosa will provide all public facilities, businesses, and residences within 500 feet of the construction zone with a notification packet that describes Project construction activities scheduled for their neighborhood. Notification will also be provided in local newspapers.

The notification packet will include:

- 1) Notice to residences and businesses that parking and access will be disrupted.
- 2) Name of the Project sponsor, Project purpose, and a brief Project description
- 3) Affected roadway segments in area, construction schedule in affected area, affected travel lanes, and reference to the traffic control plan.
- 4) Applicable detour routing and alternate access and/or parking for affected land uses
- 5) Name and phone number of a Project manager the public can contact with questions or comments regarding any aspect of the Project

During construction, the construction manager will maintain pedestrian and vehicular access to all public facilities, businesses, and residences along the route.

Alternative/Component

Alternatives 2, 3, 4, and 5a

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

City of Santa Rosa Utilities Department and Construction Manager

Timing:

Start: Ninety days prior to construction.

Complete: At the completion of construction.

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

The City will perform daily checks to ensure access is maintained to private and public uses. The City will respond to complaints from private citizens regarding restricted access within 24 hours.

2.2.21 Repair Road Damage

Prior to construction, the City of Santa Rosa will survey and videotape the condition of all roads scheduled to have construction on or adjacent to them. The survey will 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 will be repaired to a condition equal to or better than that which existed prior to the construction activity.

Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	City of Santa Rosa Utilities Department
Timing:	<p>Start: Prior to construction of a Project component. The City of Santa Rosa will review the road survey prior to authorizing construction along roads.</p> <p>Complete: Within one year after completion of construction of a Project component.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City will complete road repairs within one year of completion of construction of a Project component. The City will demonstrate compliance with this measure by videotaping the conditions of all roads where construction activities occurred.

2.2.22 Park Within Construction Easements

Description:	The construction manager will establish construction staging areas. All construction worker vehicles, construction equipment, and materials will be kept within the staging area. Construction easements at the pump station will be expanded to accommodate all construction related activity.
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	City of Santa Rosa Utilities Department and Construction Manager
Timing:	Start: Prior to the start of construction. Complete: At completion of construction.
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City will check compliance with this measure daily, throughout construction.

2.2.23 Limit Delivery Hours

The City of Santa Rosa will restrict construction deliveries to off-peak commute hours. Peak commute hours are between 7:00 a.m. and 9:00 a.m. in the morning and 4:00 p.m. and 6:00 p.m. in the evening.

Alternative/Component

Alternatives 2, 3, 4, and 5a

Lead Agency:

City of Santa Rosa Utilities Department

Implementing Agency:

Construction Manager

Timing:

Start: At the beginning of construction. The City of Santa Rosa will monitor the construction manager's compliance on a daily basis during construction.

Complete: At the completion of construction.

Monitoring Agency:

City of Santa Rosa Utilities Department

Validation:

The City will check compliance with this measure daily, throughout construction.

2.2.24 Limit Ingress/Egress of Construction Equipment

Description:	<p>During construction, the construction manager will ensure that ingress and egress of construction equipment onto highways from construction parking areas and access roads is conducted in accordance with Caltrans “Manual of Traffic Controls for Construction and Maintenance of Work Zones” (Caltrans 1990).</p> <p>Adequate traffic controls will be provided at access road intersections in accordance with Caltrans “Manual of Traffic Controls for Construction and Maintenance of Work Zones” (Caltrans 1990).</p>
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	Construction Manager
Timing:	<p>Start: At the beginning of construction. The City of Santa Rosa will monitor the construction manager’s compliance on a daily basis during construction.</p> <p>Complete: At the completion of construction.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City will check compliance with this measure daily, throughout construction.

2.2.25 Minimize/Reduce Fossil Fuel Consumption

Description:	<p>During construction, the construction manager will implement the following measures to minimize fossil fuel consumption:</p> <p>Construction vehicles and equipment will be maintained and tuned at the interval recommended by the manufacturers</p> <p>Construction equipment idling will be kept to a minimum when equipment is not in use. No piece of equipment will idle in one place for more than 30 minutes.</p> <p>Maintain stockpiles to avoid trucks hauling less than full loads.</p> <p>Coordinate construction equipment use to minimize actual hours of operation.</p> <p>Encourage construction crews to car pool.</p>
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	Construction manager
Timing:	<p>Start: During construction. The City of Santa Rosa will monitor the construction manager's compliance on a daily basis during construction.</p> <p>Complete: At the completion of construction.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City of Santa Rosa will monitor the construction manager's compliance on a daily basis at the end of each work day.

2.2.26 Odor Control for Sludge Handling

Description:

The following odor control measures for sludge handling are being implemented at the Laguna Wastewater Treatment Plant as part of the adopted mitigation for the Santa Rosa Subregional Sludge Beneficial Use Project. The City incorporates these measures into the Long-term Wastewater Project:

De-watered biosolids from the Laguna Wastewater Treatment Plant will be delivered to destinations as quickly as possible and not stored on-site. A specific plan will be developed as part of Project design to accomplish this. Destinations include the compost facility, land application site, and the Central Landfill.

Mixing of the biosolids and bulking agent shall be done in an area that is either covered or enclosed. Covering protects against rainfall, and enclosure permits the air to be collected and treated.

Anaerobic digestion of the biosolids prior to de-watering (practiced at the Laguna plant) will be done to significantly reduce odors of digested biosolids compared raw biosolids by stabilizing it.

De-watered biosolids applied to agricultural land will be quickly applied. Where possible it will be incorporated into the soil. This will reduce vector attraction and potential runoff impacts.

The Subregional System will employ process control measures including proper housecleaning procedures such as rapid cleanup of spillage and frequent wash down of hauling trucks and conveyance equipment.

The agitated bed process will be utilized to provide continuous mixing of compost to prevent formation of anaerobic regions within the compost pile and to provide control over moisture and temperature. The agitated bed process is an enclosed system which will permit ambient air as well as process air to be collected and treated.

Process air and ambient air will be treated by either a compost bio-filter or a two-stage chemical scrubber.

Compost production and yard waste delivery will be scheduled to meet demands and minimize the need for storage.

Sludge will be treated by anaerobic digestion (defined by federal regulations as a Process to Significantly Reduce Pathogens).

Alternative/Component	Alternatives 2, 3, 4, and 5
Lead Agency:	City of Santa Rosa Utilities Department
Implementing Agency:	Laguna Treatment Plant Operations
Timing:	<p>Start: Measures are already being implemented as part of the Laguna Wastewater Treatment Plant's Biosolids Management Program.</p> <p>Complete: Ongoing, throughout the life of the Project.</p>
Monitoring Agency:	City of Santa Rosa Utilities Department
Validation:	The City of Santa Rosa will monitor and evaluate implementation of these measures annually.

2.2.27 Uniform Relocation Assistance

Description:	The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646) will govern all of the acquisition and displacement actions related to the implementation of the proposed Project. Affected property owners and businesses, depending on eligibility, will be afforded various services and forms of compensation in accordance with the provisions of this act.
Alternative/Component	Alternatives 2 and 3
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: Upon certification of the EIR. Complete: Prior to the start of construction.
Monitoring Agency:	City of Santa Rosa
Validation:	Compensation of affected property owners and business shall be agreed upon prior to construction.

2.3 PLANNING MEASURES

This section contains mitigation measures to be implemented during the final planning and detailed design of the Project. These measures often require the refinement of the final Project design to accommodate particular environmental constraints. Compliance with these mitigation measures would result in avoidance and/or minimization of adverse environmental impacts.

2.3.1 Replacement of Open Space Easements

Description: The City shall contribute funds to the Sonoma County Agricultural Preservation and Open Space District as compensation for land acquired for Pump Station G3. The City's cash contribution shall be equal to the value of the land acquired for the pump station. All moneys contributed by the City shall be utilized in accordance with the Sonoma County Open Space Expenditure Plan.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
1.6.2. The pump station component may convert public open space for Project facilities.	Alt 4 - Less than Significant
Alternative/Component	Alternative 4
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: Upon certification of EIR.
	Complete: Prior to the beginning of construction.
Monitoring Agency:	City of Santa Rosa and Sonoma County Agricultural Preservation and Open Space District
Validation:	A Memorandum of Agreement shall be signed between the City and the District prior to the beginning of pump station construction.

2.3.2 Restrict Approval of Agricultural Irrigation Contracts

Description: The City shall not approve irrigation contracts for new orchards and vineyards on slopes greater than 10% or for specialty crops on slopes greater than 5% (as identified in Measure 2.2.4). Approval of contracts for these lands shall be granted only after the City of Santa Rosa has completed a demonstration program showing that the restricted agricultural uses can be conducted on these sloped lands without causing excessive soil erosion. The demonstration program is explained under Mitigation Measure 2.3.3.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
2.7.3. The agricultural irrigation component may reduce agricultural soil productivity due to erosion of topsoil	Alts 2 and 3 - Less than Significant
Alternative/Component:	Alternatives 2 and 3
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa Utilities Department
Timing:	<p>Start: Prior to the delivery of water for agricultural irrigation</p> <p>Complete: This restriction shall be in place for the life of the Project</p>
Monitoring Agency:	City of Santa Rosa
Validation:	This restriction shall be maintained throughout the life of the Project or until studies show that this measure is no longer necessary.

2.3.3 Agricultural Irrigation Demonstration Program

Description:

Prior to approval of irrigation contracts for new orchards and vineyards on slopes greater than 10% or for specialty crops on slopes greater than 5%, the City shall conduct a demonstration program utilizing a number of erosion control practices and monitor erosion. If the City can demonstrate that there are effective and feasible erosion control measures that enable new orchards and vineyards to be grown on slopes greater than 10% or for specialty crops to be grown on slopes greater than 5%, without exceeding the T value as established in the Irrigation Management Guidelines Technical Memorandum, then contracts for irrigation on similar slopes with similar crops may be signed.

Monitoring of these contracts shall include erosion measurements for the first two seasons; contracts are subject to cancellation if erosion cannot be reduced below the T value.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
2.7.3. The agricultural irrigation component may reduce agricultural soil productivity due to erosion of topsoil	Alts 2 and 3 - Less than Significant
Alternative/Component:	Alternatives 2 and 3
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa Utilities Department
Timing:	<p>Start: Prior to approval of irrigation contracts for new orchards and vineyards on slopes greater than 10% or for specialty crops on slopes greater than 5%.</p> <p>Complete: The program shall be complete upon the successful demonstration that T values will not be exceeded. Monitoring of any lands approved for such contracts shall occur throughout the life of the Project</p>
Monitoring Agency:	City of Santa Rosa
Validation:	<p>Irrigation contracts for new orchards and vineyards on slopes greater than 10% or for specialty crops on slopes greater than 5% can only be established if the City is able to successfully complete a irrigation demonstration program that demonstrates application of erosion control technology is able to maintain soil loss at acceptable rates for long-term sustainable agriculture. Monitoring of lands approved for such contracts shall occur throughout the life of the Project</p>

2.3.4 Slope Stabilization Design

Description:

The City shall retain a licensed geotechnical engineer and a structural engineer to conduct construction level geotechnical investigation of the pipeline routes, pump station areas, and the storage reservoir site. The investigation shall identify slope stability risk areas and provide engineering design and construction recommendations to stabilize slopes at the dam, on the slopes around the reservoir, at pump station areas, and at pipeline routes. Slope stability recommendations shall include, but not be limited to, the following measures

Removal and replacement of unstable materials in an existing landslide with a stronger material.

Grading to an acceptably stable topographic configuration by terracing, reducing slope angles, and reducing the height of cut and fill slopes.

Drainage facilities, such as subdrains and dewatering wells to reduce pore water pressure and reduce the risk of slope failure.

Buttressing the toe of slopes to provide additional support to the slope.

Where buttressing is not feasible, internal reinforcement such as a pinning system or lattice grid can be incorporated into the slope design to strengthen the slope.

Retaining walls or other external applications to strengthen slopes.

In addition, within the geysers steamfield area, pipeline alignments can be adjusted to avoid areas with slope stability problems.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.4.1 The pipeline component may be located within areas of unstable slope conditions.	Alts 2 and 3 - Less than Significant Alt 4 - Significant.
3.5.1 The storage reservoir component may be located in an area of unstable slope conditions	Alt - Significant
3.8.1 The geysers steamfield component may be located in an area of unstable slope conditions.	Alt 4 - Less than Significant

Alternative/Component: Alternatives 2, 3, and 4

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

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

Complete: Prior to issuance of grading permit

Monitoring Agency: City of Santa Rosa and Division of Safety of Dams

Validation:

The City will comply with this measure prior to certifying the Final Engineering Drawings or issuance of a grading permit.

2.3.5 Liquefaction Stabilization Design

Description:

The City shall retain a registered geotechnical engineer to conduct a detailed, facility specific, soil analysis in areas mapped by California Division of Mines and Geology as having a “high” liquefaction potential. The analysis shall determine locations where facilities could be damaged by liquefaction and shall include:

Identification of density profiles

Determination of maximum shallow groundwater levels

Characterization of the vertical and lateral extent of saturated sand/silt layers that could undergo liquefaction during strong ground shaking.

Where facility specific testing indicates that conditions are present that could result in liquefaction and damage to Project facilities, appropriate, feasible measures shall be included in the site specific soils analysis and shall be incorporated into the Project design. These measures shall include the following, unless the site-specific soils analysis dictates otherwise:

Densification or dewatering of surface and subsurface soils.

Construction of concrete foundations to support pipelines or pile foundations to support buildings.

Removal of material that could undergo liquefaction in the event of an earthquake and replacement with stable material.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.4.3 The pipeline component may be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake.	Alts 2, 3, 4, and 5a - Less than Significant
3.6.3 The pump station component may be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake.	Alts 2, 3, and 4 - Less than Significant
3.9.3 The discharge component may be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake.	Alt 5a - Less than Significant

Alternative/Component: Alternatives 2, 3, 4, and 5a

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa Utilities Department

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

Complete: Upon completion of construction.

Monitoring Agency: City of Santa Rosa Utilities Department

Validation: The City shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

2.3.6 Standard Engineering Methods for Corrosive Soils

Description:

Conduct Pre-Design Soil Analysis

Prior to design the City shall hire a Certified Professional Soil Scientist to conduct a soil survey along all pipeline alignments. The survey shall record soil type and soil properties (including pH, salinity, and active sulfides).

The Certified Professional Soil Scientist shall conduct an analysis of soil properties and the chemical interaction between soil, groundwater, and pipe materials. The analysis shall include a determination of pipeline alignments requiring corrosion prevention measures.

Pipelines Traversing Reyes Soils

The City shall design pipelines that traverse Reyes soils to be comprised of coated steel, or equivalent, to reduce potential damage from corrosive soils.

Pipelines Traversing Highly Corrosive Soils

The City shall design pipelines that traverse highly corrosive soils to utilize non-corrodable materials such as PVC or have an active cathodic protection system (one that applies a current to the pipe and protects metals from effects of low pH)

Agricultural Irrigation Pipelines

Agricultural irrigation pipelines traversing Reyes soils or highly corrosive soils shall either be constructed as described above or they shall be constructed with PVC pipe (or equivalent).

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.4.8 The pipeline component may be exposed to damage due to corrosive soils.	Alt 2 - Less than Significant
3.7.8 The agricultural irrigation component may be exposed to damage due to corrosive soils.	Bay Flats and Lakeville Irrigation- Less than Significant
Alternative/Component	Alternative 2, Bay Flats and Lakeville Irrigation Component
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa Utilities Department
Timing:	Start: During Project design
	Complete: At the completion of the design phase.

Monitoring Agency: City of Santa Rosa Utilities Department

Validation: The City will comply with this measure prior to certifying the Final Engineering Drawings. The City shall retain a Certified Professional Soil Scientist to verify compliance with this measure.

2.3.7 Slope Monitoring and Response System

Description:

The City shall develop and install a slope stability monitoring system along unstable portions of Pine Flat Road (the geysers pipeline alignment). The monitoring system shall include slope inclinometers to measure changes in slope angles and piezometers to measure changes in water levels and pore water pressure that could indicate active slope movement. The monitoring system would provide advanced warning of slope failure that could damage pipelines.

If accelerated slope movement is detected, then immediate corrective action, such as pipe maintenance or activation of isolation valves and draining of pipeline segments, shall occur. Areas experiencing accelerated slope movement shall have additional slope stabilization measures applied. These measures are discussed under Measure 2.3.4.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.4.1 The pipeline component may be located within an area of unstable slope conditions.	Alt 4 - Significant Alts 2 and 3 - Less than Significant
Alternative/Component:	Alternatives 2, 3, and 4
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa, Utilities Department
Timing:	Start: During design. The slope monitoring system shall be in place prior to operation of the Project. Complete: For the duration of the Project.
Monitoring Agency:	City of Santa Rosa, Utilities Department
Validation:	The City will comply with this measure prior to certifying the Final Engineering Drawings.

2.3.8 Earthquake Preparedness and Emergency Response Program

Description:

The City shall develop and implement an Earthquake Preparedness and Emergency Response Program. The Program shall be detailed and shall include, at a minimum, the following elements (to be indicated on the Final Engineering Drawings, where appropriate):

Identify specific pipeline locations that would be vulnerable to damage in an earthquake and define priorities for system repairs.

House emergency equipment and supplies at key locations along the transmission distribution system

Dams shall be inspected by a registered Civil Engineer following strong ground shaking events, and corrective action shall be taken if damage is observed.

Ensure that emergency power supply, such as back up generators, would be available to supply electricity to critical facilities.

Provide all plant operators and irrigation system operators with emergency response training.

Provide training for personnel in first aid and cardiopulmonary resuscitation.

Conduct practice drills, using simulated earthquake scenarios, of emergency response procedures annually.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.4.1 The pipeline component may be located within an area of unstable slope conditions.	Alt 4 - Significant Alts 2 and 3 - Less than Significant
3.4.2 The pipeline component may be subject to ground rupture due to location near surface trace of an active fault.	Alts 2, 3, and 4 - Significant
3.8.4 The geysers steamfield component may induce seismicity.	Alt 4 - Less than Significant

Alternative/Component: Alternatives 2, 3, and 4

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa Utilities Department

Timing: **Start:** The Program shall be developed during Project design

Complete: Implementation of the Program shall occur upon completion of construction. Training and practice drills shall be conducted annually, throughout the life of the Project.

Monitoring Agency:

City of Santa Rosa, Utilities Department

Validation:

The Program shall be developed prior to certification of the Final Engineering Drawings

2.3.9 Adjust Pipeline Alignments

Description:

During final design of the pipelines, alignments of pipelines shall be adjusted within the Project corridor to avoid visually sensitive features and conditions which would result in major landform alteration or mature landscape removal. Visually sensitive features include significant stands of oaks and eucalyptus, visually significant rock outcroppings, highly visible steep slopes, and highly visible roadside foreground areas. For example, the pipeline alignment along Lakeville Highway shall be adjusted from one side of the highway to middle of the highway to avoid destruction of the visually significant eucalyptus trees.

As previously discussed in Measure 2.2.5, Avoid Sensitive Biological Resources, pipelines will be sited to avoid protected trees (as defined by the Sonoma County and Marin County tree ordinances).

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
14.4.2 The pipeline component may be inconsistent with the Sonoma County or City General Plans regarding scenic landscape units.	Alts 2, 3, 4, and 5a - Less than Significant
14.4.3 The pipeline component may be inconsistent with the Sonoma County or City General Plans regarding scenic corridors.	Alts 2, 3, 4, and 5a - Less than Significant
14.4.5 The pipeline component may cause an adverse effect on foreground or middleground views from a high volume highway, recreation use area, or other public use area.	Alts 2, 3, and 5a - Less than Significant Alt 4 - Significant
14.4.6 The pipeline component may cause an adverse effect on foreground or middleground views from one or more private residences.	Alts 2, 3, 4, and 5a - Less than Significant

Alternative/Component Alternatives 2, 3, 4, and 5a

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** During Final Design.

Complete: Prior to the beginning of construction.

Monitoring Agency: City of Santa Rosa

Validation: The Plan shall be developed prior to certification of the Final Engineering Drawings

2.3.10 Limit Construction Disturbance

Description:

During final design of the Project, the City shall review all construction zones and staging areas to ensure they are kept to a minimum operable size in order to minimize the visual impacts construction areas. Construction activities which would increase the amount of disturbance outside of the construction zone shall also be

limited. These include the number and extent of access roads (temporary or permanent) and widened right of way clearing to accommodate construction staging areas and material storage. In addition, the boundaries of these areas shall be designed to have curvilinear, rather than straight, boundaries in order to prevent the creation of stark, highly contrasting boundaries

All changes in construction zone size shall be clearly indicated on the Final Engineering Drawings.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
10.4.1 The pipeline component may destroy wetlands or other waters of the U.S	Alt 2, 3, 4, and 5a - Less than Significant
14.4.1 The pipeline component may be inconsistent with the Sonoma County General Plan Open Space Element regarding Community Separator areas.	Alt 2, 3, and 4 - Less than Significant
14.4.2 The pipeline component may be inconsistent with the Sonoma County or City General Plans regarding scenic landscape units.	Alts 2, 3, 4, and 5a - Less than Significant
14.4.3 The pipeline component may be inconsistent with the Sonoma County or City General Plans regarding scenic corridors.	Alts 2, 3, 4, and 5a - Less than Significant
14.4.5 The pipeline component may cause an adverse effect on foreground or middleground views from a high volume highway, recreation use area, or other public use area.	Alts 2, 3, and 5a - Less than Significant Alt 4 - Significant
14.4.6 The pipeline component may cause an adverse effect on foreground or middleground views from one or more private residences.	Alts 2, 3, 4, and 5a - Less than Significant
Alternative/Component	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: During Final Design. Complete: Prior to the beginning of construction.
Monitoring Agency:	City of Santa Rosa
Validation:	The Plan shall be developed prior to certification of the Final Engineering Drawings

2.3.11 Sensitive Resource Conservation Program

Description:

Construction of reservoir sites shall not result in a net-loss of the sensitive resources or the function and value of jurisdictional wetlands. In order to meet this criterion, following Project selection, the City shall prepare and implement a Project-specific Sensitive Resource Conservation Program. The Sensitive Resource Conservation Program will contain elements and measures that upon implementation, will compensate for the loss of biological resources through the creation, restoration and long-term preservation of comparable biological resources.

Creation of habitat and associated ecological communities is possible through building and reconstructing habitats and ecological communities in situations where these habitats and communities previously have not existed or have been historically eliminated. Restoration is the re-establishment of biological and/or physical function in sites where some habitat or community elements remain intact though the habitat or community is highly degraded. Restoration processes replace missing elements and abrogate degrading processes, allowing the biological function of the historic condition to return over time. Preservation is the provision of long-term protection of existing resources.

Due to the nature of each of these mitigation processes (creation, restoration and preservation), the potential for success, and the potential net benefit that each process offers, the compensatory value of each process may differ. Mitigation ratios, (compensatory acreage: impact acreage), will be determined by the functions and values of the impacted resources, the expected functions and values of the future condition of the compensation site and the mitigation processes involved (see Table 2.31).

Many of the biological resources of the reservoir sites, though measurable as separate and distinct units, are functionally inter-related within the local ecosystem. Though the significance of potential impacts was analyzed for each distinct sensitive resource, compensatory mitigation for integrally related resources should be conducted on an ecosystem basis in order to incorporate all related resources into a coordinated and functional whole.

Table 2.3-1 presents the types of sensitive biological resources unavoidably impacted by construction at any of the nine proposed storage reservoir sites (10 proposed storage reservoir configurations) identified in the Project description, and corresponding minimum mitigation obligations.

The mitigation options and ratios presented in Table 2.3-1 are alternatives, which can be combined in order to achieve mitigation for the entirety of the lost sensitive biological resources. The total acreage of creation of new wetland or aquatic habitat will be at least equal to the acreage of Section 404 impacts (fills, excavation, and directly

consequent losses) on jurisdictional wetlands and other waters of the U.S.; with the following exceptions:

- Restoration of cropland to natural wetland habitat conditions, coupled with permanent protection under a conservation easement, will be regarded as habitat creation.
- Where substantial and verifiable lateral expansion of existing wetland habitat along drainage systems can be demonstrated to result from mitigation actions, credit for habitat creation may be deemed to have occurred.

Mitigation Opportunities

There are a variety of opportunities for habitat and community creation, restoration and preservation in Sonoma and Marin counties. Each of the 10 reservoir sites evaluated in this EIR/EIS provide opportunities to implement this measure. Other opportunities are identified in the *Mitigation for Wetlands and Waters of the U.S. for Proposed Reservoir Site* and include:

- Santa Rosa Plain;
- Vernal Pool Preservation Plan;
- Laguna de Santa Rosa;
- Stemple Creek Enhancement Plan; and
- Sonoma Bay Trust Preservation Plan.

Table 2.3-1

Protected or Sensitive Biological Resources Potentially Impacted through Reservoir Construction and Maintenance

Protected or Sensitive Resource	Mitigation Ratios ¹			Target Habitat/Community
	Creation	Restoration	Preservation	
Oak Woodland/ Oak-Bay-Madrone Woodland ²	1:1	1.5:1	2:1	Oak Woodland/ Oak-Bay Madrone Woodland ²
Native Grassland ²	1:1	2:1	3:1	Native Grassland ²
Riparian Woodland/Coolwater B Stream ²	1:1	2:1	3:1	Riparian Woodland/Coolwater A or B Stream/Red-legged Frog Habitat And NW Pond Turtle Habitat ²
Riparian Woodland/Warmwater A Stream/Red-legged Frog Habitat And NW Pond Turtle Habitat ²	1:1	2:1	3:1	Riparian Woodland/Warmwater A Stream/Red-legged Frog Habitat And NW Pond Turtle Habitat ²
Non-wooded Riparian/Warmwater B Stream ²	-	2:1	-	Riparian Woodland/Warmwater A Stream/Red-legged Frog Habitat And NW Pond Turtle Habitat ²
Fresh Water Marsh ²	1:1	2:1	3:1	Fresh Water Marsh ²
Freshwater Ponds/Red-legged Frog And NW Pond Turtle Habitat ²	1:1	2:1	3:1	Fresh Water Marsh/Red-legged Frog And NW Pond Turtle Habitat ²
Freshwater Seep Wetlands Or Other Waters Of The U.S. ²	-	2:1	3:1	Fresh Water Marsh ²
Seasonally Wet Vegetation Wetlands	1:1	2:1	3:1	Seasonally Wet Vegetation Wetlands
Cropped Wetlands Or Other Waters Of The U.S. ²	-	2:1	-	Seasonally Wet Vegetation Wetlands
Drainage Wetlands Or Other Waters Of The U.S. ²	-	2:1	-	Riparian Woodland/Warmwater A Stream
Annual Grassland Wetlands Or Other Waters Of The U.S. ²	-	2:1	-	Seasonally Wet Vegetation Wetlands
All other Wetlands Or Other Waters Of The U.S. ²	-	2:1	-	Riparian Woodland/Warmwater A Stream

Source: Harland Bartholomew & Associates, Inc., 1996

Notes:

1. Subject to change at the discretion of the U.S. Army Corps of Engineers.
2. Resource may contain Corps jurisdictional wetlands or other waters of the U.S.

Preconstruction Surveys

Following Project selection, but prior to construction of a reclamation alternative, qualified biologists shall verify and refine existing biological resource data and mapping associated with the proposed storage reservoir site(s) of the preferred Project. Survey protocols shall be developed through coordination with the appropriate managing and/or regulatory agency(ies). Sensitive biological resources and their associated managing/regulatory agencies are identified in Table 2.3-2. Functional evaluations shall be conducted for all potentially impacted jurisdictional wetlands.

Table 2.3-2

Sensitive Biological Resources and Managing Agency

Sensitive Resource	Managing/Responsible Agency
Oak woodland	CDFG, Sonoma and Marin Counties
Riparian woodland	CDFG
Native grassland	CDFG
Fresh water marsh	USFWS, CDFG, Corps
Aquatic stream and pond habitat	USFWS, CDFG, Corps
California red-legged frog habitat	USFWS, CDFG
Northwestern pond turtle habitat	CDFG
Other Corps jurisdictional wetlands and other waters of the U.S.	Corps, CDFG, USFWS

Source: Harland Bartholomew & Associates, 1996

Identification, Selection and Purchase of Mitigation Site(s)

The City of Santa Rosa shall compile a database of available mitigation opportunities and conduct feasibility studies to evaluate available properties for potential watershed enhancement and restoration. The following site attributes will be considered in the feasibility study:

1. High potential for long-term restoration success;
2. Biological resources of the mitigation site(s) currently or historically;
3. Adequate aerial extent; proximity to impact area;
4. Proximity to other restoration and/or preservation projects;

5. Availability through purchase of deed or long-term conservation easements; and
6. Achievable habitat diversity.

The City shall select mitigation sites in consultation with regulatory and trustee agencies considering the above criteria. To ensure long-term preservation of the restored and created resources, upon selection of the mitigation site(s), the City shall purchase suitable properties in deed or long-term conservation easements.

Following mitigation purchase, qualified professionals shall prepare a site specific Sensitive Resource Conservation Program. The conservation plan shall be based upon the principle of combining physical habitat construction or improvement with appropriate land management and planting in order to facilitate the rapid development of self-sustaining, naturalistic habitat complexes that will retain viability over the lifetime of the Project.

Selected sites will be surveyed to identify sensitive resources that should be considered in the Program including, but not limited to; protected species, sensitive habitats, and jurisdictional wetlands mentioned in this document. Impacts to these resources shall be avoided unless authorization is obtained through the appropriate agency.

The Conservation Program shall contain all elements necessary to ensure successful creation, restoration and preservation of the mitigation site(s) including, but not limited to, the following :

Description of the site, including the soil types, climate, hydrology and existing vegetation;

List of plant species to be used and a map showing where they will be planted;

Number and size of shrubs and trees to be planted;

Description of the extent and method of irrigation, if any;

Methods of propagation, seeding, etc. Specifications for site preparation and installation of plant materials;

Specifications and schedule for on-site care, including amount and application method of fertilizers (if necessary) and use of anti-herbivore netting;

Specifications for long-term plant care and monitoring, including guidelines for replacing plants that fail to establish during the monitoring period;

Long-term land management plan for the site including the limitations on grazing and other resources uses; and

Performance and monitoring criteria that specify a minimum of 80 percent survival rate that must be reached at the end of the first five-year period for the mitigation to be considered successful (subject to change at the discretion of the U.S. Army Corps of Engineers).

Habitat Construction

In some areas, particularly where streams have become excessively entrenched, wetland habitat creation or restoration may include grading in order to increase the frequency of flooding or to decrease the depth to seasonal soil saturation.

Planting

Except for some grass and forb seed that will be needed in quantity for slope stabilization and weed exclusion, plant material shall be limited to native species to the extent that they can be used in restoration, all material of woody and robust rhizomatous riparian species that can be readily transplanted, such as willows, bulrushes, and cattails, shall be salvaged from impact areas and used in restoration. To the extent called for in restoration plans, woody material (such as root wads) needed for stream restoration will also be derived from impact sites. Transplantation of other species shall be considered and addressed in the final restoration plans.

Other native plants will be established primarily from seed, either collected from impact sites or supplied commercially.

Land Management

No grazing shall be permitted in any mitigation areas during the initial five-year establishment period. Subsequently, short-season restoration grazing (such as one to two months in the early season, every third year) may be permitted on a pasture-by-pasture basis, with utilization limited to no more than 15% of woody stems or "light" utilization of herbaceous vegetation.

Access shall be permitted for monitoring, scientific study, and passive recreational use.

Feasibility

Mitigation for unavoidable impacts to U.S. Army Corps of Engineers jurisdictional wetlands shall ultimately be authorized through the individual wetlands fill permit (Section 404, Clean Water Act). Mitigation for the loss of the federally proposed California red-legged frog will be authorized through the Section 7 (Endangered Species Act) consultation with the U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

There are a variety of opportunities for habitat and community creation, restoration and preservations in Sonoma and Marin counties. The current ecological conditions of each of the nine reservoir storage sites evaluated in the EIR/EIS provide opportunities for mitigation (Table 2.3-3). Other alternative mitigation opportunities are further

defined in the *Mitigation for Wetlands and Waters of the U.S. for Proposed Reservoir Sites* (Parsons Engineering Science, Inc. 1996b)

Impacts Mitigated and Mitigation Level:

Impacts Mitigated	Level of Significance After Mitigation
8.5.5 The storage reservoir component may cause loss of sensitive native terrestrial plant communities.	Alts 2 and 3 - Less than Significant
8.5.7 The discharge component may cause permanent loss of sensitive native terrestrial plant communities.	Alt 5a - Less than Significant
9.5.1 The storage reservoir component may cause loss of individual or occupied habitat of federally listed, proposed, or candidate aquatic wildlife or plant species.	Alts 2a, 3a, 3b, 3d and 3e - Less than Significant
9.5.3 The storage reservoir component may cause loss of potential or occupied habitat of aquatic species of concern.	Alts 2a and 2c - Less than Significant
9.5.4 The storage reservoir component may cause permanent loss of sensitive aquatic plant communities and associated wildlife habitats.	Alts 3a - Less than Significant
9.5.5 The storage reservoir component may result in loss of aquatic habitat	Alts 2 and 3a - Less than Significant
9.5.8 The storage reservoir component may cause a change in streamflows, affecting aquatic habitat or aquatic life downstream from proposed dam sites.	Alts 2, 3b, 3c, and 3d - Less than Significant
10.5.1 The storage reservoir component may destroy wetlands or other waters of the U.S.	Alts 2 and 3 - Less than Significant
10.9.1 The discharge component may destroy wetlands or other waters of the U.S.	Alt 5a - Less than Significant

Alternatives/Component: Alternatives 2, 3, and 5a

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** Immediately following construction

Complete: After five years or when performance criteria are met.

Monitoring Agency: City of Santa Rosa, California Department of Fish and Game, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers

Table 2.3-3

Sensitive Biological Resources Identified at Storage Reservoir Sites

Storage Reservoir Site	Oak Woodland Habitat (acres)	Native Grassland (acres)	Mixed Riparian (acres)	Willow Riparian (acres)	Non-wooded Riparian (acres)	Red-legged Frog Habitat (acres)	Jurisdictional Wetlands (acres)	Cool-water Habitat (linear feet)	Warm-water Habitat A (linear feet)	Warm-water Habitat B (linear feet)	Pond (acres)
West County											
Bloomfield	0.6	0.0	1.0	8.7	13.6	2.7	57.4	0.0	0	14,500	1
Carroll Road	0.0	1.0	0.0	17.4	1.1	0.0	68.9	2700	3,400	6,900	3
Huntley	0.0	2.0	1.1	3.5	2.6	1.5	48.3	0	4,100	7,000	>1
Two Rock	58.3	1.3	8.3	7.4	3.0	8.7	61.8	350	6,000	7,700	3
Valley Ford	1.0	0.0	0.0	9.0	3.2	3.4	101.5	0	5,300	4,000	3
South County											
Adobe Road	16.9	0.0	60.2	0.0	3.9	0.0	30.3	0	0	7000	3
Lakeville Hillside	0.0	0.6	0.0	10.6	8.0	1.4	21.6	0	0	10,100	1
Sears Point	6.2	0.0	43.7	15.4	6.4	1.6	52.6	0	5,200	13,100	<1
Tolay Extended	0.0	25.0	4.4	2.4	19	4.8	247.6	0	1,850	27,300	1
Tolay Confined	0.0	23.9	4.4	2.6	18.9	4.8	86.9	0	1,850	12,500	1

Source: Harland Bartholomew & Associates, 1996

Validation: Monitoring shall be established primarily in terms of function and value criteria for jurisdictional waters and habitat goals for all other resources (as appropriate to the habitat types specified in the habitat creation and ecological restoration plans). Habitat goals shall be one element of the functional criteria for jurisdictional waters. In general, such goals are based upon percent aerial or basal cover and vigor of desired woody or herbaceous species rather than on survivorship of planted individuals. For most wetland mitigation habitat types, the success criterion for cover will be a minimum of 80% cover (subject to change at the discretion of the U.S. Army Corps of Engineers) within five years of habitat construction or restoration, however, lower overall cover criteria are appropriate for aquatic habitat incorporating some open water or for drainages that are characteristically partially unvegetated. Habitat criteria for oak woodland and other upland habitats will be primarily comparative, based upon monitoring of appropriate control plots in preserved habitats of those types. Vigor and plant diversity will be monitored but used primarily as a means of identifying appropriate improvements to habitat management or remedial actions for non-performing habitat, rather than as performance criteria.

Post-construction monitoring shall be conducted by a qualified restoration scientist annually for five years. Annual reports shall be submitted to California Department of Fish and Game, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers. If mitigation appears to be failing at any time during the five-year monitoring period, the City will correct or replace the non-effective elements of the mitigation program.

The City shall review annual reports beginning with end of first growing season following construction. Conduct field monitoring on yearly basis or as deemed appropriate. Review annual reports and conduct monitoring annually for five years.

2.3.12 Provide Replacement Water Supply for Affected Wells

Description:

Prior to reservoir construction the City shall conduct a comprehensive well survey and hydrogeologic study at the selected reservoir site. This study shall include the following:

The City shall contact all property owners by mail and collect information about water sources and uses. A field check of all residential properties shall be conducted to accurately identify the location of all domestic wells. Detailed well location, well yield, and water source information shall be collected.

A qualified California Certified Hydrogeologist shall be retained to prepare a detailed, site-specific hydrogeologic investigation of the subbasin of the selected reservoir. This investigation shall serve to verify assumptions used in the groundwater impact evaluation, in Section 4.6 of this EIR/EIS, and to refine the location of the 20 percent or greater contribution zone.

The study shall include installation of an aquifer test well and a minimum of three observation wells located down gradient of the dam and upgradient of the nearest water supply well.

Upon completion of the aquifer tests, all wells shall be maintained as groundwater monitoring wells.

The City shall begin quarterly groundwater monitoring a minimum of one year prior to reservoir filling to establish baseline conditions. Nitrate concentrations shall be measured quarterly in all monitoring wells and compared with baseline measurements.

Should data from the monitoring wells indicate a substantial increase in nitrate levels or exceedence of the MCL of 10 mg/L (where background nitrate levels did not exceed MCLs) that would affect nearby private water supply wells, the City shall:

Develop and provide a replacement water supply for any affected drinking water uses within the 20 percent or greater contribution zone, and in any other areas where nitrate levels exceed the MCL. Replacement water would be provided by a water pipe that would originate at the Laguna Wastewater Treatment Plant. This pipe would be installed at the time of construction, and would occupy the same trench as the reclaimed water pipe from the treatment plant to the reservoir. Potable water pipelines from the reservoir to users would be installed in the same trench as the reclaimed water distribution lines serving irrigation areas. Pipes would be installed with adequate vertical and horizontal separation between potable water and reclaimed water lines to insure that the potable water would be protected. The number of users served, the volume of water replaced, and the size of the

pipes shall be based on projected water quality impacts at individual wells and approval of applicable zoning laws. Because the pipeline would be connected to the City's water supply, only City approval would be required for hook-ups. The City has an adequate water supply to ensure this measure is feasible.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
Impact 5.5.1 The storage reservoir component may degrade groundwater quality at existing wells, resulting in a public health hazard	Alts 2 and 3 - Less than Significant
Impact 5.5.2 The storage reservoir component may degrade groundwater quality at future drinking water wells, resulting in a public health hazard	Alts 2 and 3 - Less than Significant
Impact 7.5.1 The storage reservoir component may expose the public to chemicals, radionuclides, or pathogens at concentrations detrimental to human health..	Alts 2 and 3 - Less than Significant
Alternative/Component:	Alternatives 2 and 3
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	<p>Start: The City shall begin the well survey and hydrogeologic study at least one year prior to reservoir construction to establish baseline conditions. Quarterly groundwater sampling and nitrate analysis shall begin one year prior to filling of the reservoir.</p> <p>Complete: Quarterly groundwater sampling and nitrate analysis shall continue throughout the life of the Project or until all drinking water supplies in affected area have been replaced.</p>
Monitoring Agency:	City of Santa Rosa
Validation:	The City shall conduct an annual review of the groundwater monitoring program throughout the life of the Project unless all drinking water supplies in affected area have been replaced.

2.3.13 Monitor Groundwater Levels and Provide Replacement Water Supply

Description: The City shall monitor the water level of all groundwater wells screened in alluvium that are down gradient from the selected reservoir and within the subbasin. If access can not be obtained to monitor existing wells, then the City shall install several monitoring wells at the nearest upgradient location.

Should water level monitoring indicate that water supply wells may become unproductive as a result of reduced upgradient inflows (not because of seasonal drought conditions) the City shall provide a replacement water supply discussed under Measure 2.312.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Mitigation Level
Impact 5.5.1 The storage reservoir component may lower groundwater levels at existing wells.	Alts 2 and 3 - Less than Significant
Impact 5.5.2 The storage reservoir component may lower groundwater levels in areas that could have been developed for future water supply.	Alts 2 and 3 - Less than Significant

Alternative/Component: Alternatives 2 and 3

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** Monitoring shall begin one year prior to filling the reservoir.

Complete: Monitoring shall be conducted annually until data indicates that wells would not be affected or when a replacement water supply has been provided for all affected wells.

Monitoring Agency: City of Santa Rosa

Validation: The City shall conduct an annual review of the groundwater monitoring program throughout the life of the Project, unless all drinking water supplies in affected area have been replaced.

2.3.14 Update Existing Hazardous Materials Management Plan

Description: The City of Santa Rosa Utilities Department shall amend the Laguna treatment plant's existing Hazardous Materials Management Plan (HMMP) to reflect the average annual increase in usage of liquid chlorine.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
7.2.2 The headworks expansion component may increase potential exposure of the public to hazardous materials due to chemical release.	Alts 2, 3, 4, and 5 - Less than Significant
Alternative/Component:	Alternatives 2, 3, 4, and 5
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa Utilities Department
Timing:	<p>Start: Prior to operation of the proposed Project.</p> <p>Complete: The HMMP shall be updated annually to reflect average annual use of liquid chlorine.</p>
Monitoring Agency:	City of Santa Rosa Fire Department
Validation:	The Fire Department shall review the amended HMMP prior to operation of the proposed Project. Reviews shall be conducted annually, thereafter.

2.3.15 Construction Management Program

Description:

At the conclusion of the design phase, the City of Santa Rosa and the construction manager shall implement a Construction Management Program (Program). To avoid or minimize potential impacts to public health and safety, the Program shall include the following measures:

The Program shall indicate that excavations will be guarded by readily visible barricades, rails or other effective means to prevent access by the public.

The Program shall incorporate Standard Transportation Procedures, Measures 2.2.16 and 2.2.20 which require that local police, public works and fire departments for each jurisdiction (city, county and state) where construction is expected to occur, receive advance notification of construction activities. Local residents and businesses shall also be notified and access shall be maintained. Additionally, where encroachment permits are required (e.g., Caltrans and the Sonoma County Department of Public Works require such permits for work on roadways) this information would be provided as part of the encroachment permit application process.

Prior to construction the City shall hire a Registered Geologist to survey all pipeline alignments for contaminated soil, recording the location, extent, and type of contamination.

In the vicinity of hazardous materials/waste release sites, construction activities related to the Project that require excavation or exposure of soil shall be monitored by the contractor for subsurface contamination. 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.

All potentially contaminated materials encountered during Project construction activities 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 following applicable regulatory agency regulations and/or guidelines. Disposal sites for both remediated and non-remediated soils shall be identified prior to beginning construction. All evaluation, remediation, treatment and/or disposal of

hazardous waste shall be supervised and documented by qualified hazardous waste personnel.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
7.4.2 The pipeline component may be constructed on or within a known hazardous waste site.	Alt 2, 3, 4, and 5a - Less than Significant
7.6.2 The pump station component may be constructed on or within a known hazardous waste site.	Alts 2, 3, and 4 - Less than Significant
7.7.2 The agricultural irrigation component may expose workers or the public to hazards from a known hazardous waste site.	Alts 2 and 3 - Less than Significant
7.8.2 The geysers steamfield component may expose workers or the public to hazards from a known hazardous waste site.	Alt 4 - Less than Significant

Alternative/Component: Alternatives 2, 3, 4, and 5a

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa and Construction Manager

Timing: **Start:** The Construction Management Program shall be developed at the conclusion of the design phase of the proposed Project. Monitoring to ensure implementation of the Program shall begin during the construction mobilization phase.

Complete: Monitoring shall continue throughout construction and cease at the completion of the construction phase.

Monitoring Agency: City of Santa Rosa and California Occupational Safety and Health Administration (Cal-OSHA)

Validation: The Construction Management Program shall be developed prior to construction. Cal-OSHA does not provide regular monitoring services, but may conduct periodic inspections.

2.3.16 Mosquito Prevention Program

Description:

The City shall prevent the creation of mosquito habitat in the storage reservoir. During design of the proposed Project, the City of Santa Rosa shall develop a Mosquito Prevention Program for the storage reservoir. The Program shall ensure that the storage reservoir 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. Measures that shall be incorporated into the Program to meet these criteria include:

The storage reservoir may be of any shape but shall not have small coves or irregularities around its perimeter.

Side slopes shall be as steep as feasible, without jeopardizing slope stability.

The storage reservoir shall have an access ramp constructed on an inside slope for launching a small boat to conduct midge sampling and control.

The Program shall include a maintenance program for weeds and erosion control on the inner slopes of the reservoir.

The Program shall also include biological controls. One such control that may be utilized is stocking the reservoir with mosquito fish (*Gambusia affinis*). Mosquito fish feed on mosquito larvae and are the most common method of biological control.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
7.5.6 The storage reservoir component may increase the potential exposure of the public to disease vectors.	Alts 2 and 3 - Less than Significant
Alternative/Component:	Alternatives 2 and 3
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: The Program shall be developed during the design phase. The City shall begin monitoring during construction of reservoirs for conformance to physical features of reservoir. The City shall monitor monthly when reservoirs are in use.

Complete: Throughout the life of the Project.

Monitoring Agency:

City of Santa Rosa and Marin/Sonoma Mosquito Abatement District

Validation:

The Marin/Sonoma Mosquito Abatement District shall review and approve the Program prior to the beginning of reservoir construction. The District shall review the City's Mosquito Management Program annually.

2.3.17 Pump Station Noise Control

Description:

The City shall retain a qualified noise engineer to assist in the final design of the pump stations. The noise engineer shall be responsible for ensuring that the following noise reduction measures are properly incorporated into the design of the pump stations

Outdoor pump stations that exceed the noise criteria listed in Section 4.13, Noise, shall be designed to include noise barriers to reduce the noise at nearby sensitive receptors. The noise engineer shall ensure that the height and location of these noise barriers are adequate to reduce the noise at nearby sensitive receptors to a level that is within noise criteria established in Section 4.13. Noise barriers may be made of concrete, masonry, noise control panel, or earth berm. Noise barriers provide approximately 10 - 20 dBA noise reduction.

Pump stations that exceed the noise criteria in Section 4.13 by more than 30 dBA shall be designed to be housed in a fully enclosed underground facility. Detailed ventilation noise controls for the underground facility, such as louvers and silencer, shall also be incorporated into the final engineering design. Underground facilities provide approximately 20 - 30 dBA noise reduction.

The design of all pump stations shall be such that all openings, such as for ventilation and doors, shall face away from the sensitive receptors. This provides approximately 10 - 15 dBA noise reduction.

All exterior doors for the pump stations shall be constructed of metal assemblies which are weather-stripped to form an airtight seal when closed. Weather-stripped steel doors provide approximately 3 - 5 dBA noise reduction.

Acoustical louvers shall be used for the pump station housing air ventilation openings. Acoustical louvers provide approximately 5 - 7 dBA noise reduction. As an alternative to the acoustical louvers, the City may utilize an air intake/exhaust plenum ("L" shaped structure) as part of the final engineering design of the Project. This option would provide approximately 7 - 10 dBA noise reduction.

All pump stations shall utilize "low noise motors" for the pump systems. Low noise motors provide approximately 3 - 5 dBA noise reduction.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
13.6.2 Operation of the pump station component may expose the public to high noise levels.	Alts 2, 3, and 4 - Significant
Alternative/Component:	Alternatives 2, 3, and 4
Lead Agency:	City of Santa Rosa

Implementing Agency: Qualified Noise Engineer/City of Santa Rosa

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

Monitoring Agency: City of Santa Rosa

Validation: The City shall review final design plans to ensure all noise control measures have been incorporated.

2.3.18 Identification and Evaluation of Cultural Resources

Description:

Upon selection of a preferred alternative, the treatment of cultural resources to be affected by the Subregional System shall continue to be addressed under the Section 106 process of the National Historic Preservation Act. Consultation to address potential adverse effects will involve, at a minimum, the U. S. Army Corps of Engineers and the City of Santa Rosa (lead agencies) and the State Historic Preservation Officer (SHPO). If necessary, the Advisory Council on Historic Preservation (ACHP) and other parties, if appropriate, may be a part of this consultation process.

A Memorandum of Agreement (MOA) between these parties, executed pursuant to 36 CFR 800.6(c), will set out specific steps for avoiding or reducing harm to cultural resources formally determined eligible to the National Register of Historic Places. The MOA may provide for a phased resource identification, evaluation, and data recovery program.

Phase I - Field survey and study of associated access roads, pump stations, and/or pipelines depicted in the final design of the preferred alternative (elements not previously subject to field survey for the Project). These surveys and cultural resource identifications must be directed by qualified archaeologists/ historians/architectural historians who fulfill the Secretary of the Interior standards, as set forth in 36 CFR Part 1210, Appendix C. These identification studies must be conducted in a manner consistent with 36 CFR Part 1210, Appendix B, and with the recommendations of the SHPO.

Phase II - All prehistoric and historic resources that may be affected by implementation of the preferred alternative shall be evaluated for National Register significance before construction of the alternative may begin. Evaluation for National Register significance will be based on criteria A, B, C, and D, as presented in the Section 106 Guidelines, and the resources' overall integrity of location, setting, use, design, materials, workmanship, feeling, and association must be addressed.

Subsurface testing of a resource is often needed in order to answer questions about an archaeological site's eligibility for the National Register or to obtain data needed to make decisions about how to mitigate Project impacts on a site already determined eligible or placed on the Register. Testing is directed toward determining the site's boundaries, the depth of its deposits, and/or its basic nature and condition. Testing is completed when sufficient information has been gathered to make a determination of eligibility or a management decision (ACHP 1980). The MOA shall set forth guidelines for the testing and the subsequent development of a detailed data recovery work plan (research design).

Phase III - The MOA shall call for the development of a data recovery work plan (research design). This plan shall include the following (ACHP 1980):

- Specification of cultural resources to be studied within the impact area of the preferred alternative;
- Development of pertinent research questions;
- Establishment of study topics, springing from the research questions;
- Establishment of study priorities;
- Definition of data needs for each topic for study; and
- Description of methods to be employed in fieldwork and analysis. Architectural characteristics should be recorded consistent with the standards published by the National Architectural Engineering Record using Historic Architectural Engineering Records (HAER).

The MOA shall provide an opportunity for appropriate technical review of the data recovery work plan, usually by the SHPO, and, where needed, by the ACHP and peer review by outside parties.

Phase IV - The data recovery work plan shall be conducted by qualified personnel (36 CFR Part 1210, Appendix C) and shall meet contemporary professional standards, and the report shall be prepared in accordance with the format standards set forth in 36 CFR Part 1210, Appendix A. Provisions for curation of recovered specimens must be made at a permanent repository meeting the standards set forth in 36 CFR Section 1012.4(a)(1). Data recovery shall be completed prior to the beginning of construction

The MOA shall address the potential to disturb human remains as a result of Project construction. The disposition of Native American burials (human remains) is governed by the provisions of the California Public Resource Code (PRC) Sections 5097.94 and 5097.98, and fall within the jurisdiction of the Native American Heritage Commission. Where human remains are known, or thought likely to exist, consultation with the Native American Heritage Commission shall be initiated by the lead agencies as early in the Project planning process as possible. The Native American Heritage Commission has statutory authority to mediate agreements relative to the disposition of Native American remains. A burial agreement, addressing known burial locations and unidentified burials, shall be developed as part of the MOA prior to any archaeological excavation or ground-disturbing construction.

Additionally, the MOA shall provide for archaeological monitoring to guard against the discovery of unknown and/or buried resources. A qualified archaeologist who meets Secretary of the Interior standards shall conduct in-field monitoring during construction activities in areas of high archaeological sensitivity. In-field monitoring of unknown archaeological resources is discussed under Construction Mitigation Measure 2.4.12, Protect Undiscovered Cultural Resource sites.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
15.4.1 The pipeline component may cause disturbance of potentially eligible National Register properties, including archaeological, historic, architectural, or Native American/traditional heritage resources	Alts 2, 3, 4, and 5a - Less than Significant
15.5.1 The storage reservoir component may cause disturbance of potentially eligible National Register properties, including archaeological, historic, architectural, or Native American/traditional heritage resources	Alts 2 and 3 - Less than Significant
15.6.1 The pump station component may cause disturbance of potentially eligible National Register properties, including archaeological, historic, architectural, or Native American/traditional heritage resources	Alts 2, 3, and 4 - Less than Significant
15.7.1 The agricultural irrigation component may cause disturbance of potentially eligible National Register properties, including archaeological, historic, architectural, or Native American/traditional heritage resources	Alts 2 and 3 - Less than Significant
15.8.1 The geysers steamfield component may cause disturbance of potentially eligible National Register properties, including archaeological, historic, architectural, or Native American/traditional heritage resources	Alt 4 - Less than Significant
Alternatives/Component:	Alternatives 2, 3, 4, and 5a`
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: Upon selection of a preferred alternative.
	Complete: Before commencement of Project construction
Monitoring Agency:	City of Santa Rosa, U.S. Army Corps of Engineers, and State Historic Preservation Officer (SHPO)
Validation:	The City shall not begin construction without concluding Section 106 Consultation with the State Historic Preservation Officer and U.S. Army Corps of Engineers.

2.4 CONSTRUCTION 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.

2.4.1 Removal of Aggregate Resources Prior to Construction

Description: Aggregate resources within the boundaries of the Adobe Road or Two Rock reservoir sites shall be removed to the extent possible and stockpiled outside the reservoir construction zone for use in construction of the reservoir, or other public or private construction projects. The purpose of the removal and stockpiling of the aggregate material is to make the resource available for future use. Aggregate not used in construction of the reservoir shall be moved to a “permanent” storage location within six months of completion of reservoir construction.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
1.5.3. The storage reservoir component may be an incompatible land use type in a designated quarry area.	Alt 2b - Less than Significant Alt 3a - Significant
Alternative/Component	Alternatives 2B and 3A
Lead Agency:	City of Santa Rosa
Implementing Agency:	Construction Manager/City of Santa Rosa
Timing:	Start: At the commencement of reservoir construction. Complete: Prior to completion of construction.
Monitoring Agency:	City of Santa Rosa
Validation:	This measure shall be completed prior to using the reservoir to store reclaimed water.

2.4.2 Remove Weak Surficial Deposits from Reservoir Footprint

Description.

During construction, the construction manager shall ensure that all weak surficial deposits, including all landslide deposits, unconsolidated alluvium and colluvium, and soil shall be excavated and removed from the borrow excavation area.

Slope stabilization measures identified in Measure 2.3.4 shall be incorporated into the borrow excavation plan for the reservoir sites to stabilize the reservoir to the extent feasible

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.5.1 The storage reservoir component may be located within an area of unstable slope conditions.	Alt 2 - Significant
3.5.7 The storage reservoir component may be exposed to damage due to expansive soils.	Alt 2 - Less than Significant

Alternative/Component: Alternative 2

Lead Agency: City of Santa Rosa

Implementing Agency: Construction Manager

Timing: **Start:** During construction of the storage reservoir

Complete: At the completion of storage reservoir construction

Monitoring Agency: City of Santa Rosa, Utilities Department

Validation: The City shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

2.4.3 Standard Engineering Methods for Expansive Soils

Description: Where the detailed pre-design soil analysis (Measure 2.3.6) has identified the presence of expansive soils, the following standard engineering methods shall be used to reduce or eliminate potential impacts from expansive soils:

Removal of native soil and replacement with an engineered fill material that is 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.

Deepening footings or other support structures in the expansive soil to a depth where soil moisture fluctuation is minimized.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.4.7. The pipeline component could be exposed to damage due to expansive soils.	Alts 2, 3, and 4 - Less than Significant
3.5.7. The storage reservoir component may be exposed to damage due to expansive soils.	Alt 2 - Less than Significant
3.6.7. The pump station component may be exposed to damage due to expansive soils.	Alts 2, 3, and 4 - Less than Significant

Alternative/Component: Alternatives 2, 3, and 4

Lead Agency: City of Santa Rosa

Implementing Agency: Construction Manager

Timing: **Start:** During Project construction.

Complete: Upon completion of construction.

Monitoring Agency: City of Santa Rosa, Utilities Department

Validation: The City shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

2.4.4 California Red-legged Frog Capture and Relocation Program

Description: Preconstruction surveys by a qualified biologist (with current California Department of Fish and Game and United States Fish and Wildlife Service Scientific Collector's Permit) to locate and live-trap California red-legged frogs that may be destroyed due to construction of storage reservoirs and associated access roads and ancillary facilities.

A qualified biologist shall relocate and release the red-legged frogs in suitable habitat established in the conservation plan.

A qualified biologist shall monitor the relocated population of red-legged frogs on an annual basis for five years to determine the effectiveness of the mitigation program. The monitoring report should include data on extent and size of the population as well as some index of habitat quality. Annual reports shall be submitted to the City of Santa Rosa and the United States Fish and Wildlife Service (USFWS).

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
9.5.1 The storage reservoir component may cause loss of individuals or occupied habitat of endangered, threatened, or rare aquatic wildlife or plant species.	Alt 2, 3a, 3b, 3d, and 3e - Less than Significant (with Measure 2.3.11)

Alternatives/Component: Alternatives 2 and 3

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing **Start:** Red-legged frog capture and relocation should occur during the active season (i.e., March-May; Mark Jennings, herpetologist, personal communication) prior to storage reservoir construction in the year of construction. First annual report should be submitted at the end of the year of storage reservoir construction.

Complete: Red-legged frog capture and relocation should be completed in March through May prior to storage reservoir construction in the year of construction. Measure will continue for a period of five years.

Monitoring Agency City of Santa Rosa and U.S. Fish and Wildlife Service

Validation: Review annual reports beginning with end of first growing season following construction. Conduct field monitoring on yearly basis or as deemed appropriate. Review annual reports and conduct monitoring annually for five years

2.4.5 Active Raptor Nest Location and Monitoring Program

Description:

Construction of reservoir sites shall not result in the loss of active raptor nests. Preconstruction surveys (April or May) by a qualified wildlife biologist shall be conducted to locate and map all active raptor nests that are within or adjacent (i.e., within 0.25 miles) to proposed storage reservoir construction zone boundaries.

If active raptor nests are located within storage reservoir construction zone boundaries, then construction shall be delayed until the end of the nesting season (April-July) or until the young have fledged (i.e., have attained the power of flight). A qualified wildlife biologist shall monitor the nest to determine when the young have fledged and submit weekly reports to California Department of Fish and Game and the City of Santa Rosa throughout the nesting season.

If active raptor nests are located in the vicinity (i.e., within 0.25 miles) of storage reservoir sites, then a buffer zone shall be established by California Department of Fish and Game around the nest tree to minimize disturbance of the breeding birds. A qualified wildlife biologist shall monitor disturbance of the nesting raptors during construction of the storage reservoir and associated access roads and ancillary facilities.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
8.5.3 The storage reservoir component may cause loss of active raptor nest sites.	Alts 2 and 3 - Less than Significant

Alternatives/Component: Alternatives 2 and 3

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing **Start:** During the raptor nesting season (i.e., April-July) of the year of construction. Prior to the onset of construction, active raptor nest surveys shall be conducted during April or May of the nesting season during the year of construction.

Complete: When all raptor young have fledged (usually by the end of July). If nests are located within or adjacent to the construction zone for proposed storage reservoirs, then monitoring will be complete when the last young raptor has fledged.

Monitoring Agency City of Santa Rosa and California Department of Fish and Game

Validation: Weekly reports will be submitted to California Department of Fish and Game and the City of Santa Rosa. If nest abandonment or early fledging of young is deemed likely, the biologist will contact the

construction manager, the City of Santa Rosa, and California Department of Fish and Game and construction will be stopped within the buffer zone until the young are fledged.

2.4.6 Screen Concrete Diversion Channels, Pump Stations and Other Facilities

Description: The City shall plant drought tolerant, non-invasive shrubs and trees and/or utilize raised berms at concrete diversion channels, pump stations and other facilities to screen views and reduce visual contrast in off-site foreground and middleground views.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
14.5.2 The storage reservoir component may be inconsistent with the Sonoma County or City General Plans regarding scenic landscape units.	Alt 2b - Significant
14.5.3 The storage reservoir component may be inconsistent with the Sonoma County or City General Plans regarding scenic corridors.	Alt 2, 3b, 3c, and 3d - Significant
14.5.5 The storage reservoir component may cause an adverse effect on foreground or middleground views from a high volume highway, recreation use area, or other public use area.	Alt 2d - Significant Alt 2b, 3b, and 3e - Less than Significant
14.5.6 The storage reservoir component may cause an adverse effect on foreground or middleground views from one or more private residences.	Alt 2, 3b, 3c, and 3d - Significant Alt 3e - Less than Significant
14.6.2 The pump station component may be inconsistent with the Sonoma County or City General Plans regarding scenic landscape units.	Alt 4 - Significant Alts 2 and 3 - Less than Significant
14.6.3 The pump station component may be inconsistent with the Sonoma County or City General Plans regarding scenic corridors.	Alts 2d and 4 - Significant Alts 2a, 2b, 2c and 3 - Less than Significant
14.6.4 The pump station component may be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors.	Alts 2d and 4 - Significant Alts 2a, 2b, 2c and 3 - Less than Significant
14.6.5 The pump station component may cause an adverse effect on foreground or middleground views from a high volume highway, recreation use area, or other public use area.	Alt 4 - Significant Alts 2 and 3 - Less than Significant
14.6.6 The pump station component may cause an adverse effect on foreground or middleground views from one or more private residences.	Alts 2, 3, and 4 - Significant

Alternative/Component Alternatives 2, 3, and 4

Lead Agency: City of Santa Rosa

Implementing Agency: Construction Manager

Timing: **Start:** During construction.

Complete: Within one year of completing construction of a Project component.

Monitoring Agency: City of Santa Rosa

Validation: The City shall complete this measure within one year of completing construction of a Project component.

2.4.7 Establish Tree Screening

Description: At the storage reservoir, trees shall be planted in a manner such that the points at which the face of dam joins the valley side slopes are screened and/or partially obscured from off-site foreground and middleground views.

Where reservoir sites may be viewed by residences, the City will coordinate with the affected landowner to provide vegetation screening on the residential property. Vegetation type and viewsheds to be screened shall be at the discretion of the landowner.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
14.5.2 The storage reservoir component may be inconsistent with the Sonoma County or City General Plans regarding scenic landscape units.	Alt 2b - Significant
14.5.3 The storage reservoir component may be inconsistent with the Sonoma County or City General Plans regarding scenic corridors.	Alt 2a, 3a, 3b, 3c, and 3d - Significant
14.5.5 The storage reservoir component may cause an adverse effect on foreground or middleground views from a high volume highway, recreation use area, or other public use area.	Alt 2d - Significant Alts 2b, 3b, and 3e - Less than Significant
14.5.6 The storage reservoir component may cause an adverse effect on foreground or middleground views from one or more private residences.	Alt 2a, 3a, 3b, 3c, and 3d - Significant Alt 3e - Less than Significant
Alternative/Component	Alternatives 2 and 3
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: During construction. Complete: Within one year of completing construction of a Project component.
Monitoring Agency:	City of Santa Rosa
Validation:	The City shall complete this measure within one year of completing construction of a Project component.

2.4.8 Revegetate Face of the Reservoir Dam

Description: The face of the reservoir dam(s) shall be revegetated with drought tolerant, non-invasive grasses (and where appropriate natural groupings of shrubs in which the root systems will not interfere with the structural integrity of the dam) to reduce the visual contrast of the exposed soil and rock face compared to the grassy hillsides.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
14.5.2 The storage reservoir component may be inconsistent with the Sonoma County or City General Plans regarding scenic landscape units.	Alt 2b - Significant
14.5.3 The storage reservoir component may be inconsistent with the Sonoma County or City General Plans regarding scenic corridors.	Alt 2a, 3a, 3b, 3c, and 3d - Significant
14.5.5 The storage reservoir component may cause an adverse effect on foreground or middleground views from a high volume highway, recreation use area, or other public use area.	Alt 2d - Significant Alts 2b, 3b, and 3e - Less than Significant
14.5.6 The storage reservoir component may cause an adverse effect on foreground or middleground views from one or more private residences.	Alt 2a, 3a, 3b, 3c, and 3d - Significant Alt 3e - Less than Significant

Alternative/Component Alternatives 2 and 3

Lead Agency: City of Santa Rosa

Implementing Agency: Construction Manager

Timing: **Start:** During construction.

Complete: Within one year of completing reservoir construction.

Monitoring Agency: City of Santa Rosa

Validation: The City shall complete this measure within one year of completing construction of a Project component.

2.4.9 Construction Noise Control Measures

Description:

The Construction Manager shall ensure that the following construction noise control measures are implemented in order to minimize noise disturbances at sensitive receptors during construction activities:

Newer equipment with improved noise muffling shall be used and all equipment items shall have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational.

All construction equipment shall be inspected weekly to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.).

Wherever possible hydraulic tools shall be used instead of pneumatic impact tools.

Construction activities after 7:00 p.m. or before 7:00 a.m. shall not be allowed within 2,000 feet of residential units, hotels, hospitals, or convalescent homes. Noise generating construction shall also be restricted within 1,600 feet of these facilities on Saturdays, Sundays, and holidays.

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.

Construction staging areas, maintenance yards, and other construction oriented operations shall not be located within 1,600 feet of a sensitive receptor

Where construction would occur within 1,600 feet of schools, the construction manager shall implement measures to insure that construction noise does not interfere with the learning activity of the students. The following noise control measures may be implemented:

Limit construction to non-school hours or weekends.

Utilize temporary noise barriers, as needed, to protect schools from excessive noise levels from construction activities. Noise barriers may be made of heavy plywood, vinyl curtain material, or natural and temporary earthberms.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
13.4.1. Construction of pipeline component may expose the public to high noise levels.	Alts 2, 3, 4, and 5a - Significant
13.4.3. Construction of pipeline component may cause high noise levels from construction traffic.	Alts 2, 3, 4, and 5a - Significant
13.5.1. Construction of storage reservoir component may expose the public to high noise levels.	Alts 2b, 2d, and 3e - Significant Alts 2a and 2c - Less than Significant
13.5.3. Construction of storage reservoir component may cause high noise levels from construction traffic.	Alts 2 and 3 - Significant
13.6.1. Construction of pump station component may expose the public to high noise levels.	Alts 2, 3, and 4 - Significant
13.7.1. Construction of the agricultural irrigation component may expose the public to high noise levels.	Alts 2 and 3 - Significant
16.4.2. The pipeline component may disrupt police, fire, schools, parks and recreation facilities, water, sewage treatment and disposal, or solid waste to such a degree that accepted service standards are not maintained.	Alts 2, 3, and 4 - Less than Significant
Alternative/Component:	Alternatives 2, 3, 4, and 5a
Lead Agency:	City of Santa Rosa
Implementing Agency:	Construction Manager/City of Santa Rosa
Timing:	Start: During Construction. Complete: At the completion of construction.
Monitoring Agency:	City of Santa Rosa
Validation:	The City will perform daily checks to ensure compliance with this measure. The City will respond to complaints from private citizens regarding construction noise within 24 hours.

2.4.10 Vehicle and Equipment Exhaust Control Program

Description:

The City of Santa shall require its contractors to implement mitigation measures to minimize the generation of exhaust emissions from construction vehicles and equipment. These measures consist of the following activities:

Construction vehicles and equipment shall be maintained and tuned at the interval recommended by the manufacturers to minimize exhaust emissions.

Equipment idling shall be kept to a minimum when equipment is not in use. No piece of unused equipment shall idle in one place for more than 30 minutes.

Construction truck trips for trucks using nearby roadways shall be scheduled during non-peak hours to reduce the amount of additional emissions that may be generated due to slower traffic on the affected roadways.

The distance of a trip to and from the construction site shall be kept to the shortest distance possible.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
12.4.1 The pipeline component may exceed emission threshold levels.	NOx emissions for Alts 2 and 3 - Less than Significant
12.5.1 The storage reservoir component may exceed emission threshold levels.	NOx emissions for Alts 2 and 3 - Significant SOx emissions for Alts 2b and 2d - Less than Significant CO emissions for Alts 2b and 2d - Significant
12.8.1 The geysers steamfield component may exceed emission threshold levels.	NOx emissions for Alt 4 - Significant

Alternative/Component: Alternatives 2, 3, and 4

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** Upon commencement of the Project construction.

Complete: Upon completion of Project construction

Monitoring Agency: City of Santa Rosa

Validation: The City of Santa Rosa will monitor the construction manager's compliance on a daily basis at the end of each work day.

2.4.11 Dust Control Program

Description:

The City of Santa Rosa shall require its contractors to implement measures to minimize the generation and transport of construction related fugitive dust. These measures consist of but are not limited to:

Soils exposed by clearing and grubbing, cutting and filling, or other operations, unpaved roads, and material storage piles shall be watered to control dust. Water shall be applied using water trucks or other means as often as necessary to keep surfaces damp. It is recommended that watering shall take place twice a day unless it rains more than one-tenth of an inch in a 24-hour period.

Surfaces that will be exposed for more than 5 working days shall be treated with a chemical dust suppressant.

Clearing of surfaces shall be limited to the area that will be actively worked on.

All trucks transporting dust producing material leaving or entering the site shall be covered, and nearby roadways shall be cleaned regularly to reduce possible fugitive dust emissions outside of the construction area.

The speed of all construction vehicles shall not exceed 25 miles per hour on unpaved surfaces.

Exposed surfaces shall be paved or revegetated as soon as possible (refer to Measures 2.2.8 and 2.2.21).

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
12.4.1 Emissions generated during pipeline construction may exceed threshold levels.	Daily particulate for Alts 2 and 3 - Less than Significant Annual particulate for Alts 3 and 4 - Less than Significant Annual particulate for Alt 2 - Significant
12.5.1 Emissions generated during storage reservoir construction may exceed threshold levels.	Daily particulate for Alts 2 and 3 - Significant Annual particulate for Alts 2 and 3 - Significant

Alternative/Component: Alternatives 2, 3, and 4

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** Upon commencement of Project construction.

Complete: Upon completion of Project construction

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Monitoring Agency:

The City of Santa Rosa and the applicable air district for the construction area, either the Bay Area Air Quality Management District or the Northern Sonoma Air Pollution Control District.

Validation:

The City of Santa Rosa will monitor the construction manager's compliance on a daily basis at the end of each work day.

2.4.12 Protect Undiscovered Cultural Resource Sites

Description:

The City shall retain an archaeological monitor to be present during certain phases of Project construction. The monitor shall be a qualified archaeologist who meets Secretary of the Interior standards and who shall conduct in-field monitoring during construction activities in areas of known resources and areas of high archaeological sensitivity. When the in-field monitor is not present, construction personnel should be made aware of indicators of cultural resources and shall report any encounters to the in-field monitor. In the event of late discoveries, work at the location should cease until the in-field monitor has evaluated the finds and situation and provided recommendations for further procedures.

If human remains are discovered, the county coroner must be notified within 48 hours (CEQA, Appendix K, Part VIII). There shall be no further disturbance to the site where the remains were found. If the remains are Native American, the coroner is responsible for contacting the Native American Heritage Commission within 24 hours. The commission, pursuant to Section 5097.98 of the PRC, shall immediately notify those persons it believes to be the most likely descendants of the deceased Native American. Treatment of the remains will be dependent of the views of the most-likely-descendent.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
15.4.2 The pipeline component may disturb unknown archaeological resources.	Alts 2, 3, 4, and 5a -Less than Significant
15.5.2 The storage reservoir component may disturb unknown archaeological resources.	Alts 2 and 3 -Less than Significant
15.6.2 The pump station component may disturb unknown archaeological resources.	Alts 2, 3, and 4 -Less than Significant
15.7.2. The agricultural irrigation component may disturb unknown archaeological resources.	Alts 2 and 3 -Less than Significant
15.8.2 The geysers steamfield component may disturb unknown archaeological resources.	Alt 4 - Less than Significant
15.9.2 The discharge component may disturb unknown archaeological resources.	Alt 5a - Less than Significant

Alternative/Component: Alternatives 2, 3, 4, and 5

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** Commencement of Project construction.

Complete: Completion of Project construction.

Monitoring Agency: City of Santa Rosa, U.S. Army Corps of Engineers, and State Historic Preservation Officer (SHPO)

Validation: Completion of Project construction.

2.4.13 Protect Vertebrate Paleontologic Resources

Description:

The City of Santa Rosa shall identify a qualified professional paleontologist who will be on call during all phases of construction occurring in areas with a high potential for containing significant fossils. If fossils are unearthed in the course of construction excavation, the contractor shall cease all activity in the area and contact the City and the project paleontologist. The paleontologist will salvage the resource(s) and assess the necessity for further mitigation.

All recovered specimens shall be prepared and stabilized for preservation and shall be identified and cataloged into the retrievable collections of an established institution. Arrangements for adequate storage of specimens recovered during monitoring shall be made at a recognized, non-profit paleontologic specimen repository with a permanent curator. A complete set of field notes, geologic maps, and stratigraphic sections shall accompany the fossil collections. A report summarizing the monitoring and salvage programs shall be prepared by the project paleontologist and submitted to the lead agency and filed at the repository institution.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
15.4.3 The pipeline component may disturb unknown vertebrate paleontologic resources.	Alts 2, 3, 4, and 5a - Less than Significant
15.5.3 The storage reservoir component may disturb unknown vertebrate paleontologic resources.	Alts 2 and 3 - Less than Significant
15.6.3 The pump station component may disturb unknown vertebrate paleontologic resources.	Alts 2 and 3 - Less than Significant
15.7.3 The agricultural irrigation component may disturb unknown vertebrate paleontologic resources.	Alts 2 and 3 - Less than Significant
15.9.3 The discharge component may disturb unknown vertebrate paleontologic resources.	Alt 5a - Less than Significant

Alternative/Component: Alternatives 2, 3, 4, and 5a

Lead Agency: City of Santa Rosa

Implementing Agency: Project Paleontologist

Timing: **Start:** Commencement of Project construction.

Complete: Completion of Project construction.

Monitoring Agency: City of Santa Rosa

Validation: Completion of Project construction.

2.4.14 Coordinate Alternative Fire Response Service

Description: Where pipeline construction occurs immediately in front of a Fire Station and temporarily disrupts emergency response service, the City of Santa Rosa, with the construction manager, shall coordinate with the local Fire Departments to provide backup emergency response service. Coordination and notification shall be conducted in compliance with Measure 2.220.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
16.4.2. The pipeline component may disrupt police, fire, schools, parks and recreation facilities, water, sewage treatment and disposal, or solid waste to such a degree that accepted service standards are not maintained.	Alts 2, 3, and 4 - Less than Significant

Alternative/Component:	Alternatives 2, 3, 4, and 5
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa/Construction Manager
Timing:	<p>Start: During pipeline construction.</p> <p>Complete: Completion of pipeline construction.</p>
Monitoring Agency:	City of Santa Rosa
Validation:	Completion of pipeline construction

2.4.15 Sensitive Plant Relocation Program

Description: Seeds of hayfield tarplant or bristly linanthus, and Lobb's aquatic buttercup populations shall be collected and reestablished in mitigation sites developed as a result of the Sensitive Resource Conservation Program.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
8.2C. Cumulative projects impacts may cause loss of individuals of CNPS List 2, 3, or 4 plant species.	Alt 3 - Less than Significant

Alternative/Component: Alternative 3

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** During construction.

Complete: Completion of construction.

Monitoring Agency: City of Santa Rosa

Validation: This measure will be completed in conjunction with Measure 2.3.11, Sensitive Resource Conservation Program.

2.4.16 Ecological Risk Monitoring and Source Control Program

Description:

A monitoring plan shall be undertaken to collect additional toxicity data (Kelley Ponds, Russian River) over a two-year period. The data shall be used in an ecological risk assessment to determine if the existing system, the Project, and cumulative project discharges will result in an EQ exceeding 10 for great blue heron in the Laguna or for harbor seals in the Russian River. If it is determined that the EQ for great blue heron or harbor seals exceeds 10, then the City shall undertake a program to reduce the cumulative EQ for aluminum to less than 3.2. The risk assessment process utilizes assumptions about exposure, bioaccumulation, and toxicity. The process is intended to be step-wise, as potential impacts are identified with conservative assumptions. The standard risk assessment procedure involves reviews of assumptions and refinement of the analysis, as is described for this mitigation measure.

Aluminum in effluent is likely derived primarily from the addition of alum (aluminum sulfate) to enhance solids removal and disaffection. Options for reducing aluminum in effluent include substituting ferric chloride or an organic polymer for alum during treatment and identifying primary sources (aside from treatment) and implementing a control program.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
8.7C. Cumulative impacts may result in ecological risk to plant and wildlife populations.	Alt 5 - Less than Significant

Alternative/Component:	Alternative 5
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: During pipeline construction. Complete: Completion of pipeline construction.
Monitoring Agency:	City of Santa Rosa
Validation:	Completion of pipeline construction

2.5 OPERATION AND MAINTENANCE MEASURES

This section contains mitigation measures to be implemented during operation of the proposed Project. These measures generally require monitoring of system operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with these measure would result in the reduction of adverse environmental impacts.

2.5.1 Pesticide Control Program

Description:

The City shall annually evaluate analytical developments for EPA-approved methods for acrolein, chlorpyrifos, demeton, guthion (azinphos-methyl), malathion, parathion, and toxaphene. Routine analytical detection limits provided by EPA-approved analytical methods are above the evaluation criteria for acrolein, chlorpyrifos, demeton, guthion (azinphos-methyl), malathion, parathion, and toxaphene, and therefore a definitive analysis of these constituents is not presently feasible. When new technologies or methodologies result in lowering the detection limits below the evaluation criterion, the City shall conduct a definitive analysis of these constituents. The analysis shall be conducted monthly in plant effluent.

If any three consecutive samples or annual average of any of these constituents are found to exceed water quality criteria, a source identification program shall be implemented by the City within 30 days. If any monitoring of these constituents in storage ponds shows that the concentration is lower than in plant effluent and the respective water quality criterion would not be exceeded as a result of discharge, then a source control identification program would not need to be implemented. These constituents are generally found in pesticides for home use. This identification control program shall include, at a minimum, investigation into the source(s) of the constituent. This would begin with potential commercial and industrial sources. If commercial and industrial sources do not fully account for the observed concentration, residential source(s) would be assumed and a public education program would be implemented. The public education program would be developed and implemented to alert the public to the sources of the problem constituents (e.g., brand names). The program could include print, video, or workshop media, and would contain information on proper application and disposal methods, and suggest alternatives to pesticides. Successful pesticide control programs are being implemented by Central Contra Costa Sanitary District, and the City and County of San Francisco (Water Pollution Prevention Program).

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
6.9.1 Acrolein, chlorpyrifos, demeton, guthion (azinphos-methyl), malathion, parathion, and toxaphene. The discharge scenarios may cause numeric-based criteria to be exceeded	Design Discharge - Less than Significant
Alternative/Component	Direct Discharge Alternatives
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	<p>Start: The City shall begin their annual review of detection methodologies upon Certification of the EIR, and begin its monthly analysis within thirty days of a measurable drop in the detection limits. The source control program shall be implemented within 60 days of a third consecutive violation of the evaluation criteria.</p> <p>Complete: These programs shall be ongoing</p>
Monitoring Agency:	City of Santa Rosa and Regional Water Quality Control Board
Validation:	The Board shall review City's compliance to this measure annually upon Certification of the EIR

2.5.2 Control Program for Dissolved Copper Levels

Description:

The City shall initially limit design irrigation acreage to 4,500 acres in the Stemple watershed and begin monitoring for dissolved copper. Irrigation shall be limited to 360 acres in the subwatershed in which the Bloomfield reservoir is proposed. These acreage limitations are based on the estimated maximum acreage that may be irrigated without causing the dissolved copper point of significance to be exceeded. The City shall monitor streams in the Stemple and Americano watersheds monthly for dissolved copper and hardness. Adjustments may be made to the allowable design and contingency irrigation acreage depending on the monitoring results for dissolved copper concentration and receiving water hardness.

Significant impacts from dissolved copper in surface waters of West County have been identified as a potential impact of design and contingency (winter) irrigation. The finding of significance for copper was based on key assumptions about the concentration of copper in reclaimed water and the hardness of surface waters to which irrigation-affected groundwater would discharge

The concentrations of dissolved copper in Americano and Stemple Creeks and their tributaries with irrigation were estimated using an average reclaimed water concentration of dissolved copper from 1991 through January 1995 (0.010 mg/L) (Merritt Smith Consulting 1996a). In September 1995, the Sonoma County Water Agency began balancing the pH in drinking water for the purposes of reducing corrosion in water supply pipes. Reducing corrosion of copper water supply pipes could reduce the concentration of dissolved copper in reclaimed water. The average concentration of copper in reclaimed water since September 1995 is 0.08 mg/L (n = 2 samples), indicating a potential long-term reduction in dissolved copper (Merritt Smith Consulting 1996a). Therefore, the concentration of dissolved copper in irrigation water may also be reduced.

The point of significance for copper increases as hardness increases. Based on pre-Project monitoring of West County streams, a hardness of 130 mg/L was used for our evaluation. This hardness yielded a point of significance for dissolved copper in West County streams of 14 µg/L. Thus, a monitoring program for copper and hardness will provide the basis for any adjustments of the allowable irrigation acreage.

The results of the pre-Project analysis of contingency (winter) irrigation impacts indicate that contingency irrigation would have a significant impact on dissolved copper in creeks throughout the Stemple and Americano irrigation areas in the dry season. Contingency irrigation is not expected to have a significant impact on dissolved copper during the wet season based on the pre-Project monitoring. Significance of contingency irrigation impact is very sensitive to the hardness and dissolved copper concentrations that result from irrigation. Therefore, mitigation is identified that allows contingency irrigation in the Stemple and Americano irrigation areas

only as indicated by data collected on the effects of design irrigation, as described in the following paragraph.

The City shall not contingency irrigate any lands in the Stemple or Americano irrigation areas prior to collection of dissolved copper and hardness data (in association with design irrigation specified above), and an evaluation of the data to calculate the appropriate contingency irrigation acreage to avoid significant impacts. Contingency irrigation of the indicated acreage could be initiated if the results of the evaluation indicate impacts on dissolved copper would be less than significant. Monitoring of contingency irrigation impacts shall be conducted to verify the impacts analysis that is based on the post-design irrigation monitoring data.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
6.7.1 Dissolved copperThe agricultural irrigation component may causenumeric-based criteria to be exceeded	Alt 3 and Alt 3 Contingency - Less than Significant
Alternative/Component	West County and ContingencyIrrigation
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: Prior to any West County contingency irrigation Complete: Ongoing until RWQCB determines that hardness has been adequately characterized and copper exceedencesare avoided.
Monitoring Agency:	City of Santa Rosaand Regional Water Quality Control Board
Validation:	This measure shall be ongoing until RWQCB determines that hardness has been adequately characterized and copper exceedences are avoided.

2.5.3 Control Program for Hydrogen Sulfide, Ammonia, and Dissolved Oxygen

Description:

The City shall implement a Monitoring and Control Program to ensure that reservoir seepage potentially contaminated with elevated levels of hydrogen sulfide and ammonia, and reduced dissolved oxygen levels do not reach surface waters immediately downstream of the reservoirs.

The City shall monitor the storage reservoir(s) monthly for stratified conditions by measuring the vertical temperature profile of the reservoir. If stratification is observed, water samples from the lower layer of the reservoir shall be collected immediately and monthly thereafter. These samples shall be analyzed for hydrogen sulfide, ammonia, and dissolved oxygen.

The City shall also collect surface water samples and shallow groundwater samples downstream of the reservoir(s). These samples shall be collected monthly and analyzed for hydrogen sulfide, ammonia, pH, total dissolved solids, and dissolved oxygen. Monitoring for pH and total dissolved solids will allow determination of un-ionized ammonia, the toxic form of ammonia.

If monitoring indicates that evaluation criteria are exceeded for any of the constituents, the City shall implement the following measure to ensure that contaminated seepage is not reaching surface waters:

The City shall install a system of wells between the reservoir(s) and downstream receiving waters that will be operated to intercept shallow groundwater seeping from the storage site. Intercepted groundwater will be returned to the storage reservoir. This measure could increase groundwater depletion below the reservoir, but mitigation for this impact is already included in Measure 2.313.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
6.5.1 Hydrogen sulfide The storage reservoir component may cause numeric-based criteria to be exceeded	Alts 2a, 2c, 2d, and 3 - Less than Significant
6.5.1 Ammonia The storage reservoir component may cause numeric-based criteria to be exceeded	Alts 2a, 2c, 2d, and 3 - Less than Significant
6.5.1 Dissolved oxygen The storage reservoir component may cause numeric-based criteria to be exceeded	Alts 2a, 2c, 2d, and 3 - Less than Significant

Alternative/Component Alternatives 2 and 3

Lead Agency: City of Santa Rosa

Implementing Agency: City of Santa Rosa

Timing: **Start:** Immediately after reservoir(s) receive reclaimed water

Complete: Ongoing until RWQCB determines that reservoir and downstream conditions have been adequately characterized relative to hydrogen sulfide, ammonia, and dissolved oxygen.

Monitoring Agency: City of Santa Rosa and Regional Water Quality Control Board

Validation: This measure shall be ongoing until RWQCB determines that reservoir and downstream conditions have been adequately characterized relative to hydrogen sulfide, ammonia, and dissolved oxygen.

2.5.4 Discharge Operations

Description:

The City shall revise discharge operations to reduce the effects of reclaimed water on waterways. The Mitigation Discharge Operating Scenario is defined by the monthly storage objective in Table 2.5-1 and emphasizes winter discharge and reduced fall and spring discharge. The monthly storage objectives shall be used as the basis for managing discharge associated with a 20 percent design discharge (Laguna or River) and geysers discharge component. In addition, discharge at Meadowlane Pond and other locations shall be minimized in favor of discharge at Delta Pond consistent with assumptions about operations upon which the impacts assessment was based

Table 2.5-1

Monthly Storage Objectives for Mitigation of Design Discharge Impacts^d

	20 Percent		Geysers	
	Project Operations ^b	Mitigation Operations ^c	Project Operations ^b	Mitigation Operations ^c
1 November	311	774	92	92
1 December	444	1079	98	98
1 January	552	839	191	200
1 February	635	600	498	350
1 March	767	360	679	500
1 April	972	120	1045	800
1 May	1139	825	1203	1150
15 May	1200	1200	1184	1184

Source: *Water Balance Summary and Model - Overall Results* (based on latest estimate of ADWF), (Parsons Engineering Science, Inc. 1996c) and *Russian River Water Quality Monitoring Results* (Merritt Smith Consulting 1996d)

^a units = million gallons

^b Monthly storage objectives implicit in the Project description

^c Monthly storage objective for mitigation operations

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
6.9.2 Algal Growth Discharge scenarios may cause narrative-based criteria to be exceeded	All alternatives - Significant
6.9.2-Turbidity. Discharge scenarios may cause narrative -based criteria to be exceeded	Alt 5a Design Discharge - Less than Significant Alt 5 Contingency Discharge - Significant
Alternative/Component	All Alternatives
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: Prior to Project-related reclaimed water discharges. Complete: Ongoing.
Monitoring Agency:	City of Santa Rosa and Regional Water Quality Control Board
Validation:	Compliance with this measure shall be required prior to Project-related reclaimed water discharges.

2.5.5 Cyanide Monitoring and Source Control Program

Description:

The City shall implement a Cyanide Monitoring and Source Control Program to verify that the concentration of cyanide in storage ponds will not cause a significant impact if discharged and, if necessary, identify and control the source of cyanide as needed to avoid exceeding the cyanide point of significance in receiving waters

The concentration of cyanide in plant effluent exceeds the point of significance for cyanide and, if discharged directly, would cause significant impacts to the Laguna and Santa Rosa Creek. However, reclaimed water is typically stored prior to discharge. Existing data from reclaimed water storage ponds (Delta and Meadowlane Ponds) indicate that, with storage, cyanide volatilizes and/or complexes with other compounds. The total cyanide concentration in stored reclaimed water was below detection and less than the point of significance for cyanide. Thus, monitoring may show that the cyanide concentration in pond discharge would not cause the point of significance to be exceeded, in which case source identification and reduction would be unnecessary.

The City shall implement a cyanide monitoring program to verify that the concentration of cyanide in storage ponds will not cause a significant impact if discharged. The concentration below which no impact will occur will be determined for the selected discharge alternative according to the methods for conservative constituents described in the *Water Quality Impacts Analysis* Technical Report (Merritt Smith Consulting 1996b). Monitoring shall be done on a bi-weekly basis in Delta and Meadowlane Ponds.

If the concentration of total cyanide in a storage pond exceeds the concentration determined to cause a significant impact for three consecutive samples or if the annual average total cyanide concentration in a storage pond exceeds the concentration determined to cause a significant impact, the City shall implement a cyanide source control program. Typical cyanide sources include processes such as metal-cleaning and electro-plating baths, gas scrubbers, gas works, coke ovens, and other chemical treatments

The program shall include, at a minimum, the following:

- Identification of industrial facilities that use cyanide and discharge to the City sewer system

- Sampling of the quality of wastewater produced by any such facilities.

- Development and enforcement of limits for industrial dischargers of cyanide as needed to avoid exceeding the cyanide point of significance in receiving waters

The cyanide source identification and control process shall be consistent with EPA pretreatment program guidance and regulations.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
6.9.1 Cyanide Discharge scenarios may cause numeric-based criteria to be exceeded	Alt 5b Design Discharge - Less than Significant Alt 5b Contingency Discharge - Less than Significant
Alternative/Component:	Discharge and 20 percent design and contingency discharge to the Laguna components
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: The City is currently monitoring for cyanide. The source control plan will be implemented immediately when exceedences are discovered Complete: Ongoing
Monitoring Agency:	City of Santa Rosa and Regional Water Quality Control Board
Validation:	The City will continue monitoring for cyanide throughout the life of the Project. The source control plan will be implemented immediately when exceedences are discovered

2.5.6 Total and Ammonia Nitrogen Source Control Program

Description:

The Subregional System members shall implement a Total and Ammonia Nitrogen Source Control Program.

The Program shall reduce the annual total nitrogen load to the Laguna by 159,000 pounds/year (a reduction from the current load of 424,700 pounds/year), and the annual ammonia nitrogen load to the Laguna by 21,500 pounds/year (a reduction from the current load of 56,610 pounds/year). See Tables 4-23 and 4-24 in the *Water Quality Impact Analysis Report* (Merritt Smith Consulting 1996b) for summaries of the load reduction goals for the Laguna.

The Program shall consist of implementing specific control measures which may include:

Manure management practices such as: separating clean rainfall runoff from water contaminated with manure, containing solids and waste liquids, and fencing waterways (Gold Ridge 1995). Additional practices considered feasible are described in the *Irrigation Management Guidelines* Technical Memorandum (Questa 1996).

Control of specific non-Subregional System sources such as: urban stormwater runoff, septic systems, and agricultural runoff (RWQCB 1995)

To the extent that additional load reduction is needed beyond that which can be achieved at non-Subregional System sources, total and ammonia load reduction may be implemented at the Laguna treatment plant, or in wetlands constructed or restored for the purpose of ammonia and total nitrogen removal. Nitrogen removal in the treatment plant to a final reclaimed water concentration of approximately 7 mg-N/L without any control of non-Subregional System sources would meet the load reduction requirement. This level of removal is considered feasible based on engineering analysis of the Laguna treatment plant (CH2M HILL 1995). The feasibility of ammonia and total nitrogen removal is documented in the *Treatment Wetlands Evaluation* Technical Report (Merritt Smith Consulting 1996c).

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
6.9.2- Total Nitrogen Waste Reduction Strategy Discharge scenarios may cause narrative-based criteria to be exceeded	Design Discharge - Less than Significant
6.9.2- Ammonia Nitrogen Waste Reduction Strategy. Discharge scenarios may cause narrative-based criteria to be exceeded	Design Discharge - Less than Significant
Alternative/Component	Alternative 5b

Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: Prior to Project-related reclaimed water discharges. Complete: Ongoing, as long as the Waste Reduction Strategies in the Laguna are exceeded.
Monitoring Agency:	City of Santa Rosa and Regional Water Quality Control Board
Validation:	Compliance with this measure shall be required prior to Project-related reclaimed water discharges.

2.5.7 Toxicity Control Program

Description:

The City shall implement a Toxicity Control Program. This program shall consist of increased monitoring, toxicity identification and reduction and is recommended regardless of which alternative is implemented. The Subregional System is currently required to monitor for chronic toxicity quarterly during the discharge season. At such time that lethal toxicity is observed in reclaimed water, the City shall increase sampling frequency to biweekly (every two weeks) until three tests have been conducted (the original quarterly test plus two biweekly tests). Tests shall be conducted as described in EPA (1991a), or as otherwise ordered by the Regional Board.

If lethal toxicity is observed consistently in the three samples, then a toxicity identification evaluation (as described in EPA 1991b, EPA 1993a, b) shall be conducted. The purpose of the toxicity identification evaluation is to identify the reclaimed water constituent(s) that are causing the toxicity. The reason that a toxicity identification evaluation is not appropriate after the first observation of lethal toxicity is that evaluation success is dependent on the presence of lethal toxicity. After the toxicity identification evaluation provides conclusive evidence of the toxic constituent(s), then sources of the constituent(s) shall be identified and controlled by a toxicity reduction evaluation (as described in EPA 1989a) so that lethal toxicity is not observed in reclaimed water.

The toxicity identification evaluation/toxicity reduction evaluation process has been documented to successfully identify and control toxicity-causing constituents in effluents exhibiting consistent toxicity (EPA 1989a, EPA 1991b, EPA 1993a, b). Therefore, this mitigation measure is considered to be effective.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
6.9.2-Toxicity (lethal effects). Discharge scenarios may cause the narrative-based criteria to be exceeded.	Design Discharge - Less than Significant Contingency Discharge - Less than Significant
Alternative/Component	Alternative 5b
Lead Agency:	City of Santa Rosa
Implementing Agency:	City of Santa Rosa
Timing:	Start: Prior to Project-related reclaimed water discharges. Complete: Ongoing.
Monitoring Agency:	City of Santa Rosa and Regional Water Quality Control Board
Validation:	Compliance with this measure shall be required prior to Project-related reclaimed water discharges.

2.5.8 Monitor Seismic Events and Adjust Injection Rates

Description:

Before injection of reclaimed water to the geysers steamfield begins, the local seismographic station network maintained by the geysers operators (Unocal-NEC-Thermal) shall be upgraded to focus instrumental coverage around the wells proposed for injection. Accelerograph stations shall be added in Cobb and Anderson Springs to allow operators to determine relationships between seismic events within the geysers steamfield and felt effects in nearby communities. Software shall be improved to enable routine automated locating and mapping of epicenters of seismic events and analysis of data.

The geysers operators shall analyze this data and determine which injection wells are more susceptible to felt induced seismicity. Injection shall be decreased at wells that produced higher levels of induced seismicity and more water shall be shunted to other well sites that produce fewer seismic events. The total volume of water injected shall remain the same.

Quarterly reports shall be prepared by the geysers operators and submitted to the City. Reports shall include plots of daily volumes of injection at each well, tables and plots of seismicity located within an agreed control radius of the well (e.g. 1 km), and planned operational responses. Success of redistribution of water and any other modifications in operations in reducing felt seismic events shall be continually evaluated so that the program can be fine tuned.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
3.8.4 The geysers steamfield component may induce seismicity.	Alt 4 - Less than Significant.
Alternative/Component:	Alternative 4
Lead Agency:	City of Santa Rosa
Implementing Agency	Geysers Operators
Timing:	<p>Start: The improvements to the monitoring network and the implementation of reporting forms for local residents shall be implemented before injection of reclaimed water begins.</p> <p>Complete: Monitoring and adjustment of operations shall continue throughout the life of the Project</p>
Monitoring Agency:	<p>The City of Santa Rosa will monitor operations. The City may retain an independent expert to evaluate the significance of the reported effects in the community and compare them to the findings of the quarterly injections operations and seismological monitoring reports.</p>

Validation:

Quarterly reports shall be prepared by the geysers operators and submitted to the City. Quarterly reports shall be available for public review at the City of Santa Rosa.

2.5.9 Implement Septic System Monitoring and Replacement Program

Description: The City shall coordinate with the Sonoma County Environmental Health Department to monitor septic systems located down gradient of the selected reservoir site. If monitoring indicates that reservoir construction has adversely affected septic system operation or environmental health and safety, then systems shall be replaced with non-conventional systems, such as a mound system, that can operate effectively in shallow groundwater conditions.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
5.5.3 The storage reservoir component may cause groundwater mounding or increase groundwater levels that cause surface discharge in a non-stream environment.	Alt 3 - Less than Significant
Alternative/Component:	Alternative 3
Lead Agency:	City of Santa Rosa
Implementing Agency	City of Santa Rosa
Timing:	Start: Prior to construction of reservoir.
	Complete: Ongoing, throughout the life of the Project.
Monitoring Agency:	City of Santa Rosa and Sonoma County Environmental Health Department.
Validation:	Monitoring shall be conducted quarterly throughout the life of the Project.

2.5.10 Discharge Prohibition During Flood Stage

Description: The Subregional System shall not discharge when the water surface elevation at the Hacienda gage is greater than 31 feet (one foot less than the flood stage).

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
4.4C. Cumulative discharge impacts may cause flooding in the Russian River and the Laguna.	All Alts - Less than Significant

Alternative/Component: All Alternatives

Lead Agency: City of Santa Rosa

Implementing Agency City of Santa Rosa

Timing: **Start:** At Project startup.

Complete: Ongoing, throughout the life of the Project.

Monitoring Agency: City of Santa Rosa

Validation: The City shall maintain daily records of operations and river flow.

2.6 SUMMARY OF MITIGATION MEASURES BY ALTERNATIVE

Table 2.6-1 provides a summary of the mitigation measures to be implemented for each alternative.

Table 2.6-1

Summary of Mitigation Measures by Alternative

Mitigation Measure	Alternative											
	2a	2b	2c	2d	3a	3b	3c	3d	3e	4	5a	5b
2.2 Measures Included in the Project												
2.2.1 Irrigation Conservation and Management Programs	X	X	X	X	X	X	X	X	X			
2.2.2 Irrigation Site Resource Maps	X	X	X	X	X	X	X	X	X			
2.2.3 Restrict Surface and Subsurface Irrigation Water Runoff	X	X	X	X	X	X	X	X	X			
2.2.4 Restrict Soil Erosion and Sediment Movement	X	X	X	X	X	X	X	X	X			
2.2.5 Avoid Sensitive Biological Resources	X	X	X	X	X	X	X	X	X	X	X	
2.2.6 Agrochemical and Fertilizer Best Management Practices	X	X	X	X	X	X	X	X	X			
2.2.7 Prohibit Creation of Mosquito Habitat	X	X	X	X	X	X	X	X	X			
2.2.8 Revegetate Temporarily Disturbed Sites	X	X	X	X	X	X	X	X	X	X	X	
2.2.9 Retain Stripped Topsoil	X	X	X	X	X	X	X	X	X	X	X	
2.2.10 Storm Water Pollution Prevention Plan	X	X	X	X	X	X	X	X	X	X	X	
2.2.11 Protect Creeks from Toxic Discharge	X	X	X	X	X	X	X	X	X	X	X	
2.2.12 Concrete Waste Management	X	X	X	X	X	X	X	X	X	X	X	
2.2.13 Pipeline Features in Active Fault Zones										X		
2.2.14 Dam Safety	X	X	X	X	X	X	X	X	X			
2.2.15 Standard Traffic Control Procedures	X	X	X	X	X	X	X	X	X	X	X	

Table 2.6-1

Summary of Mitigation Measures by Alternative

Mitigation Measure	Alternative											
	2a	2b	2c	2d	3a	3b	3c	3d	3e	4	5a	5b
2.2.16 Emergency Response Vehicles Will Not be Impeded	X	X	X	X	X	X	X	X	X	X	X	
2.2.17 Maintain Maximum Number of Open Lanes on Roadways	X	X	X	X	X	X	X	X	X	X	X	
2.2.18 Jack and Bore Construction at Major Highways	X	X	X	X	X	X	X	X	X	X	X	
2.2.19 Fence or Cover Trenches	X	X	X	X	X	X	X	X	X	X	X	
2.2.20 Access to Businesses and Residences	X	X	X	X	X	X	X	X	X	X	X	
2.2.21 Repair Road Damage	X	X	X	X	X	X	X	X	X	X	X	
2.2.22 Park Within Construction Easements	X	X	X	X	X	X	X	X	X	X	X	
2.2.23 Limit Delivery Hours	X										X	
2.2.24 Limit Ingress/Egress of Construction Equipment	X	X	X	X	X	X	X	X	X	X	X	
2.2.25 Minimize/Reduce Fossil Fuel Consumption	X	X	X	X	X	X	X	X	X	X	X	
2.2.26 Odor Control for Sludge Handling	X	X	X	X	X	X	X	X	X	X	X	X
2.2.27 Uniform Relocation Assistance	X	X	X	X	X	X	X	X	X			
2.3 Planning Measures												
2.3.1 Replacement of Open Space Easements										X		
2.3.2 Restrict Approval of Agricultural Irrigation Contracts	X	X	X	X	X	X	X	X	X			
2.3.3 Agricultural Irrigation Demonstration Programs	X	X	X	X	X	X	X	X	X			
2.3.4 Slope Stabilization Design	X	X	X	X	X	X	X	X	X	X		
2.3.5 Liquefaction Stabilization Design	X	X	X	X	X	X	X	X	X	X	X	

Table 2.6-1

Summary of Mitigation Measures by Alternative

Mitigation Measure	Alternative											
	2a	2b	2c	2d	3a	3b	3c	3d	3e	4	5a	5b
2.3.6 Standard Engineering Methods for Corrosive Soils	X	X	X	X	X	X	X	X	X			
2.3.7 Slope Monitoring and Response System	X	X	X	X	X	X	X	X	X	X		
2.3.8 Earthquake Preparedness and Emergency Response Program	X	X	X	X	X	X	X	X	X	X		
2.3.9 Adjust Pipeline Alignments	X	X	X	X	X	X	X	X	X	X	X	
2.3.10 Limit Construction Disturbance	X	X	X	X	X	X	X	X	X	X	X	
2.3.11 Sensitive Resource Conservation Program	X	X	X	X	X	X	X	X	X		X	
2.3.12 Provide Replacement Water Supply for Affected Wells	X	X	X	X	X	X	X	X	X			
2.3.13 Monitor Groundwater Levels and Provide Replacement Water Supply	X	X	X	X	X	X	X	X	X			
2.3.14 Update Existing Hazardous Materials Management Plan	X	X	X	X	X	X	X	X	X	X	X	X
2.3.15 Construction Management Program	X	X	X	X	X	X	X	X	X	X	X	
2.3.16 Mosquito Prevention Program	X	X	X	X	X	X	X	X	X			
2.3.17 Pump Station Noise Control	X	X	X	X	X	X	X	X	X	X		
2.3.18 Identification and Evaluation of Cultural Resources	X	X	X	X	X	X	X	X	X	X	X	
2.4 Construction Measures												
2.4.1 Removal of Aggregate Resources Prior to Construction		X			X							

Table 2.6-1

Summary of Mitigation Measures by Alternative

Mitigation Measure	Alternative											
	2a	2b	2c	2d	3a	3b	3c	3d	3e	4	5a	5b
2.4.2 Remove Weak Surficial Deposits from Reservoir Footprint	X	X	X	X								
2.4.3 Standard Engineering Methods for Expansive Soils	X	X	X	X	X	X	X	X	X	X		
2.4.4 California Red-legged Frog Capture and Relocation Program	X	X	X	X	X	X		X	X			
2.4.5 Active Raptor Nest Location and Monitoring Program	X	X	X	X	X	X	X	X	X			
2.4.6 Screen Concrete Diversion Channels, Pump Stations and Other Facilities	X	X	X	X	X	X	X	X	X	X		
2.4.7 Establish Tree Screening	X	X		X	X	X	X	X	X			
2.4.8 Revegetate Face of the Reservoir Dam	X	X		X	X	X	X	X	X			
2.4.9 Construction Noise Control Measures	X	X	X	X	X	X	X	X	X	X	X	
2.4.10 Vehicle and Equipment Exhaust Control Program	X	X	X	X	X	X	X	X	X	X		
2.4.11 Dust Control Program	X	X	X	X	X	X	X	X	X	X		
2.4.12 Protect Undiscovered Cultural Resource Sites	X	X	X	X	X	X	X	X	X	X	X	
2.4.13 Protect Vertebrate Paleontologic Resources	X	X	X	X	X	X	X	X	X	X	X	
2.4.14 Coordinate Alternative Fire Response Service	X	X	X	X	X	X	X	X	X	X		
2.4.15 Sensitive Plant Relocation Program					X	X	X	X	X			
2.4.16 Ecological Risk Monitoring and Source Control Program											X	X

Table 2.6-1

Summary of Mitigation Measures by Alternative

Mitigation Measure	Alternative											
	2a	2b	2c	2d	3a	3b	3c	3d	3e	4	5a	5b
2.5 Operation and Maintenance Measures												
2.5.1 Pesticides Control Program											X	X
2.5.2 Control Program for Dissolved Copper Levels					X	X	X	X	X			
2.5.3 Control Program for Hydrogen Sulfide, Ammonia, and Dissolved Oxygen	X		X	X	X	X	X	X	X			
2.5.4 Discharge Operations	X	X	X	X	X	X	X	X	X	X	X	X
2.5.5 Cyanide Monitoring and Source Control Program												X
2.5.6 Total and Ammonia Nitrogen Source Control Program												X
2.5.7 Toxicity Control Program												X
2.5.8 Monitor Seismic Events and Adjust Injection Rates										X		
2.5.9 Implement Septic System Monitoring and Replacement Program					X	X	X	X	X			
2.5.10 Discharge Prohibition During Flood Stage	X	X	X	X	X	X	X	X	X	X	X	X

Source: Harland Bartholomew and Associates, Inc. 1996

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