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Review copies of the complete Scoping Report are available at the following locations:

Libraries

Central Library
3rd & E Streets
Santa Rosa, CA 95404

Rohnert Park-Cotati Regional Library
660 Hunter Dr.
Rohnert Park, CA 94928

North West Santa Rosa Regional Library
150 Coddington Center
Santa Rosa, CA 95403

Sebastopol Regional Library
7140 Bodega Avenue
Sebastopol, CA 95472

Guerneville Regional Library
14107 Armstrong Woods Rd.
Guerneville, CA 95446

Marin County Library
Civic Center Administration Blvd.
San Rafael, CA 94903

Petaluma Regional Library
100 Fairgrounds Dr.
Petaluma, CA 94953

Novato Regional Library
1720 Novato Blvd.
Novato, CA 94947

City Halls/County Administrative Buildings

City of Santa Rosa
100 Santa Rosa Avenue
Santa Rosa, CA 95404

City of Sebastopol
7120 Bodega Avenue
Sebastopol, CA 95472

City of Cotati
201 W. Sierra Avenue
Cotati, CA 94931

County of Sonoma
Administrator's Office
575 Administration Drive
Santa Rosa, CA 95403

City of Rohnert Park
6750 Commerce Blvd.
Rohnert Park, CA 94928

City of Petaluma
11 English Street
Petaluma, CA 94952

Other

Laguna Wastewater Treatment Plant
4304 Llano Road
Santa Rosa, CA 95407

1. INTRODUCTION

PROPOSED PROJECT

The City of Santa Rosa is developing a Long-Term Wastewater Project for the disposal of treated wastewater from the Laguna Wastewater Treatment Plant (Laguna Plant) and the expansion of headworks capacity (pumping of wastewater from the plant intake to the treatment facilities). Five project alternatives, including the No Project/No Action alternative, are currently being evaluated for their impacts on the environment. Though a specific project has not been selected, it has been determined that there would be significant effects on the environment from all project alternatives. Therefore, the City is preparing an Environmental Impact Report (EIR) as required by the California Environmental Quality Act (CEQA). An Environmental Impact Statement (EIS), as required by the National Environmental Policy Act (NEPA), is jointly being prepared by the U.S. Army Corps of Engineers (COE) because of the potential impact to wetlands and navigable waters of the United States.

SCOPING REPORT

A two-step approach is being used to prepare the environmental documentation for the Santa Rosa Subregional Long-Term Wastewater Project. These steps include the Step I Scoping Phase and the Step II Environmental Study Phase. The tasks associated with each step are identified below.

The Step I Scoping Phase includes:

- Identification of potential alternatives and alternative components;
- Screening and selection of alternatives to be evaluated in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS); and
- Determination of analysis to be conducted in the EIR/EIS.
- Public participation.

The Step II Environmental Study Phase includes:

- Design and pre-engineering of the project alternatives;
- Preparation of related scientific and engineering studies;
- Preparation of the EIR/EIS; and
- Public participation.

The purpose of this Scoping Report is to summarize the work that has been completed to date as part of the Step I Scoping Phase, to identify issues and impact criteria defined during Step I, and to provide the direction of the project for the Step II Environmental Study Phase. This Final Scoping Report is a revision of the Preliminary Scoping Report that was produced on October 20, 1994. With the completion of the Step I Scoping Phase, the report and the EIR/EIS Scope of Work included in it have (see Volume 1, Chapter 4) been revised to reflect the comments

provided by interested agencies and the public. The Final Scoping Report includes additional issues, recommendations, and comments submitted to the City of Santa Rosa in writing during formal scoping and at the public hearings held on November 17, 1994, at 3:00 p.m. and at 7:00 p.m. The revised Scope of Work included in this Final Scoping Report is scheduled for adoption by the City Council in September, 1995. The Report also contains an updated list of products completed to date.

This Final Scoping Report is organized into three volumes: Volume I contains the Introduction, Summary of Work Completed, List of Issues and Impact Criteria, Scope of Work, Glossary of Abbreviations and Acronyms, Notice of Preparation (NOP)/Notice of Intent (NOI), Initial Study, Library Catalog, and Agencies and Project Team. Volume II contains Scoping Meeting Responses and Written Comment Responses. Volume III contains the Scoping Meeting Transcript and Written Comment Letters.

PROJECT LOCATION

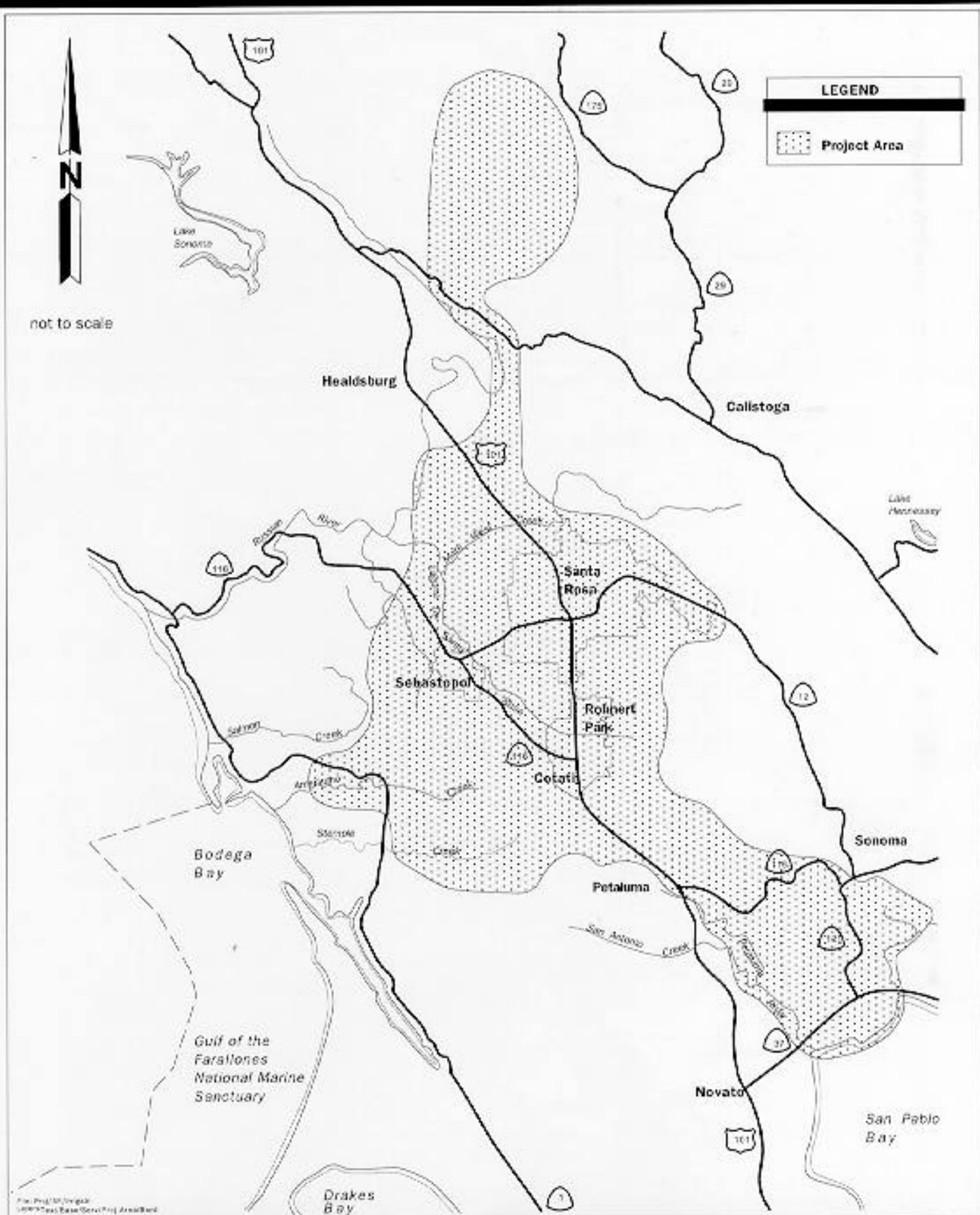
The five project alternatives, including a No Project/No Action alternative (as required by CEQA/NEPA), encompass a large geographic area in Sonoma County and a portion of northern Marin County. As shown in Figure 1, this area is focused around the Cities of Santa Rosa, Rohnert Park, Cotati, and Sebastopol, but also extends from the Geysers area north of Healdsburg to the San Pablo Bay Flats located southeast of Petaluma.

PURPOSE OF THE PROJECT

The Laguna Wastewater Treatment Plant is part of the Subregional Wastewater Reclamation System (Subregional System) that is operated by the City of Santa Rosa, and treats wastewater collected from the Cities of Santa Rosa, Rohnert Park, Cotati, Sebastopol, and the Southpark County Sanitation District. The plant also treats septic waste from most of Sonoma County. The Laguna Plant is a tertiary treatment plant and is currently permitted to treat 18 million gallons per day (mgd) average dry weather flow (ADWF).

The Subregional System currently uses a combination of reuse and discharge for disposal of treated effluent. A series of pumps and pipelines carries reclaimed water from the Laguna Plant to users for agricultural irrigation on over 5,100 acres of land located primarily in the Santa Rosa Plain, golf course irrigation, and urban landscape irrigation. A portion of the reclaimed water is also used for the management of two created wetland areas in the Santa Rosa Plain. The Subregional System is supported by storage facilities that hold the treated wastewater until it can be reused or discharged.

Treated wastewater that is not used for irrigation is discharged to the Laguna de Santa Rosa and to Santa Rosa Creek, which eventually flow into the Russian River approximately 10 miles north of the plant. Ordinarily, discharge to the Russian River is limited to a maximum of one percent of river flow (five percent with the permission of the Regional Water Quality Control Board) between October 1st and May 14th. Storage facilities are used to hold treated wastewater so that maximum legal discharge is not exceeded. No discharge is allowed from May 15 through September 30. However, due to a combination of weather conditions that may occur during the



October 1 to May 14 discharge season, the Subregional System currently has the potential to exceed the legal maximum discharge to the Russian River due to limited storage. These conditions, although infrequent, occur during winters characterized by periodic light rain and overall drier-than-normal conditions. As a result, the current Subregional System is weather-dependent, leaving it without a reliable, legally sanctioned, wastewater disposal option.

The Regional Water Quality Control Board (RWQCB) has mandated that the Subregional System must put into place, by 1999, a solution to the disposal problem that will meet both current and future disposal needs, independent of weather conditions by 1999. The Santa Rosa Subregional Long-Term Wastewater Project is intended to provide for the reuse of existing flows and increased wastewater flows generated by the future population that is projected through buildout of the General Plans of the communities making up the Subregional System. Wastewater flows through the Laguna Plant are projected to increase to about 21.0 mgd ADWF at buildout of the General Plans after reductions due to water conservation programs. This projected increase would result in an annual average flow of 8,300 million gallons (MG), an increase of approximately 20 percent over the current annual average flow of 7,000 MG.

PROJECT OBJECTIVES

The Santa Rosa Board of Public Utilities (BPU), as the governing body of the Subregional System, adopted the following project objectives on December 16, 1993, reaffirmed them on May 27, 1994.

Overall project objectives are:

- Provide wastewater treatment and disposal for the Santa Rosa Subregional Wastewater Reclamation System to accommodate projected growth as indicated in the currently adopted General Plans of each of the Subregional entities; and
- Develop and operate the wastewater treatment and disposal system in ways that protect public health and safety, and promote wise use of water resources.

Supporting project objectives are:

- Maximize reclamation, recycling, and reuse of advanced treated wastewater to the greatest extent feasible;
- Recycle or dispose of reclaimed water that is not reused in a manner that protects beneficial uses of receiving waters;
- Optimize water resource conservation where practical;
- Operate the wastewater treatment plant and disposal system successfully under all foreseeable weather conditions;
- Satisfy applicable regulatory agency and institutional guidelines and requirements;
- Develop a disposal system that is manageable and reliable; and
- Develop a program that can be successfully financed and is economically feasible.

These supporting objectives are intended to further define the overall project objectives and to provide guidance in the development and evaluation of project alternatives.

STEP I SCOPING PHASE

Identification of Potential Alternatives and Alternative Components

An extensive list of potential project alternatives and alternative components, representing a wide spectrum of possible solutions to the Subregional System's wastewater disposal problem, was developed by the BPU at the onset of the Step I Scoping Phase. These potential alternatives were developed through the review of alternatives previously considered by the BPU, with input from the public obtained at four workshops held in September 1993 and two workshops held in November 1993, and from communications with individuals and groups in interviews, written correspondence, and meetings. The BPU identified 75 alternatives suggested prior to March 1993, and an additional 79 alternative components that were recommended by the public, City of Santa Rosa City staff, and individuals and agencies consulted since March 1993.

The list of potential alternatives and alternative components was carefully reviewed to develop a manageable list of alternatives for evaluation and screening. The two main objectives in developing alternatives were:

- To include all feasible components suggested by the public in the September and November workshops in at least one alternative; and
- To develop "all reasonable alternatives" that would meet CEQA and NEPA requirements for alternative analysis in the EIR/EIS.

A preliminary list of 20 alternatives was published on December 29, 1993. This list was distributed to the public for review and comment to ensure that it adequately represented all alternative components nominated for consideration. The preliminary list of alternatives was then presented to the BPU at a meeting held on January 13, 1994. To allow time for further public comment, the BPU continued the discussion of alternatives to the following week. During the public review period, an additional 10 alternatives were suggested and were presented to the BPU at their meeting on January 20, 1994. At that meeting, the BPU directed that all 30 alternatives be evaluated in the screening process. Two additional alternatives were subsequently developed in response to a request from the public that multiple small reservoirs be evaluated as an option.

Screening and Selection of Alternatives to be Evaluated in the EIR/EIS

The Santa Rosa Long-Term Wastewater Project Screening Report (available by request from the City of Santa Rosa) evaluated all 32 alternatives according to criteria adopted by the BPU, and was completed and distributed for review in March, 1994. Five public workshops were conducted in April and May 1994 to assist in the selection of a reasonable range of alternatives to be studied in the EIR/EIS. The Policy Advisory Committee (PAC), Technical Review Group (TRG), and Technical Advisory Committee (TAC) for the Santa Rosa Long-Term Subregional Wastewater Project each advised the BPU by reviewing and providing comment on the Screening Report. In addition, two joint study sessions on the Screening Report were held by the City and BPU, during which public and agency comments concerning alternatives that should be carried forward for review in the EIR/EIS were received orally and in writing.

Based on the findings of the Screening Report and comments received from the public and agencies, the BPU at its May 27, 1994 meeting determined which of the potential project alternatives and components for the Santa Rosa Subregional Long-Term Wastewater Project were to be retained and which ones would be eliminated from further review in the EIR/EIS process. The BPU selected six alternatives, including the No Project/No Action alternative, to be carried forward in the preparation of the EIR/EIS. One alternative was dropped by the BPU on April 6, 1995. The decision to drop this alternative from further consideration is discussed in detail on the next page.

Determination of Analysis to be Conducted in the EIR/EIS

In addition to the screening of potential project alternatives, the Step I Scoping Phase of the project allowed federal, state, and local agencies and interested members of the public to provide early comment on the environmental documentation that would be produced for the project. Further comment and identification of issues for the EIR/EIS were obtained through the formal CEQA/NEPA scoping process, which began with release of the Notice of Preparation/Notice of Intent (NOP/NOI) and the Preliminary Scoping Report, on October 22, 1994. The Preliminary Scoping Report provided a summary of the project, a list of issues and impacts, and a draft scope of work. The formal public Scoping Meeting was held on November 17, 1994 to receive comments on the NOP/NOI and Preliminary Scoping Report. The Step I Scoping Phase was closed for public comment on December 5, 1994.

On April 6, 1995, the BPU adopted a revised scope of work that reflected the pertinent comments and issues brought forth during the Step I Scoping Phase. The BPU decided to eliminate Alternative 3, Community Separator, from the EIR/EIS workscope due to the potential difficulties of assembling the minimum number of parcels required to create the desired greenbelt. However, Aquifer Storage and Recovery was retained as an independent component. With the elimination of Alternative 3, a total of five project alternatives, including the No Project/No Action alternative, were approved for evaluation in the EIR/EIS. The five selected project alternatives are described in the following section. The City Council approved the scope of work as recommended by the Board of Public Utilities on April 18, 1995. For purposes of the EIR/EIS, the existing conditions are those conditions which existed on April 18, 1995.

PROJECT ALTERNATIVES

Alternative 1 - No Project/No Action

CEQA and NEPA require that a No Project/No Action alternative be analyzed in detail in the environmental document. The No Project alternative is an evaluation of impacts that would occur if no project was implemented. In this case, the No Project/No Action alternative is the existing wastewater disposal system and Interim Master Plan components (Figure 2).

The existing wastewater disposal system utilizes a combination of direct discharge to the Russian River; urban irrigation; discharge/reuse through created wetlands in the Santa Rosa Plain; and reuse for agricultural irrigation.

Additional reuse components which ~~are to be~~ implemented as part of the Interim Master Plan are:

Agricultural irrigation - an additional ~~150~~ 350 acres; ~~and~~
~~Urban reuse at the Santa Rosa Country Club Golf Course - 150 acres; and~~
 Urban irrigation in Rohnert Park - ~~280~~ 300 acres.

These components are scheduled to be completed by 1996. The Interim Master Plan for the Subregional System also provides for the upgrading of treatment facilities at the Laguna Plant. This alternative assumes continuation of efforts by the City to improve water conservation practices thereby reducing wastewater flow.

Alternative 2 - South County Reclamation

The South County Reclamation alternative focuses on the reuse of treated wastewater for agricultural irrigation in areas south and east of Santa Rosa (Figure 3). Under this alternative, discharge to the Russian River would be at 1% of river flow.

Primary additional reuse and discharge components of this alternative (in addition to existing reuse and discharge) are:

- Agricultural irrigation of 4,700 acres of land in areas east of Rohnert Park; east of Adobe Road; east of Lakeville Highway; in the San Pablo Bay flats; and north of Petaluma; and
- Storage of 4,000 million gallons (13,811 acre feet) of treated wastewater in a reservoir to be constructed along Tolay Creek south of Highway 116 (Site S39, Tolay) for seasonal reuse in agricultural irrigation or stream augmentation.

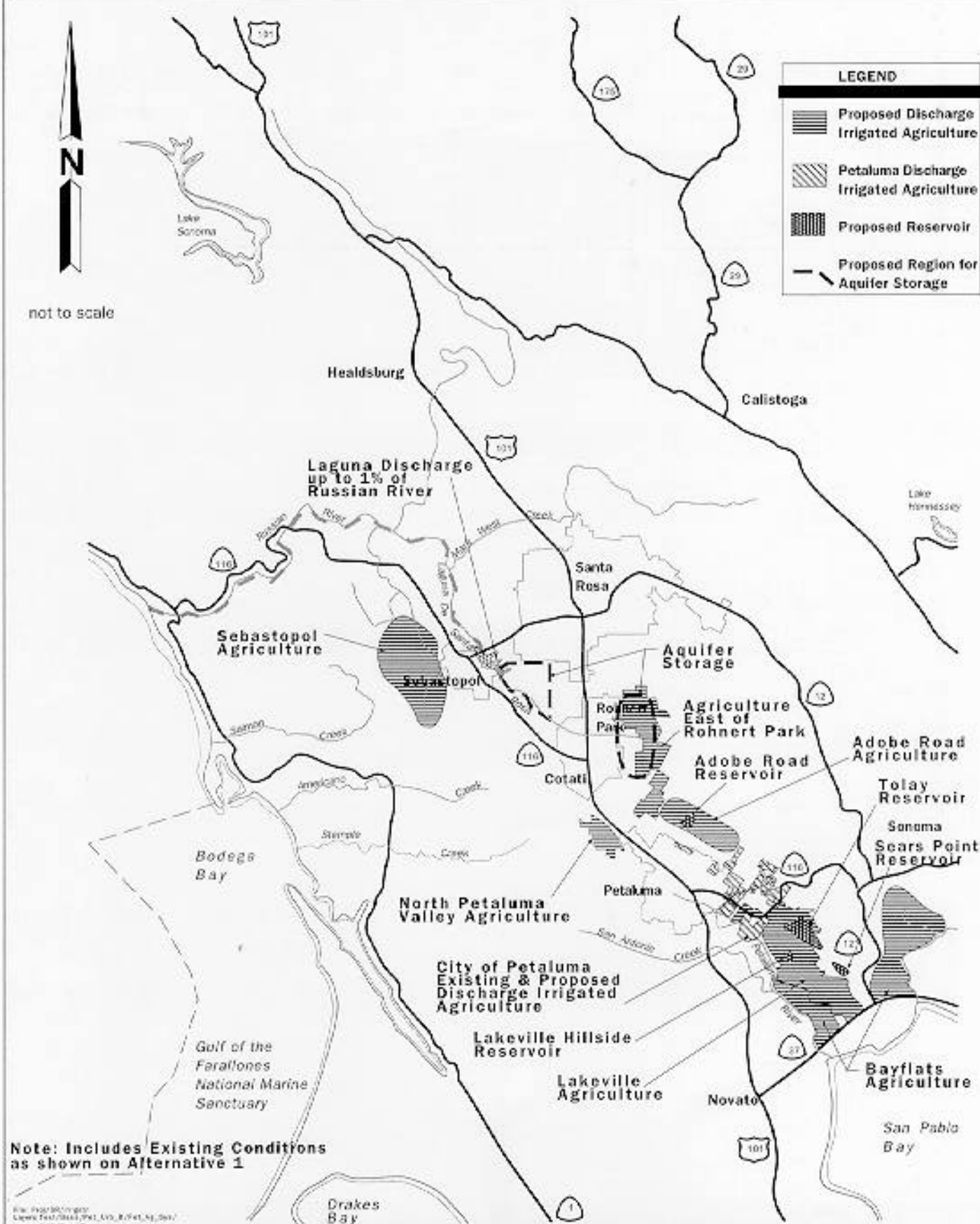
This alternative also includes expansion of capacity at the Laguna Plant to provide for a total capacity of 21.0 mgd average dry weather flow (ADWF).

In addition, this alternative assumes that the following components to reduce wastewater flow will continue:

- Installation of water conservation devices or new fixtures to reduce water consumption and subsequent wastewater flows through expansion of the Subregional Retrofit Program; and
- Implementation of other programs to improve water conservation practices in accordance with State regulations.

Other components which are to be included as options in this alternative are:

- Discharge to the Russian River up to 20%; and
- Reservoir sites to be considered in optional configurations in place of, or in conjunction with, the primary reservoir site (Site S39, Tolay).



These sites are:

- Site S27, Adobe Road (located east of Adobe Road and South of Sonoma Mountain Road);
- Site S31A, Lakeville Hillside (located east of Lakeville Highway at Old Lakeville Road No. 3); and
- Site S35, Sears Point (located along Tolay Creek north of Highway 121).

Possible reservoir configurations also include a smaller reservoir at the S39 Tolay site; a combination of the S31A Lakeville Hillside and S35 Sears Point sites; and a combination of the S27 Adobe Road and S31A Lakeville Hillside sites; S31A Lakeville Hillside; and a smaller reservoir at S39 Tolay in conjunction with aquifer storage and recovery.

- Urban irrigation projects involving up to 500 acres such as the Bennett Valley Golf Course;
- Discharge of treated wastewater into aquifers for storage prior to reuse; and
- Sebastopol irrigation up to a maximum of 2,600 acres.

Alternative 3 - West County Reclamation

The West County Reclamation alternative focuses on the reuse of treated wastewater for agricultural irrigation in areas west of Cotati and Petaluma (Figure 4). Under this alternative, discharge to the Russian River would be maintained at 1% of river flow.

Primary additional reuse and discharge components of this alternative (in addition to existing reuse and discharge) are:

- Agricultural irrigation of 6,600 acres of land in areas along Stemple and Americano Creeks; and
- Storage of 4,000 million gallons (13,811 acre feet) of treated wastewater in a reservoir to be constructed along a tributary of Stemple Creek north of Walker Road (Site S20, Two Rock) for seasonal reuse through agricultural irrigation.

This alternative also includes expansion of capacity at the Laguna Plant to provide for a total capacity of 21.0 mgd ADWF.

In addition, this alternative assumes that the following components to reduce wastewater flow will continue:

- Installation of water conservation devices or new fixtures to reduce water consumption and subsequent wastewater flows through the expansion of the Subregional Retrofit Program; and
- Implementation of other programs to improve water conservation practices in accordance with State regulations.

Santa Rosa Subregional Long-Term Wastewater Project EIR/EIS

Task Name	Duration	Start	Finish	1994	1995	1996
Scoping	325d	Fri 6/10/94	Thu 9/7/95			
Preparation of Draft EIR	214d	Sat 5/20/95	Thu 3/14/96			
Circulation of DEIR/DEIS	8.8w	Thu 3/14/96	Tue 5/14/96			
Preparation of Final EIR/EIS Env. Working Paper	123d	Tue 4/16/96	Thu 10/3/96			
Final EIR Certification	4.2w	Fri 9/27/96	Fri 10/25/96			

Other components which are included as options in this alternative are:

- Discharge to the Russian River up to 20% of river flows;
- Reservoir sites to be considered in optional configurations in place of, or in conjunction with, the primary reservoir site (Site S20, Two Rock).

These sites are:

- Site S40, Bloomfield (located north of Bodega Highway and west of Bloomfield Road);
- Site S44, Huntley (located south of Bodega Highway along Martinoni Road);
- Site S56, Carroll Road North (located on Carroll Road, north of Bodega Highway);
- Site S53, Valley Ford East (located north of Bodega Highway at Highway 1); and
- ASR

Possible reservoir configurations for this alternative also include a smaller reservoir at the S20 Two Rock site in conjunction with aquifer storage.

- Urban irrigation projects involving up to 500 acres such as the Bennett Valley Golf Course; and
- Sebastopol irrigation up to 2,600 acres.

Alternative 4 - Geysers Recharge

The Geysers Recharge alternative provides for transmission of the treated wastewater to the Sonoma Geysers, located northeast of Healdsburg, for recharge of the geysers that are currently used as a source of geothermal energy. This alternative would not involve discharge of treated wastewater to the Laguna de Santa Rosa or Russian River, and no additional storage is currently planned for this alternative (See Figure 5).

This alternative also includes expansion of capacity at the Laguna Plant to provide for a total capacity of 21.0 mgd ADWF.

In addition, this alternative assumes that the following components to reduce wastewater flow will continue:

- Installation of water conservation devices or new fixtures to reduce water consumption and subsequent wastewater flows through the expansion of the Subregional Retrofit Program; and
- Implementation of other programs to improve water conservation practices in accordance with State regulations.

Another component which is included as an option in this alternative is:

- Urban irrigation projects involving large irrigable areas such as the Bennett Valley Golf Course.

Alternative 5 - 20% Maximum Russian River Discharge

This alternative provides for the discharge of treated wastewater to the Russian River up to a maximum rate of 20% of river flow (Figure 6). Under this alternative no additional reuse or storage of treated wastewater would be required.

Discharge to the Russian River would be accomplished through one of the following methods:

- Transmission of treated wastewater and direct discharge to the Russian River at a location above the Sonoma County Water Authority intakes; or
- Discharge of treated wastewater to the Laguna de Santa Rosa at the existing (15) discharge locations.

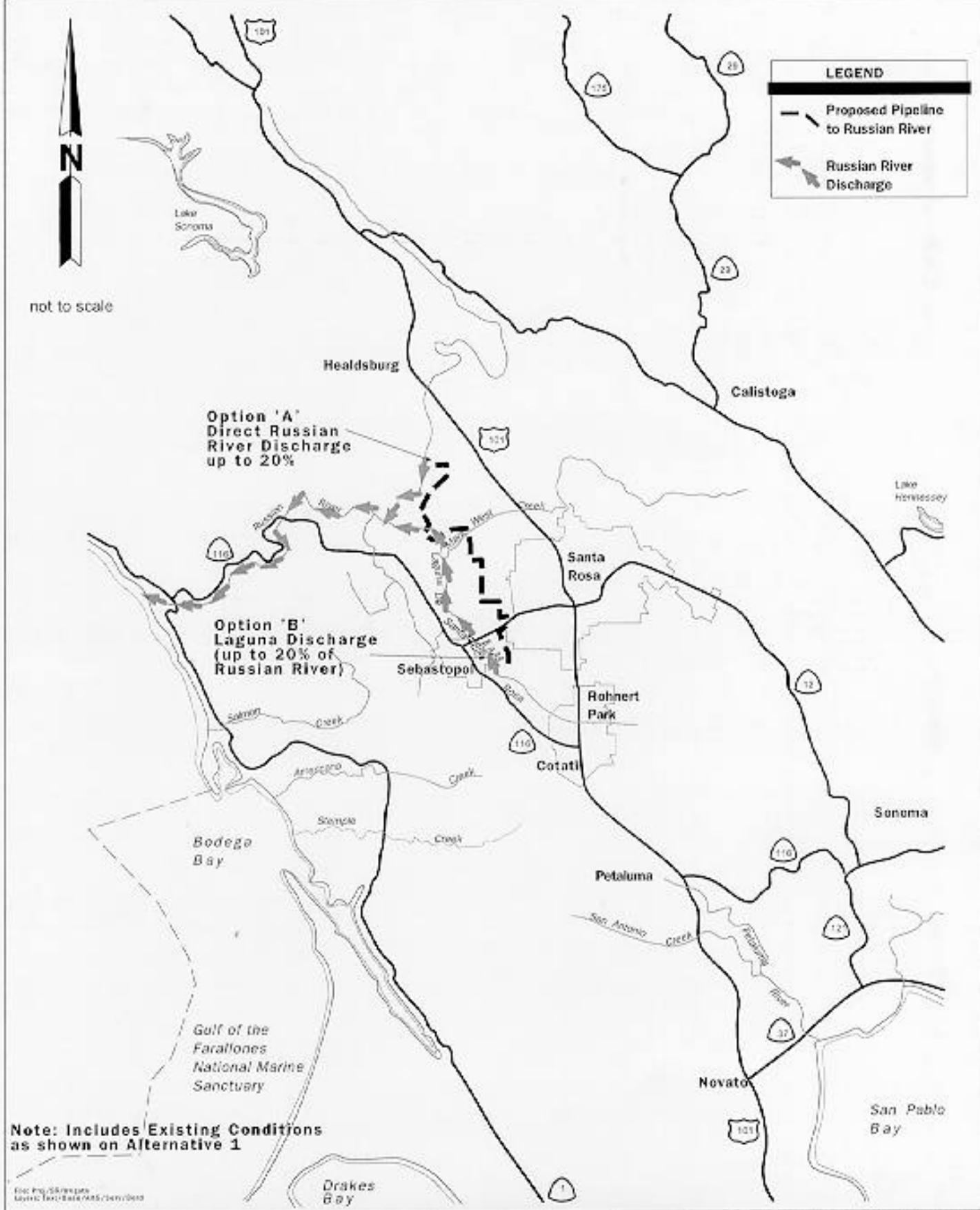
This alternative also includes expansion of capacity at the Laguna Plant to provide for a total capacity of 21.0 mgd ADWF.

In addition, this alternative includes the following components to reduce wastewater flow:

- Installation of water conservation devices or new fixtures to reduce water consumption and subsequent wastewater flows through expansion of the Subregional Retrofit Program; and
- Implementation of other programs to improve water conservation practices in accordance with State regulations.

Another component which is included as an option in this alternative is:

- Urban irrigation projects involving up to 500 acres such as the Bennett Valley Golf Course.



STEP II ENVIRONMENTAL STUDY PHASE

The potential environmental effects of the project alternatives and optional components are being studied in order to prepare the Draft EIR/EIS. This document will identify potential impacts, whether these are significant, and what mitigation measures, if any, might be needed to lessen or eliminate potentially significant impacts. In addition, the feasibility of the optional components will be further studied during the preparation of the EIS

The Step II Environmental Study Phase will include design and pre-engineering of the project alternatives, preparation of related scientific and engineering studies, and preparation of the EIR/EIS. These tasks will be conducted in accordance with the Scope of Work provided in Chapter 4 of this report. In addition, a draft Public Participation Plan has been prepared. The purpose of the Public Participation Plan is to provide a framework for orderly, early, and effective public consultation during the Environmental Study Phase of the project.

The draft Public Participation Plan is available at the Laguna Wastewater Treatment Plant library. The Public Participation Plan includes both required and optional forms of public participation. Both CEQA and NEPA provide for a formal public participation process, which begins with the release of the Draft EIR/EIS and concludes with certification of the EIR/EIS (in the case of CEQA) and publication of the Notice of Availability (in the case of NEPA). Following release of the Draft EIR/EIS, there will be a period of time during which written comments on the Draft EIR/EIS will be received and during which noticed public meetings will be held for receiving oral comment. The City of Santa Rosa Board of Public Utilities (BPU) will choose a project once the EIR/EIS is certified and the Notice of Availability is published by the Corps of Engineers.

LIST OF ENVIRONMENTAL CONSULTANTS

In order to effectively complete the required environmental studies, HBA has formed a project team of qualified professionals who have been contracted to assist in the preparation of the EIR/EIS and associated special studies. The following is a list of the firms which are members of the Environmental Consultant Team and their areas of technical expertise.

Name of Firm	Areas of Primary Responsibility
Harland Bartholomew & Associates, Inc. (HBA) (A Unit of the Parsons Corporation)	Project Management; Land Use; Public Services and Utilities; Recreation; Terrestrial Ecology; Cultural; Transportation and Circulation
Parsons Engineering Science, Inc. (Parsons - ES) (A Unit of the Parsons Corporation)	Geology/Seismicity/Soils; Dams and Reservoirs; Pipeline Design; Wastewater Engineering; Energy; Hazardous Materials; Public Health; Drinking Water Studies; Groundwater; Reclamation; Water Balance; Wetland Determination Delineation /Permitting; Air Quality; Noise
Dames & Moore	Hydrology and Visual
Economic & Planning Systems (E&PS)	Economics and Fiscal; Population and Housing

Name of Firm	Areas of Primary Responsibility
Rust Environment and Infrastructure	Geotechnical Engineering
Merritt-Smith Consulting	Anti-degradation, Water Quality, Fisheries, Aquatic Biology
W. L. Corpening & Associates	Water Conservation
West Yost Associates	Water Conservation
Questa Engineering	Irrigation Suitability
Sycamore Environmental Consultants	Vegetation
Anthropological Studies Center, Sonoma State University	Cultural Resources

ENVIRONMENTAL CONSULTANT TEAM

Each of the firms involved in providing environmental review for the Santa Rosa Subregional Long-Term Wastewater Project have a highly qualified staff. The following table identifies the technical manager and the key technical staff for each environmental topic area.

Environmental Topic Area	Technical Manager	Key Technical Staff
Dams and Reservoirs	Pat Creegan	Stanley Kline
Geology/Seismicity/Soils	Fred Kintzer	Sandi Potter
Geotechnical Engineering	Stan Kline	Tony Buengan
Pipeline Design	Richard Maurer	Therese Wooding
Wastewater Engineering	Richard Maurer	John Hake
Aesthetics and Visual Quality	Robert Duchek	Stephen Sheppard
Cultural Resources	Jody Brown Christian Gerike	Seana Searle
Economics and Fiscal	Walter Kieser	Chuck Teller
Energy	Richard Maurer	Li Boccia
Hazardous Materials	Neal Siler	Dennis Brown
Land Use	Pat Collins	Robert Duchek
Population & Housing	Robert Duchek	Chuck Teller
Public Health	Robin Cort	Dennis Brown
Public Services & Utilities	Rob Brueck	Jody Brown
Recreation	Robert Duchek	Jody Brown
Regulatory & Permitting	Pat Collins	Gary Halsey
Transportation & Circulation	Robert Duchek	Dan Greyuski
Agricultural Irrigation/Drainage	Jeff Peters	Norman Hantzsche
Anti-degradation	David Smith	James Roth
Drinking Water Studies	David Smith	Dennis Brown Donna Dehn
Fisheries	Michael Fawcett	James Roth
Groundwater	Neal Siler	Phil McLaughlin
Limnology/Aquatic Ecology	Randy Palachek	David Smith Marcie Commins
Reclamation	Richard Maurer	Robin Cort
Terrestrial Ecology	Mike Bumgardner	Joyce Hunting

Environmental Topic Area	Technical Manager	Key Technical Staff
Water Balance	Richard Maurer	John Hake
Water Conservation	Wendy Corpening	Jim Yost
Water Quality	Randy Palachek	David Smith
Wetland Determination Delineation /Permit ting	Joyce Hunting	Gary Halsey
Air Quality	Claire Chapin	Ivy Edmonds
Noise	Areg Gharabegian	Sean Bui

PEER REVIEW COMMITTEE

HBA has also organized a Peer Review Committee to provide independent review of the technical reports and environmental documentation prepared by the Consultant Team. A list identifying the participants of the Peer Review Committee is provided below.

Expertise	Affiliation	Reviewer
Reclamation Engineer	Independent	Bahman Sheikh, Ph.D., PE
Anti-degradation/Water Quality	Larry Walker & Associates	Thomas Grovhoug
Fisheries Biologist	Buell & Associates	Jim Buell, Ph. D.
Wetlands Conceptual Design	Humboldt State University	Bob Gearhart, Ph.D., PE
Wastewater Engineer	Parsons Engineering Science	Joseph Reichenberger
Local Issues	Independent	John Cummings, Ph.D.
Agricultural Irrigation/Drainage	UC Davis	Mark Grismer, Ph.D.
CEQA/NEPA Compliance	Nevada Natural Resources Committee	David Ziegler

SCHEDULE

A project schedule has been provided on the next page to show the estimated overall time frame of this project through construction.

Santa Rosa Subregional Long-Term Wastewater Project EIR/EIS

Task Name	Duration	Start	Finish	1994	1995	1996
Scoping	325d	Fri 6/10/94	Thu 9/7/95			
Preparation of Draft EIR	214d	Sat 5/20/95	Thu 3/14/96			
Circulation of DEIR/DEIS	8.8w	Thu 3/14/96	Tue 5/14/96			
Preparation of Final EIR/EIS Env. Working Paper	123d	Tue 4/16/96	Thu 10/3/96			
Final EIR Certification	4.2w	Fri 9/27/96	Fri 10/25/96			

2. SUMMARY OF WORK COMPLETED

On July 13, 1993, HBA and the City of Santa Rosa signed a consulting agreement for the provision of services to prepare the Subregional Long-Term Wastewater Project EIR/EIS. The following discussion provides a summary of the work HBA has completed to date. Table 2-1 lists the products produced to date. All published documents are available at the Laguna Plant Library for review.

MANAGEMENT AND MEETINGS

HBA and Parsons Engineering Science, Inc. (Parsons ES) are responsible for the management of the Santa Rosa Subregional Long-Term Wastewater Project EIR/EIS. Project management has included preparation of monthly progress reports, attendance at monthly Project Status Meetings, determination of scope of work required, review of all documents produced, management of subconsultants, and assistance with the public involvement process. HBA has prepared and maintained a project Mailing List, a Library Catalogue, and a Correspondence Database. HBA has also assisted Urban Alternatives (public participation consultant) with the technical information needed to support the public involvement program.

The following meetings have been held:

- Project Manager/Technical Director/City Kickoff Meeting
- Agency/Consultant Kickoff Workshop
- Management Team Meetings
- Peer Review Committee Meetings
- City Committee Meetings
- Interest Group Meetings
- Alternatives Development Public Workshops
- Alternatives Screening Public Workshops
- Fisheries Tour/Fisheries Update Meetings
- Vernal Pool Task Force Meetings
- RWQCB's Water Quality Monitoring Coordinating Committee Meetings
- Russian River Water Quality Model Development Workgroup Meetings
- Technical Review Group Meetings
- Political Advisory Committee Meetings
- Technical Advisory Committee Meetings
- Board of Public Utilities Meetings and Study Session
- City Council Meetings
- Meetings with Agencies (EPA, COE, BLM, NOAA, DFG, NRCS, USFWS, NBRWQCB, SFRWQCB, SCWA, DHS)

SCOPING

The following tasks have been completed by HBA as part of the Step I Scoping Phase.

- HBA developed a list of potential alternatives and the various sites and components that have been described in past documents.
- To assist in screening, a set of project alternative evaluation criteria was developed to accompany the project objectives developed by the City of Santa Rosa.
- HBA coordinated three days of field reconnaissance to view the sites and performed preliminary assessments of potential impacts.
- The Regulatory Agencies having permitting or approval authority over the project were identified and meetings were held to determine the status of present requirements and agency information needs.
- HBA identified the permitting requirements for each of the alternatives to be evaluated in the EIR/EIS.
- Based on the alternatives selected for evaluation in the EIR/EIS, the potential list of reservoir sites was screened to arrive at a short list of sites that could adequately serve each of the three alternatives that require storage. A short list of streams was identified for recommendation to the City of Santa Rosa for more detailed evaluation of stream flow augmentation. Alternatives and components will be evaluated to identify the need for wetlands creation or enhancement.
- HBA prepared an Initial Study in accordance with CEQA to evaluate each of the potential alternative reclaimed water use areas, storage sites, and pipeline corridors and each of the contingency plan elements.
- HBA coordinated with the City and the COE to prepare and distribute the NOP/NOI.
- Based on the review and analysis of the results of ongoing public involvement processes, HBA identified the need for and extent of additional studies or continuation of studies as necessary for the environmental review process documents or permit applications.
- HBA prepared a Preliminary Scoping Report summarizing the work completed in Step I.
- The Preliminary Scoping Report was circulated for public comment from October 22, 1994 to December 14, 1994, and the Public Scoping Meeting was held on November 17, 1995. A total of 129 written comment letters were received from agencies and the public. The scoping meeting included a minimum of 120 participants with approximately 50 oral commentors.
- HBA coordinated and participated in the presentation for the Scoping Meeting (held November 17, 1994). Comments presented during this meeting have been incorporated into the Scoping Report, as have written comments received during the NOP/NOI comment period (October 21 to December 14, 1994).
- HBA coordinated joint study sessions with the BPU and the City Council on January 16th and 17th, 1995. The study sessions allowed the decision makers and HBA to further refine the scope based on the comments received during the scoping process.
- HBA revised the draft Scope of Work and budget based on the comments received during the scoping period. HBA coordinated with the BPU and City Council in a

joint study session to further refine the Scope of Work with all comments considered. This resulted in an increased scope and a budget that could have reached 20 million dollars. HBA then coordinated with the BPU to reconsider the project components. Based on the consultants professional judgment, a reduced scope and budget adequate for an EIR/EIS was presented. As a result of the reduced scope, the BPU eliminated the following components:

- a) Wetland Creation - creation of new wetlands using treated wastewater;
 - b) Schellville Irrigation Area - use of treated wastewater for agricultural irrigation in the area along Schellville Road area, South County;
 - c) Chileno Irrigation Area - use of treated wastewater for agricultural irrigation in the Chileno Valley area;
 - d) Reyes Soils Irrigation area - use of treated wastewater for agricultural irrigation of the Bay Flats Area (a reduced study of Reyes soils remains in the project description);
 - e) Rapid Infiltration - discharge of treated wastewater to the Russian River through rapid infiltration gravel ponds;
 - f) Alternative 3, Community Separator - reuse of treated wastewater for a combination of wetland creation, agricultural and urban irrigation, and stream flow augmentation; and
 - g) Stream flow augmentation.
- The Scope of Work was revised based on the removal of these components, resulting in a total budget of 10.9 million dollars. On April 6, 1995, the BPU adopted the final Scope of Work. This final Scope of Work was approved by the Santa Rosa City Council on April 18, 1995.

DOCUMENTS PUBLISHED THROUGH APRIL 1995

The following is a list of documents completed for this project.

Ongoing

Library Catalog, Harland Bartholomew & Associates, Inc. Revisions: 9/3/93, 10/15/93, 12/2/93, 1/3/94, 4/29/94, 8/16/94, 1/19/95. (400 documents between the years 1962 - August 1994)

Address Book, Harland Bartholomew & Associates, Inc., most recent revision: January, 1995. (over 1,500 names and addresses)

Glossary of Terms, Harland Bartholomew & Associates, Inc., March 7, 1994.

Completed***June 1993***

Public Participation Needs Assessment/Plan for the Santa Rosa Long-Term Wastewater Project EIR/EIS, Urban Alternatives. (June 9, 1993)

October 1993

Acquisition Options Report, Harland Bartholomew & Associates, Inc., October, 1993.

Final Draft Feedback Reports for Round One Public Workshops: Workshop No. 1 Feedback Report (Petaluma), Urban Alternatives, October 27, 1993.

Final Draft Feedback Reports for Round One Public Workshops: Workshop No. 2 Feedback Report (Bloomfield), Urban Alternatives, October 15, 1993.

Final Draft Feedback Reports for Round One Public Workshops: Workshop No. 3 Feedback Report (Guerneville), Urban Alternatives, October 29, 1993.

Final Draft Feedback Reports for Round One Public Workshops: Workshop No. 4 Feedback Report (Santa Rosa), Urban Alternatives, October 27, 1993.

November 1993

Alternatives Considered Previously through February 1993, Harland Bartholomew & Associates, Inc., November, 1993.

Alternatives Considered from March 1993, Harland Bartholomew & Associates, Inc., November, 1993.

Alternative Components, Harland Bartholomew & Associates, Inc., November 1993.

Alternative Workbook, Harland Bartholomew & Associates, Inc., November 1993.

Cross-Workshop Summary Report: Round One Public Workshops to Generate Possible Solutions, Urban Alternatives, November 1993.

December 1993

Alternatives Evaluation Criteria Report, Harland Bartholomew & Associates, Inc., December, 16 1993.

Summary of Preliminary Wastewater Management Alternatives, Harland Bartholomew & Associates, Inc., December, 1993.

Final Draft Feedback Report: Round Two Public Workshops to Develop Complete Alternatives, Urban Alternatives, December 1993.

March 1994

Preliminary Sections of the DEIR/DEIS, Harland Bartholomew & Associates, Inc., March 7, 1994.

Baseline Data Report, Harland Bartholomew & Associates, Inc., March 9, 1994.

Alternative Screening Report Volumes I - IV, Harland Bartholomew & Associates, Inc., March 21/24, 1994.

April 1994

Aerial photos of the Potential Project Area, Harland Bartholomew & Associates, Inc., April and May, 1994.

May 1994

National Marine Sanctuary Research Permit Application, Merritt Smith Consulting, May 17, 1994.

June 1994

Regulatory Aspects of Flow Augmentation, Merritt Smith Consulting, June 9, 1994.

Evaluation of Streamflow Augmentation Component, Merritt Smith Consulting, June 14, 1994.

Recommended Storage Reservoirs, Parson Engineering Science, Inc., June 15, 1994.

Evaluation of Wetland Creation Components, Merritt Smith Consulting, June 29 1994.

July 1994

Further Screening of Reservoir Sites, Parsons Engineering Science, Inc., July 28, 1994.

Proposed Refined Approach to Wetland Creation, Merritt Smith Consulting for Harland Bartholomew & Associates, Inc., July 29, 1994.

Final Draft Feedback Report: Round Three Public Workshops to Evaluate Alternatives for Study in the EIR/EIS, Urban Alternatives, July 1994.

August 1994

Preliminary U.S. Army Corps of Engineers 404 Permit Application, Harland Bartholomew & Associates, Inc., August, 1994.

Proposed Refined Approach to Flow Augmentation, Merritt Smith Consulting for Harland Bartholomew & Associates, Inc., August 11, 1994.

September 1994

Migratory Fish Study, Merritt Smith Consulting for Parsons Engineering Science, Inc., September 6, 1994.

October 1994

U.S. Army Corps of Engineers Preliminary Alternatives Analysis, Parsons Engineering Science, October, 1994.

Draft Updated Public Participation Needs Assessment/Plan for the Environmental Study Phase of the Santa Rosa Subregional Long-Term Wastewater Project EIR/EIS, Urban Alternatives, October 1994.

Preliminary Scoping Report, Harland Bartholomew & Associates, Inc., October 1994.

Urban Alternatives Summary of Preliminary Scoping Report, Urban Alternatives, October 1994.

November 1994

Santa Rosa Water Balance Development of Computer Model, Harland Bartholomew & Associates, Inc., November 3, 1994.

Special-Status Amphibian Surveys on Potential Reservoir Sites: Technical Summary, Harland Bartholomew & Associates, Inc., November 7, 1994.

California Wildlife Habitat Relationships System (CWHR) Field Data Collection: Technical Summary, Harland Bartholomew & Associates, Inc., Inc., November 7, 1994.

Summary of Botanical Survey Methods and Results for Potential Reservoir Sites and the Estero Americano: Technical Summary, Harland Bartholomew & Associates, Inc., Inc., November 7, 1994.

Evaluation of Grossi Reservoir Site, Parsons Engineering Science, Inc., November 22, 1994.

Human Health Effects of Environmental Estrogens: Technical Summary, Parsons Engineering Science, Inc., November 22, 1994.

Wetland Creation Site Selection Criteria, Merritt Smith Consulting, November 22, 1994.

County of Sonoma Public Health Department Application for Water Well Permits, Rust Environment & Infrastructure, November 22, 1994.

California Department of Fish and Game, Agreement Regarding Proposed Stream Alteration, Parsons Engineering Science, Inc., November 23, 1994.

December 1994

Brown Pond Fish Kill Report, Merritt Smith Consulting for Harland Bartholomew & Associates, Inc., December 7 1994.

Evaluation of Cougar Reservoir Site, Parsons Engineering Science, Inc., December 9, 1994.

Santa Rosa Water Reclamation System Operations Model, Parsons Engineering Science, Inc., December 14, 1995.

January 1995

Board of Public Utilities Study Session Workbook, Harland Bartholomew & Associates, Inc., January 13 and 14, 1995.

Draft U.S. Army Corps of Engineers Purpose and Need Statement, Parsons Engineering Science, January, 1995.

Possible Rapid Infiltration Site Constraints, Parsons Engineering Science, Inc., January 20, 1995.

Search for Interim Reservoir Sites East Rohnert Park, Parsons Engineering Science, Inc., January 25, 1995.

Phase I ASR Report, Parson Engineering Science, Inc., January 1995.

February 1995

Water Balance Update - Model Modifications, Parsons Engineering Science, Inc., February 7, 1995.

Water Balance Update - Model Modifications, Parsons Engineering Science, Inc., February 24, 1995.

Rapid Infiltration Site Selection Criteria, Parsons Engineering Science, Inc., February 1, 1995.

March 1995

San Antonio Reservoir Site, Technical Memorandum TM-R-1, Harland Bartholomew & Associates, Inc., March 13, 1995.

Interim Reservoir Sites, Technical Memorandum TM-IR-3, Harland Bartholomew & Associates, Inc., March 13, 1995.

Water Conservation Programs, W.L. Corpening and Associates for Harland Bartholomew & Associates, Inc., March 1995.

Andromous Fish Migration Study, Merritt Smith Consulting for Harland Bartholomew & Associates, Inc., March 1995.

Water Balance Update - Results, Parsons Engineering Science, Inc., March 6, 1995.

Water Balance and Preliminary Cost Estimate, Parsons Engineering Science, Inc., March 15, 1995.

Pipeline and Pump Station Criteria, Parsons Engineering Science, Inc., March 9, 1995.

April 1995

Revised System Storage Curve, Parsons Engineering Science, Inc., April 10, 1995.

Tunnel Length Optimization Analysis, Parsons Engineering Science, Inc., April 10, 1995.

Sizing of New "S" Pump Station, Parsons Engineering Science, Inc., April 10, 1995.

Reservoir Runoff Diversion Structures, Parsons Engineering Science, Inc., April 12, 1995.

Pipeline Alignments, Parsons Engineering Science, Inc., April 12, 1995.

Transmission Line Routes to Lakeville, Tolay A. Tolay C, Adobe Road, Sears Point, Huntley, Valley Ford, Carroll Road, Bloomfield, and Two Rock Reservoir Sites, Parsons Engineering Science, Inc., April 12, 1995.

3. LIST OF ISSUES AND EVALUATION CRITERIA

The City of Santa Rosa has conducted an extensive public involvement process on the Subregional Long-Term Wastewater Project since March 1993. Issues have been compiled through meetings, written correspondence, and personal communications. Over 800 communications have been received to date. The list of issues provided below is an evolving list and does not necessarily represent the complete list of issues to be addressed in the EIR/EIS. Issues identified during the formal CEQA/NEPA scoping period (October 21, 1994 through December 14, 1994) on the NOP/NOI and Initial Study have been incorporated into this list of identified issues as well.

A number of public meetings have been held to receive comments during the various steps of the scoping process. The meetings are as follows:

Public Workshops

- Petaluma - September 1993
- Bloomfield - September 1993
- Santa Rosa - September 1993
- Guerneville - September 1993 and October 1993
- Santa Rosa - November 1993
- Petaluma - November 1993
- Petaluma - April 1994
- Santa Rosa - April 1994

Board of Public Utilities/City Council Meetings

- Subcommittee of the Board of Public Utilities and the Santa Rosa City Council Meeting - November 1993
- Board of Public Utilities and Santa Rosa City Council Joint Meeting - December 1993
- Board of Public Utilities (Adopted Objectives and Environmental Evaluation Criteria) - December 1993
- Board of Public Utilities Meeting to Discuss Alternatives - January 1994
- Board of Public Utilities Meeting to Select Alternatives - May 1994
- Board of Public Utilities and City Council Joint Study Session to refine the scope of work - January 1995
- Board of Public Utilities and City Council Meetings - April 1995

Scoping Meetings

- Santa Rosa - November 1994

Issues identified by the public and agencies have been organized by CEQA topic area. Each issue has associated evaluation criteria that have been recommended by CEQA and the technical

staff to determine each impact's level of significance. The following section divides each CEQA topic area into two headings:

- Issues; and
- Environmental Evaluation Criteria.

The issues are followed by a Task number (in parentheses) which indicates where the issue is addressed in the Scope of Work provided in Chapter 4. The EIR/EIS must identify each significant impact on the environment caused by each alternative. Therefore, as the Consultant Team prepares the EIR/EIS, there may be issues not identified here that will be addressed due to the results of the environmental review.

LAND USE AND AGRICULTURE¹

Issues

What are the effects on agricultural lands? (Task 39)

Are the proposed project facilities (e.g. pump stations, reservoirs) compatible with adjacent land uses? (Task 39)

Would there be a loss of open space? (Task 39)

Would irrigation and more intensive agriculture reduce the availability of these lands for wildlife use? (Task 39)

Will the General Plan assumptions regarding buildout be reexamined as a result of this project? (Task 39)

How can the City ensure that each farm would adequately maintain and manage irrigation in perpetuity? (Task 19)

How would appropriate lands for irrigation be selected? Which crops and soils are suitable? (Task 19)

What climate conditions are required for the application of reclaimed wastewater? (Task 39)

What is the need for agricultural irrigation throughout Sonoma County? Who controls the rate of irrigation? (Task 39)

What would prevent overwatering by farmers? (Task 39)

What impact does the tertiary water have on the food chain using different Sonoma County crops? (Task 39)

¹ Added in response to NOP/NOI and Scoping Meeting comments.

Would agricultural irrigation of rangelands cause increased cattle densities? (Task 19)

What effects are there in converting rangeland to cropland? (Tasks 19, 33, 39)

How would the project affect coastal beaches and recreation? (Task 39)

Environmental Evaluation Criteria

Would the project result in:

1. A land use that is inconsistent with the land use plan map of an adopted General Plan?
2. A land use that is inconsistent with the zoning?
3. The conversion of ten or more acres of prime agricultural lands or farmlands of statewide importance to non-agricultural uses?
4. The cancellation of an open space contract made pursuant to the California Land Conservation Act of 1965 (Williamson Act) for any parcel of 100 acres or more?
5. The development of an incompatible land use type in an area designated in the Mineral Resource Zone 2 classification according to the Mineral Land Classification of the California Division of Mines & Geology?
6. The introduction of inappropriate uses in a Community Separator as defined in the Sonoma County General Plan?
7. A long-term jobs/housing ratio or housing type ratio which is inconsistent with an adopted General Plan?
8. An increased potential for conflict as a result of incompatible land uses?
9. A net loss of open space?

VISUAL RESOURCES

Issues

Would there be any alterations or obstructions of views or viewsheds? (Task 37)

Is there any incompatibility with identified scenic corridors or sites? (Task 37)

Environmental Evaluation Criteria

Would the project result in:

1. Conflicts with the adopted General Plans or objectives of the appropriate jurisdictions?

2. New light and glare?
3. The obstruction of any scenic vista or view open to the public, or the creation of an aesthetically offensive site open to public view?

GEOLOGY

Issues

Soils

What are the potential impacts from reclaimed wastewater irrigation on soils due to accumulation of minerals, heavy metals, salts, and pollutants from the wastewater? (Task 35)

Seismicity

How is the system protected from massive breaks during a seismic event? (Task 35)

Does the City have insurance to cover whatever damages would take place? (Task 35)

What are the reservoir safety requirements? (Task 35)

Would geyser injection increase the possibility of seismic activity? (Task 35)

Environmental Evaluation Criteria

Would the project result in:

1. Unstable earth conditions or a change in geologic substructures?
2. Permanently disrupted, displaced, compacted or overcovered soils?
3. Substantially and permanently altered topography or ground surface relief features?
4. The destruction, modification, or covering of a unique geologic or physical feature?
5. Adverse wind or water-associated erosion?
6. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet, or lake?
7. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?
8. Any project structure (not pipeline) being located within the Alquist-Priolo Special Studies Zone or within a known active fault zone?

9. Any project structure (not pipeline) being located on soils substrate consisting of material that is subject to liquefaction or other secondary seismic hazards in the event of groundshaking?
10. Evidence of static hazards which affect structures or public safety, such as landsliding or excessively steep slopes that could result in slope failure?
11. Any project structure (not pipeline) located on soils that are likely to collapse?
12. Any project structure (not pipeline) located on soils that are characterized by shrink/swell potential that might result in deformation of foundations or damage to structures?

HYDROLOGY AND WATER QUALITY

Issues

Hydrology

Does the project increase flood potential or alter flood patterns? (Task 38)

What was the historic condition/patterns of the Laguna de Santa Rosa prior to it being drained during the summer? How much dried out? How do we know? (Task 38)

Will there be downcutting of embankments along the Russian River due to high flows? (Task 38)

What changes would occur to the current hydrology of drainages below and above dam sites? (Task 21)

What are the impacts of excess West County irrigation and reservoir seepage? (Task 38)

How would this project affect the water balance when more and more water is diverted upstream of the discharge? (Task 38)

How would the project interface with Sonoma County Water Agency (SCWA) rights and activities? (Task 38)

What impacts would water perched or leaked from dam sites have on current flows in drainages downstream from dam sites? (Task 38)

Would storage facilities be located on or off-stream; how would construction affect flows? (Task 38)

Water Quality

What is the potential impact of mixing wastewater and stormwater? (Task 21)

What are the impacts of heavy metals, salts, chlorinated hydrocarbons, trace metals, copper, and phosphates in wastewater discharges on water quality? (Task 21)

What is the quality of untreated wastewater? (Task 21)

Why is wastewater discharge appropriate in streams but not in wetlands? (Tasks 19, 21, 39)

What are the environmental effects of estrogen, silica, and algal growth? (Tasks 19, 21, 32)

What is the effect of chlorinated hydrocarbons in the Kelly Farm Demonstration Wetland? (Task 23.5)

What are considered acceptable drinking water standards? (Task 32)

What is the impact of copper in the water from corroding pipes? (Task 21)

Does wastewater contribute to virus and parasite content of the river water? To what degree? What monitoring is taking place for these? (Tasks 21, 32)

Discuss Total Dissolved Solids for the Laguna. What monitoring is taking place in the Laguna on this? How does a drought exacerbate build-up? (Task 22)

What trace metals build-up is occurring in the Laguna? Is this being monitored? Are these metals moving into the groundwater? (Task 21)

What is the total percentage of wastewater in Russian River flow at Guerneville taking ALL discharges into account? How does that impact the Department of Health recommendation of no discharge into a drinking water system? (Task 21)

What are all the various processes possible that could be added on to the current system to improve water quality? (Addressed as Mitigation - Task 40)

How can filtration be improved? Dual media filters? With carbon filters? (Addressed as mitigation - Task 40)

What tests will be conducted to determine the level of virus removal? (Task 21)

What measures would be taken to monitor, control, and eliminate excess amounts of the following: Carbon Tetrachloride, Chloroform, p-Dichloroethylene, 1,2-Dichloroethane, 1,1-Dichloroethylene, 1,2-Dichloroethylene, dioxin, PCB's, Tetrachloroethylene, Toluene, 1,1,1-Trichloroethane, Trichloroethylene (TCE), Vinyl Chloride? How many possible organics can be found in Santa Rosa's wastewater currently? What are they? How much? (Task 21)

How would the Proposition 65 and EPA priority pollutants be monitored? (Task 21)

What scientific evidence establishes that "pathogen free" wastewater is free of viruses, particularly enteric viruses? Have there been any cases of polio or Hepatitis A in the river area

for the last five years? What viruses remain in the water after chlorination and filtration? (Task 32)

How does disinfection and filtration affect *Giardia lamblia*? (Task 32)

Will the Laguna Marsh be credited for any improvements in water quality? Will organic matter be increased in the Russian River as a result of marsh development? (Task 21)

Is it possible that more advanced treatment of the wastewater could purify it to a point that it could be safely stored as drinking water (in Warm Springs Dam)? (Task 32)

How should a constructed wetland be operated to improve effluent water quality, especially to remove nutrients? (Task 21)

Are toxic pollutants accumulating in sediment or biota as a result of the existing discharge? How would each Long-Term project alternative affect the *status quo*? (Tasks 19, 21, 39)

Are there cyclical and seasonal fluctuations to be expected in the rate of absorption/discharge of nutrients and heavy metals in the Laguna/Kelly Pond? (Tasks 19, 21)

What are the effects on algal growth in the Esteros? (Task 19)

What would be the effects of nutrient loading on aquatic species, particularly commercial fisheries? (Task 19, 21)

Groundwater

There are many small wells along the Russian River that are in poor condition. Would the wastewater discharges cause the EPA to require expensive filtration systems on these wells? What would be the fiscal impact of such a requirement? (Task 30)

What are the impacts on the groundwater hydrology from seepage of irrigation water and from groundwater recharge? (Task 30)

How would the Laguna aquifer be protected from wastewater if irrigation occurs in the hills west of Sebastopol? (Task 38)

How are domestic wells affected by irrigation and wastewater disposal practices? (Task 30)

What is the feasibility/acceptability of aquifer injection in the community separator plan? (Task 22)

What impact would irrigation have on leaching organics and metals into the water? Do nitrates leach into the groundwater from irrigation in the Laguna? To what extent? What monitoring will take place for this? (Task 30)

How can wastewater be used to recharge the groundwater supply? (Task 22)

Discuss maximum conservation components and how they could be applied to any alternative. (Task 29)

Water Conservation

What are the costs and benefits of existing water conservation programs which have been implemented by the Subregional System member agencies for reduction of inside water use and wastewater flows? (Task 29)

How would cost and benefits of the existing water conservation programs be affected by additional water conservation activities relying on conventional or proven technology? (Task 29)

What are the benefits, costs, and drawbacks of implementing graywater systems, composting toilets, or other less conventional conservation technologies in the Subregional System service area? (Task 29)

Environmental Evaluation Criteria

Would the project result in:

1. Changes in currents, or the course or direction of water movements, in either marine or fresh waters?
2. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?
3. Alterations to the course or flow of flood waters?
4. Change in the amount of surface water in any water body?
5. Discharge to surface waters, or any alteration of surface water quality, including but not limited to temperature, dissolved oxygen, or turbidity?
6. Alteration of the direction or rate of flow of groundwaters?
7. Change in the quantity of groundwaters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?
8. Substantial reduction in the amount of water otherwise available for public water supplies?
9. Exposure of people or property to water related hazards such as flooding or tidal waves?
10. Increased runoff volumes that exceed the capacity of storm drain facilities, cause downstream or off-site drainage problems, or significantly alter inflows to an adjacent wetland to the extent that there is a net degradation of functions and values of aquatic habitat?
11. Stormwater discharges that exceed established water quality standards, increase erosion and sedimentation, or endanger aquatic habitats?

12. Substantial degradation of groundwater resources or interference with groundwater recharge?
13. Exceedance or non-attainment of numeric or narrative water quality objectives, criteria, or standards?
14. Significant alteration of water quality in an Area of Special Biological Significance or National Marine Sanctuary?
15. Degradation of water quality as defined in State Water Resources Control Board Resolution No. 68-16 and 40 Code of Federal Regulations (CFR) Part 131.12?
16. Savings in water use and wastewater flow consistent with the California Urban Water Conservation Council's Best Management Practices?
17. Additional water and wastewater savings necessary to meet the Subregional System treatment plant's regulatory discharge standards and compliance schedules?
18. Water use and wastewater flow reduction savings consistent with the Subregional System operating policies and objectives?
19. A constraint to the ability of individual consumers within the Subregional System service area to apply conservation practices and/or equipment which go beyond the member agency formal water conservation programs or accepted methodology (e.g. graywater systems, composting toilets, etc.)?
20. Discharge inconsistent with North Coast Regional Water Quality Control Board policies?

BIOLOGICAL RESOURCES

Issues

Terrestrial Biology

Vegetation

What is the impact of irrigation on endangered vegetation, valley oaks, and vernal pools? (Task 19)

What are the effects of salinity and water depth on eelgrass? (Task 19)

What is the possible loss of riparian habitat in the South County? (Task 19)

Are there differences between plants that thrive in a seasonal wetland versus a year-round wetland? (Task 19)

How much of each community type would be destroyed and what might replace it? (Task 19)

What are the potential impacts to vegetation and wetlands along the riparian corridor of the Russian River? (Task 19)

What impacts will occur to wetland plant communities and riparian vegetation downstream from reservoirs? (Task 19)

Wildlife

What are the estrogenic effects of treated wastewater on wildlife? (Task 19)

How is the long-term survival of rare, threatened, and endangered species affected by the wastewater discharge? (Task 19)

What is an “indicator species” or “analysis of species diversity?” (Task 19)

What are the effects of treated wastewater on arthropods and a wide range of organisms? (Task 19)

Would maintenance roads open new areas to public access thereby affecting wildlife? (Task 19)

Would maintenance roads be established in transmission line corridors to the geysers? Would this result in an impact on wildlife? (Task 23)

Could wildlife be affected by accumulation of heavy metals or other wastewater constituents in wetlands or other vegetation? (Task 29)

Vernal Pools

What are the effects on vernal pools? (Task 19)

Would this project provide any benefits to vernal pools and accompanying endangered species? (Task 19)

Aquatic Biology

Is the wastewater safe for aquatic species and for estuarine/riparian habitats? (Task 20)

What are the effects of wastewater discharge on the California freshwater shrimp population in Blucher Creek? (Tasks 19, 20)

What are the effects of direct ocean discharge or indirect via the Russian River on marine biology? (Task 20)

Migratory Fish

What are the effects on steelhead and coho from wastewater discharge? (Task 14)

What is the impact of heavy metals, chlorinated hydrocarbons, and other toxins on fish tissues and other aquatic animals and plants? (Tasks 20, 21)

Was the Laguna once a salmon or steelhead habitat? (Tasks 14, 20)

What are the effects of dams on instream fisheries below the dam site? (Task 14)

Wetlands Suitability and Irrigation Suitability

Wetlands

Are there examples of successful wetlands that have been created or restored? (Task 18)

Does the Laguna de Santa Rosa show signs of eutrophication including algal blooms that deplete dissolved oxygen at night? If so, how would a restored wetland address that condition? (Task 18)

Can Santa Rosa Plain wetlands be created in connected patches? (Task 18)

What is the smallest size of wetland that will provide “polishing?” (Task 18)

Is there potential for wetland creation or riparian creation at rapid infiltration sites? (Task 18)

What is the impact of heavy metals on wetlands? (Task 18)

Can constructed wetlands provide reliable and consistent nutrient removal regardless of seasonal changes? (Task 18)

What are the potential impacts on the Petaluma Marsh? (Tasks 18, 19)

What effects do fertilizing of agricultural lands have on wetlands? (Task 18)

What methods were used to perform the technical studies of wetlands? (Task 18)

Would there be management of releases to Blucher Creek or eastside Laguna headwater streams to avoid discharge to the Laguna during the summer seasonal discharge prohibition? (Task 18)

How should a constructed wetland be operated to improve effluent water quality, especially to remove nutrients? (Task 18)

How would wetlands be constructed to avoid “no net fill?” What percent enters the groundwater and Laguna? What is the expected irrigation life of the Laguna floodplain? (Task 18)

Does the “June 1990 Jurisdictional Wetland Delineation Report” provide adequate information? (Task 18)

What are the purposes of “created wetlands?” (Task 18)

What are the impacts of dam and reservoir construction to existing wetlands, and how would these impacts be mitigated? (Task 18)

What are the impacts of reservoir delivery and irrigation delivery pipelines to riparian wetlands (stream crossings) and seasonal wetlands? (Task 18)

What impacts to existing wetlands would result from wetlands creation and restoration? (Task 18)

Will any marshland created/restored provide ambient water temperatures and habitat suitable for anadromous fish as opposed to their competitors? (Tasks 19, 20)

What are the effects of bioaccumulation of all carcinogenic elements and compounds found in wastewater? (Task 21)

What is the potential for riparian restoration at Stemple Creek? (Task 19)

What is the potential impact on salt marshes from Tolay Creek releases? (Tasks 19, 21)

What are the impacts of Adobe Creek, San Antonio Creek, and Lichau Creek wastewater releases on the Petaluma River Slough? (Task 19)

Environmental Evaluation Criteria

Terrestrial Biology

Vegetation

Would the project result in:

1. Introduction of new species of plants into an area, or a barrier to the normal replenishment of existing species?
2. Reduction in acreage of any agricultural crop?
3. The temporary or permanent loss of vernal pools and other jurisdictional wetlands?
4. The temporary or permanent loss of riparian habitat/communities?
5. The temporary or permanent loss of native grassland?
6. The temporary or permanent loss of old growth forests?
7. The temporary or permanent loss of serpentine chaparral?
8. The temporary or permanent loss of any natural community identified as sensitive by the California Natural Diversity Data Base?
9. Increased access to areas where sensitive plant communities occur?
10. Diversion or elimination of the natural flow of water away from wetland habitats/communities?

11. Changes in community structure due to bioaccumulation, salinity, or other factors?
12. Mortality of plants meeting the definitions of Section 1901, Chapter 10 (Native Plant Protection Act), or Section 2062 and 2607 (California Endangered Species Act of the California Department of Fish and Game Code)? Plants on List 3 and List 4 of the California Native Plant Society (CNPS) Inventory will also be considered for significant impacts. (Examples of potential project effects are bioaccumulation and changes in salinity.)
13. Loss or degradation of trees included in the Sonoma County Tree Ordinance or any city tree ordinance that may apply?
14. Bioaccumulation of compounds, metals, toxic substances, etc., in crops beyond the acceptable levels defined by law?

Wildlife

Would the project result in:

1. Changes to the diversity of species or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, or insects)?
2. Introduction of new species of animals into an area, or a barrier to the migration or movement of animals?
3. The deterioration of existing fish or wildlife habitat?
4. Blockage or fragmentation of important wildlife migration or travel corridors?
5. Substantial loss of habitat diversity or habitat value?
6. Bioaccumulation of pollutants to adverse levels in the tissues of wildlife?

Rare, Threatened and Endangered Species

Would the project result in:

1. Substantial effects to rare or endangered plant or animal species or the habitat of the species as defined by Section 15380 of the State CEQA Guidelines:
 - "Endangered" when its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors; or
 - "Rare" when either:
 - a) Although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or

- b) The species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as that term is used in the Federal Endangered Species Act.
- A species of plant or animal shall be presumed to be rare or endangered if it is listed in:
 - a) Section 670.2 or 670.5, Title 14, California Administrative Code; or
 - b) Title 50, Code of Federal Regulations Sections 17.11 or 17.12 pursuant to the Federal Endangered Species Act as rare, threatened, or endangered.
- A species not included in any listing identified above shall nevertheless be considered to be rare or endangered if the species can be shown to meet the criteria associated with "Endangered" or "Rare" species.

Aquatic Biology

Fisheries

Would the project result in:

1. A significant reduction in fish or shellfish production, or a change in species diversity?
2. Bioaccumulation of pollutants to adverse levels in the tissues of aquatic life?
3. A significant risk to aquatic life in a National Marine Sanctuary or National Wildlife Refuge?

Invertebrates

1. Would the project affect zooplankton or larger invertebrates?

Wetlands Suitability and Irrigation Suitability

Wetlands

Would the project result in:

1. Construction in wetlands unless there is no practicable alternative and the proposed action includes all practicable measures to avoid or minimize harm to wetlands and to mitigate for impacts to provide no net loss of wetlands acreage, function, or value (Clean Water Act, Section 404 (b)(1))?
2. Effects on significant riparian, marsh, or other wetland wildlife habitat?
3. Contribution to the conversion of saltwater wetlands that support special-status species to freshwater wetlands?

4. Inconsistencies with Executive Order 11990 - Protection of Wetlands?
5. Violation of the Clean Water Act Section 404(b)(1) guidelines or failure to meet the following standards of the National Environmental Policy Act (NEPA):
 - produces minimal cumulative effect;
 - does not violate State Water Quality standards or toxic effluent standards;
 - does not jeopardize rare, threatened, or endangered species; and
 - does not adversely affect resources within a National Marine Sanctuary?

CULTURAL AND HISTORICAL RESOURCES

Issues

Would the project come into contact with or have the potential to affect known historic or archaeological sites? (Task 36)

Environmental Evaluation Criteria

Would the project result in:

1. Damage to an important archaeological resource? For the purposes of CEQA, an “important archaeological resource” is one which: (*CEQA, NEPA, National Register of Historic Places*):
 - Is associated with an event or person of:
 - a) Recognized significance in California or American history; or
 - b) Recognized scientific importance in prehistory.
 - Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable historical or archaeological research questions.
 - Has special or particular quality such as oldest, best example, largest, or last surviving example of its kind.
 - Is at least 100 years old and possesses substantial stratigraphic integrity.
 - Involves important research questions that historical research has shown can be answered only with archaeological methods.
2. The alteration or destruction of a prehistoric or historic archeological site?
3. Adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?
4. A physical change that would affect unique ethnic cultural values?
5. The restriction of existing religious or sacred uses within the potential impact area?

PUBLIC SAFETY AND HAZARDS

Issues

What are the potential human health impacts of contact with or ingestion of treated wastewater? (Task 32)

Is there an increased risk of cancer for persons exposed to treated wastewater? (Task 32)

Would health sensitive receptors, such as children, the elderly, the ill, and the disabled, be affected by exposure to treated wastewater? (Task 32)

Are there estrogenic compounds in treated wastewater? How may these compounds affect human life? (Task 32)

Would irrigation with treated wastewater expose persons to hazardous levels of metals, organics, bacteria, or other pathogens? (Task 32)

How would the discharge or reuse of treated wastewater affect drinking water sources such as those used by the Sonoma County Water Agency? (Task 32)

Would the reuse of treated wastewater result in an increase in mosquitoes and other pests? Would there be an increase in mosquito-borne diseases? (Task 32)

Would the project expose the public or workers to hazardous materials wastes? (Task 32)

What crops and soils are suited to the existing quality of the wastewater? (Task 32)

Environmental Evaluation Criteria

Would the project result in:

1. Reclaimed water that exceeds California Title 22 standards for unrestricted use?
2. Rates of discharge to the Russian River unacceptable to the Department of Health Services and that exceed North Coast Regional Water Quality Control Board standards?
3. Reclaimed water discharges that cause drinking water standards to be exceeded at drinking water supply intakes?
4. Undiluted reclaimed water that exceeds EPA and California Department of Health Services primary drinking water standards for organic and inorganic chemicals?
5. Undiluted reclaimed water that exceeds human health objectives established by State and Federal law?
6. Project distribution facilities being located in areas known to be contaminated with hazardous materials?

Refer to Sections 3.1 and 3.2 for Environmental Evaluation Criteria related to water quality, geologic hazards, and flood hazards.

TRANSPORTATION

Issues

What would construction effects on traffic be? (Task 39)

Environmental Evaluation Criteria

Would the project result in:

1. Levels of service (LOS) at unacceptable levels (below LOS "D") at existing intersections or on arterial roadways?
2. Traffic increases along arterials or at intersections currently operating at unacceptable levels?
3. Alterations to the existing patterns of circulation which overly restrict the movement of people or goods?
4. Potential increase in traffic hazards to motor vehicles, bicyclists, or pedestrians?
5. Construction activities resulting in unsafe operating conditions for vehicular traffic?
6. Construction activities resulting in substantial delays to vehicular traffic?
7. Construction unduly restricting access to properties adjacent to the construction zone?

AIR QUALITY

Issues

What are the secondary air quality impacts at the geysers due to continued operation (i.e., higher sulfur emissions)? (Task 39)

Would there be an effect on the existing emissions with expansion of the wastewater treatment headworks? (Task 39)

What are the effects on air quality from construction? (Task 27)

Environmental Evaluation Criteria

Would the project result in:

1. A violation of ambient air quality standards?
2. The contribution of any criteria pollutants in a non-attainment area?

3. Exposure of sensitive receptors to substantial pollutant concentrations?
4. A significant health risk above the typically accepted cancer risk of 1 in 1 million?
5. The creation of objectionable odors?
6. Non-compliance with the Bay Area Air Quality Management District's Rules and Regulations?
7. The alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?

NOISE

Issues

None identified.

Environmental Evaluation Criteria

Would the project result in:

1. Noise levels that exceed the maximum allowable dB for the project or adjoining areas?
2. Substantially increased noise levels in areas of sensitive receptors (i.e., residences, schools, libraries, churches, etc.)?
3. Proposed land uses that are incompatible with ambient noise level standards?
4. Construction noise?

PUBLIC SERVICES AND UTILITIES

Issues

Would increase in groundwater mounding result in septic system failures and well contamination? (Task 30)

What are the direct and indirect impacts of pipelines and structures on the environment? (Task 39)

How many sewer hookups presently exist and how many future hookups are planned? (Task 39)

How much wastewater is generated per person vs. total wastewater discharge? (Task 39)

Differentiate between industrial, commercial, and residential sewage flow totals and describe quality of each. (Task 21)

Environmental Evaluation Criteria

Would the project result in:

1. An increased demand for public services or utilities which exceeds existing supply or capacity of the existing infrastructure system?
2. Increased deterioration and therefore increased maintenance of existing utilities infrastructure?
3. Exceedance of published national, State, or local standards relating to solid waste or litter control?

RECREATION

Issues

Is there an impact on water-oriented recreation due to changes in water quality? (Task 39)

Environmental Evaluation Criteria

Would the project result in:

1. An increased demand for recreational facilities and services that exceeds existing supply or capacity of the existing recreational system?
2. Increased deterioration or increased need for maintenance of existing recreational facilities?

POPULATION, HOUSING, AND EMPLOYMENT

Issues

What are the most accurate population projections? (Task 33)

Is there a market for the tertiary treated wastewater? (Task 33)

Will Santa Rosa Utilities customers bear the real cost of a truly balanced system without damaging rural resident's systems or the quality of the environment? (Task 33)

What are the cost criteria and how are they established? (Task 33)

Is it economically feasible to have multiple small facilities? (Task 33)

Is the existing construction and design of the sub-regional treatment plant appropriate for the optimum range of long-term alternatives? (Task 33)

What revenues are generated from residential, industrial, and commercial sewage producers, and what is produced from hookup fees? (Task 33)

What are the present operating costs in terms of land, labor dollars, and energy? (Task 33)

What are the future cost estimates in terms of land, labor dollars, and energy? (Task 33)

What is the cost per million gallons to treat sewage effluent? (Task 33)

What are the penalties and fines for sewage spills? (Task 33)

What about a phased implementation of small incremental improvements in treatment and storage so as to allow flexibility as wastewater technologies advance and gain public acceptance? (Task 33)

What is the existing economic viability of each of the irrigation sites? (Task 33)

How will market conditions affect the long-term viability of these crops and farms? (Task 33)

If the water cannot be sold under long-term contracts, what are the implications? (Task 33)

Identify which crops are not suitable for reclaimed water. (Tasks 18, 39)

How will marketing of the wastewater impact the economics of the project? (Task 33)

What are the growth inducing effects of the project, and how do they relate to local growth policies? (Task 33)

What is the impact of the project alternatives on the local agricultural economy? (Task 33)

Would the project have an impact on jobs/housing conditions in the area? If so, what are these impacts likely to be? (Tasks 33, 39)

What is the energy cost per million gallons to treat sewage effluent? (Task 39)

In times of drought, what measures can be taken to minimize paying farmers for use of this precious resource? (Task 33)

Would reservoir sites result in visual/odor effects that would affect nearby housing values? (Tasks 21, 33)

Are there economic impacts to fishing/shellfish industries due to potential loss or reduction of species numbers? (Tasks 20, 33)

Environmental Evaluation Criteria

Would the project result in:

1. Development beyond the capacity planned for in the General Plans of the communities in the Subregional System?
2. Onerous financial burden on rate payers as a result of increased demand fees and/or service charges?
3. Constraining the development of new housing and thereby limiting the affordable housing opportunities?
4. A physical element or division that adversely affects property values or development patterns?
5. Impacts to local or regional economies that cause specific industries to no longer be viable?

ENERGY

Issues

How much energy would be required to pump wastewater to the Geysers? (Task 39)

Discuss economic costs of using wastewater to generate power. (Task 39)

Discuss Geyser power generation vs. other means to meet future needs. (Task 39)

Environmental Evaluation Criteria

1. Would the project result in the use of substantial amounts of fuel or energy?

CUMULATIVE IMPACTS

Issues

What are the cumulative impacts of all discharges into the Russian River for the life of the project? (Task 39)

PROJECT DESCRIPTION

Issues - Components

Russian River Discharge (0 - 20%)

What is the percentage of flow that is used to determine the five percent discharge? (Task 39)

Why would early releases of effluent in October not affect beneficial uses (in EIP project description) but later releases would? What are the impacts on all beneficial uses of discharging at five percent when the river is at low flow and the weather is warm?

4. SCOPE OF WORK

The following Scope of Work identifies the known tasks required to prepare and complete the Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The Scope of Work is organized by the major phases of the project: Management and Meetings, Project Design, Administrative Draft EIR/Administrative Draft EIS (ADEIR/ADEIS) and Special Studies, Draft EIR/Draft EIS (DEIR/DEIS), Final EIR/Final EIS (FEIR/FEIS), and Permitting.

The special studies presented in the Scope of Work have been designed to address by the issues identified by the consulting team, city project team, the public, and interested agencies through the initial phases of the Scoping Process. The outline provided below identifies the major phases of the Scope of Work and the tasks that fall under those phases. This outline has been modified to reflect the changes in the revised scope during the scoping period. Task numbers have changed since the Preliminary Scoping Report and reassigned to the special studies, Administrative EIR/EIS, Draft EIR/EIS, Final EIS, and Permitting Report (Tasks 18-46).

MANAGEMENT AND MEETINGS

Task 1 Step I & II Project Management through April 1996
 Task 2 Public Involvement Step I and II Through April 1996

SCOPING

Task 3 Review Existing Documents
 Task 4 Analyze Results of Ongoing Studies
 Task 5 Prepare Project Alternative Evaluation Criteria
 Task 6 Conduct Field Reconnaissance
 Task 7 Identification and Screening of Alternatives
 Task 8 Meetings with Regulatory Agencies
 Task 9 Develop Initial Study
 Task 10 Identify and Summarize Permitting Requirements
 Task 11 Identification of Additional Studies
 Task 12 Prepare Notice of Preparation (NOP) and Notice of Intent (NOI)
 Task 13 Prepare Scoping Report and Identify Cost for Step II
 Task 14 Migratory Fish Study/Migration Monitoring
 Task 15 On-Call Services

PROJECT DESIGN

Task 16 Aerial Photographs
 Task 17 Access to Private Lands (through April 1996)
 Task 31 Engineering Design - Facilities Plan of Alternative Projects

SECTIONS OF THE ADMINISTRATIVE DRAFT EIR/EIS AND SPECIAL STUDIES

Task 18 Wetlands Determination, Irrigation Suitability and Created Wetlands
 Task 19 Terrestrial Biological Studies
 Task 20 Aquatic Biological Studies
 Task 21 Water Quality - Stream Characterization
 Task 22 Groundwater Recharge/Aquifer Storage and Recovery Potential
 Task 23 Refinement of Alternative Component Sites
 Task 24 Preparation of U.S. Army Corps of Engineers 404 Permit Application
 Task 25 Russian River Environmental Studies
 Task 26 NOAA Research Permit Application
 Task 27 Sediment Quality Characterization
 Task 28 Russian River Water Quality
 Task 29 Water Conservation
 Task 30 Assessment of Groundwater Impacts
 Task 32 Drinking Water Impacts
 Task 33 Socio Economics
 Task 34 Potential Impacts of Wastewater on Wetlands
 Task 35 Geotechnical Engineering
 Task 36 Cultural and Historical Resources
 Task 37 Land Use and Visual Resource Analysis
 Task 38 Hydrology Special Studies
 Task 39 EIR/EIS Sections

DRAFT EIR/EIS

Task 40 Preparation of Administrative Draft EIR/EIS
 Task 41 Draft EIR/EIS

FINAL EIR/EIS

Task 42 Final EIR/EIS Environmental Working Paper

The scope of services modifications are identified as follows, an underline represents text added and ~~strike through~~ represents text removed.

TASK 1 STEP I & II PROJECT MANAGEMENT THROUGH APRIL 1996

City Involvement

The Consultant shall provide for the involvement of the designated City Staff in the environmental documentation process. Time shall be scheduled for the City's review of intermediate and final work products.

Project Manager/Technical Director/City Kickoff Meeting

A project kickoff meeting is to be held between the City and Consultant's Project Manager and Technical Director.

Agency/Consultant Kickoff Workshop

Consultant will coordinate a kickoff workshop for the project team, agency representatives and interest groups. The purpose of the workshop is to receive training from Urban Alternatives, to become familiar with the City Staff, U.S. Army Corps of Engineers staff, and responsible agency staff, and to discuss the available data, technical managers' initial assessment of the adequacy of the data, data gaps, additional required technical work, setting sections, project and project alternatives.

Project Mailing List

Consultant will maintain the project mailing list which includes identified Potential Affected Interests (PAIs). This list will be included as an appendix in the Draft and Final EIR/EIS.

Library Catalogue

Consultant will maintain the library and data catalogue throughout the process as a project management function.

Correspondence Database

Consultant will maintain a database of the correspondence received from March 1993 through completion of the Draft EIR/EIS, November 1995. ~~Step I-~~ The database will consist of, at a minimum, author, date, and topic of content.

Progress Reports/Monthly Project Status Meetings

The Consultant will prepare a brief monthly progress report summarizing the project budget, schedule, progress, and significant management issues to be addressed, if any. The Consultant and City will conduct monthly project management meetings to review the progress reports and resolve issues.

Peer Review Committee

The Peer Review Committee (PRC) will meet during Step I to strengthen the technical adequacy and objectivity of the technical engineering and environmental studies, conceptual facilities planning and habitat studies, EIR/EIS impact conclusions and mitigation measures, and further insure public and agency acceptance. These individuals will not participate in the preparation of the EIR/EIS or day-to-day preparation of the technical studies and plans. Their role is to independently review the work plans and draft products of the facilities plans and environmental studies and the conclusions of the studies and EIR/EIS in terms of significance of impacts and effectiveness of mitigation measures. This panel will provide an independent review of critical documents before public release.

The Peer Review Committee (PRC) will review Step II technical reports and the Administrative DEIR/EIS for technical adequacy. The PRC will provide an independent critical review of documents before public release.

Robin Cort, Ph.D., Technical Director for the Consultant, will serve as the chair of the committee and will facilitate its input and review. She will have no voice in the Committee's proceedings. This Committee will advise the City, The U.S. Army Corps of Engineers, and the Consultant. Their recommendations will be submitted to the City.

The local issues representative of the Peer Review Committee will attend the Technical Review Group (TRG) meetings as the representative of the PRC. The local issues representative may, with the City's written authorization, attend meetings of local groups or committees for the purpose of keeping the Project Team and Peer Review Committee apprised of local issues.

TASK 1		SUMMARY	
Product	Medium	Pages	
		(through April 96)	
Mailing List Maintenance (quarterly/12 copies/80 pages)	Print	17,280 4800	
Library Catalogue Maintenance (quarterly/12 copies/15 pages)	Print	3,240 900	
Progress Report (1 per month/6 copies each/10 pages)	Print	3,462 1200	
Meetings		Number	
Agency/Project Manager/Technical Director Kickoff (1 day) (<u>completed</u>)		1	
Agency/Consultant Kickoff (2 days) (<u>completed</u>)		1	
City/Project Management Meetings (<u>1 day/2 professionals</u>)		38 18	
Consultant Management Meetings (<u>1 day/2 professionals</u>)		38 18	
Peer Review Committee (<u>1 day - 9 Professionals</u>)		42	
PRC Representative attendance at TRG Meetings		23 13	
PRC Representative attendance at local groups		as authorized	

TASK 2 PUBLIC INVOLVEMENT STEP I AND II THROUGH APRIL 1996

City Committee Meetings

The Consultant will meet with the City and its public involvement consultants, and the Technical Review Group (TRG), Technical Advisory Committee (TAC), Policy Advisory Committee (PAC), and City Staff Wastewater Team during the development of the initial study/checklist (as supplied by the City) and environmental assessment of the alternatives. The Consultant will continue to meet with these committees through the development of the Draft EIR/EIS.

Interest Group Meetings

The Consultant will also participate in additional meetings and discussions to solicit input from interested individuals on related issues/concerns.

Public Outreach

The Consultant shall provide the public outreach consultant (Urban Alternatives) with the basic information needed to support the public outreach program, including input for fact sheets, input for up to four issue papers at four pages each and display boards, participating in field trips, and conducting small meetings or presentations to individual groups to respond directly to requests for information for the public outreach program. A separate set of display boards will be prepared to illustrate the BPU selected alternatives.

Alternative Development Workshop

At the conclusion of the review of Previous Alternatives, the Consultant Team will meet with the City to develop any new alternatives which are appropriate to assure that all potential alternatives have been brought into the process.

Alternatives Workshops

The Consultant will coordinate with Urban Alternatives in the preparation for the three sets of workshops. Workshop 1 will present the Draft Project Alternative Evaluation Criteria. Workshop 2 will present the Alternative Screening Information and will result in an initial ranking of alternatives. Workshop 3 will present the Most Feasible Alternatives and will result in alternatives recommendations. The City Staff will select the alternatives to be evaluated in Step II. For each workshop, the Project Manager and Technical Director will review the draft feedback reports prepared by Urban Alternatives and make written recommendations. The Consultant will attend a pre-workshop dry run for each of the three (3) sets and will participate in each workshop.

Scoping Meeting

The Consultant will coordinate the presentation for the Scoping Meeting. The Project Manager and Technical Director will participate in the Scoping Meeting.

Fisheries Tour/On-Call Fisheries Advice

A one day tour of the fisheries will be conducted to familiarize the public with the study methods and streams of the fisheries studies. A meeting will be held to review the scope of work and determine if the study program in Task 14 requires modification.

The Consultant Team fisheries director will be available to the City for attending meetings and providing data and information to the City on the fisheries program.

Vernal Pool Task Force

Coordination with the Vernal Pool Task Force and with CH2M Hill on the evaluation of the vernal pools resource of the Santa Rosa Plain through April 1996. ~~November 1994~~.

RWQCB's Water Quality Monitoring Coordinating Committee

To avoid duplication of monitoring effort, and to seek an equitable distribution of monitoring costs, Consultant will participate in the RWQCB's Water Quality Monitoring Coordinating Committee.

Russian River Water Quality Model Development Workgroup

An existing Russian River water quality model developed by the North Coast RWQCB will be modified by Merritt Smith Consulting through participation in RWQCB's Russian River Water Quality Modeling Workgroup.

BPU Meetings

The Consultant will attend two BPU meetings a month to provide updates on the EIR/EIS process and to receive direction concerning issues requiring a policy decision.

BPU/CC Liaison Committee Meetings

The Project Manager and/or Technical Manager will attend the monthly BPU/CC Liaison Committee meeting.

Technical Advisory Committee (TAC)

The Project Manager and/or Technical Manager will attend the monthly TAC meeting. The TAC is a committee made up of the public works directors for all the Subregional Member Cities.

Policy Advisory Committee (PAC)

The Project Manager and/or Technical Manager will attend the monthly PAC meeting. The PAC is a committee made up of City Council representatives from each Subregional member city.

Technical Review Group (TRG) (through April 1995)

The Project Manager and/or Technical Manager will attend the monthly TRG meeting. This group consists of responsible and interested agencies in the Subregional Long-Term Wastewater Project. The purpose is to discuss the technical concerns of the agencies and to establish early communication with the agencies and interest groups.

Information Requests

The Consultant will respond to approximately 200 requests for information.

Additional Meetings

The members of the Consultant Team will be available to attend two hundred forty two (242)~~One hundred and twelve (112)~~ additional unscheduled meetings per the budget established in this Task. Consultant will receive the City's written authorization for any unscheduled meetings.

TASK 2 SUMMARY

Product	Medium	Copies
Fact Sheet input (2 pages each)	Print	10
Issue Papers (4 pages each)	Print	4
Display Boards (5 boards/3 sets)	Print	15
Feedback Report Review	Print	3

Meetings	Number
<i>Scoping Meeting (combined State and Federal, 1 day, 2 professionals)</i> <i>(completed)</i>	1 29 16
Technical Review Group (1 day each, 4 professionals)	26 13
Technical Advisory Committee (1 day each, 4 professionals)	24 11
Policy Advisory Committee (1 day each, 4 professionals)	15
Interest Groups Meetings & Field Trips (1 day each, 3 professionals)	200
Information Requests (by phone @ 1/2 hour each)	20
<i>Alternatives Workshop (1 day each, 4 professionals) (completed)</i>	
Vernal Pool Task Force (1 day each, 1 professional)	19 9
RWQCB Water Quality Monitoring Coordinating Committee (1 day each, 1 professional)	7 2
RWQCB Russian River Water Quality Model Workgroup (1 day each, one professional)	3
City Wastewater committee (1 day each, 2 professionals)	51 38
Unscheduled Meetings (1 day, 1 professional)	250 108
<i>Fisheries Tour (1 day, 5 professionals) (completed)</i>	1
<i>Alternative Development Workshop (1 day, 16 professionals) (completed)</i>	1
<i>Board of Public Utilities Meetings (1 day, 2 professionals)</i>	32 6
<i>BPU/CC Liaison Committee Meetings (1 day, 2 professionals)</i>	14

TASK 3 REVIEW EXISTING DOCUMENTS

The Consultant will collect, copy and create two libraries of the available material relevant to the Santa Rosa Long-Term Wastewater Project. Documents will be collected from various agencies, consulting firms and the City of Santa Rosa. One library will be at the Laguna Wastewater Treatment Plant and the second library will be maintained at the HBA Santa Rosa Office.

Consultant will make available at the HBA Library the relevant data to the appropriate technical managers. The Consultant will then review the existing data and sources to optimize the use of available data.

The Consultant shall review existing documents on the history of the project and compile pertinent information for the development of a thorough evaluation of alternatives considered to date, and to summarize and use pertinent baseline data on the environmental setting, environmental data, and previous assessments which may be applicable. The intent is to optimize the use of available information to establish the basis for the new EIR/EIS.

Note: The following text was previously in Task 4

Two studies currently being conducted by CH2M Hill will be evaluated. One study is a steelhead fish migration study to evaluate the impact of discharge to the Laguna at the 5 percent Russian River discharge rate. The other ongoing study is a study of water quality in the Laguna to characterize the water quality impact of current discharges.

The studies include: laboratory-conducted avoidance studies; fish counts in the upper watershed and fish trapping in the Lower Laguna to evaluate the impact of variable Russian River reclaimed wastewater discharge rates on steelhead migration; and continued routine water quality monitoring to characterize the impact of current discharges.

These studies will be completed and delivered to the Consultant by the City prior to commencement of Task 4 as shown in the schedule. The results of these studies will be compared by the Consultant with available data from previous years for use in determining what, if any, studies are needed, and will be summarized and incorporated into the initial study.

The Consultant will prepare the Baseline Data Report which lists, by CEQA/NEPA topic, the data to be utilized in the Step I and II reports.

The Consultant will catalogue the electronic, mapped and textual information provided by the City and maintain the data in a project library at Consultant's office and at the Laguna Wastewater Treatment Plant. Consultant will maintain the library and data catalogue throughout Step I.

TASK 3 SUMMARY

Product	Medium	Copies
Project Library Catalogue, initial	Print	20
Administrative Baseline Data Report	Print	20
Baseline Data Report	Print	20

TASK 4 ANALYZE RESULTS OF ONGOING STUDIES

Note: Task 4 is incorporated in Task 3.

TASK 5 PREPARE PROJECT ALTERNATIVE EVALUATION CRITERIA

The basic objectives of the project have been defined by the City. A set of project alternative evaluation criteria will be developed to accompany these project objectives. These evaluation criteria (or goals if there are no quantifiable criteria) should be forward looking to the year 2010. (See Screening Report which translates objectives to criteria.)

The basic environmental goals are to comply with existing environmental quality regulations adopted by federal, state, and local agencies. These may consist of applicable policies, numeric water and air quality standards, basin plan water quality objectives, drinking water standards, Coastal Commission policies, DHS guidelines, EPA Best Management Practices, local agency policies, etc.

The environmental criteria used shall be developed by the Consultant based on prevailing and anticipated regulatory criteria (air quality, water quality, waste disposal, groundwater, public health and safety, etc.); land use (general plans and zoning); water quality protection policies and regulations (basin plans); and natural resource management objectives (NOAA) marine sanctuary, California Department of Fish and Game, etc.). Other criteria may be appropriate and may be based on those identified in past EIRs and planning documents, discussions with various regulatory agencies, consultation with interested parties, and the City and other local and regional agencies.

The Consultant will also develop the set of engineering criteria that will be used to screen alternatives for manageability, reliability, and feasibility in Step I and to more fully evaluate alternatives in Step II. This list of criteria will be submitted to the City by the Consultant. A meeting will be held to fully discuss each criterion and arrive at a consensus on a final list. This meeting will be approximately a 4-hour session attended by the Consultant, project manager, the deputy project manager, and the technical director for engineering. The Consultant will utilize to the maximum extent, materials developed to date by the City and previous consultants. However, to maintain objectivity, the Consultant will review past information that is being utilized for applicability and appropriateness. For the Step I screening, the alternatives will not have been developed to a facilities planning level; thus the screening evaluation will necessarily need to be based on experience, judgment, and order-of-magnitude data concerning conceptual costs. For the Step II evaluation of alternatives in the Draft EIR, the alternatives carried forward from Step I will have been developed to facilities planning level and project components identified, sized, located, and conceptually costed. This evaluation will allow a higher degree of quantification than the screening analysis. Additionally, as in the screening analysis, previously generated data will be utilized subsequent to Consultant review for applicability and appropriateness. It is envisioned that the criteria used in the screening analysis will also be used in the Step II evaluation. However, the criteria will be readdressed at a shorter 2-hour workshop to arrive at a consensus on the list of criteria. The same Consultant members will attend.

TASK 5 SUMMARY

Product	Medium	Copies
Administrative Draft Project Alternative Evaluation Criteria	Print	50
Draft Project Alternative Evaluation Criteria	Print	50

TASK 6 CONDUCT FIELD RECONNAISSANCE

After familiarization with the various project elements and proposed alternatives sites for the various reports, the Consultant will coordinate three days of field reconnaissance to view the sites, and will perform preliminary assessments of potential impacts. In addition, the manner in which the sites may be acquired will be addressed.

The Consultant will conduct preliminary assessments of impacts using a field evaluation form based on the environmental evaluation criteria prepared in Task 2. ~~The field notes will be used to prepare the preliminary evaluation. The field notes and preliminary evaluation will be presented in the Field Evaluation Report.~~ The field notes will be summarized in the Screening Report. A report discussing acquisition options and a matrix which lists acquisition options by potential site will be prepared.

TASK 6 SUMMARY		
Products	Medium	Copies
Draft Field Evaluation Report	Print	50
Field Evaluation Report	Print	50
Draft Acquisition Options Report	Print	50
Acquisition Options Report	Print	50
Meetings		Number
Field Reconnaissance Tours (1 day each)		3

TASK 7 IDENTIFICATION AND SCREENING OF ALTERNATIVES

A key task in Step I process is developing a well defined project and alternatives for evaluation. A large number of alternative have been considered over the years, and in light of the recent regulatory changes which have prompted re-evaluation of this project, a review of previously evaluated alternatives with consideration of current and potential future regulatory and policy changes will be prepared. The Consultant shall develop a listing of alternatives and the various sites and components which have been described in past documents. These alternatives shall be mapped on 22 sheets at a scale of 1"=2,000, a reduction of the large maps to an 8 1/2"X11" size, and on a single mounted map to show their geographic range and location.

The Consultants shall prepare the following documents: Alternatives Considered Previously, Alternatives Considered from March 1993, Alternative Components and the Alternative Workbook in preparation of the Round Two workshop.

The Consultants shall prepare a report that summarizes the information received from the public during the first and second Round of public workshops held in the initial Scoping phase of Step I. The Summary of Preliminary Wastewater Management Alternatives Report shall compile complete alternatives from the suggested alternatives and components. This document will encompass up to 32 alternatives and 68 components.

The Consultant shall attend two workshops with staff to identify and refine suggested alternatives. The preliminary mapping of the General Plan land uses on the 1" = 2,000' maps shall occur in Step I to provide information available of existing land uses at the proposed wastewater components. The land use maps will be utilized to screen the alternatives.

The conceptual costs and associated impacts of the various alternatives shall be compiled environmental screening analysis which shall be prepared to provide an assessment of the level of environmental information available to assess a particular alternative and the alternative's potential impact on the environment. The Screening Report will evaluate the alternatives and components equally by topic area using the adopted objectives, evaluation criteria and the CEQA Checklist in order to assist in the "mix and matching" of components to make up alternatives. Discussions will be provided for each component and alternative which identify key issues, background information, and data gaps. If the need for additional information is indicated, then the exact nature of the required information shall be identified. A detailed discussion of the screening process shall be prepared and used in the development of a statement of initial conclusions discussing the reasons that various alternatives are proposed for further evaluation and why others are not.

In order to determine the conceptual cost of the alternatives, the Consultant engineering staff will identify preliminary pipeline corridors between all of the proposed reservoirs and discharge points. Once the preliminary draft is completed, the document will be circulated for review and comment to the TRG, City staff, Peer Review Committee, and focus group. Three workshops will be held to compile and discuss recommended changes to the Screening Report. Up to five members of the Consultant Team will be required to attend to provide their technical expertise.

The Summary of the screening analysis shall be used as an attachment to the NOP and NOI. This shall form the basis for public input on the alternatives to be evaluated which are found to be feasible.

Early Preparation of Environmental Setting/Project Descriptions. The Consultant will prepare the first draft environmental setting for each CEQA/NEPA topic area and will prepare the first draft of the project descriptions during the preparation of the alternative evaluation criteria. These drafts are prepared at this time to identify data gaps, to establish impact evaluation criteria and to establish analysis methodology. The consultant will prepare a draft Glossary to be incorporated in the EIR/EIS.

TASK 7 SUMMARY		
Products	Medium	Copies
Administrative Draft Setting	Print	50
Draft Setting	Print	50
Alternatives Considered Previously	Print	50
Alternatives Considered from March 1993	Print	50
Alternative Components	Print	50
Alternative Workbook	Print	50
Summary of Preliminary Wastewater Management Alternatives	Print	50
Draft Screening Report, Volumes I, II, III, IV	Print	50
Screening Report, Volumes I, II, III, IV	Print	50
Previous Alternatives Map	Mylar/blackline	
New Alternatives Mapping	Mylar/blackline	
Land Use Map	Mylar/blackline	
Meetings		Number
Consultants & Staff Meeting to Develop Alternatives (1 day, 2 professionals)		3

TASK 8 MEETINGS WITH REGULATORY AGENCIES

The Project Manager, Technical Director and Technical Managers will confer with the appropriate Regulatory Agencies having permitting or approval authority over the project to determine the status of present requirements and agency information needs. Meeting notes will be prepared focusing on application requirements, permit scheduling, existing regulations, proposed regulations, potential regulations, agency information requirements and agency information preferences. A report which summarizes the findings will be prepared. The Report will be organized by agency and cross referenced by CEQA/NEPA topic area. This report will be utilized in preparing the reports required by incorporate the permitting requirements report and identification of additional studies.

TASK 8 SUMMARY

Product	Medium	Copies
Agency Requirements and <u>Permitting</u> Report	Print	50
Meetings	Number	
Agency Meetings (17 regulatory agency meetings, 8 follow-up meetings)	25	
Background Interviews of Key Staff by Urban Alternatives	6	

TASK 9 DEVELOP INITIAL STUDY

The Consultant shall prepare an initial study ~~and environmental assessment checklist~~ (combined to meet requirements of ~~both~~ CEQA ~~and~~ NEPA) for each of the proposed alternative reclaimed water use areas, storage sites, and pipeline corridors and each of the contingency plan elements. These will be used to complete combined CEQA initial study for use in the NOP. Each project/alternative component group will be separately evaluated.

TASK 9 SUMMARY

Product	Medium	Copies
Draft Initial Study	Print	50
Initial Study	Print	50

TASK 10 IDENTIFY AND SUMMARIZE PERMITTING REQUIREMENTS

The Consultant will ~~utilize the Agency Requirements and Needs Report~~ to identify the permitting requirements for each of the alternatives to be evaluated in the EIR/EIS in matrix form. The matrix will identify each responsible agency, review agency, the permits required, key data or application requirements, and a realistic schedule to process the applicable permits. A critical path chart will be developed to show the sequencing and inter-relationships of these permit requirements and the EIR/EIS process and determine a schedule which will meet the project's ultimate needs. The environmental documentation needs of each permit or approval will be determined so that applications are complete and avoid unnecessary processing delays. The permitting requirements will be incorporated in to the Agency Requirements and Permitting Report in Task 8.

TASK 10 SUMMARY

Product	Medium	Copies
See Task 8	Print	50

TASK 11 IDENTIFICATION OF ADDITIONAL STUDIES

Based on the review and analysis of the results of ongoing public involvement studies, identification of permit environmental documentation and key issues that need to be addressed in the EIR/EIS, the Consultant shall identify the need for and extent of additional studies or continuation of studies as necessary for the environmental review process documents or permit applications. See the description of additional studies under Step II for anticipated studies which may be needed. Where possible, specific recommendations as to the nature, location, extent, and cost of such studies will be prepared.

The identification of up to 28 reservoir sites and 33 alternatives which cover most of Sonoma County, the results of the inventory of the Natural Diversity Data Base, and meetings with the Corps of Engineers, Fish and Wildlife, and Fish and Game require identification and refinement of biological (wildlife and fisheries) studies. There will be two meetings with COE, one meeting with USFWS and CDFG to identify agencies concerns and protocol requirements. Information to determine the required studies include: Natural Diversity Data Base, USFWS and CDFG protocol, field visits and existing documents. Preliminary habitat mapping will be prepared to be used in the Screening Report and scoping of the additional studies.

TASK 11 SUMMARY

Product	Medium	Copies
Report <u>Memorandum</u> on Need for Additional Studies	Print	20
Habitat Mapping	Print Blackline	1

TASK 12 PREPARE NOTICE OF PREPARATION (NOP) AND NOTICE OF INTENT (NOI)

The Consultant shall coordinate with the City and the Corps of Engineers the preparation and distribution of the NOP and NOI. The Corps will be responsible for distribution of the NOI to federal agencies and the City will be responsible for distribution of the NOP in compliance with CEQA.

TASK 12 SUMMARY			
Products		Medium	Copies
Administrative Draft NOP/NOI		Print	50
NOP/NOI		Print	200

TASK 13 PREPARE SCOPING REPORT AND IDENTIFY COST FOR STEP II

Preliminary Scoping Report

The Consultant shall prepare a Preliminary Scoping Report summarizing the work completed in Step I. The Scoping Report shall be written in clear concise language that is readily understandable to the general public. The Consultant shall also prepare a detailed Scope of Services for Step II including all studies identified as necessary during Step I and identify associated order-of-magnitude costs. This report will be distributed with the NOP/NOI.

Final Scoping Report

Upon the close of the NOP/NOI circulation period, the Consultant will review the NOP/NOI comments and modify the Preliminary Scoping Report.

The Consultant will review and refine the Summary of the Scope prepared by the Public Involvement Consultants. The Consultants will also prepare the following items for the Scoping Meeting: Comment Form, Sign in sheets, Request to speak cards and Overheads.

The Consultant will assist the public decision makers in their review of the comments presented on the Scope of Work and NOP/NOI by preparing the following summaries:

- Additional issues raised
- Comments on Criteria
- Comments on Scope
- General comments
- Comments on the Initial Study

Scoping comments and issues will be reviewed. A written response will be provided. Scopes will be revised to reflect BPU and City Staff direction. A two (2) day workshop with the BPU will be attended and input will be provided as necessary.

The Consultant and the City will conduct a two day workshop to refine and detail the project assumptions, project scope of work and schedule, project alternatives, and environmental evaluation criteria. The workshop is designed to have all participants reach consent on the Scope of Work for Step II. The Consultant will prepare a detailed agenda to facilitate the review of the Scope of Work. The agenda will include specified times so that agencies and individuals interested in a specific topic may schedule their time to be in attendance.

Based on the results of this workshop the Consultant will submit the scope of work through the Draft Environmental Impact Report/Draft Environmental Impact Statement ~~scoping report~~ to the City and Corps of Engineers for approval.

Upon completion and approval by the City and Corps of Engineers of the scope of work ~~Final Scoping Report~~, the Consultant will prepare the ~~contract amendment~~ Final Scoping Report for the Step II Scope of Work, Schedule, and Budget. This will be submitted to the City and made available to the public.

TASK 13 SUMMARY

Products	Medium	Copies
Draft Preliminary Scoping Report	Print	50
Preliminary Scoping Report	Print	50
Draft Final Scoping Report (for workshop)	Print	50
Final Scoping Report	Print	50
Step II Scope of Work	Print	50
Meeting		Number
Scoping Report Workshop (1 day, 6 professionals)		2

TASK 14 MIGRATORY FISH STUDY/MIGRATION MONITORING

Task 14.1 Migratory Fish Study

Long-Term reclamation alternatives potentially involve continued reclaimed water discharge to the Laguna de Santa Rosa. The Laguna is a migratory corridor for steelhead trout and potentially for coho salmon. A three-year study of upstream adult steelhead trout migration indicated that reclaimed water may discourage migration during low stream flow conditions in Mark West Creek. Based on input from the public and agencies, further evaluation of potential impacts on salmon and steelhead trout is necessary to prepare a complete EIR/EIS. To avoid affecting the schedule of the EIR/EIS and to collect information about coho salmon and juvenile steelhead trout that is only available in the fall season, a Fishery Study Program has been developed with the input of concerned public and agency representatives and reviewed with the Technical Review Group. The study program involves the following elements:

Task 14.1.1 - Habitat Characterization

Field surveys of the quality and quantity of spawning, hatching, and juvenile rearing habitat for steelhead trout and coho salmon will be conducted using stream habitat typing protocols developed recently in Washington state for adoption by the American Fisheries Society (Bissen and Nielson) and those developed by the California Department of Fish and Game Eel River program (Downey). These surveys will be used to estimate the carrying capacity of Santa Rosa Creek, Mark West Creek and a ~~control~~ reference stream (Maacama Creek) to produce salmonids and to assess the impacts of upstream land uses on habitat. Surveys will be conducted in Fall 1993, Summer 1994, ~~and~~ Fall 1994 and Fall 1995. The Fall 1993 and 1994 surveys are estimated to require eight crew days in each stream. Summer 1994 surveys are estimated to require three crew days each.

Task 14.1.2 - Juvenile Density Abundance Survey

The abundance of juvenile salmonids in Santa Rosa Creek, Mark West Creek, Maacama Creek and Green Valley Creek will be assessed using electrofishing, seining, and other methods, to determine juvenile salmonid production in relation to the carrying capacity as identified in Task 14.1.1. Three surveys will be conducted in each stream, at sites determined from habitat surveys to be representative of each stream. Each survey will require approximately 5 crew days in each stream and will be conducted simultaneously with the Habitat Characterization.

Task 14.1.3 - Redd Count and Spawning Success Evaluation

Repeated observations will be made at representative potential spawning sites in each stream to confirm whether spawning and nest (redd) formation is successful, and to estimate the number of redds in each study zone. Observations on potential spawning grounds will be conducted in conjunction with daily visits to attend fyke nets and smolt traps (see Task 14.2.1).

Task 14.2 Migration Monitoring

Task 14.2.1 - Migration Monitoring

Fyke nets will be placed at one location in Santa Rosa Creek, Mark West Creek, and Maacama Creek to monitor each of the upstream migration of steelhead trout and coho salmon in relation to streamflow and reclaimed water releases in the 1993-94 and 1994-95 migration seasons (November-April). In addition nets will be deployed in the Laguna when flow conditions permit. Temporal "windows" of no or low reclaimed water releases will be coordinated with reclamation staff to help evaluate the significance of such releases to migration success. In the 1993-94 season, fyke nets were deployed whenever flows allowed. In the 1994-95 season, fyke nets will be deployed in association with rainfall runoff events, which is when adults and smolts are most likely to migrate. Upstream migrating adult salmonids will be marked so that they can be identified and used to estimate total number of fish in the run if they are caught again. Nets designed to intercept downstream migrating fish will also be deployed at each site in order to monitor the return to the sea by post-spawned adult steelhead trout (November- April), and the outmigration of steelhead trout and coho salmon smolts (November - April). Smolts returning to the sea will be compared between the three creeks to evaluate Santa Rosa and Mark West Creek salmonids' reproductive success per unit spawning and nursery habitat in relation to the control stream. In the past three seasons, fyke nets have been deployed from January through March, the upstream migration period for steelhead trout.

Task 14.2.2 - Fish Scale Evaluation

Scales will be removed from each adult fish that is collected in the 1993-94 season and preserved for possible future analysis. The approximate age and history will be characterized to determine if the fish derive from distinct populations (e.g., hatchery and wild fish).

Task 14.2.3 - Stream Flow Monitoring

Stream level gauges now installed on Santa Rosa Creek, Mark West Creek, and the Laguna de Santa Rosa will be maintained and attended as necessary to obtain a continuous record of water levels throughout the study period. A gauge will also be installed in Maacama Creek for the 1994-95 season. A Marsh-McBirney electronic flowmeter will be used to measure totalized stream flow in each stream over a broad range of stream levels, to establish the relation between level and flow (stage curve). Due to erosion and deposition in the streambed near the gauging station, this relationship must be established/confirmed each season. Streamflow data is necessary to estimate the concentration of reclaimed water in the streams through which the salmonids must migrate. Maintenance of stream gauges will be extended through July 1996.

Task 14.3 Migratory Fish Study Report

Two A migratory fish study reports will be prepared summarizing the migratory fish study conducted during winter and spring of 1993/94 and 1994/95. Statistical methods will be evaluated with the aim of providing better interpretation of the data that has already been collected.

Review and technical assistance of a member of the Peer Review Committee.

TASK 14 SUMMARY

Product	Medium	Copies
Fisheries Progress Reports	Print	25
Migratory Fish Study Report 1993/94 and 1994/5	Print	25

TASK 15 ON-CALL SERVICES

At the City of Santa Rosa's direction the Consultant shall provide environmental consulting services on the Advanced Treatment Upgrade for the Laguna Subregional Wastewater Treatment Plant.

TASK 16 AERIAL PHOTOGRAPHS

16.1 Aerial Photos

In accordance with the recommendations of the USFWS, CDFG and COE, aerial photos will be taken of all areas of potential impact for the full range of components. The photos will be utilized to document the environmental conditions during spring 1994 (especially with regards to wetlands and potential vernal pool special status species habitat), provide the BPU Screening Committee with additional information on wetlands and special status species habitat, and assist in Step IIA engineering, hydrological and geological tasks. This task will also include coordination with the subregional partners and project team to assure that the scale and geographic area covered are appropriate for the widest range of uses.

16.2 Ground Surveys

Ground surveys will be provided on an as needed basis to obtain or verify spot elevations, generate topographic detail of limited areas, and refine locations and extent of existing constructed features, all in support of the facilities planning design efforts (Task 31). For budgeting purposes, a moderate level of survey effort is assumed but additional funds may be needed if more extensive survey work proves necessary.

16.3 USGS Digitized Maps (previously a contingency budget item)

Purchase of digitized quad maps to serve as base maps for the project.

TASK 16 SUMMARY			
Product		Medium	Copies
Aerial Photos		Negatives	1

TASK 17 ACCESS TO PRIVATE LANDS (THROUGH APRIL 1996)

Field access is required for biological, cultural, geological, and groundwater studies. Access to private lands will need to be obtained to allow for field surveys. Property owners will need to be identified and contacted for permission to access their property. Consultant will coordinate with property owners during survey periods. Site access will be an ongoing task throughout the field studies.

Maps shall be prepared that include parcel lines to assist the field teams in their field work for the following components: Reservoirs, Geyser pipeline, Wetland creation, West County Agriculture, South County Agriculture, pipelines, Sebastopol Agriculture, and Aquifer Storage sites.

TASK 18 WETLANDS DETERMINATION, ~~DELINEATION~~ AND IRRIGATION SUITABILITY AND CREATED WETLANDS

18.1 Irrigation Studies

18.1.1 Reconnaissance Level Irrigation Area Surveys (Phase I-Completed)

The reconnaissance level evaluation consists of an office irrigation suitability study utilizing available maps and air photos with windshield reconnaissance verification. This level of analysis will allow for the identification of the most obvious sensitive wetlands and other environmental features (project alternative fatal flaws) and estimated maximum acreage of potential irrigable lands and potential wetland creation sites within $\pm 20\%$. It is assumed the study area is about ~~20,000~~ 25,000 acres (Vineyards East of Tolay, Bayflats, Adobe Road, East of Rohnert Park and Chileno Valley). Agricultural irrigation, wetlands assessment and restoration/creation studies already performed for the West County, Sebastopol and Santa Rosa Plain components are considered adequate. This would be completed immediately to assist with screening. Although data will be produced on work maps, no reproducible maps will be provided in this task. A very brief report will be prepared documenting sensitive features, potential irrigable land, and potential wetlands restoration/creation acreage. The conceptual planning and permitting will follow completion of this Task. Data sources include: The Soil Conservation Service (SCS), Sonoma County Soil survey, Bureau of Reclamation North Bay Irrigation District Soil Reconnaissance, National Wetlands Inventory maps, USGS topographic maps, California Department of Fish and Game Natural Diversity Data Base maps and recent aerial photography available from commercial sources at USGS topographic scale. Performed by Questa Engineering and reviewed by Parsons ES.

18.1.2 Irrigation Land Classification (Phase II)

South County

An Order II Irrigation Land Classification Study will be completed using procedures modified from those developed by the U.S. Bureau of Reclamation. In this approach, available SCS soil survey information will be supplemented by a field reconnaissance level land classification to define the irrigation suitability of the study areas. Unlike a taxonomic survey, which groups soils on the basis of genetic similarities and land forms, irrigation suitability land classification is an interpretive and predictive survey which includes consideration of drainage, and parcel size and configuration in addition to soils and topographic factors. Landowner willingness must also be determined through direct contacts.

Soils will be examined and logged in the field (typically to a depth of 60 inches) using standard field forms. The work scope also includes double-ring infiltrometer and hydraulic conductivity field testing of representative soils. At this level of mapping, typically one observation is required for about every 80 acres, to properly classify and map the soils. Field mapping will be accomplished on 1" = 1000' base maps by direct observation and field plotting and stereo-photo interpretation techniques. Drive by surveys, observations along road right-of-ways and photo

interpretive data will be used to extend mapping from observation points into parcels with poor or disallowed access.

Lands will be classified into three types: (1) irrigable (land class 1, 2, 3); (2) marginal (15 to 25 percent slopes or other problems) class 4; and, (3) non-irrigable (class 6). The Scope of Work includes assembly of material for preparation of a Technical Report similar to Technical Memorandum R12 Irrigation Suitability Land Classification Stemple/Americano Creeks Area (February 1990). The technical report will be completed under Final Scope of Work (April 1995). The irrigation land classification field work and mapping will be closely coordinated with the wetlands determinationdelineation work effort. The Irrigation Land Classification Technical Report will serve as a basis for selecting irrigation lands for a facilities planning level irrigation layout design and cost estimate. Approximately 12,000 - 14,000 acres are proposed to be surveyed in the following areas: East of Rohnert Park, Adobe Road, Lakeville Highway, Sears Pt. area, and N. Petaluma. Approximately 100 acres of apple orchards in the Sebastopol area have also been added. This area will be surveyed and included in the suitability maps and technical report.

Information on future (with irrigation project) crop choices and farm water requirements will be developed for the South County. This will include consultation with such agencies as the SCS, Department of Water Resources, U.C. Extension and the County Farm Advisor. Existing agricultural land use patterns will also be mapped during the soil mapping program. All mapped data will be furnished on the project Auto Cad files.

Pre-Screened Reyes Soils - Bay Flats

This option would focus on environmentally less sensitive Bayflats (Reyes soils) areas. Areas of Reyes soils would be screened to eliminate parcels most likely to have wetlands, endangered species or significant water quality issues. This would be accomplished through a review of aerial photography, a search of Natural Diversity Data Base (NDDB) and other agency files and records, and a field reconnaissance. The following factors would be used to pre-screen and qualify Reyes soils more suitable for irrigation and management as permanent pasture or improved hayland:

1. Prior converted to agriculture (prior to 1985, to avoid jurisdictional wetlands issues).
2. Fields that have existing agricultural drainage ditches and have been continuously farmed over the last five years.
3. Fields that currently have existing water quality management problems that can be improved upon through wastewater program management. (Water quality problems would be determined through field instrument screening and file records).
4. No areas of ponding visible on historic winter/spring air photos or during field reconnaissance.
5. No wetlands identified on photography or field reconnaissance.

6. Fields not immediately adjacent to viable salt marsh.
7. No NDDB or other records of rare and endangered species.
8. Screen out areas overlying domestic/potable aquifers utilizing available well logs, through well canvassing program and well point sampling analysis.

Approximately 4,000 to 5,000 acres of less sensitive Reyes soils have been identified.

A special management plan for irrigation of Reyes soils would be prepared that would serve as part of the project description. The plan would include the following elements.

1. Careful monitoring of soil and drainage water pH with liming to control acidity as appropriate.
2. Carefully manage Reyes soils at a very high water content to minimize oxidation of near surface sulfides and reduce formation of acidic compounds.
3. Provide for occasional tidal entry into ditch system to utilize the buffering capacity of bay water.
4. Pump discharge from ditch system only at high tide and after monitoring of pH salinity, and sulfides.
5. Establish managed seasonal and permanent wetland buffers along all field borders and major drainage ditch systems.
6. Control ditch pumping to avoid particular periods of higher aquatic sensitivity and take advantage of higher flow periods with increased dilution. Utilize existing ditching system and improve on management of pump discharge over existing conditions to maintain or reduce current pumping impacts.
7. Establish permanent pasture utilizing California native hydrophytic plants. Mow and manage as appropriate.

The combination of a pre-screening approach and introduction of irrigation Best Management Practices, as a component of the project description, will greatly reduce impacts and consequently the need for detailed biological and drainage, surface and groundwater quality impacts. Much of the impact assessment will be reduced by evaluating the operational and water quality problems of the Novato, Napa, and Schelville reclaimed wastewater irrigation projects and their self-monitoring reports and inspection records. If significant problems crop up during the pre-screening studies and record searches that prove this option infeasible or appear to require more costly studies than anticipated, work will be halted and the City and BPU consulted for direction.

West County

The 1990 West County Irrigation Suitability report will be field reviewed for adequacy. It was previously assumed the report is adequate for West County irrigation suitability land classification and facilities planning level irrigation layouts. If deficiencies are identified, Consultant will provide a separate scope and budget for upgrading the West County report.

An independent Quality Control Review of the West County Study (of soil suitability) will be performed to verify its precision and make minor modifications to the mapping, where required. It is assumed the report is adequate for West County irrigation suitability land classification and facilities planning level irrigation layouts. The soils portion of the Irrigation Land Classification work completed previously for the West County is acceptable. ~~In addition, approximately 2,000 acres of land with slopes in the 15 to 25% range previously considered non-irrigable will be reevaluated.~~

A spot check of the West County area will be conducted to examine/log soils and compare prior study classifications. Existing land-use information will be developed based on air photo interpretations and field reconnaissance. An agronomist will be retained to assist in the development of future crop choices. Farm water requirements will be determined based on future crop use, choices utilizing U.C. Extension methods for determining hydraulic loading.

Technical Memorandum

Two separate Technical Memoranda (Irrigation Suitability Land Classification for West County, and South County) will be prepared similar in format and content to 1990 Report R-12. Pencil copy mapping will be furnished on County 1"=500' topographic/parcel maps for input to the AutoCADD system.

Field work, mapping and reporting performed by Questa with back up soil scientist, review, CAD mapping and project management by Parsons ES.

18.1.3 Soil Impact Analysis

The Irrigation Suitability Technical Reports will also include information that can be abstracted and summarized for use in the project EIR/EIS to address issues raised in the Scoping process. These will include such issues as: 1) additive and cumulative effects of bio-solids additions; 2) accumulation of salts and metals in soils from irrigation; 3) development of poor drainage conditions in areas with subsoil restrictive layers; 4) soil erosion problems; and, 5) chemical transformations of nutrients, salts, and metals in the soil and their transport in irrigation tail water and runoff. Items 1, 2, and 3 can be accomplished by desk-top calculations using soils, wastewater and bio-solids data. Separate work scopes are presented for items 4 and 5 (Sections 18.1.7 and 18.1.8, respectively). They are mentioned here as confirmation of the intent to provide technical support to the writers preparing the EIR. Where impacts are identified, offsetting mitigation measures will be developed. Performed by Questa with review and project management by Parsons ES.

18.1.4 Agronomic Studies and Team Support

A consulting agronomist will be retained to: 1) confirm crop choice data; 2) develop information on typical crop-based agrochemical inputs to irrigation areas (for use in water quality impact analysis); 3) project induced dairy herd size changes from expanded irrigated pasture (as input to dairy waste runoff estimates); and, 4) as technical support to project agricultural economic analysis, and impact analysis. The agronomic data will be developed for typical situations or scenarios, and not on an individual farm or parcel basis. Impact analysis support will be coordinated with the soils support (Section 18.1.3) and is included with that budget item. The above information will be included in brief letter reports, tables, and charts for use by various team members. Performed by outside agronomist with review by Questa and Parsons ES and project management by Parsons ES.

18.1.5 Irrigation Drainage Return Flow

Comments have been received from several individuals and agencies requesting that information be provided on possible impacts to shallow groundwater from irrigation of soils having restrictive (perching) layers. Another concern is that the shallow groundwater perched from irrigation of such soils may discharge during summer months to local creeks, changing the aquatic chemistry and ecology from the present intermittent flow conditions. Such impacts could conceivably extend to the estuaries of the creeks.

The proposed approach will address irrigation drainage return flow impacts on shallow groundwater and summer base flow to streams, which will be analyzed for several typical situations. The results will be extrapolated to the rest of the West and South County areas. This will be accomplished by performing desk-top calculations using existing information on soil and groundwater conditions, and from assumptions based on soils, for permeability and flow rates. The analysis will be completed for several (up to 5) representative and worst-case conditions representing combinations of soil conditions, crops, irrigation practices, and proximity to creeks. The data will be used to estimate the rate of water table build-up and flow to near-by tributaries. However, the data will represent only the specific situations examined and would be extended only qualitatively to any watershed-wide impacts. No quantitative, cumulative-effects analysis will be prepared.

The results of the analysis will be summarized in a brief report that can be easily abstracted into the EIR, including methods, existing conditions, results/impacts, and recommended mitigation measures.

18.1.6 Irrigation Management Plan

Preparation of Irrigation Operation Management Plans (OMP) have been recommended by U.C. Extension service and the Natural Resource Conservation Service. The OMPs will be integrated with the Drainage Management measures, and with ~~currently is not included in the Work Scope,~~ although certain elements (i.e., farm water requirements/crop consumptive use, and drainage requirements) ~~are~~ being completed as components of the Irrigation Suitability Studies and conceptual level irrigation field layouts as part of engineering design. The Irrigation Operations Management Plan (OMP) will be prepared based on discussions with the Soil Conservation

Service, U.C. Extension, and the California Department of Water Resources. A review of reclaimed irrigation water management programs from other municipalities and input from the Regional Board will also be sought. An agronomist or agricultural engineer from U.C. Davis will assist us in preparation of the Irrigation OMP.

Technical Memorandum

The Irrigation OMP will be prepared in the form a technical memorandum with a summary included as part of the overall project description. Because soils, drainage, climate, crops and impact issues are significantly different between the South County and the West County irrigation areas, we propose two separate plans be prepared, one for each area. The OMP's will include the following elements:

1. Documentation of allowable hydraulic loading rates taking into consideration soils, crop ET, and nitrogen content of wastewater per U.C. Davis Extension hydraulic loading criteria (from irrigation suitability).
2. Irrigation scheduling and application rate guidelines, including possible use of DWR irrigation scheduling program, or NRCS empirical methods.
3. Runoff and erosion control measures.
4. Any restrictions on time, frequency, and amount of irrigation water applications, and coordination with fertilizer/pesticide applications.
5. Avoidance, buffer, and setback guidelines from streams, wetlands, and sensitive habitats.
6. Monitoring of shallow water table and receiving water.
7. Restoration/rehabilitation of adjacent stream courses and gullied land.
8. Facilities inspection and maintenance.
9. Surveillance, record-keeping and reporting requirements.
10. Training and continuing education of water users.

Performed by Questa, with input from outside agronomist or agricultural engineer, review and management by Parsons ES.

Watershed Hydrology/Mass Balance

The completion of a watershed hydrology study is necessary to support Task 30, Assessment of Groundwater Impacts. Specifically, hydrologic support studies are needed to complete subtask 30.4, the mass balance investigation. The mass balance study will provide estimates of water volume and chemical loading impacts on groundwater arising from the seepage of reclaimed water from storage reservoirs and irrigation areas. These impacts may in turn affect downgradient water supply wells and surface water discharges. The technical approach used in

the mass balance study depends on flow net analyses to represent existing groundwater flows. The effects of seepages from storage reservoirs and irrigation areas are then superimposed on the flow nets to estimate any changes to existing groundwater conditions.

Stream hydrographs are an integral part of flow net analyses. Water contour maps form the basis of the flow net approach and will be created as an initial step. The inclusion of stream hydrographs are crucial as they provide an independent check on existing discharges predicted through flow net analysis. The validity of chemical loading estimates and the fate of chemicals along groundwater flow paths, will depend on the accuracy with which the flow net diagrams establish discharge (i.e., transport) parameters.

Stream hydrographs showing monthly discharges will be developed for key watersheds in the general area of storage reservoirs and irrigation sites. Hydrographs will be completed for normal, dry and wet rainfall years. Since most of the streams in the project area are ungauged, development of hydrographs will be accomplished by relating existing hydrological data from similar, nearby gauged streams (e.g., Salmon Creek), through regression analysis, to streams of interest in the project areas. Monthly hydrographs will be developed for selected creeks (approximately 10) within the project area.

Technical Memorandum

The results of the watershed hydrology analysis will be provided in a technical memorandum and include maps showing the locations of the streams where hydrographs were developed, the hydrographs themselves, and tabulated hydrologic data sets.

18.1.7 Erosion Assessment

A semi-quantitative approach will be utilized to estimate potential increases in soil erosion from converting grass or oat hay lands into irrigated crop land. The approach will utilize the USDA's Soil Erosion Model (VUSLE). A "before" and "after" analysis of project irrigation effects on soil erosion will be completed on three representative soil-crop scenarios for both the West County and South County. The model will estimate soil loss in tons per acre, annually, under normal rainfall conditions. We will not attempt to extrapolate the information to provide estimates of sediment yield on a watershed wide basis. However, the extent of highly erodible range soils that could be converted will be discussed and a narrative will be prepared qualitatively discussing overall project irrigation impacts on soil erosion and sediment yield. Appropriate mitigation measures will be identified in outline form. Erosion impacts from other project features, particularly segments of the Geysers pipeline alternative that traverse steep and erodible soil areas, will also be discussed qualitatively.

The results of the analysis will be presented in a brief report for abstraction into the EIR including methods used, existing conditions, project impacts, and recommended mitigations.

18.1.8 Soil and Water Chemistry of Irrigation Return Flow and Drainage Subflow

Conversion of rangeland and oat hay land to more intensive irrigated crop uses will likely mean increased agro-chemical inputs to the lands (fertilizers and pesticides).

Constituents in the reclaimed wastewater, changes in nitrogen loading from dairy herd responses to irrigation water availability, and even applications of bio-solids, have potential implications on the quality of direct irrigation return flow and drainage subflow, which may make their way to local surface water bodies. Several commentors have requested that these issues be addressed.

The proposed approach is to assess these issues and address them qualitatively through consideration of inputs on several typical crop-soil situations, as well as the worst-case scenario. The likelihood of these contaminants (addressed above) finding their way into local streams will be discussed in consideration of expected loading rates, common chemical transformations and assimilation of the contaminants in the soil, and the likely rate of surface and shallow groundwater movement.

The results of the analysis will be presented in a brief report that can be abstracted for use in the EIR, including methods and sources of literature, impact findings, and mitigation recommendations.

18.1.9 Hydrology, Irrigation, Drainage, Soil and Water Chemistry Technical Support

This task consists of providing technical support to the DEIR/EIS writing team and the City. Information necessary for, or contributing to, hydrologic, irrigation, drainage, and water quality impact analysis will have been prepared and presented in various Technical Memoranda. The consultants will be available for clarification and interpretation of results contained in the memoranda and for assistance in review and editing of ADEIR/EIR written sections prepared by others. In addition, the soil scientist will review and comment, and provide input on typical irrigation contract. Performed by Questa with input by agronomist, soil and water chemist as needed.

Task 18.2 Planning Level Wetlands Determination ~~Delineation~~ and Assessment

The technical methods prescribed in the 1989 Environmental Laboratory. 1987 Corps of Engineers Wetlands Delineation Manual. Tech. Report 4-87-1. USACE, WES, Vicksburg, MS. Federal Manual for Identifying and ~~Determining~~~~Delineating~~ Jurisdictional Wetlands (Federal Interagency Committee for Wetland ~~Determining~~~~Delineation~~) will be used to complete an Order 1-/2+ Planning Level wetland ~~determination~~~~delineation~~, and assessment for reservoir sites, and pipeline crossings and an order 2- wetland determination for irrigation of each alternative's components. On-site determinations and observations of soil and vegetation characteristics and hydrologic data will be made throughout the study areas where access is provided. Offsite or remote surveying methods will be used for potential irrigation parcels where access has been denied. These efforts will result in a consistent level of resolution for comparative impact analysis and a comprehensive inventory of wetlands. The completed work will have a 90 to 95 percent estimated confidence (80 to 85 percent for irrigation), but since the ~~determinations~~ ~~delineation~~ will be made by relating probable wetland areas to landscape patterns and vegetation visible in air photos and in the field, it will lack the density of site specific field observations typically required for a Corps approved project specific permit level Jurisdictional Determination. Approval of jurisdictional determinations will be sought as part of the full 404 permit application for the selected project components, which is not part of this scope.

This work will be completed for the reservoirs sites, ~~created wetlands~~, major pipeline crossings, and the South County irrigation lands. The 1990 West County Wetlands mapping will also be updated/upgraded to an Order 2 level.

Based on 1/31/95 discussions regarding ~~We are currently discussing~~ wetland mapping procedures and the scale of ~~determination~~~~delineation~~ with the Army Corps of Engineers and NRCS SCS, an Order 1 -/2 + ~~determination~~~~delineation~~ study plan ~~for created wetland sites~~ and an Order 2- ~~determination~~ study plan for the irrigation areas (West County and South County) will be conducted.

Soils

The hydric soil assessment procedure will be applied. In this approach, the landscape is stratified for additional, more detailed study by first identifying areas that meet or have the potential to meet hydric soil criteria. Potential hydric soils will be identified by consulting the Soil Conservation Service (SCS) Soil Surveys for Sonoma and Marin Counties and the SCS Sonoma and Marin County hydric soils list. The taxonomic classifications of the soil series, map unit positions, and other relevant landscape characteristics will be considered during this phase of the initial stratification. Boundaries of SCS soil map units will be transferred to blueline reproductions of USGS 1:24,000-scale quadrangles showing the ten short-listed dam sites, areas of potential future inundation, and potential irrigation areas.

Map units will be visited, and locations for soil observation borings selected on the basis of physiographic position, vegetation, and other observable characteristics. Soil borings will be augured to at least 18 inches (typically 24-30"). Locations of soil/vegetation observations will then be plotted on the mapping photos and the soils described and classified according to the conventions of the National Cooperative Soil Survey. Data from the observation of soil characteristics will be summarized on the routine on-site determination method data forms.

In Irrigation Land Classification, the locations of soil observations made during the land classification will be indicated on the mapping photos and the 1:12,000-scale photos. Soils with observed hydric properties will be correlated to photo tones and landscape positions. The boundaries of potential hydric soils will then be ~~estimated and plotted~~~~delineated~~ on maps using a combination of field-verified photo interpretation ~~with and~~ consideration of SCS soil survey and U.S. Fish and Wildlife Service National Wetlands Inventory maps.

Vegetation

The refined hydric soils boundaries will also be the basis for selecting the locations of the vegetation observations. As with the soils observations, most of the vegetation observation points will be placed within the boundaries of hydric soils, with some located outside the hydric boundary to refine the placement of the boundary between uplands and jurisdictional wetlands.

The method for gathering plant cover estimates will be by means of release. This method utilizes a plotless sampling technique, which is essentially a species list with accompanying cover-abundance estimates. This technique is compatible with the "hydric soil assessment procedure" for obvious and non-obvious situations. Visual plant cover estimates will be made for all

dominant species and other plants identifiable in the field. The plant communities will be classified qualitatively based on cultural practices (e.g., cultivated hayfield) or repeating plant assemblages (e.g., *Carex* spp in wet meadows).

The wetland indicator status and synonymy of each species will be ascertained by referencing the "National List of Plant Species that Occur in Wetlands: California." The plant cover estimates will also be recorded on the routine on-site determination method data forms.

Hydrology

Wetland hydrology will be determined by a review of aerial photographs and field indicators, including observation of inundation groundwater, or soil saturation, oxidized rhizospheres, water marks, drift lines, water-stained leaves, surface scouring, wetland drainage patterns, morphological plant adaptations and hydric soil characteristics. Water levels will be observed where pziometers have been installed by other special studies.

Prior Converted Agricultural Lands

The National Food Securities Act Manual (NFSAM) will be utilized to identify prior converted agricultural lands, not subject to Sec. 404 permit regulations. This will include discussions with farmers and review of three (3) sets of aerial photos ~~dated prior to 1985~~ to identify prior converted lands. The USDA National Resources Conservation Service (USDA-NRCS) will be contacted to review the findings

WETLAND FUNCTION AND VALUE

~~Based on scoping comments and discussions with the Corps (1/31/95), wetland functions and value will be determined qualitatively for all identified wetland areas. This work will be coordinated with the biological survey field crews. A simple wetland quality criteria checklist will be devised which rates function & value parameters (habitat, flood reduction, water quality) in terms of low, moderate, or high value and notes existing degree of disturbance. This qualitative assessment will be used in developing mitigation ratios and wetland mitigation plans.~~

WETLAND FUNCTION AND VALUE

Definitions of wetland function and value are provided in the Wetland Evaluation Technique (WET, Corps, 1991): "Wetland functions are physical, chemical, and biological processes or attributes of wetlands that are vital to the integrity of the wetland system, and operate whether or not they are viewed as important to society. Values, on the other hand, are wetland attributes that are not necessarily important to the integrity of the wetland system itself, but are perceived as being valuable to society." The primary purpose of a wetland function and value assessment is to provide the reader of the EIR/EIS sufficient characterization of potentially affected wetlands to allow comparative impact analysis of alternatives. Secondly, the function and value analysis will be instrumental in mitigation planning including the identification of replacement wetland type and acreage, estimating costs, and the identification of mitigation sites. For the EIR/EIS, a discussion of the functions and values of potentially affected wetlands will be presented in the

Jurisdictional Wetland Resources Section. Specific impact analysis of wetlands functions are evaluated in other pertinent sections of the EIR/EIS, including hydrology, water quality, cultural resources, and aquatic and terrestrial biological resources sections. A planning level wetland function and value assessment will be conducted on storage site and irrigation components.

A WET II Level One Social Significance Evaluation will be conducted to assess wetland values on storage sites. Social significance is the value society places on wetland functions and values as evidenced by their economic worth or official recognition. WET II provides a standardized approach to assigning relative values to the biological, chemical and physical functions of potentially affected wetland areas. The result of the Wet II Social Significance Evaluation provided in the Jurisdictional Wetland Resources Section of the EIR/EIS will provide the reader with an adequate characterization of existing wetland functions to understand potential wetland impacts addressed in the appropriate sections of the EIR/EIS.

On storage sites, wetland functions will be identified and discussed for major wetland types (vegetation communities) based on the Corps' Hydrogeomorphic Classification for Wetlands. This approach will provide a characterization of functions for groups of wetlands, not individual wetlands. This evaluation also provides a crosswalk (link) between the vegetative classification system we have developed for this region and the classification system recommended by the USFWS (Cowardin et. al. 1979).

Due to the vast acreage of the irrigation components and the limited nature of potential wetlands impacts, wetlands within irrigation area components will be classified by major wetland types (vegetation communities). A baseline function characterization for each wetland type in irrigation areas will be based on the Corps' Hydrogeomorphic Classification for Wetlands.

After the preferred project is chosen, a detailed impact analysis of wetland functions and values may be necessary as part of the permitting process. This scope will be developed at a later date if necessary.

Results

Field Work, mapping and reporting to be performed by Parsons ES with wetland scientist support and report review by Questa. Wetlands Determination Reports will be provided for the following components:

18.2.1 Reservoir Sites

An Order 1-/2+ Planning Level Reservoir Sites Wetlands ~~Determination~~Delineation Report has will-been prepared in December--January 1996 - February for the City/BPU and Corps of Engineers review at a higher level than the June 22, 1990, Jurisdictional Wetland ~~Determination~~Delineation Report for the West County and Tolay Reservoir sites. The report will include methodology, ~~determination~~delineation results (with a set of 1" = 500' aerial photo maps and routine on-site data forms) and a brief overview of wetland resources (types of wetlands,

functions, values in a regional context). Up to 10 reservoir sites will be surveyed, including confirmation surveys of the 1990 work at the Two Rock, Bloomfield and Tolay reservoir sites.

Additional work is needed at reservoir sites based on scoping comments, Corps concerns and proposed changes in reservoir footprints. Since the 1994 survey, five sites have been reconfigured with larger impoundments. All reservoir sites will be revisited to survey for potential jurisdictional wetlands in these larger footprints and their construction envelopes which would include the proposed footprint of dams, access roads, staging, borrow and disposal areas. Based on scoping comments and Corps concerns, habitat type mapping from Task 19 will be confirmed for wetlands, and the functional value and extent/severity of existing disturbance (e.g., grazing) qualitatively assessed. Wildlife habitat value assessed in Task 19 will be incorporated into the functional value assessment. Wetland hydrology and vegetation parameters will be spot checked during the wet season to confirm ~~determinations~~~~delineations~~ and assure they are not overly conservative. The Wetland ~~Determination~~~~Delineation~~ Report for Proposed Reservoir Sites (including Auto CAD maps) will be updated to include this additional information and any comments on the February draft report from the City/BPU and Corps. Scope includes two meetings with the Corps and production of a final report and maps in response to City/BPU and Corps comments.

18.2.2 Irrigation Areas

The original approach or level of resolution of the wetland determination survey for proposed irrigation lands was increased between Amendment 6 and Amendment 8 because the Corps found the original approach (same low level resolution as the 1990 West County Wetland ~~Determination~~~~Delineation~~ Report) inadequate. In Amendment 8 we conservatively budgeted for moderately high resolution surveys. The Corps has since accepted a more moderate resolution survey which would lower study costs.

Potential South County and West County irrigation components ~~and flow augmentation/wetland enhancement and creation components~~ will be surveyed for wetlands at an order 2- level of resolution where access is allowed ~~and function and value qualitatively assessed~~. For parcels where access is not allowed, mapped data will be extrapolated using drive-by surveys, air photo interpretation and soils maps. All mapping will be entered into the project Auto CAD files and will indicate wetlands mapped by field surveys versus off-site interpretation. The West County irrigation wetlands survey will focus on valley margins and tributary valleys outside of the Stemple/Americano Creek mainstream valleys and spot check the 1990 survey along these mainstream creeks for confirmation and to raise it to an order 2- level. ~~The Wetlands determination-delineation reports for these components will be prepared in April-May-June as part of the final Scope of Work for the West County and South County Irrigation Areas.~~ Two meetings with the Corps are budgeted to review scope/approach and draft reports. The reports will be revised in response to City/BPU and Corps comments. (Note: this survey intensity was accepted by the Corps on 2/14/95. It is less than budgeted in Amendment 8, but more than the original budget because the 1990 survey approach was found by the Corps to be inadequate.

18.2.3 Created Wetlands

Wetlands delineation for created wetlands was proposed at a lower resolution similar to irrigation (see ~~strikeout above~~). A higher resolution (intermediate order 1-/2+) will be required by the Corps, similar to reservoir sites, because created wetlands involve cuts and fills in potential jurisdictional wetlands and will require a 404 permit.

In the original Scope of Work no wetland mapping field work was considered necessary for the Stemple/Americano Creeks and Laguna sites, existing ~~determination~~~~delineation~~ effort was considered adequate. Given the higher resolution requested, these sites will be surveyed to confirm the accuracy of the original surveys, add sampling points to the desired resolution, and revise the ~~determinations~~~~delineations~~ as needed. If either component is not carried forward this work would be scaled back accordingly.

~~An order 1-/2+ wetlands survey and qualitative functional value assessment for impact evaluation will be performed for the Community Separator Created Wetland sites east of Rohnert Park, west of Cotati and near Kelly Pond and proposed irrigated riparian forest component. No previous delineation has been conducted in these areas.~~

~~Survey results will be mapped in project Auto CAD files. Draft Wetland Delineation Reports for Created Wetlands will be prepared and revised in response to City/BPU and Corps review. The budget includes a meeting with the Corps.~~

18.2.4 Pipeline Crossings

An order 1-/2+ wetland ~~determination~~~~delineation~~ survey will be performed at each major distribution pipeline stream and wetland crossing identified in engineering plans. This will include distribution pipelines to reservoir sites, Geysers Recharge, New Russian River Discharge above SCWA intakes and Aquifer Storage and Recovery sites. Wetland habitat type, a qualitative assessment of function and value, and site specific measures to avoid or minimize impact and post-construction restoration will be noted. This cost will be minimized by adding one wetland scientist to the biological survey team visiting these sites in Task 19.

Wetland ~~determination~~~~delineation~~, impact assessment and mitigation (avoidance, minimization and on-site restoration) will be performed in response to scoping and Corps comments. The pipeline crossing wetland determination and assessment is scoped and budgeted at this time because there is a better understanding of individual components which will go forward that require pipeline crossings or new discharge points, rough locations of these facilities and how to ~~best~~ coordinate these studies with facilities engineering and other biological studies.

A Draft Pipeline Crossings Wetland ~~Determination~~~~Delineation~~ and Assessment Report will be prepared and revised in response to comments from the City/BPU and Corps. All maps will be entered into project Auto CAD files and crossing information summarized in tabular form. One meeting with the Corps is budgeted and the Bureau of Land Management will be included in any Geysers Alternative meeting.

18.3 Wetlands Creation Design

Wetlands creation concepts and designs will be developed in this task at a level sufficient to both serve as a project description for evaluation of impacts, development of mitigation measures, and to provide the basis for cost estimates for comparison of alternatives. This will require that the proposed locations be investigated, land requirement of wetlands creation sites be determined, and conceptual designs be prepared showing areas of open water, emergent marsh, seasonal wetlands, and riparian vegetation. Landowner cooperation for proposed sites must also be determined.

Conceptual designs will be prepared, including plan and section views illustrating the size, slope, and height/depths of embankments and ponds, the footprint of facilities, and a description of the size and operation of significant hydraulic and water control structures. The plans will include water budgets and illustrative flow diagrams showing, by season, the route and residence time of wastewater through the created wetlands and the location of points of discharge. The design effort will require hydrologic and water quality modeling to establish optimum flow-through rates for development of such management as winter storage, spring rapid flow-through and summer residence for polishing prior to creek release. The plans will include 1" = 500' drawings and cross-sections and initial cost estimates. These drawings and sections will be presented at meetings and workshops. A new Technical Report for the wetland creation components will be prepared in April.

Wetlands creation design will be limited to:

- 1) — 500 acres along the Laguna de Santa Rosa;
- 2) — 500 acres along Americano and Stemple Creeks in West County;
- 3) — Two (2) 500 acre emergent marsh sites in the Santa Rosa Plain (Community Separator Alternative;
- 4) — West of Cotati; and
- 5) — East of Rohnert Park.

An additional 1,200 acres will be investigated and conceptual plans prepared for flood irrigation of riparian forest lands along the discharge sites. Flood irrigation would be integrated with flood management west of the Cotati site. The work scope will include hydraulic analysis and modification of levees and bypass structures. This will require coordination with the Sonoma County Water Agency.

Scoping comments and site reconnaissance investigations/literature review also indicate the need to investigate more thoroughly possible effects of water impoundment in the created wetlands on local groundwater levels and groundwater quality. This will require review of well logs, development of field permeability data and hydraulic analysis of shallow groundwater interactions. Design work will be input into the AutoCADD database.

Technical Memorandum

The results of the investigations and planning studies will be graphically oriented with plan view, illustrative drawings, sections, and flow diagrams. Key decisions requiring BPU guidance and interim work products will be documented in brief memos. All drawings will be input into the project Auto Cad files. The complete technical memorandum for the community separator, West County and Laguna created wetlands alternatives will be prepared in April 1995.

18.4 Wetlands Mitigation Sites and Conceptual Plans

Mitigation will be required for wetlands loss at each component site that impacts wetlands and other waters of the U. S. subject to Corps jurisdiction. Mitigation requirements will depend on the habitat type, functional value and extent/severity of existing disturbance of impacted wetlands at each component site. The approach will be to avoid or minimize impacts first then mitigate on-site or off-site with "in-kind" (same habitat type) or higher functional value wetlands. Mitigation plans would follow EPA and Corps guidance documents. Work will be performed by Parsons ES with back up support by Questa if needed.

Reservoir Sites

Aerial photographs, topographic maps and parcel maps of the drainage of each reservoir site would be reviewed and proposed reservoir drainages field inspected to identify potential mitigation sites for wetlands loss. Conceptual mitigation plans would be developed for EIR/EIS purposes. More detailed plans will be developed only after reservoir sites are selected and a detailed permit application completed.

In the West County created wetlands on the mainstream of Stemple and Americano Creeks could serve to mitigate reservoir wetlands loss (see Technical Memorandum W10 and W11). Based on irrigation drainage return flow studies and recommended irrigation management plans prepared by Questa, and potentially very limited or zero fresh water discharge criteria to the Esteros (San Antonio and Americano) imposed by the National Marine Sanctuary, created wetlands may not be carried forwarded as a project component. If not, a scaled back conceptual wetlands restoration plan could be developed on the mainstream creeks as mitigation, or mitigation sites and conceptual plans developed further upstream on or adjacent to the reservoir sites.

In the South County, flow augmentation has been dropped as a component. It was initially envisioned that mitigation of reservoir wetland impacts could be achieved by wetland restoration along augmented streams. A conceptual mitigation plan will be prepared to mitigate for South County reservoir wetland impacts along suitable drainages near each reservoir site. These sites may include drainages that were previously considered for flow augmentation, but plans would not include a reclaimed wastewater flow augmentation component.

Technical Memoranda will be prepared identifying potential reservoir wetland mitigation sites in the South County and West County. The proposed sites will be reviewed by the City/BPU, the Corps, EPA, USFWS, and CDFG. Conceptual mitigation plans will be prepared for selected sites and presented in a Technical Memoranda for the South and West County. These plans will

be revised in response to City/BPU and agency comments. Three (3) interagency and/or TRG meetings are included in this review process.

Constructed Wetlands

Conversion occurs when an existing wetland type (i.e., seasonal wetlands) are converted to another type (i.e., open water and emergent wetlands).

It is our belief that the constructed open water and emergent wetlands for polishing purposes will also provide higher habitat value than existing conditions at these sites. Limited seasonal wetlands, riparian wetlands and buffer upland habitat would only be designed into these created wetlands, provided they function to consume and/or polish reclaimed wastewater and are necessary to meet agency permit requirements regarding conversion and other impacts to existing wetlands.

Irrigation Lands

On and off-site wetland determinations performed in Task 18.2 would be used to identify and avoid impacts to sensitive wetlands in potential irrigation areas. Irrigation of degraded (heavily grazed non-native grassland) seasonal wetlands may result in an enhancement of the wetland hydrology and vegetation of these seasonal wetlands. Irrigation return flow studies will be conducted and management plans prepared which will avoid or minimize potential adverse impacts to streams, wetlands and sensitive habitats (see appropriate elements of Irrigation Task 18.1). Created wetlands may be considered to mitigate irrigation drainage impacts to Stemple and Americano Creeks and their esteros, if the return flow studies indicate they are required. No additional mitigation for impacts to wetlands and waters of the U.S. for proposed irrigation lands should be required.

Pipeline Crossings

The pipelines would be located to avoid or minimize impacts to streams and other wetlands and waters of the U.S. by following existing rights of way and disturbed areas. Standardized construction procedures would be developed for stream and wetland crossings to minimize impacts. These procedures would include a reduced construction width, staging away from wetland and riparian habitats, timing restrictions when and where appropriate, erosion control and construction practices to avoid and minimize impacts. Mitigation would consist of post construction habitat restoration at and immediately adjacent to each crossing. When the wetland ~~determinations~~delineations are performed for major distribution pipeline stream and wetland crossings (Task 18.2.4) the field scientist will recommend alignment refinements and other measures to avoid/minimize impacts, and note the type and approximate area of wetland habitat that would be disturbed and would need to be restored.

A Wetlands ~~Determination~~Delineation and Assessment Report would be prepared for Pipeline Crossings and will include tabular assessment of area and habitat-type of wetlands and waters of the U.S. impacted and to be restored at each crossing, and Standard Stream Crossing Best Management Practices (BMP's) to avoid/minimize impacts and any specific recommendations at major stream crossings. This memorandum will be reviewed and revised in response to

City/BPU and agency comments. An interagency and/or TRG meeting is included to present and receive feed back on this technical memorandum.

TASK 18 SUMMARY

Product	Medium	Copies
20 copies will be provided (includes team and City/COE)		
Progress Memos		
Summary of Reconnaissance Level Irrigation Surveys		
Soil Erosion Evaluation of the West County and South County Reclamation Alternatives		
Irrigation Management Plan for the West County and South County Alternatives		
Baseline Hydrology and Irrigation Drainage Evaluation for West County and South County Reclamation Alternatives		
Irrigation Suitability Land Classification - South County Area		
Irrigation Suitability Land Classification - West County Area (Addendum 1995)		
Water Quality Evaluations on Wastewater Irrigation in West County and South County Alternatives		
Water Quality Evaluations on Wastewater Irrigations in West County and South County Alternatives		
Cropping Scenarios for the West County and South Reclamation Alternatives		
Potential Crops Suitable for Use In the West County and South County Project Areas		
Santa Rosa Sub-Regional Long-Term Wastewater Project - Baylands (Reyes Soils) Screening Study		
West County and Sebastopol Irrigation Areas Wetland Determination Report (Stemple Americano Creeks Report)		
South County Irrigation Areas Wetland Determination Report		
Major Pipeline Crossings Wetland Determination Report		
Identified Potential Wetland Mitigation Sites for Santa Rosa Subregional Alternatives		
Ecological Risk Assessment		
Existing Agricultural Land Use Patterns Map (CADD)		
Reservoir Sites Planning Level Wetland Determination Report		
Technical Memorandum on Conceptual Mitigation Plans		
California Department of Fish and Game, Agreement Regarding Proposed Stream Alteration - Geotech Testing		

TASK 19 TERRESTRIAL BIOLOGICAL STUDIES

Special Spring Surveys

Biological studies will be conducted during the Spring of 1994 and 1995 on all accessible potential reservoir sites. Biological resources addressed in these studies will focus on vernal pool special status plant species and special status riparian birds.

Ongoing Terrestrial Biological Surveys

Ongoing studies of special-status species occurrences within project facility layouts will be focused on those areas where existing data is deemed inadequate or requires verification. Evaluation criteria of existing data will include: seasonality of studies; availability of resource mapping; survey locations; study focus; methodologies (as evaluated against current resource agency guidelines); and year of collection. The preliminary special-status species table is presented in Exhibit B. This list identifies species that may occur in the project areas and has been compiled through a series of discussions with CDFG and USFWS including letters from NMFS and USFWS. To the greatest extent practicable, HBA will evaluate impacts to these species. Specific species methodologies are noted in the text of the scope of work where appropriate.

Russian River Discharge Facility Biological Studies

Terrestrial vegetation communities, special-status plant and wildlife species, and other important plant and wildlife resources associated with ~~upland~~-habitat of the proposed Russian River ~~infiltration ponds~~ direct discharge sites will be characterized. This subtask will consist of the following study components.

Literature Review

Previous studies on the Russian River will be compiled and reviewed. A search of the California Natural Diversity Data Base will also be conducted.

Habitat Mapping

~~Habitat of the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs and the aforementioned literature search. Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (CWHR) system analysis. Mapping will be conducted using AutoCADD.~~

[Vegetative communities will be mapped on 1" = 500' scale aerial photos or topographic base maps. Vegetation communities will be identified by dominant and indicator species and will be classified using Holland \(1986\), modified to denote the unique plant associations of the north coast geographic region.](#)

Wildlife Habitat Relationships System Analysis

Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the CWHR system modeling program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.

Special-Status Species Field Studies

The following field studies for special status species will be conducted in areas proposed for siting of the rapid infiltration ponds:

Fall Plant Surveys

Pedestrian survey transects for special status plant species will be conducted in areas proposed for siting of the rapid infiltration ponds. Surveys will be conducted to allow 100% visual coverage of the ground surface and will be conducted concurrently with the botanical diversity surveys. Surveys will be conducted when the plants are most phenotypically identifiable. It should be noted that a second year of surveys for special status plant species associated with seasonal wetlands (i.e., in compliance with USFWS direction to the COE on Section 404 permitting) may be required if impacts to seasonal wetlands cannot be avoided. These surveys, if required, would be conducted in 1996 (after the CEQA and NEPA documentation process has been completed).

Laguna de Santa Rosa Biological Studies

Terrestrial vegetation communities, special status plant and wildlife species, and other important plant and wildlife resources associated with the Laguna de Santa Rosa will be characterized. ~~Because substantial study of the Laguna de Santa Rosa has already been conducted by a number of entities, new field studies proposed under this task will focus attention on areas~~ Targeted [for areas of potential impact](#). ~~for wetlands creation and the created riparian area~~ that are potentially subject to the effects of effluent discharge. This subtask will consist of the following study components.

Literature Review

Previous studies on the Laguna de Santa Rosa will be compiled and reviewed. A review of the California Natural Diversity Data Base will also be conducted.

Habitat Mapping

Habitat of the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs and the aforementioned literature search. Both wildlife and vegetative habitats will be mapped on 1"=500' scale aerial photos or topographic base maps in any area of potential impact. Wildlife habitats will be classified according to the California Wildlife Habitat Relationships System (Mayer and Laudenslayer 1988). The following habitat characteristics will be determined through field sampling or aerial interpretation to define wildlife habitat types:

- geographic location;

- dominant vegetation size class; percent and species composition of ground cover or canopy closure;
- degree of decadence; and
- habitat elements essential to the life history of wildlife species.

Vegetation communities will be identified by dominant and indicator species and will be classified using Holland (1986), modified to denote the unique plant associations of the north coast geographic region.

Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (CWHR) system analysis. Mapping will be conducted using AutoCADD.

Wildlife Habitat Relationships System Analysis

Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the California Department of Fish and Game (CDFG) CWHR system modeling program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.

Vernal Pool Crustacean and Amphibian Surveys

~~Surveys will be conducted to identify vernal pools (spring-filled ephemeral pools) that may serve as habitat for California tiger salamander and federally proposed threatened and endangered vernal pool crustaceans. Sampling for California Tiger Salamander will be conducted in suitable habitat within the areas of potential effect. These surveys assume that complete avoidance of seasonal wetlands may not be possible. If complete avoidance of seasonal wetlands can be accomplished during siting these surveys will become unnecessary.~~

Plant Surveys

~~Pedestrian survey transects to record special status plant species and to characterize overall plant diversity will be conducted at sites targeted for wetlands creation and areas that are potentially subject to the effects of effluent discharge. Surveys will be conducted to allow 100% visual coverage of the ground surface. Surveys will be conducted when the plants are most phenotypically identifiable. It should be noted that a second year of surveys for special status plant species associated with vernal pools and swales (in compliance with USFWS direction to the COE on Section 404 permitting) may be required if impacts to seasonal wetlands cannot be avoided. These surveys, if required, would need to be conducted in 1996 (after the CEQA and NEPA documentation process has been completed), and are not part of this scope. This constitutes 10% of the survey scope for special status plant surveys in the Laguna de Santa Rosa region.~~

Technical Report

A technical report will be produced summarizing the findings of the above studies.

Wetland Creation Sites Santa Rosa Plain Biological Studies

Wetlands creation within the Santa Rosa Plain and surrounding areas may be constrained by sensitive biological resources occurring in this area. The purpose of this study will be to locate and map the sensitive resources of the Santa Rosa Plain and identify potential wetlands creation sites and their associated wildlife and botanical resources. The Santa Rosa Plain studies proposed under this subtask will focus attention on areas targeted for wetlands creation. This subtask is based on the assumption that preliminary review of the existing resources in the Santa Rosa Plain will allow for the identification of approximately 1,500 acres of land that would be minimally constrained by sensitive biological resources. Special status species field surveys within these 1,500 acres will then be conducted to address species that have not received adequate study through previous investigations or for which state and federal management status has recently changed (i.e., newly designated special status plants). This subtask will consist of the following study components.

Literature Review

Previous studies on the Santa Rosa Plain will be compiled and reviewed. This scope assumes that current mapping efforts by the Vernal Pool Task Force, CDFG, and U.S. Army Corps will be an available resource. ~~This subtask will be rescoped if the latter resources are not available.~~ A review of the California Natural Diversity Data Base will also be conducted.

Habitat Mapping

~~Habitat of the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs, the aforementioned literature search, and specific biological resource surveys. Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (CWHR) system analysis. Mapping will be conducted using AutoCADD.~~

Wildlife Habitat Relationships System Analysis

~~Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the California Department of Fish and Game (CDFG) CWHR system modeling program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.~~

Vernal Pool Crustacean and Amphibian Surveys

~~Surveys will be conducted to identify vernal pools (spring filled ephemeral pools) that may serve as habitat for California tiger salamander and federally proposed threatened and endangered vernal pool crustaceans. Sampling for California Tiger Salamander will be conducted in suitable habitat within the areas of potential effect. These surveys assume that complete avoidance of seasonal wetlands may not be possible. If complete avoidance of seasonal wetlands can be accomplished during siting these surveys will become unnecessary.~~

Early Spring Plant Surveys

~~Pedestrian survey transects to record special status plant species and to characterize overall plant diversity will be conducted at sites targeted for wetlands creation. Surveys will be conducted to allow 100% visual coverage of the ground surface. Surveys will be conducted when the plants are most phenotypically identifiable. It should be noted that a second year of surveys for special status plant species associated with vernal pools and other seasonal wetlands (in compliance with USFWS direction to the COE on Section 404 permitting) may be required if impacts to seasonal wetlands cannot be avoided. These surveys, if required, would need to be conducted in 1996 (after the CEQA and NEPA documentation process has been completed), and are not part of this scope. Twenty percent of the complete special status plant survey scope and budget for the Santa Rosa Plain will be required to complete the early spring surveys.~~

Western Sonoma County Agricultural Irrigation Biological Studies

Terrestrial vegetation communities, special status plant and wildlife species, and other important plant and wildlife resources associated with the watersheds of proposed irrigation lands of Western Sonoma County will be characterized. Major resources, other than proposed irrigation lands, that will be characterized in this study include Stemple, Americano, and Walker Creeks, and the Esteros Americano and de San Antonio. Although western county streams are not expected to receive direct flow augmentation, the aforementioned drainages and esteros may be indirectly affected by the application of wastewater on local rangelands. Because substantial study of Western Sonoma County drainages has already been conducted by a number of entities, new field studies proposed under this task will focus on areas targeted for wetlands creation and the esteros. Field studies conducted in proposed irrigation lands will be reconnaissance level studies that provide representative characterization of the existing resources. This subtask will consist of the following study components.

Literature Review

Previous studies on Western Sonoma County rangelands, Stemple Creek, Americano Creek, Walker Creek, the Estero Americano, and the Estero de San Antonio will be compiled and reviewed. A review of the California Natural Diversity Data Base will also be conducted.

Habitat Mapping

~~Habitat associated with the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs, the aforementioned literature search and specific biological resource surveys. Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (WHR) system analysis. Mapping will be conducted using AutoCADD.~~

Wildlife Habitat Relationships System Analysis

~~Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the California Department of Fish and Game (CDFG) WHR system modeling~~

~~program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.~~

Special Biological Studies for West County Irrigation Areas

Biological studies for proposed irrigation areas will be conducted in two phases. The first phase will involve a reconnaissance survey, and will cover accessible, non-cropped range lands. The second phase will consist of return visits to specific sites that were designated during the first phase as potential special status species habitat, such as vernal pools. Special status field studies are designed to cover the potential wetland creation sites and reaches of Stemple Creek and Americano Creek.

Phase One - Plant and Wildlife Surveys

Objectives of the first phase of the study are: a) to develop plant and wildlife species lists for each parcel; b) to determine if habitats are present that may support special status species; c) to record rodent burrow density data; d) to collect CWHR field data; and e) map vegetation communities.

Biologists and botanists will walk meandering transects approximately 100 varying 25 to 100 feet apart along the length of the accessible properties. Transects will be spaced to provide 100% visual coverage of the proposed irrigation parcels. Both vegetation data and wildlife habitat data will be collected along the transects.

All wildlife observations and sign encountered during the reconnaissance surveys, specifically the presence or absence of rodent burrows that may provide sheltering habitat for special status species such as California tiger salamander, California red-legged frog, and western burrowing owl will be estimated. Areas of high rodent burrow density will be mapped for each parcel, and other potential special status wildlife habitat will also be mapped.

Data necessary to perform a California Wildlife Habitat Relationships System (CWHR) analysis will be collected for each proposed irrigation site, using a hoop transect method within each CWHR habitat type. Dominant plant species, cover percentage, and approximate height will be recorded.

Phase Two - Additional Surveys

During the second phase, areas will be revisited that have high potential for presence of special status habitat. Riparian corridors identified in phase one surveys will not be studied further since it is assumed that these areas will not be made available to irrigation. For budgetary purposes, we have assumed that the second phase will be 15% of the first phase.

Analysis Of Inaccessible Sites

Based on a review of existing data including aerial photos, soil mapping, previous studies, and roadside surveys, potential resources of the inaccessible irrigation sites will be identified for impact analysis.

Irrigable Land Impact Analysis

Future cropping scenarios will be reviewed to determine the most appropriate situation for impact analysis. Potential impacts created by predicted future actions on current resources will be evaluated and quantified.

Wildlife and Plant Diversity Characterization

~~A field sampling program will be designed and implemented to characterize the wildlife and plant diversity of proposed irrigation lands. Specific resources addressed in the program will include bird, small mammal, and plant assemblages.~~

Special Status Field Studies For the Wetland Creation Sites

~~The following field studies for special status species will be conducted in potential wetlands creation sites and reaches of Stemple Creek and Americano Creek that could be affected by effluent wastewater. These studies will be conducted to address species that have not received adequate study through previous investigations that require updated surveys, or for which state and federal management studies has recently changed (i.e., newly listed special status plants).~~

California Freshwater Shrimp Surveys

~~Surveys for freshwater shrimp will be conducted in suitable habitat by a Federally permitted species expert (Larry Serpa). These surveys will be conducted to update previous surveys and to address areas not previously investigated.~~

Stream Amphibian and Western Pond Turtle Surveys

~~Surveys for adult California red-legged frog will be conducted in Stemple, Americano and Walker Creeks during August and September using a study methodology recommended by CDFG's State Staff Herpetologist (John Brode). The study methodology consists of visually identifying adult frogs during night visits to suitable habitat. Three visits to each area of suitable habitat will be conducted.~~

~~Western pond turtle surveys will be conducted in suitable habitat. Surveys will consist of binocular searches for active individuals. These surveys are a continuation of special spring surveys initiated under Task 20 - Aquatic Biological Studies.~~

Fall Plant Surveys

~~Pedestrian survey transects for special status plant species will be conducted at sites targeted for wetlands creation. Surveys will be conducted to allow 100% visual coverage of the ground surface. Surveys will be conducted when the plants are most phenotypically identifiable.~~

Esteros Impact Analysis

A thorough literature review will be conducted to determine the salinity intolerance's of vegetation, wildlife and vegetation communities found in the esteros. Based upon this review

and the predicted changes in the water quality condition of the esteros, potential habitat and species impacts will be assessed.

Technical Report

A technical report will be produced summarizing the findings of the above studies.

Southern Sonoma County Agricultural Irrigation Biological Studies

Terrestrial vegetation communities, special status plant and wildlife species, and other important plant and wildlife resources associated with proposed irrigation lands of southern Sonoma County will be characterized. This subtask will consist of the following study components.

Literature Review

~~Previous studies on southern Sonoma County rangelands will be compiled and reviewed. A review of the California Natural Diversity Data Base will also be conducted.~~

Habitat Mapping

~~Habitat associated with the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs, the aforementioned literature search and specific biological resource surveys. Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (WHR) system analysis. Mapping will be conducted using AutoCADD.~~

Wildlife Habitat Relationships System Analysis

~~Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the California Department of Fish and Game (CDFG) WHR system modeling program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.~~

Special Biological Studies for South County Irrigation Areas

Biological studies for proposed irrigation areas will be conducted in two phases. The first phase will involve a reconnaissance survey, and will cover accessible, non-cropped range lands. The second phase will consist of return visits to specific sites that were designated during the first phase as potential special status species habitat, such as vernal pools.

Phase One - Plant and Wildlife Surveys

Objectives of the first phase of the study are: a) to develop of plant and wildlife species lists for each parcel; b) to determine if habitats are present that may support special status species; c) to record rodent burrow density data; d) to collect CWHR field data; and e) map vegetation communities .

Biologists and botanists will walk meandering transects approximately 100 varying 25 to 100 feet apart along the length of the accessible properties. Transects will be spaced to provide 100% visual coverage of the proposed irrigation parcels. Both vegetation data and wildlife habitat data will be collected along the transects.

All wildlife observations and sign encountered during the reconnaissance surveys, specifically the presence or absence of rodent burrows that may provide sheltering habitat for special status species such as California tiger salamander, California red-legged frog, and western burrowing owl will be estimated. Areas of high rodent burrow density will be mapped for each parcel, and other potential special status wildlife habitat will also be mapped.

Data necessary to perform a California Wildlife Habitat Relationships System (CWHR) analysis will be collected for each proposed irrigation site, using a hoop transect method within each CWHR habitat type. Dominant plant species, cover percentage, and approximate height will be recorded.

Phase Two - Additional Surveys

During the second phase, areas will be revisited that have high potential for presence of special status habitat. Riparian corridors identified in phase one surveys will not be studied further since it is assumed that these areas will not be made available to irrigation. For budgetary purposes, we have assumed that the second phase will be 15% of the first phase.

Analysis Of Inaccessible Sites

Based on a review of existing data including aerial photos, soil mapping, previous studies, and roadside surveys, potential resources of the inaccessible irrigation sites will be identified for impact analysis.

Irrigable Land Impact Analysis

Future cropping scenarios will be reviewed to determine the most appropriate situation for impact analysis. Potential impacts created by predicted future actions on current resources will be evaluated and quantified.

Wildlife and Plant Diversity Characterization

A field sampling program will be designed and implemented to characterize the wildlife and plant diversity of proposed irrigation lands. Specific resources addressed in the program will include bird, small mammal and plant assemblages.

Technical Report

A technical report will be produced summarizing the findings of the above studies.

Sebastopol Agricultural Irrigation Biological Studies Technical Report

Terrestrial vegetation communities, special status plant and wildlife species, and other important plant and wildlife resources associated with the watersheds of proposed irrigation lands of Sebastopol will be characterized. Although streams in the Sebastopol area are not expected to receive direct flow augmentation, the Green Valley/Atascadero drainage system may be indirectly affected by the application of wastewater on local orchards or vineyards. ~~This study will also provide particular attention to areas targeted for wetlands creation.~~ This subtask will consist of the following study components.

Literature Review

Previous studies on Sebastopol area rangelands will be compiled and reviewed. A review of the California Natural Diversity Data Base will also be conducted.

Habitat Mapping

~~Habitat associated with the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs, the aforementioned literature search and specific biological resource surveys. Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (WHR) system analysis. Mapping will be conducted using AutoCADD.~~

Wildlife Habitat Relationships System Analysis

~~Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the California Department of Fish and Game (CDFG) WHR system modeling program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.~~

Special Biological Studies for Sebastopol Irrigation Areas

Biological studies for proposed irrigation areas will be conducted in two phases. The first phase will involve a reconnaissance survey, and will cover accessible, non-cropped range lands. The second phase will consist of return visits to specific sites that were designated during the first phase as potential special status species habitat, such as vernal pools.

Phase One - Plant and Wildlife Surveys

Objectives of the first phase of the study are: a) to develop of plant and wildlife species lists for each parcel; b) to determine if habitats are present that may support special status species; c) to record rodent burrow density data; d) to collect CWHR field data; and e) map vegetation communities.

Biologists and botanists will walk meandering transects approximately 100 varying 25 to 100 feet apart along the length of the accessible properties. Transects will be spaced to provide 100%

visual coverage of the proposed irrigation parcels. Both vegetation data and wildlife habitat data will be collected along the transects.

All wildlife observations and sign encountered during the reconnaissance surveys, specifically the presence or absence of rodent burrows that may provide sheltering habitat for special status species such as California tiger salamander, California red-legged frog, and western burrowing owl will be estimated. Areas of high rodent burrow density will be mapped for each parcel, and other potential special status wildlife habitat will also be mapped.

Data necessary to perform a Wildlife Habitat Relationships System (CWHR) analysis will be collected for each proposed irrigation site, using a hoop transect method within each CWHR habitat type. Dominant plant species, their cover percentage, and average vegetation height will be recorded.

Phase Two - Additional Surveys

During the second phase, areas will be revisited that have high potential for presence of special status habitat. Riparian corridors identified in phase one surveys will not be studied further since it is assumed that these areas will not be made available to irrigation. For budgetary purposes, we have assumed that the second phase will be 15% of the first phase.

Analysis Of Inaccessible Sites

Based on review of existing data including aerial photos, soil mapping, previous studies, and roadside surveys, potential resources of the inaccessible irrigation sites will be identified for impact analysis.

Irrigable Land Impact Analysis

Future cropping scenarios will be reviewed to determine the most appropriate situation for impact analysis. Potential impacts created by predicted future actions on current resources will be evaluated and quantified.

Wildlife and Plant Diversity Characterization

~~A field sampling program will be designed and implemented to characterize the wildlife and plant diversity of proposed irrigation lands. Specific resources addressed in the program will include bird, small mammal, and plant assemblages.~~

Special Status Field Studies

~~The following field studies for special status species will be conducted in the reaches of Green Valley and Atascadero Creeks that could be affected by effluent wastewater.~~

California Freshwater Shrimp Surveys

~~Surveys for freshwater shrimp will be conducted in suitable habitat by a Federally permitted species expert (Larry Serpa).~~

Stream Amphibian and Western Pond Turtle Surveys

~~Surveys for adult California red-legged frog will be conducted in the Green Valley/Atascadero drainage system during August and September using a study methodology recommended by CDFG's State Staff Herpetologist (John Brode). The study methodology consists of visually identifying adult frogs during night visits to suitable habitat. Three visits to each area of suitable habitat will be conducted.~~

~~Western pond turtle surveys will be conducted in suitable habitat. Surveys will consist of binocular searches for active individuals. These surveys are a continuation of special spring surveys initiated under Task 20 - Aquatic Biological Studies.~~

Fall Plant Surveys

~~Pedestrian survey transects for special status plant species will be conducted at sites targeted for wetlands creation. Surveys will be conducted to allow 100% visual coverage of the ground surface. Surveys will be conducted when the plants are most phenotypically identifiable.~~

Technical Report

A technical report will be produced summarizing the findings of the above studies.

Pre-Screened Reyes Soils - Bay Flats

Terrestrial biology evaluation will be conducted on 5,000 acres of identified irrigable Reyes soils. Methodology will be developed to be consistent with west and South County irrigation studies as presented in amendment #9.

Storage Reservoir Sites Biological Studies

Terrestrial vegetation communities, special status plant and wildlife species, and other important plant and wildlife resources associated with ten nine potential reservoir sites will be characterized (excluding resources that were previously evaluated and studies completed through spring 1994). Previous studies will be reviewed for accuracy. Verification of existing data and collection of primary data will be conducted on locations where essential data is inadequate, unavailable or otherwise unsuitable for EIR/EIS analysis. Additional site visits will be required as configurations are refined. This subtask will consist of the following study components.

Literature Review

Previous studies conducted at the sites of proposed storage reservoir sites will be compiled and reviewed. A search of the California Natural Diversity Data Base will also be conducted.

Habitat Mapping

Habitat of the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs, the aforementioned literature search and specific surveys. Both wildlife and vegetative habitats will be mapped on 1"=500' scale aerial photos or topographic base maps.

Wildlife habitats will be classified according to the California Wildlife Habitat Relationships System (Mayer and Laudenslayer 1988). The following habitat characteristics will be determined through field sampling or aerial interpretation to define wildlife habitat types:

- geographic location;
- dominant vegetation size class; percent and species composition of ground cover or canopy closure;
- degree of decadence; and
- habitat elements essential to the life history of wildlife species.

Vegetation communities will be identified by dominant and indicator species and will be classified using Holland (1986), modified to denote the unique plant associations of the north coast geographic region.

Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (CWHR) system analysis. Mapping will be conducted using AutoCADD.

Wildlife Habitat Relationships System Analysis

Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the California Department of Fish and Game (CDFG) CWHR system modeling program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.

Special Status Species Field Studies

The following field studies for special status species will be conducted in potential wetland creation sites:

Small Carnivore Surveys

~~Trailmaster 1500 infrared game monitors with 35 mm camera attachments will be used to determine habitat utilization by small carnivores. Use of the cameras will allow for definitive identification of species visiting the sampling stations. Sampling stations will be established in appropriate habitat~~

Vernal Pool Crustacean and Amphibian Surveys

Surveys will be conducted to identify vernal pools (spring filled ephemeral pools) that may serve as habitat for California tiger salamander and federally proposed threatened and endangered vernal pool crustaceans. Sampling will be conducted in suitable habitat within the areas of potential effect. Dip seine sampling will occur biweekly during periods of pool inundation in accordance with USFWS survey protocol recommendations (May, 1994) for these species.

Stream Amphibian and Western Pond Turtle Surveys

Surveys for adult California red-legged frog and foothill yellow-legged frog will be conducted during August and September using a study methodology recommended by CDFG's State Staff Herpetologist (John Brode). The study methodology consists of visually identifying adult frogs during night visits to suitable habitat. Three visits to each area of suitable habitat will be conducted.

Western pond turtle surveys will be conducted in suitable habitat. Surveys will consist of binocular searches for active individuals. These surveys are a continuation of special spring surveys initiated under Task 20 - Aquatic Biological Studies.

Fall Plant Surveys

Pedestrian survey transects to record special status plant species and to characterize overall plant diversity will be conducted within proposed construction areas and areas that would be affected by the stored water. Surveys will be conducted to allow 100% visual coverage of the ground surface. Surveys will be conducted when the plants are most phenotypically identifiable. ~~It should be noted that a second year of surveys for special status vernal pool plant species (in compliance with USFWS direction to the COE on Section 404 permitting) may be required if impacts to seasonal wetlands cannot be avoided. These surveys, if required, would need to be conducted in 1996 (after the CEQA and NEPA documentation process has been completed), and are not part of this scope.~~

Downstream Impacts

When dams are placed on streams, downstream hydrology is changed. Winter, spring and early summer flows will be reduced from current conditions. Potential effects include: dewatering of downstream reaches, changes in vegetation composition, and a seasonal influx of water resulting in hydrological changes. Based on hydrological conditions predicted in other tasks, reaches of the streams potentially effected by dam construction will be determined.

HBA will conduct botanical and wildlife surveys and habitat mapping in riparian corridors downstream at each of the nine proposed reservoir sites. Surveys will be designed to detect special status plants and wildlife occurring within the riparian corridor between the proposed dam sites to a point where flows converge with other waters. The total length of all downstream surveys is approximately 36 miles.

Technical Report

A technical report will be produced summarizing the findings of the above studies.

Geysers Biological Studies

Terrestrial vegetation communities, special status plant and wildlife species, and other important plant and wildlife resources associated with the Geysers study area and associated wastewater distribution line corridors, will be characterized. This subtask will consist of the following study components.

Literature Review

Previous studies on the Geysers study area and associated water transmission line corridors will be compiled and reviewed. A review of the California Natural Diversity Data Base will also be conducted.

Habitat Mapping

~~Habitat of the study area will be mapped at an appropriate scale utilizing data derived from aerial photographs, the aforementioned literature search and specific biological resource surveys.~~ Both wildlife and vegetative habitats will be mapped on 1"=500' scale aerial photos or topographic base maps. Wildlife habitats will be classified according to the California Wildlife Habitat Relationships System (Mayer and Laudenslayer 1988). The following habitat characteristics will be determined through field sampling or aerial interpretation to define wildlife habitat types:

- geographic location;
- dominant vegetation size class; percent and species composition of ground cover or canopy closure;
- degree of decadence; and
- habitat elements essential to the life history of wildlife species.

Vegetation communities will be identified by dominant and indicator species and will be classified using Holland (1986), modified to denote the unique plant associations of the north coast geographic region.

Aerial photograph interpretation will be reconciled to existing study site conditions through a designed sampling program. The sampling program will include collection of data for input to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships (CWHR) system analysis. Mapping will be conducted using AutoCADD.

California Wildlife Habitat Relationships System Analysis

Terrestrial wildlife resources potentially occurring in the areas of mapped habitat will be predicted through the California Department of Fish and Game (CDFG) CWHR system modeling program. Field measurements of specific habitat components, conducted during the habitat mapping, will precede the computer analysis.

Stream Crossings Assessment

Biological resources in the vicinity of proposed stream crossings that are associated with wastewater transmission line corridors will be described. Biological resources that will be described include vegetation communities, important wildlife habitat, and special status plant and wildlife species that are associated with the drainage and that are located within 100 feet of the stream crossing.

Special Status Field Studies

The following field studies for special status species will be conducted within the Geysers study area and associated wastewater transmission and distribution line corridors.

Plant Surveys

Pedestrian survey transects to record special status plant species and to characterize overall plant diversity will be conducted within proposed wastewater transmission and distribution line corridors. Surveys will be conducted to allow 100% visual coverage of the ground surface. Surveys will be conducted when the plants are most phenotypically identifiable.

Northern Spotted Owl Surveys

~~Surveys for suitable northern spotted owl habitat will be conducted to identify reaches of the proposed transmission and distribution line corridors that may have to be resited or that would have restricted construction windows.~~

Technical Report

A technical report will be produced summarizing the findings of the above studies.

Wastewater Transmission Line Biological Studies

Terrestrial vegetation communities, special status plant and wildlife species, and other important plant and wildlife resources potentially affected by the construction of wastewater distribution and transmission lines will be characterized. This subtask will consist of the following study components.

Stream Crossings Assessment

Biological resources in the vicinity of proposed stream crossings that are associated with wastewater transmission line corridors will be described. Biological resources that will be described include vegetation communities, important wildlife habitat, and special status plant and wildlife species that are associated with the drainage and that are located within 100 feet of the stream crossing.

Special Status Field Studies

The following field studies for special status species will be conducted along wastewater transmission and distribution line corridors.

Plant Surveys

Pedestrian surveys transects to record special status plant species and to characterize overall plant diversity will be conducted within proposed wastewater transmission and distribution line corridors. Surveys will be conducted to allow 100% visual coverage of the ground surface. Surveys will be conducted when the plants are most phenotypically identifiable.

Technical Report

A technical report will be produced summarizing the findings of the above studies.

Ecological Risk Assessments

The risk for adverse effects on organisms will be quantified using the ratio between the exposure concentration (Water Quality and Hydrology/ Irrigation Return Flow Task) and selected benchmark values (E/B). This ratio will be calculated for typical conditions at each site or receiving body. The use of these ratios is a semi quantitative approach to calculate the potential risk to selected site receptors. Benchmark values delimit containment concentrations in various media that, below which, adverse effects on organisms are unlikely to occur. The E/B ratios will be compared to literature values for assessing risk posed by contaminants. Site receptors will include representatives from 4 to 6 levels of the ecological food chain and specific special status organisms.

<u>Receiving Bodies</u>	<u>Contamination Scenario</u>	<u>Specific Organisms of Concern</u>
<u>Esteros de San Antonio</u>	<u>Subsurface Flows</u>	<u>Tide Water Goby, Freshwater Shrimp, Black Rail</u>
<u>Esteros Americano</u>	<u>Subsurface Flows</u>	<u>Tide Water Goby, Black Rail</u>
<u>Laguna de Santa Rosa/ Russian River</u>	<u>Discharge (1-20%)</u>	<u>Freshwater Shrimp, Migratory Salmonids, Harbor Seal, Red-legged Frog</u>
<u>Perennial Stream /Mercury Contaminated Discharge</u>	<u>Discharge (Small Leak to Catastrophic Break)</u>	<u>TBA</u>
<u>Petaluma River/ Marsh</u>	<u>Subsurface Flows</u>	<u>Split-tail</u>
<u>A Model Intermittent Stream</u>	<u>Subsurface Flows (Small, 100% Flow)</u>	<u>Freshwater Shrimp, Red -legged Frog</u>
<u>Reservoir</u>	<u>100% Effluent</u>	<u>Migratory Shorebirds, Golden Eagle</u>
<u>Crane/ Copeland Creek</u>	<u>Discharge (Large, 100% Flow)</u>	<u>Freshwater Shrimp, Red-legged Frog</u>
<u>Seasonal Wetlands</u>	<u>Discharge</u>	<u>California Linderiella, California Tiger Salamander</u>
<u>Created Wetlands</u>	<u>Discharge (100% Effluent)</u>	

Biological Team Coordination

Biological team coordination will be required due to the diversity of field studies that must be integrated to be effective and efficient. Coordination will be conducted through completion of biological studies. ~~Eighty percent of the total proposed biological team coordination scope and budget will be required through March 1995.~~

Agency consultations and coordination will be provided on a ongoing basis as the project progresses.

TASK 19 SUMMARY

Product	Medium	Copies
Technical Reports (6)	Print	25
Summary of Surveys	Print	25
Special-Status Amphibian Surveys on Potential Reservoir Sites: Technical Summary		
California Wildlife Habitat Relationships System (CWHR) Field Data Collection: Technical Summary		
Summary of Botanical Surveys Methods and Results for Potential Reservoir Sites and the Estero Americano: Technical Summary		
West County Agricultural Irrigation Biological: Technical Report		
Estero Studies Biological Technical Report		
South County Agricultural Irrigation Biological Report		
Sebastopol Biological Technical Report		
Reservoir Sites Biological Technical Report		
Geysers Biological Technical Memorandum		
Wastewater Transport and Distribution Lines		
Pre-Screened Reyes Soils - Bay Flats Evaluation		

TASK 20 AQUATIC BIOLOGICAL STUDIES

20.1 Special Spring 1994 Studies

20.1.1 *Stream Habitat Aquatic Life Surveys*

This task is intended to characterize the aquatic biological resources that may be affected by the project.

A characterization of aquatic vertebrates (other than fish) will be conducted in 1994 ~~spring~~ on streams, rivers, and estuaries that may be affected by the project as site access is obtained. Water bodies and drainages that will be surveyed include Santa Rosa Creek, Americano Creek, Estero Americano, Stemple Creek, Estero de San Antonio, Petaluma River, Adobe Creek, Copeland Creek, Crane Creek, Gossage Creek, Blucher Creek, San Antonio Creek, Tolay Creek, the Green Valley/Atascadero System, and Walker Creek, as well as streams in potential storage sites. Two stations will be sampled in Santa Rosa Creek, and two in San Antonio Creek, and one in other listed streams. This characterization will consist of qualitative habitat assessments to determine suitability of the stream habitat for California red-legged frogs, Foothill yellow-legged frogs, western pond turtle, California tiger salamander, and other species of interest. The results will be summarized in a technical memorandum.

~~Samples of benthic organisms will be collected in the Laguna, Santa Rosa Creek and the Russian River.~~

20.1.2 *Flow Augmentation and Irrigation Stream Fish Surveys*

An aquatic life survey will be conducted in the Summer of 1994, subject to access, on streams and estuaries which may be affected by irrigation or flow augmentation, including Americano Creek, Stemple Creek, Adobe Creek, Copeland Creek, Crane Creek, Blucher Creek, San Antonio Creek, Tolay Creek, Lichau Creek, Lynch Creek, Willow Brook, the Green Valley/Atascadero system, and Walker Creek. Two stations will be sampled in San Antonio Creek, and one in all other streams. Fish will be censused using trawls, gill nets, or beach seines as appropriate for the habitat. Results will be summarized in a technical memorandum. As flow augmentation streams and irrigation areas are deleted from the project description or as other information becomes available, field studies will be reduced accordingly.

20.1.3 *Petaluma River*

Flow augmentation in the Petaluma River basin could affect aquatic life in the Petaluma River. This task includes an evaluation of the Petaluma River to characterize the environment and provide the basis for identifying environmentally beneficial streamflows. Fish, larval fish and benthos in the Petaluma River will be characterized at three stations in summer and fall 1994, and winter and spring 1995. This task will also include a special survey for the Sacramento split-tail, a special status fish believed to reproduce in the wetlands of the Petaluma River, and its habitat. Petaluma River monitoring will be summarized in a technical memorandum. After one

preliminary field trip, work on this study was discontinued based on BPU direction to eliminate South County flow augmentation.

20.1.4 *Russian River/Laguna de Santa Rosa*

The characterization of aquatic life in the Laguna and Russian River will include characterization of Russian River attached algae and macrophytes, and surveys for fish and benthos. Fish and benthos will be characterized once during the summer of 1994 at each of two stations in Santa Rosa Creek, three stations in the Laguna, and three stations in the Russian River. A technical memorandum will be prepared to summarize this evaluation. Fish collections were found to be unnecessary because DFG determined that existing information is adequate.

The abundance of nuisance visible plants (macrophytes) may be increasing in the Russian River and reclaimed water discharges may stimulate growth of such plants. The purpose of this task is to continue an assessment of the abundance of attached algae and macrophytes in the Russian River to provide the basis for future evaluation of discharge impacts. Attached algae will be removed from rocks in a defined quadrat and weighed. Other plants will be qualitatively mapped. The survey of attached algae, submerged macrophytes and emergent macrophytes was authorized in Task 25 and has begun. This task provides for the continuation of surveys to assess the biomass of algae and macrophytes in the River throughout the spring and summer growth period. The information from this task will be used to describe the Russian River environment and to provide input to the water quality model(s). A technical memorandum will be prepared to summarize this evaluation.

Task 20.2 1995 Studies

Surveys designed to characterize the fish and other aquatic life in the project area streams will continue in 1995. These surveys are as follows:

20.2.1 *Fish and Other Aquatic Life Surveys - West County Irrigation Streams*

Fish and other aquatic life surveys will be conducted on streams which may be affected by irrigation, including Atascadero, Stemple, and Americano. One station in each creek will be visited quarterly in 1995. Fish will be censused using trawls, gill nets, or beach seines as appropriate for the habitat. The purpose of these collections is to supplement collections that were to be made in 1994 under Task 20.1.2. Discussions with personnel in the California Department of Fish and Game indicate that there is currently sufficient information on fish in Green Valley Creek. Benthos samples will be collected in Green Valley, Atascadero, Stemple, and Americano Creeks using a petite PONAR or Surber sampler as appropriate for the habitat. Portions of these streams are annual and polluted and thus probably have a depauperate fauna. However, because listed or unusual species have been found in these watersheds where they were not expected, an assessment of the benthic fauna in these streams is appropriate. Information collected in this task will be summarized in the Task 20.1.2 technical memorandum.

20.2.2 Fish and Other Aquatic Life Surveys - Storage Reservoir Streams

Fish and other aquatic life surveys will be conducted on streams that are potentially affected by leakage from storage sites and/or inundation. These include Tolay Creek, an unnamed creek tributary to the Petaluma River near Lakeville Road, and West County storage sites except Two Rock (for which there is existing information). These creeks will be visited quarterly in 1995. Fish will be censused using beach seines. Benthos samples will be collected using a petite PONAR or Surber sampler as appropriate for the habitat. Information collected on the storage site streams will be summarized and incorporated into the Task 20.1.2 technical memorandum.

20.2.3 Fish and Other Aquatic Life Surveys - Discharge/Groundwater Recharge Streams

Streams located east of Rohnert Park have been identified as potential sources of groundwater recharge (i.e., Crane Creek, Copeland Creek, and Hinebaugh Creek). Discharge of wastewater to these streams, then recharge to groundwater, has been identified as a potential project component by the BPU at the January 1995 Study Session. Fish populations will be characterized in these streams using a beach seine at one location in each stream during spring 1995. Information collected on the ground-water streams will be summarized and incorporated into Task 20.1.2 technical memorandum.

20.2.3 Fish and Other Aquatic Life Surveys - Russian River Macrophytes

Quantification of attached algae, submergent macrophytes, and emergent macrophytes will continue in 1995 to support extended water quality model calibrations, as directed by the BPU at the January 1995 Study Session. They will be measured in early spring, late spring, and summer in the River. A technical memorandum summarizing the data collected in 1994 and 1995 on the quantification of attached algae, submergent macrophytes, and emergent macrophytes in the Russian River will be produced under Task 28.

20.3 - Pipelines

This scope is based on the assumption that Geysers operators will not change diversions from local surface waters as a result of reclaimed water injection.

20.3.1 Stream Crossing Site

Streams that will be crossed by the Geysers pipeline will be characterized to provide a basis for evaluating pipeline construction impacts. The streams will be assessed in the field by the team members evaluating the pipeline corridor pursuant to Task 19. These scientists will be provided with stream evaluation criteria and a form to complete. Several key stream crossings will be visited by aquatic and the Task 19 terrestrial scientists to standardize the field evaluation. Streams that will be crossed by pipelines other than the geysers pipeline will be characterized to provide a basis for evaluating pipeline construction impacts. Several key stream crossings will be visited by aquatic scientists to provide a field evaluation.

A technical memorandum describing the results of this Task will be prepared.

20.3.2 - Pipeline Rupture Analysis

The Geysers pipeline is expected to traverse soils that contain high levels of trace metals (and metalloids). A pipeline rupture could transport such soil into the aquatic environment, but the quantity of such soil that would be transported is assumed to be limited by automatic valves that would stop the flow of wastewater flow in response to a pressure change characteristic of a rupture. This task provides for the coordination of an estimate of wastewater discharge volume by pipeline experts (in Task 31) and a soil transport evaluation by a soil scientist (in Task 18). Biota typical of Geysers area streams will be identified in this task using existing information.

20.4 Estero Studies

Biological data for Estero Americano and Estero de San Antonio have been collected from 1989 through 1990, and additional data have been collected by others. These data will be summarized to characterize the environmental setting, and potential impacts of the projects on the Esteros will be identified. A technical memorandum summarizing the information from this task will be produced.

20.5 - Task Report

A report will be prepared summarizing the technical memoranda produced for this task and evaluating potential impacts of the Project on aquatic life.

TASK 20	SUMMARY	
Product	Medium	Copies
Stream Habitat Survey Result	Print	25
Aquatic Life Survey Results		
Stream Crossings Assessment		
Russian River Algae and Macrophytes		
Aquatic Life Impacts Assessment		
Environmental Conditions in West County Waterways		

TASK 21 WATER QUALITY - STREAM CHARACTERIZATION

21.1 Effluent Quality Characterization

Effluent samples will be collected and analyzed for pathogens and other parameters of environmental and public health concern to supplement routine monitoring data (e.g. chlorine residual, organohalides, enteric viruses, and silica). Existing effluent quality data will be input to a data base to calculate average and worst case effluent quality. The effluent quality database will be updated periodically.

Alkylphenolic compounds will be characterized in two effluent samples to evaluate xenoestrogen compounds in reclaimed water. The information will be used in Task 34, Risk Assessment. However, even with the quantitative results the evaluation will be qualitative because little is known about the relationship between exposure to xenoestrogens and their human health effect. During the remaining two Russian River sample collections alkylphenolic compounds will be collected and analyzed.

21.2 Characterize Potential Flow Augmentation Streams in 1994

Water quality in several seasonal streams in Sonoma County will be characterized. The purpose of this task is to characterize water quality in these streams. Water quality characterizations will be conducted in each of the following streams, rivers and estuaries: Adobe Creek, Copeland Creek, Crane Creek, Blucher Creek, San Antonio Creek, Lichau Creek, Lynch Creek, Willow Brook, and Tolay Creek.

Literature Search

A search will be made of available literature for studies done previously on these streams.

Field Survey

Each stream was visited on two occasions during the spring of 1994. Streams that became dry in the spring of the 1994 drought year prior to contract approval (and thus sample collection) will be sampled in spring 1995. On the first visit, to be conducted early spring, the following water quality parameters will be measured at each station: temperature, conductivity, dissolved oxygen, pH, nutrients (nitrate, ammonia, total phosphate, and dissolved orthophosphate, total kjeldahl nitrogen), total dissolved solids (TDS), hardness, total metals (cadmium, chromium, copper, lead, nickel, silver, and zinc), chlorophyll *a*, total organic carbon, and total suspended solids. Flow, when present, will be measured at all stations. Temperature, conductivity, dissolved oxygen and pH will be measured in the field during both visits. Dip samples for the other constituents will be collected in the field to be analyzed by a certified laboratory. As flow augmentation streams are eliminated from the project description, field studies will be reduced accordingly. A technical memorandum will be prepared.

21.3 Characterize Potential Flow Augmentation Streams in 1995

~~**Water Quality.** Streams located East of Rohnert Park have been identified as potential sources of groundwater recharge. Discharge of wastewater to these streams, then recharge to groundwater, has been identified as a potential project component. The purpose of this task is to measure the magnitude of recharge that occurs in the streams. Flow gauges will be installed in each of the two streams at locations above and below the recharging stream reaches to measure differences in flow under conditions that will allow recharge to be estimated. Four gauges will be rented and deployed in spring of 1995. Data will be collected for approximately two weeks, and then the gauges will be removed. The data will be evaluated to estimate recharge, and a technical report will be prepared.~~

~~**Stream Gauging.** Streams located east of Rohnert Park have been identified as potential sources of groundwater recharge (i.e. Crane Creek, Copeland Creek, and Hinebaugh Creek). Discharge of wastewater to these stream, then recharge to groundwater, has been identified as a potential project component. Water quality in these streams will be characterized by collecting two samples in each stream in spring 1995 to provide a basis for evaluating water quality impacts of the discharge. Results of these collections will be summarized and incorporated into the technical memorandum describing irrigation stream water quality.~~

21.3 Characterize Potential Irrigation Streams

Some streams in Sonoma County which will not have direct flow augmentation area potentially affected by irrigation from the Project. The purpose of this task is to characterize water quality in these streams. Water quality characterizations will be conducted in the Green Valley/Atascadero system ~~and Walker Creek~~. Estero de San Antonio, Estero Americano, Americano Creek, and Stemple Creek are also potentially affected by irrigation, and these waters are addressed in Task 21.7.

This task begun in 1994, will be continued in 1995 because information about the environment in this region of the county will help to know what effect irrigation will have on stream flooding and thus water quality.

21.4.1 Literature Search

A search will be made of available literature for studies done previously on these streams.

21.4.2 Field Survey (Sebastopol and Chileno Valley)

The Green Valley/Atascadero system, ~~and Walker Creek, and San Antonio Creek~~ will be visited on two occasions, spring and summer 1994 and quarterly in 1995. ~~All other streams will be visited on five occasions, spring 1994, summer 1994, fall 1994.~~ On the first visit to be conducted in early spring, the following water quality parameters will be measured at each station: temperature, conductivity, dissolved oxygen, pH, flow, nutrients (nitrate, ammonia, total kjedahl nitrogen, total phosphate and dissolved orthophosphate), total dissolved solids (TDS), chlorophyll a, total organic carbon, hardness, and total suspended solids. Temperature, conductivity, dissolved oxygen pH, and flow will be measured in the field. Dipp samples for the

other constituents will be collected in the field to be analyzed by a certified laboratory. Subsequent visits will replicate the above measurements and add total and dissolved metals, and dissolved organic carbon.

A technical memorandum will be prepared summarizing the water quality of the irrigation area streams and the impact of the anticipated groundwater discharge on surface water quality.

21.4.3 Characterize Potential Storage Site Streams

Some streams are potentially affected by Project Storage sites. The purpose of this task is to characterize water quality in these streams to provide the basis for evaluating impacts of reservoir leakage. These streams include Tolay Creek (two sites) an unnamed stream tributary to the Petaluma River, one site at the Lakeville/Hillside storage site, and streams at one storage site in each of the Americano and Stemple watersheds. One site in the unnamed stream and two in Tolay Creek (upper and lower) will be sampled quarterly in 1995. The following water quality parameters will be measured: temperature, conductivity, dissolved oxygen, pH, nitrate, ammonia, total Kjeldahl nitrogen, total and dissolved orthophosphate, TDS, chlorophyll TSS, TOC, hardness, total and dissolved metals, and dissolved organic carbon. The water quality data will be used as input to the Task 30 groundwater analysis to indicate the quality of discharging groundwater under current conditions, and to compare to estimated quality under project conditions. A technical memorandum will be prepared summarizing the results of these collections.

21.5 Effect of Irrigation on Nonpoint Source Discharges

Agricultural operations affect water quality through inadvertent discharge of animal waste, copper pesticides, and other constituents. Irrigation could affect agricultural operations and the potential for nonpoint discharges (e.g., increased herd size and more animal waste or better utilization of manure with an irrigation system). The effect of irrigation on nonpoint discharges will be assessed and programs to prevent adverse impacts will be developed as needed. The potential for irrigation to reduce nonpoint source discharges will also be assessed. Input from Tasks 18 and 33 will be incorporated into a technical memorandum.

21.6 Characterization of Laguna de Santa Rosa Water Quality

The North Coast Regional Water Quality Control Board and City staff are currently measuring water quality in the Laguna. Funding for RWQCB monitoring is expected to expire in June 1995 and City monitoring is infrequent relative to data needs for this program. The water quality information from the Laguna is necessary to calibrate for the Russian River Water Quality Model so the purpose of this task is to continue the Laguna Water Quality Monitoring for the first three months of the 1995 fiscal year (beginning July 1995). Sampling will be bi-weekly at four stations for the following parameters: temperature, conductivity, dissolved oxygen, pH, nitrate, ammonia, TKN, nitrite, dissolved orthophosphate, and BOD. Due to a sparsity of information on metals in the Laguna, total and dissolved metals will be measured monthly at three stations through September 1995. Laguna water collections will be summarized in a technical memorandum. Russian River water quality monitoring is under Task 25.

21.7 Estero Studies

Water quality data for Estero Americano and Estero de San Antonio have been collected from 1989 through 1990, and additional data have been collected by others. These data will be summarized to characterize the environmental setting, and potential impacts of the projects on the Esteros will be identified. A qualitative modeling approach will be used to estimate the impacts of inflow in bar-closed conditions on Estero hydraulics and water quality. It will be based on existing morphological data. A technical memorandum summarizing the information from this task will be produced.

21.8 Task Report

A report will be prepared summarizing the technical memoranda produced for this task and evaluating potential impacts of the Project on water quality. Risk assessments will follow methodology described in Task 19.

21.9 Peer Review Involvement

A member of the Peer Review Committee will advise the project team on the regulatory developments, especially the revisions of Statewide plans. The PRC member shall also review the technical reports and provide written comments on up to 10 draft technical reports. The PRC member will also review sections of the administrative draft EIR/EIS and provide written comments.

TASK 21	SUMMARY		
Product		Medium	Copies
Irrigation/Storage Streams Water Quality Monitoring Results		Print	25
Laguna Water Quality Monitoring Results			
Estero Water Quality Model			
Water Quality Impact Analysis Report			

TASK 22 GROUNDWATER RECHARGE/AQUIFER STORAGE AND RECOVERY POTENTIAL

Phase I

Information Review

The consultant will conduct a review of information available for consultants and agencies who have conducted groundwater or related studies in the Santa Rosa Plain groundwater basin or who maintain records of well operations or groundwater quality. Available data from the Cities of Santa Rosa, Sebastopol, Cotati, and Rohnert Park; the Sonoma County Water Agency; Sonoma County Public Health Department; California Water Resources Control Board; California Department of Water Resources; and/or the U.S. Geological Survey will be reviewed and analyzed.

The feasibility of using percolation ponds and/or direct injection by wells will be evaluated. Issues to be considered are land area needs, the need for groundwater recovery in addition to recharge, construction and operational costs, and regulatory considerations.

Information to be obtained for wells includes: location of existing wells, aquifer characteristics (position and thickness of aquifer and confining units, position and nature of aquifer boundaries), hydrogeologic parameters, (transmissivity, storativity, groundwater level and gradients), hydraulic stresses, groundwater quality, effluent water quality, groundwater uses (beneficial uses), and regulatory requirements. For percolation ponds data include: soil/surficial geology, underlying hydrogeology, physical site characteristics, physical site constraints, demographics, groundwater quality, effluent water quality, surface and groundwater uses, and regulatory requirements. Consultants and agencies to be contacted include: CH2M Hill, Sonoma County Water Agency, U.S. Geological Survey, California Department of Health Services, California Department of Water Resources, Regional Water Quality Control Board (North Coast, San Francisco, and Monterey), and the Sonoma County Health Department.

Identify Candidate Type Sites

Based on the information obtained during the information review, a set of siting criteria will be developed for preliminary site selection of recharge sites. Sites to be considered are within the Santa Rosa Plain and in proximity to existing wastewater transmission lines. Areas of the Santa Rosa Plain groundwater basin that are currently within the Sonoma County Water Agency's planning area and pilot study area for drinking water aquifer storage and recovery would not be considered in the preliminary site selection process. Factors that could affect criteria for well injection sites would include but not necessarily be limited to: hydrogeologic variables such as geologic formation, transmissivity, and storativity; water quality; and desired application rates. Factors that might affect criteria for percolation pond sites would include: soil permeability, slope, contact area, and subsurface hydrogeology.

Using the siting criteria, several type sites will be identified. For example, percolation sites could be grouped based on soil type, landform, or location; injection well sites could be divided

into groups with similar aquifer properties and hydrogeology. A list of potential sites would be developed, but future studies would focus on a representative type site. Studying a single site that is typical of a number of sites would reduce the need for a site-specific field investigation. Scope and budget for field studies will be prepared after identification of sites for study.

Phase II

This phase will consist of a detailed evaluation of groundwater conditions and subsurface geology in the northeast portion of Study Area 1, which includes the Laguna Treatment Plant and Study Area 2. Existing data will be used to conduct preliminary groundwater modeling to further determine the feasibility of ASR in the selected study area. DWR records and any existing pertinent literature will be used to construct cross-section(s) of the subsurface geology in the targeted areas. These records will also be used to determine groundwater uses and to identify wells that may be used in a survey, which would include the collection of water level data. A field reconnaissance will be necessary to identify the status of wells and to determine accessibility of the wells, including obtaining the consent of well owners.

The potential ASR will be evaluated in light of current groundwater uses and pertinent regulations. Appropriate agencies will be contacted to further define regulatory constraints, issues and concerns, and to allow direct input from those agencies.

The results of this phase of the investigation will be synthesized in a letter report to the City of Santa Rosa along with a revised preliminary cost estimate.

Scope for Oversight of Phases III through V of ASR Program

The implementation of Phases III through V of the ASR program will be overseen by the Consultant and implemented by a contractor to the City as directed by the BPU on January 14, 1995. The proposed scope of work includes: aquifer testing and evaluation, piloting testing consisting of injection and recovery of potable water; permitting including the generation of an engineering report; piloting testing consisting of injection and recovery of reclaimed water; and evaluation of the results. This process will be applied at two selected study areas in the Santa Rosa Plain groundwater basin. The oversight role will include phone conversations with the contractor and the city, review of all contractor's deliverables to the City including all Engineer's Reports, - and modeling and four meetings with the City and contractor. Available results of Phases II through V will be incorporated in the DEIR. The complete scope of the contractor's work is not currently defined, therefore the cost estimate for oversight is based on the following assumptions:

- Phases III through V will include aquifer testing and two pilot studies (one using potable water and one using reclaimed water) at two locations in the Santa Rosa Plain (for a total of 2 aquifer tests and 4 pilot studies). This work will be performed by a contractor to the City.
- Duration of oversight will be 24 months.
- Monthly meetings/phone conversations with contractor for duration.
- 12 major deliverable reviews (one workplan and one report of findings for each phase for each study area)

- Review of two finite element analysis (1 for each study area)
- Monthly phone conversations with the City for the duration
- Four meetings with the City and the contractor

TASK 22 SUMMARY

Product	Medium	Copies
Groundwater Recharge/Aquifer Storage and Recovery Potential Report - Phase I	Print	25
Groundwater Recharge/Aquifer Storage and Recovery Potential Report - Phase II	Print	25

TASK 23 REFINEMENT OF ALTERNATIVE COMPONENT SITES

Reservoir Sites

Based on the alternatives selected for evaluation in the EIR/EIS, the potential list of reservoir sites will be screened to arrive at a short list of sites that could adequately serve each of the three alternatives which require storage. Sites will be evaluated based on their environmental constraints, relative storage volume, proximity to other elements of alternatives, cost effectiveness, and hydraulic suitability. Analysis will then determine those sites that would effectively serve each alternative. It is expected that a list of two or three sites will be developed for each alternative. A draft recommendation will be prepared for the City. The list of recommended sites will be finalized based on input from City staff. ~~Up to three additional pond-type reservoir sites will be identified in the South County, with the objective of developing a storage option for a 10% maximum Russian River discharge project. Upland sites with little or no wetlands impacts will be identified for a total storage capacity of 1,900 MG. Sites will be identified through review of existing maps, supplemented by a one-day field reconnaissance effort. A brief memorandum summarizing recommendations will be prepared. Scope and budget will be prepared for development of the selected reservoir sites.~~

Review of Potential New Reservoir Sites

The Consultant was asked to review the feasibility of a reservoir site in the Cougar Mountain area and the Railroad Avenue Reservoir Site. Additionally, the Consultant is conducting a basic screening to confirm that no feasible large reservoir sites in West or South County have been missed. This effort will be an office exercise, using USGS topographic maps, and will focus on ascertaining whether any outstanding sites have been missed. The results of this search will be provided in a memorandum, along with documentation of criteria established as a basis for the study.

Flow Augmentation Streams

A short list of streams will be identified for recommendation to the City of Santa Rosa for more detailed evaluation of stream flow augmentation. A memorandum will be prepared that summarizes regulatory issues associated with stream flow augmentation. Criteria will be developed by which to evaluate streams in the Petaluma River and Laguna watersheds. The evaluation will be conducted using information collected in Task 20 and other available information. A memorandum will be prepared that identifies streams that will be recommended for further evaluation.

Wetlands Evaluation

Alternatives and components will be evaluated to identify the need for wetlands creation or enhancement. Need will be determined based on criteria such as polishing requirements, water use, and water management (i.e., retention or storage). A memorandum will be prepared to describe the need for wetlands in association with each project alternative or component. The need for wetlands creation or enhancement to mitigate direct project effects on jurisdictional

wetlands is not included in this evaluation and will be evaluated after a preliminary identification of jurisdictional wetlands has been conducted.

TASK 23 SUMMARY

Product	Medium	Copies
Summary of Recommendations	Print	25
Meetings		Number
City Staff Meeting		1
BPU Meeting		1

TASK 24 PREPARATION OF U.S. ARMY CORPS OF ENGINEERS 404 PERMIT APPLICATION

Preparation of U.S. Army Corps of Engineers Draft 404 Permit Application

As soon as descriptions of the alternatives are finalized (including selection of reservoir sites), a draft Preliminary Section 404 Permit application to the U.S. Army Corps of Engineers (COE) for the purpose of determining the need for an EIS will be prepared. As directed by the COE in their letter dated 4 May 1994, the permit application will have sufficient information for their Regulatory Branch to determine the project alternatives that would require an individual Department of the Army permit. Information will be provided to allow the COE to determine that they have jurisdiction and that the project alternatives would require the preparation of an EIS. The application will include a written and tabular description of each of the five selected project alternatives and a graphic which generally describes the project elements of each alternative. Detailed mapping is not possible at this time, but the graphics will include a location for each element.

A Draft Preliminary Application will be prepared for City review. The Consultant Team will attend a meeting to review comments. The revised Preliminary Application will be submitted to the COE, and one meeting will be held with the COE.

Documentation in Support of the Elimination of Alternatives Preliminary 404 (b) (1) Alternatives Analysis

A documentation in support of the elimination of Alternatives preliminary-alternatives-analysis will be prepared to address the rationale for dismissing alternative components from further consideration in the Draft EIR/EIS. The intent of this analysis will be to provide the basis for the completion of an 404 (b) (1) alternatives analysis when a project is selected for implementation. The rejected components will be evaluated against the project purpose and the 404 criteria of cost, technology, and logistics. The following components will be addressed: ocean outfall, bay outfall, Lake Sonoma disposal, ~~and~~ alternative reservoir sites, wetland creation, Bayflats irrigation area, Chileno Valley irrigation area, Schellville irrigation areas, and Rapid Infiltration. The evaluation of reservoirs will be based on the criteria previously established for evaluation of cost effectiveness and engineering feasibility of reservoir sites.

For analysis of discharge options, it will be important to establish that the purpose of the project is to design a system to allow the beneficial reuse of wastewater. A more narrow definition of project purpose limited to wastewater disposal will pose problems for evaluation of the ocean outfall discharge options.

TASK 24 SUMMARY

Product	Medium	Copies
Preliminary Army Corps 404 Permit Application	Print	25
<u>Documentation in support of the elimination of Alternatives Preliminary 404 (b) (1) Alternatives Report Evaluation</u>	Print	25

Meetings	Number
City Permit Review	1
<u>Army Corps of Engineers</u>	<u>1</u>

TASK 25 RUSSIAN RIVER ENVIRONMENTAL STUDIES

Develop Study Plan with Agencies

Concerned agencies such as the California Department of Fish and Game and the Regional Water Quality Control Board will be contacted to obtain input regarding their desired approach for evaluation of plants in the River.

Characterization of Attached Algae

Growth of attached algae in the Russian River is dependent on the amount of coarse gravel and cobbles, nutrients, and sunlight. In order to measure algae abundance, attached algae will be removed from rocks in a defined quadrat and weighed. Other plants will be qualitatively mapped. Under this task, the abundance of attached algae and the amount of suitable habitat will be characterized in June and July.

Characterization of Russian River Macrophytes (Aquatic Plants)

The abundance of nuisance visible plants (macrophytes) may be increasing in the Russian River and reclaimed water discharges may stimulate growth of such plants. The purpose of this task is to continue an assessment of the abundance of attached algae and macrophytes in the Russian River to provide the basis for future evaluation of discharge impacts.

The emergent and submerged plants are distributed throughout the River, with the greatest abundance below Monte Rio. The macrophyte beds will be mapped. The biomass of attached algae and emergent and submergent macrophytes will be assessed at representative locations in the Russian River. The information from this task will be used to describe the Russian River environment and to provide input to the water quality model(s). A technical memorandum will be prepared to summarize this evaluation.

TASK 25 SUMMARY

Product	Medium	Copies
See Task 28	Print	25

TASK 26 NOAA RESEARCH PERMIT APPLICATION

A Research Permit Application will be prepared and submitted to the National Oceanographic and Atmospheric Administration (NOAA) to study the Estero aquatic environment.

The NOAA will be contacted to develop a detailed description of the information that it considers necessary to evaluate project alternatives. Study options for responding to NOAA's information request will be developed and evaluated according to cost schedule, and technical feasibility.

TASK 26 SUMMARY

Product	Medium	Copies
Permit Application	Print	1

TASK 27 SEDIMENT QUALITY CHARACTERIZATION

Sediment quality characterization in the area of the existing discharge is necessary to address RWQCB concerns and to provide a basis for evaluating the impact of continued Laguna discharge. Sample analysis will be presented in a technical memorandum.

Sample Collection and Analysis

Samples will be collected once at each of eleven locations, including Kelly Farm Demonstration Wetland, two storage ponds, the Laguna system above and below discharge locations, and the Russian River above and below the Laguna. Samples will be analyzed for particle size, organic content, moisture content, metals, and organic compounds of concern in one surface and one deep composite sample collected at each site.

Comparison with RWQCB and Other Data

RWQCB and other pertinent data will be obtained, reviewed, and compared with data obtained from samples collected in this task.

Technical Memorandum

A technical memorandum will be prepared summarizing the work done in this task.

TASK 27 SUMMARY			
Product		Medium	Copies
Progress Reports		Print	25
Sediment Quality Characterization and Impacts Assessment		Print	25

TASK 28 RUSSIAN RIVER WATER QUALITY

The purpose of this task is to assess the influence of water quality parameters on macrophyte abundance. The information obtained will also be used as input to the Russian River water quality model. The following water quality parameters will be measured at two locations in the Russian River: temperature, conductivity, dissolved oxygen, pH, nutrients (nitrate, ammonia, total kjeldahl nitrogen, total phosphate, and dissolved orthophosphate), total metals, (cadmium, chromium, copper, lead, nickel, silver, and zinc), chlorophyll *a*, total organic carbon, TDS, hardness and total suspended solids. Temperature, conductivity, dissolved oxygen, and pH will be measured in the field. Dip samples for other constituents will be collected in the field to be analyzed by a certified laboratory. These measurements will be conducted twice in 1994. In 1995 the following parameters will be measured monthly through September of these locations: nitrate, ammonia, total kjeldahl nitrogen, nitrite, dissolved orthophosphate, temperature, conductivity, dissolved oxygen, and pH. In addition, two diel studies of dissolved oxygen will be conducted at two to three locations in the Russian River each in 1994 and 1995. The purpose of collecting this information is to extend the model calibration through the summer of 1995, as directed by the BPU at the January study session.

Potential sources of coliform bacteria in the Russian River, particularly septic systems and sediment, will be assessed. This will be done by conducting one synoptic surveys of coliform in the Russian River ~~at different times of the year~~ to assess the effect of reclaimed water, recreation, septic systems, and other sources on river water quality.

The results of the Russian River monitoring will be summarized in a technical memorandum.

River Discharge Evaluation

Discharge alternatives include direct discharge to the Russian River and discharge through the Laguna de Santa Rosa. The purpose of this task is to assess potential impacts of various wastewater discharge scenarios on water quality in the Russian River and the Laguna de Santa Rosa. This task consists of five subtasks: Develop model applications, model impacts on the Laguna de Santa Rosa and Russian River, evaluate for compliance with the California Inland Surface Water Plan, evaluate cumulative impacts, and prepare a technical memorandum.

Develop Model Applications

Qual2E, the U.S. EPA's steady state water quality model, was adapted to the Russian River by U.C. Davis for the Regional Water Quality Control Board. Concerns about this model have been raised by members of the public in the Regional Board's Water Quality Modeling Workgroup meetings. The model will be modified to address these concerns to the extent possible, unless RWQCB and other Workgroup participants believe that the model limitations cannot be overcome. In addition, a dynamic model will be adapted to address conditions that Qual2E is not intended to address, such as water quality impacts in the tidal portion of the Russian River. The model will be used to evaluate historic discharges on a daily time-step to estimate the actual concentration of wastewater in the Russian River.

Demonstrate Model

A demonstration of the QUAL2E model application will be prepared for the BPU workshop that is scheduled for the 13th and 14th of January 1995.

TASK 28 SUMMARY

Product	Medium	Copies
Russian River Water Quality Monitoring Results	Print	25
Russian River Water Quality Model	Print	25

TASK 29 WATER CONSERVATION

~~The Water Conservation Component in all of the Selected Alternatives is expressed as "standard conservation." The actual definition of "standard conservation" may vary depending on the amount of the conservation technologies and programs and the willingness of the consumer or business to participate in the conservation program. For purposes of evaluating the Project Alternatives, it is assumed that "standard conservation" will, at the least, include adherence to the State of California Best Management Practices and any existing State Regulations and Standards or Codes. "Standard Conservation" should not require any additional study.~~

~~The data and results obtained in the work described above will be reviewed and compared with hydrologic conditions to either estimate the impact on water use and wastewater flow resulting from the program elements, or confirm estimates developed by others. Reductions from program elements will be compared to temperature, precipitation, growth and other factors that could have impacted the results. A baseline estimate for savings associated with the current programs will then be developed for review and approval by all the participating entities. This will serve as the base for evaluation of any future water conservation programs, and on which a program to achieve the reduction in wastewater flow necessary to meet the 1999 compliance can be structured.~~

Inventory/Evaluate Current Programs

Member entities of the Subregional System will be contacted to obtain existing available information to define existing water conservation activities and to describe planned activities that could effect wastewater flows in the Subregional System. CH2M Hill will be contacted to review their wastewater flow projections, and more specifically the inclusion of water conservation considerations into their flow projections. Wastewater flow and water use data will also be obtained from member entities. "Analysis and Flow Projections Methodology" (which describes the procedure to be followed in the analysis of existing water use and wastewater flow, and in the projection of future flow) will be developed and circulated for review.

The conclusion of work completed to date is that there is a large difference between the available data and ongoing and proposed water conservation programs for each of the member entities. This amended work scope reflects the need to integrate this mixture of data and member entity objectives and the results and conclusions from this completed work, and is adjusted to integrate the work effort needed to develop the work products described in the original work scope.

A technical memorandum will be prepared that documents the available data and presents the results of the work completed in this work task.

Develop and Analyze Additional Water Conservation Options

This task includes two steps. The consultant will identify other water conservation measures which could be considered by Subregional System member agencies to decrease the wastewater flow generated by each over the life of the project, and will then project the resulting wastewater flow for each. The results will be presented in a technical memorandum summarizing the

findings. The findings will be arrayed in a matrix format to display the potential measures, the project unit savings for each, the unit costs, and other appropriate facts that will be useful in assessing the usefulness of each measure in an expanded conservation effort. The resulting wastewater flow to the Subregional plant will be projected. Based on the input received from the BPU, consultant will develop and analyze the following options:

Application of BMP's for Wastewater Flow Reduction

Individual Subregional Member Agencies

Uniformly over Entire Subregional System

More Aggressive Conservation Program

~~Consultant will identify other water conservation measures which could be considered by Subregional System member agencies to decrease the wastewater flow generated by each over the life of the project, and then will project the resulting wastewater flow for each. The result will be presented in technical memorandum summarizing the findings. The findings will be arrayed in a matrix format to display the potential measures, the projected unit savings for each, the unit costs, and other appropriate facts that will be useful in assessing the usefulness of each measure in an expanded conservation effort. The resulting wastewater flow to the Subregional plant will be projected.~~

The projected flow resulting from each option will be developed for each of the member entities, as will the resultant flow to the Subregional treatment plant. The findings will be presented to the BPU (and other Subregional member agencies ~~as directed by HBA~~) for review and comment. Input on which measures to consider as elements of the Subregional Systems project description will be solicited, and descriptions prepared of the selected options. ~~The flow projected for the member entities will then be finalized as will the resultant flow to the Subregional treatment plant, and a~~ A revised technical memorandum will then be prepared which integrates these findings for review and comment.

Prepare Issues and Criteria for Water Conservation

This work will include identification of the issues associated with water conservation, and the development of the criteria for judging significance of potential impacts associated with conservation elements of the project.

Finalize Technical Memoranda and Participate in Related Meetings

The response to comments generated from the review of the Technical Memoranda will be prepared, and final draft versions of these two memos integrating all review comments will be prepared. This will be submitted for review and comment, and a final version prepared for review and comment by member entities of the Subregional System and the BPU as appropriate.

This task will include participation in one meeting with the BPU, and up to two public meetings and/or public hearings dealing with the technical memoranda or other water conservation items.

TASK 29 SUMMARY

Product	Medium	Copies
Wastewater Flow Projections	Print	25
Additional Water Conservation Options		

TASK 30 ASSESSMENT OF GROUNDWATER MONITORING/IMPACTS

Evaluation will include an assessment of potential impacts to water supply wells ~~both along the Russian River and~~ near proposed reservoirs and irrigation ~~and created wetland~~ areas. An evaluation of whether the project would cause groundwater flows that ~~which~~ will influence surface water bodies will also be conducted. The latter information would be used in the evaluation of surface water quality impacts. This task will include an evaluation of ~~the Russian River discharge and~~ of reservoir storage and reuse in the Sebastopol, West County and South County areas. The following seven subtasks will be conducted as part of Task 30:

30.1 Well Log Survey

Identify locations of wells that could be affected by project activities by contacting the California Department of Water Resources, Sonoma County Water Agency and/or the Sonoma County Health Department. Incorporate results of well survey in Subtask 30.4 technical memorandum.

30.2 Background Water Quality

Define the groundwater quality using data from the above listed agencies and existing regional and local groundwater quality studies. Incorporate results in Subtask 30.5 technical memorandum.

30.3 Effluent Quality

Quantify effluent quality using data provided by the City for the past two years of monitoring. Incorporate results in Subtask 30.4 technical memorandum.

30.4 Mass Balance

Estimate effect of applied ~~Identify reclaimed~~ water volumes and mass loading on aquifer system(s) which may result from seepage of reclaimed water, and assess potential impacts to surface waters and water supply wells. (This will be based on general mass balance calculations, not detailed groundwater modeling). ~~If groundwater modeling is required this would be an additional cost.)~~ Subtask 30.4 is subdivided into the following steps.

- Assemble available information to develop longitudinal hydrogeologic cross sections of uppermost aquifer in each groundwater basin of concern (Santa Rosa [3], Petaluma [5], and Coastal Watershed basins [6]). [total no. of cross-sections: up to 14]
- Use available water level data to interpret a pair of seasonal water-table maps (Spring/Fall) for groundwater basins of concern (Santa Rosa [2], Petaluma [2], and coastal watersheds [1]). [total no. of maps: up to 11]
- Develop plan-view and cross-sectional flow nets. Calculate existing groundwater discharges to streams using flow nets and available aquifer parameters. [total no. of flow nets: up to 25]
- Calibrate flow nets with streamflow data provided by hydrologist (Task 18.1) and finalize for each groundwater basin. Summarize existing conditions with regard to groundwater discharge to streams. [calibrate up to 25 flow nets]

- Superimpose reservoir seepage on flow nets for each affected groundwater basin and estimate changes in groundwater flow due to increased recharge. Similarly, superimpose recharge effects from irrigation seepage, considered as shallow groundwater flow to streams in some areas, and as deeper recharge to regional water table and subsequent flow to streams in other areas. Some areas may have both shallow and deep groundwater flow associated with irrigation seepage. [up to 25 flow-net analyses]
- After estimating groundwater discharges to streams, for both existing conditions and for reuse loading, simulate water chemistry for both existing and loading conditions. Complete initial calculations using a dilution model for major ions, trace metals, and organics. Use available aquifer mineralogy data to develop potential chemical interactions that will be examined by the geochemical models PHREEQE and WATEQ4F. Limited geochemical evaluations will be designed to assess whether significant changes in major element and trace metal chemistry will occur. The potential transport of organic compounds will be examined using soil partitioning and/or retardation models. The results will be used in evaluations of surface water quality (Task 20) and health impacts to water-supply wells (Task 32). [up to 16 geochemical analyses]

Prepare an interpretive report which will include the results of the above work and a summary of the relative water volume and water chemistry impacts of the various reuse configurations of the different project alternatives.

30.5 Conceptual Hydrogeologic Model

Based on existing information (well logs, aquifer pump test data, aquifer parameter data, water quality data), a conceptual model of the hydrologic/hydrogeologic system will be developed to the extent possible. This model will be used to characterize potential hydraulic connections between seepage of reclaimed water from storage/reuse areas; water supply wells and between surface water bodies; and the underlying aquifer system. Complete Technical Memorandum.

30.6 Monitoring Wells

Conduct field work for purpose of collecting hydrogeological and background water quality data to augment existing data. Install monitoring wells and implement a quarterly groundwater monitoring program. We assume ~~40~~ 23 wells (maximum depth of 60 feet) will be installed and groundwater monitoring will be performed on a consecutive quarterly basis for a period of ~~one~~ year two quarters. Additional monitoring is shown as an optional cost.

A Sampling and Analysis Plan will be completed and distributed prior to beginning the well construction work. (\$8,000)

The estimated costs to install monitoring wells using air rotary drilling techniques is \$6,000 per well. The estimated cost for 23 wells is \$138,000. Another \$6,400 is requested for County well permits (23 wells @ \$277 each). It is assumed that the wells will be 60 feet deep, with 4-inch-diameter PVC casing/screen installed in a 10-inch-diameter borehole. The drilling and well installation work will take approximately five weeks to complete. The cost includes two geologists, one for drilling/well installation, and the other for well development. Includes costs

for pre-disposal analyses of residuals and for land surveying. This estimate assumes no hazardous materials are encountered during drilling. All assumptions are summarized at the end of Subtask 30.6.

A Well Completion Report which summarizes the well construction work and hydrogeologic findings will be prepared (\$27,500).

Well monitoring includes sampling 23 wells on two separate quarterly sampling events. It is assumed that 8 days will be required for each sampling event. Costs include a two-man sampling team. This estimate also includes two Quarterly Well Monitoring Data Reports and a Technical Memorandum summarizing the two consecutive quarters of well monitoring. All assumptions are summarized at the end of Subtask 30.6. (\$23,400)

The samples collected during the monitoring events will be analyzed for the following chemical constituents: coliform, volatile organic compounds (EPA Method 524.2), semi-volatile organic compounds (EPA Method 525), organochlorine pesticides and polychlorinated biphenyls (PCBs) (EPA Method 508), metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc) (EPA Method 200.7/200.8 series), anions (chloride, fluoride, sulfate, phosphate, nitrite and nitrate) (EPA Method 300.0 series), pH (EPA Method 150.1), chemical oxygen demand (EPA Method 410.4), specific conductance (EPA Method 120.1), Total Dissolved Solids (EPA Method 160.2) and hardness (EPA method 130.2). EPA methods 524.2 and 508 (volatile and semi-volatile organic compounds) will be run only on first-quarter samples to confirm anticipated non-detect levels. All other methods will be run for all quarters. Estimated unit costs for analyses are listed below:

<u>EPA 524.2</u>	<u>≡</u>	<u>\$200/sample</u>	<u>23 wells @ 1 qtr</u>
<u>EPA 525</u>	<u>≡</u>	<u>450/sample</u>	<u>23 wells @ 1 qtr</u>
<u>EPA 508</u>	<u>≡</u>	<u>175/Sample</u>	<u>23 wells @ 2 qtrs</u>
<u>metals</u>	<u>≡</u>	<u>300/sample</u>	<u>23 wells @ 2 qtrs</u>
<u>anions</u>	<u>≡</u>	<u>90/sample</u>	<u>23 wells @ 2 qtrs</u>
<u>COD</u>	<u>≡</u>	<u>30/sample</u>	<u>23 wells @ 2 qtrs</u>
<u>TDS</u>	<u>≡</u>	<u>20/sample</u>	<u>23 wells @ 2 qtrs</u>
<u>Hardness</u>	<u>≡</u>	<u>20/sample</u>	<u>23 wells @ 2 qtrs</u>
<u>Coliform</u>	<u>≡</u>	<u>100/sample</u>	<u>23 wells @ 2 qtrs</u>

The total analytical cost, based on the above unit costs is \$48,800. The total for Subtask 6 is \$252,000.

The following assumptions were used to develop the cost estimate presented for Subtask 30.6:

- A total of 23 monitoring wells will be constructed.
- The cost of County well permits is included @ \$277 per well.
- The wells will be 60 feet deep, constructed of 4-inch diameter PVC casing/screen and installed in a 10-inch-diameter borehole.
- No major interruptions due to drilling refusal.

- No site access problems
- No hazardous materials encountered.
- Average drilling/well construction rate of 75 ft/day (1.25 wells/day or 6 wells/week).
- A total of up to 30 yd³ of drill spoils will be generated.
- A 15 yd³ roll-off bin will be rented for up to 5 weeks.
- Roll-off bins used for containing drill spoils can be temporarily staged on county or city property for a period of up to one month, at central locations with respect to well construction sites.
- Drill spoils will be found to be non-hazardous after pre-disposal analysis of four composite samples collected from each of three bins, and can be disposed in the nearby Sonoma Central Disposal Site (Class III). The City of Santa Rosa will pay disposal fees, disposal costs are included in estimate.
- Well development rate of 2 wells per day.
- A total of 300 gal/well of wastewater, or up to 7,000 for all 23 wells, will be generated during well development.
- A 10,000 gallon portable tank will be rented for up to 2 months.
- The 10,000 gallon portable tank containing well development wastewater can be temporarily staged at the Laguna Wastewater Treatment Plant for period of up to 2 months.
- Wastewater stored in the portable tank at the Laguna Wastewater Treatment Plant will be found to be non-hazardous after pre-disposal analysis of a single composite sample of the tank's contents, and then be accepted for disposal into the treatment plant. Turbid water will be allowed. The City of Santa Rosa will pay any disposal fee. Disposal costs are included in the estimate.
- Drill-rig geologist required for up to 5 weeks, well development geologist for up to 3 weeks; for both, 10-hour days and an additional 4 hours travel time per week.
- Land surveying of the wells will be completed in a one-week period, working 10-hour days, and including both field and office work.
- No analytical parameters/methods other than those listed for pre-disposal analysis of soil and wastewater will be required.
- Two consecutive quarterly sampling events will be completed for all 23 wells.
- A quarterly sampling event will be completed in 8 days, working 10-hour days and with four hours per week for travel.
- The total amount of well-purge wastewater generated for a quarterly sampling event will be 35 gallons per well, or up to 1000 gallons for all 23 wells.
- For a quarterly sampling event, up to 250 gallons of well-purge wastewater per day, for the eight consecutive days of a sampling event, will be contained at the well sites in a portable tank-trailer.
- On the basis of the "non-hazardous" characterization of this wastewater, established during pre-disposal analysis of well development wastewater, up to 250 gallons a day of well-purge wastewater, for 8 consecutive days, will be allowed to be disposed at the treatment plant. No pre-disposal analysis will be required; turbid water will be allowed. This procedure will be repeated for two sampling events. The City of Santa Rosa will pay any disposal fees, disposal costs are included in estimate.

- No analytical parameters/methods other than those listed for quarterly monitoring will be required to satisfy project needs.
- Costs for well abandonment at the close of the project are not included.

~~Estimated costs to install one 4-inch diameter well with a 12-inch diameter hollow stem-auger to a maximum depth of 60 feet = \$5,000/well (includes geologists time). This will take approximately 2 days for installation and development. Approximately two days will be required for each monitoring event (includes all wells in a given alternative area). Standard monitoring protocols will be used. Complete Technical Memorandum summarizing analytical results will be prepared.~~

30.7 Summary Memorandum

Complete a summary memorandum synthesizing results of above technical memorandums and outlining potential impacts to water supply wells and surface water bodies. Recommend mitigation measures as needed.

TASK 30	SUMMARY		
<u>Product</u>		<u>Medium</u>	<u>Copies</u>
Technical Memorandum: Conceptual Hydrogeologic Model (Subtask 30.5)		<u>Print</u>	<u>25</u>
Technical Memorandum: Groundwater Sampling and Analysis Plan (Subtask 30.6)		<u>Print</u>	<u>25</u>
Technical Memorandum: Well Construction Summary (Subtask 30.6)		<u>Print</u>	<u>25</u>
Technical Memorandum: Well Monitoring Data Report - Second Sampling Event (Subtask 30.6)		<u>Print</u>	<u>25</u>
Technical Memorandum: Summary Report - Groundwater Well Monitoring (Subtask 30.6)		<u>Print</u>	<u>25</u>
Technical Memorandum: Mass Balance (Subtask 30.4)		<u>Print</u>	<u>25</u>
Technical Memorandum: Summary - Assessment of Groundwater Impacts (Subtask 30.7)		<u>Print</u>	<u>25</u>

TASK 31 ENGINEERING DESIGN - FACILITIES PLAN OF ALTERNATIVE PROJECTS

Task 31.1 Task Management of Facilities Plan

The Consultant will manage the development of the BPU selected alternative projects (with the termination of Alternative 3, up to five four alternative projects, plus the no-project alternative are assumed) to a facilities planning level of detail, including the location and size of each major project element. The construction cost, the operating cost, and the operations plan for each alternative will also be developed. All major project elements, including pipelines, pump stations, reservoirs, irrigation areas, wetlands (including determineddelineated wetland areas within each candidate reservoir,) ~~infiltration-discharge areas,~~ geysers discharge concept, and groundwater recharge facilities (as currently limited in 31.9 below) will be defined at an equal level of conceptual design. Previous conceptual designs will be used to the extent feasible for the development of the alternatives. ~~The following study results will be mapped on CAD: Wetland delineation and terrestrial biological field studies. (Created wetlands and discharge by use of rapid infiltration beds have also been studied, then terminated after expending most of the budget for those components).~~

This subtask includes overall task management of the engineering and CAD drafting team. Internal technical review and quality assurance/quality control reviews are included.

Results from other tasks, in particular, the Irrigation Area Suitability Study, the Wetland Creation Study (Task 18), the Water Quality Stream Characterization Stream-Flow Augmentation Study (Task 21), the Groundwater Recharge Aquifer Storage Recovery (ASR)Injection-Well Study, (Task 22), the Russian River Water Quality Study (Task 28), the Water Conservation Study (Task 29), the Drinking Water Impacts Study (Task 32), the Geotechnical Engineering Study (Task 35), and the Hydrology Special Studies (Tasks 38), will be utilized for completion of ~~this Task 31 and will be referenced in the appendix to this memorandum.~~ The Engineering Team will actively coordinate with other team members and special studies as necessary to obtain input to the engineering and mapping needs of Task 31.

Task 31.2 Special Mapping and Drawing

~~The Facilities Plan, will include drawings and a technical memorandum~~ Facilities for each alternative and for the existing reuse system planning project areas will be shown on plan drawings based on digital contour maps generated from USGS 7.5 minute quadrangles. CAD or GIS software will be used to customize the base maps by addition of project component facilities. Finished topographic site plan maps or drawings will be provided at a scale of 1" = 500' for wetland determinationdelineation, and at 1" = 2000' for overall project facilities mapping. Contour interval will be refined with respect to proposed project facilities by linear interpolation between contours provided from the USGS digital data. Accuracy and refinement of topographic data and existing constructed features will be refined locally in the field as needed by the ground surveys (Task 16.2). Drawings furnished will include prints and one set of reproducible mylar media, and will be 22" x 34" size within borders, including title block. Drawings will include typical sections and details of specific project elements, a legend of all symbols and abbreviations, and a drawing identification index.

This task will include coordination with other task managers and direction of CAD personnel in the preparation of facilities mapping for team members requesting CAD mapping services independent of engineering needs, including interaction with team members who require CAD services in the preparation of mapping for special studies, such as reservoir wetlands determinationdelineation, irrigation areas definition, and lot line mapping. As an example, this task includes CAD mapping associated with proposed restored wetlands for mitigation of loss of jurisdictional wetlands impacted by proposed reservoir sites in West and South County. Mapping of two such sites each in West and South County is expected. CAD mapping of impacted wetlands and riparian habitat along proposed pipeline alignments is also included. The engineering team will schedule and coordinate mapping deliverables of completed maps to the appropriate team members, and coordinate and manage revisions to maps resulting from team member review of draft documents. Maps and drawings will be prepared for presentations.

Task 31.3 Technical Memoranda

The technical memoranda~~um~~ will include, for each alternative project, project description, associated water balance and hydraulic design criteria, ~~previously established for the Step I Screening Report~~, project elements design criteria, utility service requirements, construction and operations and maintenance cost estimate and operations plan.

A conceptual operations plan will be developed for each alternative, covering both wet and dry season operation. The plan will include facility operating control features and system malfunction alarm provisions. With the termination of Alternative 3, five technical memoranda will be prepared, one for each project alternative, including the no-project alternative. The latter will describe the existing system.

Task 31.4 Cost Estimate

A conceptual level construction cost estimate will be prepared for each alternative, using quantities estimated from the drawings and conceptual design cost curves, augmented by site specific conditions and quantities, where necessary. An operating and maintenance cost estimate will also be prepared for each alternative project. The estimates will be coordinated with other task managers for input to design and costs for specific project components. The present worth will be determined for each alternative to allow comparison of total project costs between alternatives, and the presentation of the cost estimate will be coordinated with the financial analyst task manager.

Task 31.5 Reservoirs

Reservoir configurations will be shown on plans to define dam orientation and footprint, spillway location and spill elevation. Dam locations will be based on previously identified sites and storage capacities from the November 1988, November 1990, and January 1993, reports by Woodward Clyde Consultants, Inc. This information will be supplemented by a limited study for other substantial reservoir sites which may have been previously overlooked or not carried forward in previous studies. Typical dam cross section, showing construction materials elements and configuration, elevations, typical reservoir outlet works will be shown. Potential need for runoff diversion structures will be investigated, and required facilities will be included in the

design. The estimate of satisfactory material volumes and the need for imported construction materials, will be provided. The required reservoir storage volume will be determined based on the water balance for the alternative. This volume will be used to select dam height and reservoir configuration. Approximate ~~Actual~~-active storage and dead storage for each reservoir will be established. ~~The extent of reservoir~~; location and size of reservoir inlet pipeline, outlet pipeline and associated pump stations; and will be shown. Up to six alternative reservoir sites in the West County and up to four in the South County, as previously identified in the above referenced 1988 to 1993 studies (which generated an ~~selected from the~~ extensive list of candidate reservoir sites) will be included, (as well as any additional viable reservoir sites found during the limited additional search for sites mentioned above) with associated pipelines and pump stations shown and tabulated to clearly identify the alternative feasible projects and associated costs.

Reservoir design will be coordinated with other task managers for input essential to the engineering effort, in particular, with Task 35 for geotechnical input and with Task 39 for hydrology input.

Task 31.6 Pipelines and Pump Stations

Pipeline routing from the existing Subregional system to each new reservoir will be shown. Pipeline routing to each irrigation area, ~~wetland area~~, discharge site, ~~infiltration discharge site~~, groundwater recharge site, and to the Geysers will be shown. Prior to termination of these components, pipelines were also under study to serve created wetland sites and the rapid infiltration area. Each subalternative for alternative reservoir sites will be laid out: ~~All~~ Pump stations will be located, and Hydraulic capacity and installed horsepower for ~~all~~ Pumps will be provided. Electrical service requirements for pump stations will be provided. Operational control and malfunction alarm systems, in general terms, for each pump station will be provided. Pipeline routings will show road and creek crossings. Pipeline routings will be located, to the maximum extent feasible, in or adjacent to public rights of way. Pipeline routings across private property will be identified, and will be aligned to minimize impact on the utilization of the property. Crossings requiring boring and jacking will be ~~defined~~ identified.

Task 31.7 Irrigation Areas

Irrigation areas will be ~~located and sized~~ mapped and designed based on input from the Irrigation Land Classification Study (Task 18). Water application rates, ~~will be as identified in the Step I Screening Report,~~ will be refined from results of Task 18. Conceptual level irrigation field layouts, application rates and runoff water collection provisions will be identified.

Task 31.8 Wetlands

~~Wetland areas will located and sized based on input from the Wetland Creation Design. Water application rates will be as identified in the Step I Screening Report and as refined for individual wetland sites from the results of Task 18. Conceptual level wetland impoundment layouts, water application rates and tailwater collection discharge or repumping provisions identified.~~ Prior to termination of created wetlands, work has been expended to identify sites and the rapid infiltration area.

Task 31.9 Aquifer Storage and Recovery (ASR)

Groundwater recharge injection and recovery (ASR) well concept and a typical well installation cross-section will be developed provided. Well installation details will be based on the California Water Well Standards. In support of the investigation of the feasibility of ASR (phases 2 through 5 of Task 22), Task 31 will include planning level design of the pipelines and pump stations necessary to implement the initial field investigation program and the ASR pilot study to conduct aquifer testing at well sites. Each of the two current ASR study areas could require transmission of both potable and reclaimed water for two pilot wells, and facilities to dispose of the recovered water. Pending results of the ASR pilot program, Task 31 does not currently include design of a project capacity ASR component. Up to three recharge well sites will be located based on results of the Hydrogeologic Study (Task 22) and proximity of the pilot wells to the existing reclaimed system main project transmission pipelines is anticipated.

Task 31.10 Geysers

Discharge to the Geysers geothermal steamfields aquifer will be investigated and developed as a project. Discussions will be held with the private industry parties seeking a source of water to further develop the Geysers' geothermal potential for energy production. The institutional, financial, and operational characteristics of such a private/public agency relationship will be established. A water balance and project design criteria will be provided and the potential need for storage associated with interruptions in delivery to the Geysers will be addressed. The potential for exporting to the Geysers only secondary treated effluent vs. the current tertiary effluent will be investigated. Required water distribution piping network and tanks at the Geysers steamfields will be incorporated into the engineering design project description, mapping, and operations plan documents. This network of piping, tanks and injection wells is proposed by the Geysers Operators to distribute the treated effluent from Santa Rosa to new injection wells. The subtask 31.10 team members will coordinate with the Geysers Operators for expected continual refinements to the proposed piping network due to operational considerations and preliminary results of environmental impact studies. However, it is assumed that no reservoir will be designed for this alternative.

Utility Company Coordination

Engineering will coordinate with utility companies for location of major existing utilities to be considered in siting major project components such as reservoirs, transmission pipelines, pump stations, created wetlands, and rapid infiltration basins. Meetings with utility company representatives and review of utility drawings to refine design to minimize potential impact on major existing utility facilities will be conducted. Coordination with PG&E to determine facilities and costs required to supply electrical power to major proposed pump stations, especially the large pump stations associated with the Geysers alternative, will be conducted.

Task 31.11 Rapid Infiltration Basins/Direct Discharge

Discharge to rapid infiltration basins proposed to be located in the gravel beds adjacent to the Russian River west of the City of Windsor was under study prior to termination of this

component. (Prior to termination, work was expended to ~~will be developed. This concept will~~ develop the annual water balance, identify the approximate hydraulic loading conditions or infiltration rate of the gravel in this area, provide a conceptual plan sizing and configuration of the basins, and establish a piping network, to distribute the water to the infiltration basins). ~~Existing water supply wells in this area will be identified and basins will be configured to minimize impact on these wells.~~ Operators of the gravel mining operations in this area ~~will be~~ were consulted for information on the extent of gravel deposits and the past and planned future gravel mining operations. The rapid infiltration conceptual plan will consider development of basins on both sides of the Russian River and the pipelines and other constructed features necessary to distribute and control water flow to all proposed basins.

Evaluation of Rapid Infiltration Basins will also include the development of a direct discharge to the Russian River in the vicinity of the water supply well intakes of the Sonoma County Water Agency. Evaluation of such a direct discharge would be ~~either as an alternative to the rapid infiltration basins, or as a component to operate in conjunction with infiltration basins.~~

~~Changes in locations and loadings to the rapid infiltration areas necessitates that modeling be undertaken to determine loadings and resultant impacts.~~

~~Data on aquifer characteristics will be collected from Sonoma County Water Agency (SCWA), Department of Water Resources (DWR), Windsor Water District and other data sources identified by SCWA and the project for areas outside the existing model limits. Collection of new field data is not planned, but any data gaps in knowledge will be identified as part of this task.~~

~~The proposed hydrologic loading conditions for RI infiltration ponds will be established based on available data from ES. Phase 2 of the modeling will address water quality, or the fate of constituents in the wastewater, as the water travels through the RI basins and migrates through the groundwater and the river gravel.~~

~~Design criteria to be developed scenarios specified by ES will include the dimensions of the ponds, infiltration loading rate. The wettest year, the drought of record and normal year will be selected as the range of hydrologic conditions to be tested.~~

~~The model will be calibrated against the period of most comprehensive data coverage available. The model performance will be checked against the previous calibration years and against a different independent time periods to demonstrate model validity. A comprehensive list of data available in the 1991 Groundwater report prepared by PWA for Sonoma County Department of Planning.~~

~~The details of the aquifer recharge alternative will be determined at a meeting with the City and Consultant. The proposed alternative will be investigated for three hydrological conditions defined in the Design Criteria (see above). Potential impacts of the RI will be investigated including: changes in the water table, changes in regional water balance, possibility and extent of aquifer contamination, influence of river-aquifer interactions, and effect on local wells (to be located and characterized by SCWA and the City).~~

~~Three copies of the report and digital files of the document will be provided.~~

31.12 Water Balance Modeling

Review of the water balance model previously developed by others for the project alternatives which rely on storage and irrigation reuse has indicated that some modifications are needed to adopt the model for current information and alternatives. ~~An additional meeting will be required to complete model investigation.~~ Restructuring of the model will require eliminating some functions and adding others. Certain calculations will be eliminated that are not relevant to the alternatives. Additional calculations ~~functions~~ for determining irrigation areas that take into account different evapotranspiration (ET) rates for different parts of the County (West vs. South County) will be run.

Upon completion of the setup of the model, it will be run for a number of scenarios including those for different project alternatives and plant discharge rates. The model will be used for two different approaches. The first approach solves for irrigation acreage and storage requirements given plant discharge rates and a given system reliability. The second approach will solve for ~~discharge rates~~ reliability given available irrigation areas and storage volumes. Combining various scenarios and approaches yields refinement of the design criteria for the alternative projects. ~~approximately 32 model runs.~~

During the course of running and validating the Water Balance Model changes are expected to occur to alternatives and model assumptions, ~~Revisions to other underlying assumptions and alternative components are likely to occur necessitating changes to the model~~ and additional model runs.

Task 31.13 Regulatory Agencies, Permitting Requirements, and Meetings

Coordination with pertinent regulatory and public agencies will be provided to refine project components and identify permitting requirements, particularly associated with development of the Geysers alternative, the Aquifer Storage and Recovery (ASR) alternative, and the Rapid Infiltration (RI) alternative. Meeting held with RWQCB (prior to termination of this component.)

At least the following agencies will be contacted; the RWQCB regarding direct discharges and crossings of surface streams, and reservoir impact on stream flows; the DOHS regarding the ASR alternatives; Sonoma County regarding pipeline road crossings and encroachment permits; CALTRANS regarding pipeline crossings of State Highways 12, 101, 116 and 128; and Sonoma County, state and federal agencies regarding construction of the pipeline to the Geysers, and agency permitting requirements and institutional and financial participation in the Geysers disposal alternative.

This task will include attendance at up to 10 total meetings with each of the following: BPU and technical review committee, Geysers operators, gravel pit operators, (meeting conducted prior to termination of RI component) reservoir site owners, and other public and private parties.

Task 31.14 Site Visits

Engineering Team members will make site visits to identify field conditions and refine design concept of alternative components at reservoir sites, pipeline road and stream crossing sites, pump station sites, Geysers project sites, ~~rapid infiltration basin sites, wetland sites,~~ and aquifer storage and recovery well sites. (Site visits of rapid infiltration and proposed created wetland area were made prior to termination of these components.)

TASK 31 SUMMARY

<u>Product</u>	<u>Medium</u>	<u>Copies</u>
6 Project Descriptions (one for each alternative) including Technical Memoranda, Cost Estimates, and Operations Plan		
<u>Engineering Drawings:</u>		
Facilities Plans (Drawings and Technical Memoranda) for Five Alternatives (including the No Project)	Print	25
Cost Estimates for Five Alternatives (including the No Project)	Print	25
<u>General Sheets</u>		
Title Sheet		
Index Map		
General Symbols and Abbreviations		
Schematic Diagram - South County Reclamation		
Schematic Diagram - West County Reclamation		
Schematic Diagram - Geysers Recharge		
Schematic Diagram - 20% Maximum Russian River Discharge		
<u>Project Overview Map</u>		
Project Facilities - Alternatives 1-6 (12 sheets)		
<u>Alternative 1 - No Project</u>		
Existing and Interim Reclamation Facilities (4 sheets)		
<u>Alternative 2A-South County Reclamation</u>		
Tolay Reservoir - Configuration A (7 sheets)		
<u>Alternative 2B - South County Reclamation</u>		
Adobe Road and Lakeville Hillside Reservoirs (7 sheets)		
<u>Alternative 2C - South County Reclamation</u>		
Tolay Reservoir - Configuration C (7 sheets)		
<u>Alternative 2D - South County Reclamation</u>		
Sears Point and Lakeville Reservoirs (7 sheets)		
Sears Point Reservoir (7 sheets)		
<u>Alternative 4A - West County Reclamation</u>		
Two Rock Reservoir (6 sheets)		
<u>Alternative 4B - West County Reclamation</u>		
Bloomfield Reservoir (6 sheets)		
<u>Alternative 4C - West County Reclamation</u>		
Carroll Road North Reservoir (6 sheets)		
<u>Alternative 4D - West County Reclamation</u>		
Valley Ford East Reservoir (6 sheets)		
<u>Alternative 4E - West County Reclamation</u>		
Huntley Reservoir (6 sheets)		
<u>Alternative 5 - Geysers Recharge</u>		
Project Facilities (6 sheets)		
<u>Alternative 6A - 20% Maximum Russian River Discharge</u>		
Laguna Discharge (5 sheets)		
<u>Alternative 6B - 20% Maximum Russian River Discharge</u>		
Russian River Discharge (5 sheets)		
<u>Reservoir Sheets</u>		
Two Rock (T6) Reservoir		
Two Rock (T6A) Reservoir		
Tolay-A (S39A), Lakeville (L-2A) Reservoirs		
Tolay-C (S39C), Lakeville (L-2A) Reservoirs		

Sears Point (SP-1) Reservoir
Adobe Road (AD-1B) Reservoir
Bloomfield (B1-A), Valley Ford (V-4), Carroll Road (V-7)
Reservoirs
Huntley (T-1) Reservoir

Civil Details

Irrigation Area - Typical Sections
Irrigation Area - Typical Details (Turnout, Distribution Piping)
Geysers Discharge Details
Typical Civil Works Details (Pipelines x-sections, Road and Creek Crossings)
Typical Reservoir Details (Dam x-section, spillway)

Mechanical Details

Storage Transmission Pump Stations, Typical Plan and Sections
Irrigation Delivery Pump Stations, Typical Plan and Sections
Groundwater Recharge Injection Well Site, Typical Plan, Section and Details

***The number of sheets listed are approximate.**

TASK 32 DRINKING WATER IMPACTS

Drinking Water Quality Technical Studies

Drinking water in the project area is primarily derived from wells that extract groundwater from aquifers and from geological strata associated with surface water. In addition, surface water is withdrawn for drinking water supply at an unknown number of locations. Discharge of reclaimed water to surface waters (i.e., Russian River discharge, irrigation and storage of reclaimed water) could potentially affect ground and surface water quality. This task provides evaluation of the potential effects of reclaimed water on drinking water supplies and human health.

An iterative approach to evaluating potential impacts on human health of long-term alternatives will be implemented. In the first phase, which is included in this scope of work, the risk to human health of reclaimed water will be assessed using worst-case assumptions about human exposure to reclaimed water. Human health risk will be assessed for Russian River water without reclaimed water and, as a worst case, consumption of 100 percent reclaimed water. If the results of the first phase suggest a significantly increased risk of adverse health effects due to reclaimed water, a second phase of work, not included in this scope and budget, would be conducted. The second phase would include additional refinement of the assumptions to reflect realistic exposure resulting from each type of project component (e.g., irrigation, storage, discharge) will be made and the health risk re-assessed. This approach is conservative with respect to protection of human health.

The first phase of the risk assessment consists of three steps as follows:

1. Data Review
2. Collection of Additional Data
3. Evaluation of Human Health Risk from Chemical Constituents
4. Evaluation of Human Health Risk from Pathogens

Each step is described below.

Data Review

Existing information on quality of reclaimed water and drinking water supplies will be assembled. Groundwater quality data collected in Task 30 will also be used in the analysis. The information will be reviewed and organized for use in the human health risk assessment. Information that is necessary for an adequate risk assessment that is not available will be identified.

Collection of Additional Data

As part of Task 21, additional data will be collected as needed.

32.1 Health Risk from Chemical Constituents

Validated existing water quality data for the Russian River and plant effluent data collected by Merritt Smith Consulting as part of Task 21 ~~this task~~ will be evaluated to determine the potential impacts on human health. A screening evaluation of the hazard associated with the identified concentrations of chemical contaminants will be performed using formulae recommended by the California Department of Toxic Substances Control (DTSC, 1994). Carcinogenic and non-carcinogenic effects will be evaluated. Only chemicals detected above reporting limits and with published slope factors (for carcinogens) and reference doses (for acute or chronic effects) will be evaluated. Slope factors (SF) and reference doses (RfD) will be obtained from the EPA's Integrated Risk Information System (IRIS).

In addition to direct exposure to chemicals in water, humans may potentially be exposed to chemicals through the consumption of food species (i.e., fish) that have bioaccumulated chemicals from water and sediments. Bioaccumulation data for metals and organochlorines, which will be collected as part of Task 34, will be used to evaluate the impacts of fish consumption on human health.

32.2 Exposure Models

Simple exposure models will be developed to explain how wastewater from the reclamation system would be distributed in the environment. A graphical model would be developed for each alternative. The models would show how the water is distributed between irrigation, recharge, storage, and discharge components, how it then moves or partitions into surface water, groundwater, soil, sediments or air and, finally, the pathway(s) (inhalation/ingestion of food or water, dermal contact) by which humans may be exposed.

The development of these models will require input from other team members and would require the production of a graphical model of each alternative (CADD time)

32.3 Human Health Effects of Estrogen-like Compounds

Recently, research laboratories in the United States and Europe have reported a decline in male fertility in both humans and animals and an increase in testicular and breast cancers in humans. One hypothesis has ascribed these phenomena to an increase in estrogen-like compounds in the environment. These estrogen-like compounds (xenoestrogens) include DDT and its metabolic, DDE, and polychlorinated biphenyls (PCBs).

Because research in this area is ongoing, definitive cause and effect relationships between estrogen-like compounds and specific human diseases are not available. As part of this task a literature search will be conducted to determine the current status of research in this area and principal authors (up to four) will be contacted to determine the latest developments in this area. Synthetic estrogens, such as those used for human birth control, will also be investigated. A summary will be prepared that discusses the results of the literature search and the author inquiries.

The list of chemicals has increased to include alkylphenolic detergents, nearly all organochlorine compounds (e.g., dioxins, organochlorine pesticides), and some metals. Literature research will require additional retrieval.

32.4 Health Risk from Pathogens

The microbial human health risk assessment will be conducted according to the methodology described by Haas, et. al., 1993. This methodology for microbial risk assessment uses the standard framework used for chemical risk assessment, which consists of:

1. hazard identification
2. dose-response assessment
3. exposure assessment
4. risk characterization

The risk assessment process is discussed below. The first iteration of this assessment will use worst case the least conservative yet reasonable assumptions for high risk.

Hazard Identification

The continuing outbreaks of disease (viral hepatitis, gastroenteritis, etc.) in the United States clearly demonstrates a hazard from microbial contamination of drinking water. A literature search will be conducted to document the outbreak of waterborne disease throughout the United States. The Centers for Disease Control (CDC) and regional public health officials will be contacted to determine if data exist on local outbreaks of waterborne disease.

Dose-Response Assessment

The dose-response assessment will attempt to identify the probability of infection as a result of exposure (infective dose) and once infected, the conditional probability that an individual will contract a disease. For some agents, disease may result in death, a further conditional probability.

Initially, worse-case dose-response data will be obtained through a brief literature review for the pathogens identified during the additional data collection phase. If data are not available in the literature on specific microorganisms, assumptions will be made based on what data are available. Refinements to the assumptions will be made through a detailed review or telephone conversations with researchers in the field as part of the iterative approach, if necessary. Microorganisms with insufficient data for quantitative analysis will be identified.

Development of disease depends on numerous factors including the immune status of the host, age of the host, virulence of the microorganism and type, strain of microorganism and route of infection. Uncertainties associated with the dose-response information available in the literature include:

- experimentation with healthy individuals as opposed to individuals with poorer health status (aged, compromised immune system) and therefore greater susceptibility

- experimentation with well-characterized strains of pathogens as opposed to indigenous pathogens

Exposure Assessment

Essential elements of the exposure assessment are the population of potentially exposed individuals, the quantity of water consumed by an individual, and the concentration of pathogenic organisms in the water. Census data will be used to determine the population of potentially exposed individuals, focusing on subgroups that may be more susceptible to infection (very young, aged, etc.). Further refinements on identifying exposed individuals can be made in subsequent iterations of the assessment, if necessary. US EPA estimates of ingestion of drinking water will be used for this assessment. The concentration of pathogenic microorganisms in water will be determined during additional data collection phase.

Exposure may also occur to individuals that do not ingest or contract contaminated water through person-to-person contact or contamination of materials with contact by non-infected individuals. Secondary and tertiary exposure potential will be evaluated qualitatively according to the type of pathogens (virus, bacteria, or protozoa) identified.

It will be assumed that exposure is independent; the chance of developing an infection from one exposure is not related to prior exposures and effects. This assumption ignores the possibility of temporary or permanent immunity. Uncertainty is added to the resulting estimates of risk made using this assumption.

Risk Characterization

Risk characterization integrates the information from the previous steps to quantitatively estimate risk. Risk can then be compared to observed risk identified in the literature. If risk estimates are high using this [least conservative yet reasonable assumption for high risk](#)~~worse-case approach~~, refinement of assumptions will be made to provide a more realistic estimate of risk. Actual risk will be underestimated using the proposed methodology because secondary and tertiary spread will not be quantitatively included.

32.6 Meetings/Consultations

The consultant will attend one BPU meetings, two team meetings, and three meetings with regulatory agencies. The team members will be coordinated to provide information on public health concerns related to surface water and groundwater quality.

TASK 32 SUMMARY

Product	Medium	Copies
Human Health Effects on Wildlife Effects of Environmental Estrogens	Print	25
Human Health Risks from Chemical and Biology Components of Reclaimed Water	<u>Print</u>	<u>25</u>

TASK 33 SOCIO ECONOMICS

33.1 Land Use, Population, and Employment Growth Projections

33.1.1 Water Balance Assistance

Estimates of the base year conditions in the service area will be compiled. Estimates of employment and population by jurisdiction have been prepared and submitted to assist the water conservation and engineering tasks for the definition of water balance.

33.1.2 Review of Regional Projections and General Plan Development Capacities

We will review the work being conduct by the County on projections of employment and population growth in the study area. We will document the differences between ABAG growth projections and projections prepared by the County and local jurisdictions. These will be critical inputs into the EIR/EIS analysis.

33.1.3 Refinement of Population and Employment Projections

A due diligence review of the General Plan growth capacities prepared by each community in the service area will be conducted. Members of the project team will contact representatives of each community to review the existing figures. As deemed necessary, the General Plan capacity estimates will be refined. The final demographic growth estimates will be submitted to define the Project specifications.

33.2 Project Alternative Cost Analysis and Financing

33.2.1 Land Acquisition Cost Estimates

We will review the land acquisition requirements for the proposed sites. We will identify the parcels that must be acquired and average land prices in the area. A refined estimate of the land acquisition costs for each project alternative will be prepared. All cost estimate will be general in nature and will not be reflective of specific development projects or appraisal estimates. The following is a more detailed description of the work to be completed in this task.

Approximate areas to be acquired will be identified. To the extent that agricultural easements can be viewed as a useful tool for achieving multiple policy objectives, the cost of acquiring such easements will be estimated for each of the Alternatives. Using existing data on current land use patterns and capabilities, land identified for acquisition will be categorized into types such as prime farmland, range land, wetlands, flood plains, and land zoned for development. Within each category, a range of land values will be assigned based on a review of existing market studies, an analysis of recent sales activity in the appropriate areas of the County, and real estate broker interviews.

Costs for land and/or easement acquisitions for each Project Alternative will be estimated. All cost estimates will be of a general nature and will not be appraisal estimates. Appraised land

values may be desired once the Preferred Alternative has been selected and approved; however, such an appraisal is not contemplated within this study.

33.2.2 Project Alternative Cost Analysis Summary

For Volume 4 of the Screening report, EPS prepared a summary of the project costs. This summary was based on the work prepared by the project engineers and was useful in summarizing the relationship between project costs and the required rates. EPS proposed to prepare a similar cost analysis summary for the EIR. Several aspects of the Impact Analysis will require detailed cost breakdowns of the Project Alternatives. Working with the Consultant Team engineers, we will assemble a Project Alternative Cost Schedule which will show line item cost details and a construction phasing program. This Cost Schedule will be prepared with an electronic spreadsheet which will allow transfer to Consultant Team members and linkage to subsequent steps of the Impact Analysis.

33.2.3 Refinement of Financing Concepts and Methods

In this task, EPS will refine our previous work that evaluated the financial impacts of the proposed project alternatives on the Santa Rosa Wastewater Agency and the related demand fees and service charges. EPS will look to City staff to provide direction on the methods to be used to estimate the demand fees and service charges associated with the Project.

33.3 Induced Growth Projections

A major impact of large-scale infrastructure improvements such as the proposed project is the growth inducing effects of the project. The Consultant will describe the issues related to growth inducing impacts of infrastructure improvements through a review of the academic literature in the fields of regional economic and planning. This will provide the background for the assessment of the growth inducing impacts of the project.

Since the ABAG growth projections exceed the General Plan capacities in some of the cities in the service area, it is possible that a "growth-inducing impact" may occur. The impact of the marginal growth over the General Plan capacities in terms of wastewater utility rates and other direct Project impacts will be quantified. The General Plans or the impact that additional development may have on other local service providers will be reevaluated.

With the City's legal counsel growth-inducing impacts of the Project will be evaluated and described.

33.4 Irrigated Agriculture Feasibility and Impact Analysis

A major component of three of the project alternatives is the benefit of the reuse of effluent on farms throughout the area. In this task the Consultant will evaluate the financial benefits of the reuse of water on prototypical agricultural settings in the area. We will describe the existing agricultural economy and discuss how the introduction of additional water for crops could affect current conditions. As a result of requests set forth in the scoping comment letters and

discussions with other Team members, EPS has revised the Agricultural Impact analysis to include the following four sub-tasks.

33.4.1 Agricultural Industry Market Analysis

This task will assess the market potential for expanded irrigated agriculture in Sonoma County under three of the Project Alternatives, the South County Alternative, the West County Alternative, and the Community Separator Alternative. This task will require the services of an agronomist on the Consultant Team.

33.4.2 Cropping Scenarios

Once the market analysis indicates the general viable possibilities for irrigated agriculture and the soil suitability and potential irrigation areas are delineated, a range of agricultural possibilities will be defined. This task will establish a set of "Cropping Scenarios" which would reflect three market possibilities for irrigated wastewater under each Project Alternative involving irrigation. The proposed Cropping Scenarios will range from simple expansion of existing forage crop production and would emphasize Summer forage crops (oats, vetch, etc.) and irrigated pasture. At the other extreme, the full potential for diversified agriculture (within constraints indicated by the market analysis) would be delineated. The third Scenario would be set somewhere between the first two scenarios, including elements of both.

In effect, the Cropping Scenarios will serve as the "project description" that will be considered and give dimension to the water quality Impact Analysis and the biological impacts analysis within the EIR.

33.4.3 Cropping Scenarios Investment Requirements

In addition to the costs of storing and distributing the effluent that will be reflected in the Project Alternative Cost Analysis, other more site-specific costs will be required in establishing irrigated agriculture, including pumping, local distribution lines, irrigation equipment, and tail water management. These costs will vary with irrigation technology selected which is, in turn, linked to the crops that will be grown. Thus, for each of the Cropping Scenarios, a set of investment and management costs will be associated with the crop acreage identified. Generally, these costs will be based upon per acre estimates drawn from comparable farmland irrigation investments in other areas. Costs associated with irrigation water management practices will similarly be derived from comparable farmland, modified, as appropriate, to reflect the unique physical and biological circumstances of the irrigation areas of the Cropping Scenarios.

33.4.4 Agricultural Industry Economic Impact Analysis

The Cropping Scenarios will each lead to an estimate of increased agricultural productivity in Sonoma County. Such productivity has a high "economic multiplier" since agricultural goods are, for the most part, exported from the County. The economic analysis will include an industry analysis, focusing upon the key agricultural products (e.g., Dairy) as well as an overall economic Impact Analysis that expresses the increased economic activity in the County in terms of increased jobs, household income, and sales in the County.

The IMPLAN Input-Output model will be used to estimate the economic impacts of increased agricultural productivity. The I-O model, which tracks the linkage of transactions through the economy, will be used to estimate the financial and job benefits of irrigated agriculture. The model will be used to estimate the direct impacts on the agricultural sector and the indirect impacts on other industry sectors affected by changes in farm production.

33.5 Regional Economic Impacts

33.5.1 Estimated Rate Increases for Households and Businesses (\$0)

The Consultant will also compare the per household demand fees and service charges to median income in the service area. EPS has refined the description of this task, as follows. In this task, the wastewater demand fees and service charges that will be required to finance each of the Project Alternatives will be estimated. The Impact Analysis will examine the economic effect of the rate increases on households in the service area. Since the rates do not vary by income group and there has been significant concern over the impact of the rates on residents with fixed incomes, the impact of the rate increases on various income groups in the region will be examined. The U.S. Environmental Protection Agency's standards will be applied regarding the relationship between wastewater rates and income to evaluate the significance of the rate increase. A comparison of the required rates to those in neighboring jurisdictions to assess the effect of the rate increase on the competitive position of the service area in attracting industry will be completed.

33.5.2 Economic Impacts of Household Expenditure Shift

For each Alternative, the impact of the rate increase on the Sonoma County economy will be estimated. The rate increase will require households to shift some income from either savings or consumption to pay for the rate increase. To the degree that income is shifted from consumption to pay the increased wastewater rates, there will be a reduction in consumption in the Sonoma County economy. Using the IMPLAN Input-Output model, the impact of the shift of expenditures from the local economy to pay the higher rates will be estimated. The shift will result in a loss of sales, income and jobs throughout the County.

33.5.3 Wastewater Improvement Investment Economic Impacts

The investment expenditures required to implement the long-term wastewater project will have economic benefits in the County. Based on the cost estimate for each Alternative, the sales, income and job benefits of the local investments will be estimated. Investments include items such as the construction of pipelines and dams as well as the purchases of water conservation measures.

33.6 Other Economic Impacts

33.6.1 Impacts of Reservoirs on Surrounding Property Values

The impact of the impoundment sites on property values will be evaluated. Areas that are likely to be visually affected by the impoundment sites will be evaluated. Two measures will evaluate

the impacts. First, a review of recent literature on the effects of similar activities on property values will be evaluated. Second, the findings on the potential impacts to the areas identified as those likely to be affected by the impoundment sites will be applied.

33.6.2 Impacts of Effluent Flows on Russian River Tourism Economy

The project team will examine the potential impacts on the tourism economy under the Alternative that would increase the disposal of treated water into the Russian River. In order to estimate the likely impacts, any regulations that would preclude the use of the Russian River for recreational purposes will be identified. Given the speculative nature of these impacts, judgment will be relied on to assess the impacts on the tourist economy.

The dictates of 40 CFR 1502.22 and 1502.24 will be followed, with particular reference to identification of any information that is incomplete or unavailable and use of methods that are generally acceptable in the field of economic analysis. Analysis will not be based on “pure conjecture,” and methodologies will be identified.

33.7 Working Group Meetings and Team Coordination

The consultant will attend working group meetings concerning the agricultural studies and the project costs and financing working group.

~~This evaluation includes an assessment of the financial impact on affected public agencies, the impact of project alternatives on the agricultural economy, and the initial stages of the land acquisition analysis.~~

Jobs/Housing Conditions

~~We will review existing and projected jobs/housing conditions in the study area. While jobs/housing conditions are not an actual impact of the project, the conditions will vary between the no project and the project alternatives. The jobs/housing analysis will look at the housing needs of existing and future workers in the region by income group and housing affordability level.~~

TASK 33 SUMMARY

Product	Medium	Copies
Regional and Other Economic Impacts	Print	25
Memorandum on Differences Between ABAG, County and Local Jurisdiction Growth Projections		
Memorandum of due diligence review of General Plan Growth Capacities		
Refined Land Acquisition Cost Estimates		
Cost Schedule		
Growth Inducing Impacts of the Santa Rosa Wastewater Project		
Agricultural Industrial Economics Impact Analysis		

TASK 34 POTENTIAL IMPACTS OF WASTEWATER ON WETLANDS

The Kelly Farm Demonstration Wetland (KFDW) was created to determine how best to develop enhancement wetlands to provide wildlife and reclaimed water polishing benefits using reclaimed water produced by Santa Rosa Subregional Water Reclamation System. The purpose of this task is to assess the potential for bioaccumulation in wetlands constructed with Project water and in other environments that are exposed to reclaimed wastewater, and to evaluate the long-term reliability of polishing (nitrogen removal) in wetlands. Continued involvement in the wetland creation siting and design.

Bioaccumulation

This task will ultimately consist of three subtasks: bioaccumulation studies in KFDW, analysis of State Mussel Watch Program (SMWP) studies in the Laguna de Santa Rosa and Toxic Substances Monitoring Program (TSMP) data pertinent to the Laguna/Russian River system, and preparation of a technical memorandum.

Bioaccumulation Studies in KFDW

The purpose of this task is to conduct further investigation of bioaccumulation in the food chain in KFDW. Triplicate samples will be collected of representatives from the food chain (for example, cattails, algae, snails, crayfish, and California roach) from one location in KFDW and one in Santa Rosa Creek. Samples will be analyzed for metals and organic carbon. Organochlorines will also be measured in the fish samples. Concentrations of metals and organochlorines in a sediment sample from KFDW will be measured as a part of Task 27. Only bioaccumulation studies in KFDW are authorized as described below.

Analysis of SMWP and TSMP Data

As a part of the SMWP, field studies in the Laguna have been conducted to assess bioaccumulation of various substances in clams. The purpose of this task is to analyze this data as well as pertinent data from TSMP.

Technical Memorandum

A Technical Memorandum will be prepared summarizing the results of this task.

Nitrogen Removal

Studies of KFDW and other wetlands have demonstrated that wetlands remove nitrogen from wastewater. Nitrogen removal would make Santa Rosa's wastewater more suitable for uses such as direct discharge, streamflow augmentation, and vineyard irrigation. This subtask includes review of existing KFDW monitoring data to characterize the seasonality of nitrogen removal. Sediment and plant material will be analyzed for nitrogen content. A nitrogen budget will be developed to provide the basis for an evaluation of the long-term reliability of nitrogen removal in wetlands like KFDW that might be constructed as part of a long-term wastewater management project. A technical memorandum will be prepared.

Peer Review

Meet or telephone to keep peer reviewer up to date and to provide advice on regulatory developments, particularly for State-wide plans. Technical reports and sections of the Administrative Draft EIR/S will be reviewed as they become available by the Project Team. Written comments will be provided.

TASK 34 SUMMARY

Product	Medium	Copies
Evaluation of Bioaccumulation in Organisms Exposed to Reclaimed Water from the SantaRosa Subregional System Treatment Wetlands Evaluation	Print	25

TASK 35 GEOTECHNICAL ENGINEERING

Reservoirs and Pipeline Routes

The following geotechnical studies will be performed ~~are proposed~~ to provide the necessary data to support the environmental analysis for the project and to support the engineering design to a facilities planning level of detail.

Reservoir Sites Two Rock (S20B), and Bloomfield (S40B)

Previous geotechnical data is available for these sites relative to their development for a dam and reservoir, including exploration borings and test pits in the dam foundation and construction materials source area. Therefore, the scope of work for these sites is limited to review and evaluation of existing geologic, seismic, and geotechnical data, a site reconnaissance, and evaluation of previous engineering studies including layouts and cost estimates. Based on the existing data, an independent conceptual dam design, reservoir layout, and opinion of probable construction cost will be developed for the reservoir alternatives at a planning level of detail. Evaluation of the reservoir sites to an expanded configuration will be made, as applicable, relative to configurations and capacities from previous studies. In addition, estimated conceptual level cost curves will be developed for reservoir earthwork construction, based on a range of dam sizes and reservoir capacities, to allow flexibility in evaluating alternatives. Only one conceptual dam design and reservoir layout for each site will be illustrated in the study results, representing the maximum practical storage capacity of the site, or the maximum required storage capacity for the project alternative.

Reservoir Sites Adobe Road (S27B), Sears Point (S35), Lakeville Hillside (S31A), Huntley (S44)

No known geotechnical exploration data is available for these sites relative to their development for a dam and reservoir. The scope of work will include review of available geologic/seismic data, a limited exploration program consisting of drilling and backhoe test pitting to assess foundation conditions and availability of construction materials, limited laboratory testing, and geologic and engineering analysis that will include conceptual dam and reservoir layouts and an opinion of probable construction cost. Evaluation of the reservoir sites to an expanded configuration will be made, as applicable, relative to configurations and capacities from previous studies. In addition, estimated conceptual level cost curves will be developed for reservoir earthwork construction, based on a range of dam sizes and reservoir capacities, to allow flexibility in evaluating alternatives. Only one conceptual dam design and reservoir layout for each site will be illustrated in the study results, representing the maximum practical storage capacity of the site, or the maximum required storage capacity for the project alternative.

Reservoir Sites Valley Ford East (S53B), Carroll Road North (S56)

No known geotechnical exploration data is available for these smaller reservoir sites relative to their development for a dam and reservoir. The scope of work will be similar to site S27B, although the field exploration program will be at a reduced scale because the initially proposed reservoirs are substantially smaller. Evaluation of the reservoir sites to an expanded

configuration will be made, as applicable, relative to configurations and capacities from previous studies. In addition, estimated conceptual level cost curves will be developed for reservoir earthwork construction, based on a range of dam sizes and reservoir capacities, to allow flexibility in evaluating alternatives. Only one conceptual dam design and reservoir layout for each site will be illustrated in the study results, representing the maximum practical storage capacity of the site, or the maximum required storage capacity for the project alternative.

Reservoir Sites Vast Oak (S26A) and Meacham (S46)

Effective with decisions made during the BPU study session on January 13 and 14, 1995, the Vast Oak (S26A) and Meacham (S46) reservoir storage sites are dropped from further consideration, and work on these sites is terminated effective with this decision. Field site reconnaissance had already been performed at the Vast Oak site, but no subsurface field investigation. No field work, had been performed at the Meacham site. Some office engineering had been performed for both sites.

Tolay Reservoir Site

This task covers fault investigation work of the Tolay Creek Fault running through the site. The scope of work will include is limited to review of available geologic/seismic data, a limited exploration program consisting of drilling and backhoe test pitting to assess foundation conditions, availability of construction materials and faulting, limited laboratory testing, and geologic and engineering analysis that will include conceptual dam and reservoir layouts and an opinion of probable construction cost. Up to four different conceptual dam design and reservoir layout configurations were originally considered for this reservoir storage site. Effective with decisions made during the BPU Study session on January 13 and 14, 1995, two of the four configurations are dropped from further consideration. Thus, two conceptual dam design and reservoir layouts for the Tolay Site will be illustrated in the study results, representing the maximum required storage capacity for the project alternative.

Pipeline Routes

The geotechnical study of pipeline routes will be based on review of available data and site reconnaissance. This will form the basis for analysis for site conditions, geotechnical feasibility, identification of potential geologic/seismic hazards or other geotechnical problems, and recommendations for possible mitigation measures, as appropriate.

The scope of this work assumes evaluation of one major pipeline route from the treatment plant to each reservoir and from each reservoir to a major distribution location. Evaluation of a pipeline route for the Geysers alternative is also included. The scope also assumes the availability of necessary information to allow performance of the work at one time.

Reservoir Site Access

Assistance will be provided on an as-needed basis in coordinating site access arrangements for geotechnical work with various land owners of the reservoir site properties. This activity includes coordination with HBA staff having the primary responsibility for this task; can include

meetings with property owners to explain the work to be done, establish limitations, and make detailed access arrangements; and can include providing written work plans and descriptions of field activities. In addition, assistance will be provided relative to court actions taken by the City to obtain approval to access various reservoir sites to conduct the required studies, including providing verbal and written input to assist preparation for court proceedings, attendance at meetings, and participation in court proceedings.

Streambed Alteration Agreement

The Consultant prepared an application for a 1601 Streambed Alteration Agreement for the California Department of Fish and Game to cover activities associated with geotechnical field work.

Field Monitors

An archeological monitor will be present for each of the two geological study teams during backhoe test pitting. A wetlands monitor will be present during preparation and initial for backhoe testpitting and stream crossings.

Geotechnical Assessment Report

A written report will provide the basis and results of the geotechnical evaluation of alternative reservoir sites and pipeline routes. The report will contain geologic and exploration maps and cross sections of the alternative sites, conceptual dam and reservoir layouts, conceptual dam design cross sections, evaluation of construction materials availability and characteristics, conceptual earthwork construction cost estimates and cost curves, and construction considerations. The report will also document the field and laboratory investigations, including field logs and lab test results. An interim report is planned to present the evaluations for the Two Rock, Bloomfield, Adobe Road, Lakeville Hillside, and Valley Ford East reservoir sites for which field work was completed first. In addition, technical memoranda will be provided on an as-needed basis to supply input required for engineering design on a progressive basis, prior to completion of the final report. The final report will contain the evaluations of all reservoir sites and pipeline routes that are part of this study.

Induced Seismicity Study

Preliminary Evaluations

Literature Review

A review of in-house documents will be conducted. The principal investigator of USGS/LBL/UCB will be contacted to assess whether additional documentation exists or meetings were held.

Applicability of the LACOSON Study

A review will be conducted to assess applicability to the Santa Rosa Project and if outside help is needed to determine this.

Development of Scope for Assessment of Potential Induced Seismicity Impacts

Development of data quality objectives. Determination of what measures of significant/insignificant induced seismicity impacts are mandated or reasonably adoptable, and what level of uncertainty is acceptable and/or achievable. A determination of the methodology to be used for assessing the induced seismicity impacts will be made. This could include a new induced seismicity study; adoption of the LACOSON existing Induced Seismicity Study; or review by outside experts or expert panel for new scope and study.

Continued Evaluation

Potential Induced Seismicity (IS) associated with proposed injection of wastewater to replenish the geothermal reservoir at The Geysers has been identified as a critical issue during the public scoping comment process. The general scope of the requisite studies is given below. However, refinement is required of both the specific methodologies that will be utilized for each of the scope tasks, and the quantity and characteristics of data needed to support these tasks, so modifications to both the scope tasks and scope budget are expected.

1. A literature search will be conducted for available studies of IS at The Geysers and analogous geothermal fields.
2. Steamfield operators at the Geysers will be consulted to determine the range of proposed wastewater injection scenarios. A summary describing the range of probable injection schedules, injectate quantities, and probable effects on the geothermal reservoir and nearby production wells (only insofar as those effects may influence factors associated with IS) will be prepared. The summary will include available information on proposed injection scenarios in the Southeast Geysers area that will result from implementation of the LACOSAN project, and will be included as a section in the EIR.
3. A detailed scope and cost proposal will be prepared that defines which specific methodologies will be utilized for predicting potential IS, and estimating environmental impacts associated with potential IS. Due to the uniqueness of The Geysers geothermal field, widely accepted standards for analysis of potential seismicity associated with fluid flux at the field have not been established. Therefore, an expert technical reviewer or panel will be identified and retained to provide peer review of the proposed protocols for analysis.
4. Currently available historical data on seismic monitoring, production and injection in the potentially affected portion of The Geysers will be compiled to support an assessment of the characteristics (i.e. magnitude, frequency, distribution and severity of ground shaking) of potential IS associated with proposed injection scenarios. If data necessary for the assessment are proprietary or unavailable, a strategy will be proposed for acquiring and/or otherwise utilizing the data.
5. A study will be conducted (utilizing an expert subconsultant) to assess characteristics (i.e. magnitude, frequency, distribution and severity of ground shaking) of potential IS that may result from the proposed injection schedules, based on the following:

- a) Acquire written releases from steamfield operators to utilize well data, and injection/production data in support of the study;
 - b) Statistical analysis of local historical injection, production and seismicity data will be conducted in order to extrapolate future IS from current trends;
 - c) The potential for injection to alter (initiate, increase, or decrease) seismicity will be assessed for local areas (within the Geysers geothermal reservoir) and for the greater region (as far away as the Rodgers Creek Fault). This assessment will incorporate an evaluation of potential injection-induced changes in local and regional tectonic stresses, and their potential effect on seismicity. Thermal, pore pressure, and volumetric mechanisms will be considered. This assessment will necessarily be theoretical in nature, since no existing empirical data address this issue directly. Therefore, emphasis will be placed on estimating uncertainties in the conclusions. In addition, studies of reservoir-induced seismicity (RIS) will be reviewed; they may provide an empirical estimate of the seismogenic effects of artificially induced stress and pore-pressure changes which may be comparable to those caused by well injection; and
 - d) The expert technical reviewer or panel identified in (3) above, will be retained to provide peer review of the results of the IS study.
6. An evaluation will be conducted to assess whether the projected characteristics of potential IS constitute significant environmental impacts. The levels of impact to be considered are: structural damage to residences and businesses, probable frequency and magnitude of ground-shaking at residential and non-residential use properties.
7. Recommendations will be developed for assessing and mitigating impacts, as appropriate (e.g. seismic monitoring and reporting), and will be presented in a subsection of the EIR.
8. A mitigation monitoring plan will be developed, based on the recommendations listed in Item 7, above.

The scope and cost estimate are based on the following assumptions:

- 1. The feasibility of wastewater injection has already been adequately assessed, and the potential effect of proposed injection on steam production would not constitute an environmental impact. Therefore, neither of these topics would be assessed.
- 2. Full access will be provided to all operator's data pertaining to utilization of wastewater for injectate. The data will be available in electronic format at nominal cost, and will include:
 - a) History of injection (schedules and quantities);
 - b) Production Records;
 - c) Historical seismicity records;
 - d) Well locations and surface traces;
 - e) Well logs (or well construction data and lithologic summaries);
 - f) All maps in CADD compatible format; and
 - g) Parcel maps.

3. The operators will provide copies of all previous proprietary and non-proprietary studies of IS at the Geysers.
4. The operators will provide the range of scenarios for wastewater injection, including injection schedules, quantities and locations.
5. Copies will be available for review of the LACOSAN EIR and all IS-related correspondence, comments and responses.
6. The main method of impact mitigation will be panel review of periodic seismic monitoring data. Parsons ES will coordinate the panel selection process.
7. Attendance at five half-day general project or public meetings by two staff members.
8. Half-day field trips by two staff members to Santa Rosa area to acquire data and coordinate with operators.

TASK 35 SUMMARY

Product	Medium	Copies
Interim Geotechnical Assessment of Alternative Reservoir Sites	Print	25
Final Geotechnical Assessment of Alternative Reservoir Sites and Pipeline Routes		
Geysers Alternative Induced Seismicity (I.S. Assessment)		

TASK 36 CULTURAL AND HISTORICAL RESOURCES

Background Research

A supplemental records search at the Northwest Information Center of the Historical Resources Information System will be done (1) to update the data base; (2) to address project alterations previously not record searched; (3) to review sources not included in the previous records search; and (4) to obtain copies of pertinent reports and records. The following State of California Department of Parks and Recreation's inventories will be reviewed: *California Inventory of Historic Resources*, *California Historical Landmarks*, *California Points of Historical Interest*, and *Five Views: An Ethnic Sites Survey for California*. The Northwest Information Center's *National Register of Historic Places* listings will also be reviewed. The records search will identify formally recorded archaeological and historical properties within the reservoir locations, irrigation areas, and pipeline routes.

Background research for archaeological resources will consist of review of archaeological, ethnographic, historical, and environmental literature and maps at Sonoma State University.

Background research for architectural resources will include research of materials at Sonoma State University, the Northwest Information Center, and government repositories such as recorder's and assessor's offices. Limited interviews may also be necessary to obtain information regarding architectural resources.

The background research will document the locations of known archaeological and historical resources, will provide information for developing cultural and natural setting overviews, and will provide a data base to assist in predicting the locations of unidentified cultural resources. This information will be gathered prior to field surveys.

Interested/Concerned Parties Contacts

Interested individuals, organizations, and agencies will be contacted for information and/or concerns that they may have about the project. The state of California Native American Commission (NAHC) will be requested to review the Sacred Lands files, and to provide a listing of Native Americans concerned about cultural resources in Sonoma and Marin counties. Those identified by the NAHC will be notified of the project by letter, with a request for information.

The State of California Office of Historic Preservation (OHP) will be contacted for information and concerns the OHP may have. Sonoma and Marin counties historical societies, which have interests in the areas of the Wastewater Project, will be notified of the project by letter, with a request for information.

Field Study

~~An on-foot mixed-strategy field survey will be done for the 12 reservoir sites, as depicted on the blackline 1:2,000 and 1:500 computerized USGS maps (October/November 1994) and the map accompanying the HBA Memorandum (8 November 1994). A maximum of 3,200 surface acres of reservoir locations will be field surveyed. Reservoir footprints and dam alignments will be~~

~~completely surveyed by the proposed study, except for areas adequately covered by previous studies. The survey will include a buffer zone of 100 feet around each reservoir and dam alignment.~~

At this time, field survey of the irrigation areas and pipeline routes will not be done because of the extensive amount of land involved and the ambiguity of which locations will finally be chosen. It is our understanding that upon the specific selection of irrigation lands and pipeline routes, that a cultural resources field survey will be conducted prior to project implementation.

As requested, personnel will be provided to monitor the field activities of the geotechnical special studies in order to avoid drilling or trenching within areas that contain archaeological resources.

Reservoirs

Field studies will be conducted of the reservoirs identified in the HBA Team Update of 8 February 1995, and depicted on the 1:500 blueline maps of January 1995. We will also conduct a field study of Tolay C, as depicted on the map contained in the January 13 and 14, 1995 *Board of Public Utilities Study Session* document, and the faxed map received 6 February 1995. Studies will include the reservoir surface acres, with a 100-foot buffer zone, and the dam footprints, with a 300-foot buffer zone.

Aquifer Storage Recovery Injection Wells

Field study will be conducted of two locations of 30 acres each. An archaeologist will monitor the drilling of each well for three days, for a total of six person days.

Recording Resources

Prehistoric and historical archaeological sites and historical architectural properties identified during the field survey will be recorded on State of California Department of Parks and Recreation forms. Recording of cultural properties will be done by personnel familiar with the type of property being recorded.

At a minimum, a supplemental site record, stating the current condition of the site, will be completed for all previously recorded cultural resources within the reservoir study areas. For those resources which, in our opinion, have inadequate documentation, the site record will be updated. Isolated finds will be identified, located, and mentioned in the report, but records will not be filled out for such finds.

Where possible, we will identify, but not record, historical architectural properties outside the Area of Potential Effect within one mile of each reservoir location that may have their setting altered by reservoir construction.

Sensitivity Study

South County Irrigation Area

A sensitivity study of this portion of the project as indicated on the maps accompanying the HBA, memo of 14 November 1994, parcels 0001-0215, will be conducted.

West County Irrigation Area

A sensitivity study of this portion of the project areas indicated on the maps accompanying the HBA, memo of 6 January 1995, parcels 301-477, will be conducted.

Sebastopol

A sensitivity study of this portion of the project area when maps depicting the areas to be studied are made available will be conducted.

Geysers Pipeline Route

A sensitivity study will be conducted at such time that a route has been determined.

Pipeline Routes

The sensitivity study will include the pipeline routes from the wastewater plant to the reservoirs and from the reservoirs to the irrigation areas at such time that maps depicting these portions of the project area are made available.

Urban Irrigation (Bennett Valley Golf Course & Fountain Grove)

It is our understanding that the cultural resources aspect of this portion of the study area is being conducted by others and that the results will be made available to us for use in our report.

TASK 36 SUMMARY

Product	Medium	Copies
Cultural Resources Study for the Santa Rosa Subregional Wastewater Project	Print	25

TASK 37 LAND USE AND VISUAL RESOURCE ANALYSIS

Field Verification and Mapping of Existing Land Uses

Maps shall be prepared at a scale of 1"=1000' in the relevant "built-up" portions of the study area and 1"=2000' in the remainder of the relevant area for each of the alternatives, along with completion of the composite future land use mapping begun last fall at the same scales. These maps would provide input for the development of project settings in Task 39 and for subsequent use in preparation of the EIR/EIS.

Visual Resource Analysis

The field work and photography will be accomplished in conjunction with the land use verification. ~~Sketch overlays to photographic enlargements showing visual impacts for selected locations will be prepared as part of the visual documentation.~~ A preliminary Visual Resource Analysis will be completed for eleven reservoir sites to aid in the selection of reservoir sites to be included in the DEIR/DEIS alternatives.

"The methods proposed for the visual impact analysis are:

- Review of the visual sensitivity of the landscape, based on the inventory of sensitive viewing locations and policies affecting the visual resource;
- Viewshed mapping that indicates the visibility of the proposed facilities from selected critical viewpoints;
- Visual simulations that illustrate the scale, form, and contrasts of the proposed facilities in accurate 3-D perspective-images based on photographs of existing conditions;
- Analysis of visual contrasts and dominance of the project relative to the surrounding landscape character;
- Analysis of the change in visual quality resulting from the expected landscape modifications; and
- Identification of any conflicts with regulations or policies protecting the visual resource."

Visual Resource Technical Studies

As a supplement to the overall visual resource analysis, more detailed technical studies would be undertaken for selected locations. These studies will aid in the analysis of locations with critical visual resources or potential significant visual impacts. Data and conclusions from these studies will be integrated into the overall visual resource analysis and DEIR/DEIS. This task includes field reconnaissance, data review, methodology development, initial data collection and input to CEQA checklist, as discussed in the following subtasks:

Baseline Development

Includes augmentation and revision of existing baseline (text and mapping), for up to 10 initial reservoirs with additional data collection, site photography (for simulation), viewshed mapping to quantify the relative visibility of dams/reservoirs or other key features (using USGS digital

terrain model, for up to 6 locations), and refinement of visual criteria for pipeline siting and reservoir alternate selection.

Preliminary Simulations

As an aid in selecting reservoir and/or pipeline route alternatives and identifying potential significance issues, preliminary simulations will be prepared using computer wireframes overlaid on site photographs. These will refine the visibility information obtained from the viewshed mapping, and indicate likely visual issues with proposed dam configurations, pipeline routes crossing rugged terrain, pumping stations, etc., without the expense of full color simulations. Up to eight wireframe overlays (allowing for project alternatives) are assumed.

“The wireframe refers to a computer-generated outline drawing of a proposed facility seen in perspective from an identified viewpoint. The wireframe, accurately scaled, can then be overlaid on a photograph of the existing view from that viewpoint in order to determine the correct scale and form of the facility in relation to its surroundings.”

Interim Report on Visual Assessment

Includes baseline update, preliminary assessment of reservoir alternatives/pipeline alternates, and recommendations.

Conceptual Landscape Plan for Proposed Wetlands (Alternative 3)

~~As part of the special studies a conceptual landscape plan for proposed wetland would be prepared to help define the project description for this alternative, working closely with the wetlands biology and engineering team. This would be necessary as a basis for simulation and community presentation, as well as to support the land use, visual, and recreation studies. As an initial product a sketch concept would be developed for review with the project team.~~

Response to Comments/Scoping

This task includes review of public written comments and scoping meeting results, preparing responses to comments, attending meetings with HBA and issues discussion meetings, preparation of BPU Issues Statements/questions, and preparation of a revised scope and budget through the final EIR/EIS.

Visual Resource Technical Report

To document the findings and recommendations of the technical studies, a technical report will be prepared. This process will also include input (text and graphics) to the DEIR/DEIS.

Prepare Final Baseline

Includes revised project description review, baseline documentation, and format reviews for technical report, addressing six reservoir sites.

Prepare Final Simulations

Includes up to six color photo simulations ~~produced by photo imaging~~, drawing on selected computer wireframes for most critical views. Includes provision of one set of original before and after prints at 8.5" x 11", using standard lens photograph.

Assess Visual Impacts

Includes input to Visual Resources Analysis impact assessment, mitigation measures, and residual impacts with mitigation, for six alternatives.

Prepare Technical Report

Includes draft and final report; report will include simulations and selected viewshed maps, with one review cycle.

Caltrans Visual Resource Analysis

Based on agency scoping comments, the visual specialist will meet with the District Landscape Architect at Caltrans to determine "Visual Resources" identified by Caltrans staff in the study area and review appropriate files and material documenting these resources. The potential impact of the project on such visual resources in or near the Caltrans right-of-way will be analyzed for inclusion in the overall analysis, consistent with Caltrans visual analysis methodologies and local District policies.

Additional Fieldwork/Baseline

This subtask extends Subtask V8 to apply to four additional reservoir sites, bringing the total number of sites studied to ten (see Table 2 for identification of ten sites to be studied at this stage).

Additional Wireframe Simulations

This subtask extends Subtask V4 to apply to six additional reservoir alternatives, bringing the total number of alternatives simulated to 14 (see Table 2 for identification of reservoir alternatives). This would allow one preliminary simulation for each reservoir alternative, which is necessary for comparative assessment of expanded reservoir alternatives at particular sites. Alternatively, up to two of the wireframes could be substituted by wireframes of the pipeline routes.

Additional Impact Assessment

This subtask extends Subtask V10 to apply to four additional sites plus four expanded reservoir alternatives (Tolay C, Sears Point, Bloomfield, and Valley Ford East) as shown in Table 2. This brings the total number of alternatives analyzed to 14.

Additional Final Simulations

This subtask extends Subtask V9 to apply to two additional reservoir alternatives, bringing the total number of photosimulations to eight. Table 2 (last column) identifies the reservoir alternatives proposed for photosimulation at this stage. Actual selections will be made following Tasks V4 and V15. It is possible that one to two reservoir alternatives would be substituted by pipeline routes.

Additions to Technical Report

This subtask extends Subtask V11 to apply to the additional reservoir sites (4) and project alternatives (up to 8). We assume that Tasks V11 and V18 will be conducted concurrently with one review cycle.

TASK 37 SUMMARY

Product	Medium	Copies
Existing & Projected Land Use Mapping	Print	1
Viewshed mapping (up to 12 locations)	Photographic	1
Fourteen wireframe overlays		
Final Simulations (eight color)		
Visual Resource Technical Report	Print	25
Interim Report on Visual Assessment		
Final Simulations (eight color)		
Caltrans Visual Resource Analysis	Print	1

TASK 38 HYDROLOGY SPECIAL STUDIES

38.1 Reservoir Spillway Hydrology

A simple hydrologic analysis suitable for preliminary sizing of the spillway at each dam site will be performed for the reservoirs included in each project alternative. The scope of work is based on the following assumptions.

Assumptions:

1. A maximum of ten reservoir sites will be analyzed.
2. The hazard classification for each dam will be determined using the Corps of Engineers hazard classification system.
3. The spillway design flood frequency for each dam will be determined using the Corps of Engineers spillway design criteria.
4. The spillway design peak inflow for each site will be calculated. Hydrographs will not be estimated and reservoir routing to determine attenuation of the peak flow will not be performed.
5. The regression equations published by the United States Geological Survey (USGS) will be used for estimating the 100-year flood peak flow for reservoirs where the 100-year flood is the appropriate design criteria.
6. The Probable Maximum Precipitation (PMP) and the Soil Conservation Service unit hydrograph procedure will be used for reservoirs where the Probable Maximum Flood (PMF) is the appropriate design criteria.

38.2 Russian River Low Flow Analysis

The hydrologic analysis for the Russian River prepared for the previous EIR/EIS is based on streamflow data developed by the Sonoma County Water Agency (SCWA) for the period 1923-1984. SCWA is presently updating the projection of stream flow to include more recent flow data and changes in the diversion of water from the river. New data will be used to update the analysis of low flows in the Russian River and provide information for water balance investigations. The results of this analysis will be presented in a Technical Memorandum.

38.3 Russian River Hydrograph Analysis

Stream flow data will be collected for use in the water quality modeling. The steady state model will use the average monthly flow data described above. The dynamic model requires hydrographs showing the change in flow during large storms. Average daily flows will be provided at key points in the river system for the water quality model calibration period. The results of this analysis will be presented in a Technical Memorandum.

38.4 Russian River High Flow Analysis

The Russian River High Flow Analysis will provide information for the design of the rapid infiltration basins. A statistical analysis of high flow data will be performed to determine the

impact of river water levels on the operation of the rapid infiltration basins. Average monthly flows will be determined at existing stream flow gauges upstream and downstream from the rapid infiltration site. Rating curves for the stream gauges will be used to estimate water surface elevations at the infiltration site corresponding to the average monthly flows. The results of this analysis will be presented in a Technical Memorandum.

38.5 Reservoir Inflow Analysis

Treated water commingled with surface water runoff could flow over the spillway. A diversion system designed to capture surface runoff and divert it around the reservoir to a point below the dam would control this problem. A reservoir inflow analysis will be performed to size the surface runoff diversion facilities at each reservoir. Hydrologic information will be developed for the 10 year storm. The results will be used to size diversion facilities to intercept the runoff and divert it around the reservoir. Peak flow rates for the 10-year storm will be estimated for sizing the diversion facilities. The budget for this work assumes that information will be developed for a maximum of 10 reservoir sites. The results of this analysis will be presented in a Technical Memorandum.

~~A Reservoir Inflow Analysis will be performed to size surface runoff diversion facilities at each reservoir. Hydrologic information will be developed for 5 and 10 year storms. The results will be used to size diversion facilities to intercept the runoff and divert it around the reservoir.~~

38.6 Laguna de Santa Rosa Floodplain ~~Definition~~Delineation

A floodplain ~~definition~~delineation is required if any of the alternatives are likely to significantly increase peak flood flow rates. Discharge to the Laguna at (0-20%) during the winter could increase flood hazards depending on how the discharge facilities are operated. We will compile existing flood inundation mapping and flood hydrology parameters for use in determining the potential impact associated with alternative operation policies. The proposed operating of discharge facilities will be compared to the existing flood hazards. If potential impacts are identified, we will make recommendations for operation modifications to avoid the impacts. The results of this analysis will be presented in a Technical Memorandum.

Task 38.7 Dam Break Inundation Analysis

Areas downstream from a reservoir will be inundated if the dam fails. An analysis will be completed to estimate the approximate depth of flooding and approximate limits inundation. Simplified methods will be used make a conservative estimate of the maximum potential area of inundation. The method used will not be a rigorous as the standard dam break analysis method used for preparing emergency action plans. However it will indicate the approximate limits of inundation and provide a basis for comparing reservoir alternatives. The computer program HEC-1 will be used to estimate the peak outflow rate during the hypothetical dam failure. Normal depth calculations will be performed using the peak flow rate at typical stream channel cross sections located downstream from the dam. The stream channel cross sections and approximate hydraulic grade line will be developed for existing digitized USGS maps. The results of this analysis will be presented in a Technical Memorandum.

38.8 Dam Break Inundation Mapping

The limits of flood inundation will be plotted on the digitized USGS maps and presented in AutoCADD format.

TASK 38 SUMMARY			
Product		Medium	Copies
Reservoir Spillway Hydrology		Print	25
Russian River Low Flow Analysis			
Russian River Hydrograph Analysis			
Reservoir Inflow Analysis			
Laguna de Santa Rosa Floodplain Definition Delineation			
Dam Break Inundation Analysis			
Dam Break Inundation Mapping			

TASK 39 EIR/EIS SETTING SECTIONS

Settings Sections will be prepared for the Draft EIR/EIS based upon the “Preliminary Sections of the Draft EIR/EIS” Report prepared in March of 1994. The sections will conform with CEQ’s NEPA regulations at 40 CFR Parts 1500-1508, USACEs NEPA regulations at 33 CFR Part 325 (Appendix B), and CEQA regulations. Data gathered during preparation of the technical reports (described in previous tasks), as well as additional research, will be used to finalize the settings, summarize impacts and develop mitigation measures.

Land Use

The land use setting section will be prepared as described in Task 37 (Land Use and Visual Resource Analysis). The setting will be taken from the land use technical report and included in the Draft EIR/EIS setting section document.

Agriculture

Technical studies on irrigation suitability and land use will be summarized as pertains to existing agricultural uses. Prime Farmland and lands under Williamson Act contract will be identified.

The potential impacts to agricultural lands identified in technical memoranda will be summarized:

- Loss of prime farmland and Williamson Act lands will be identified for each alternative
- Potential changes in agricultural uses and crops will be discussed

Possible benefits of providing reclaimed water for agriculture will be summarized, with reference to other relevant EIR/EIS sections (e.g., socio-economic, land use)

Visual Resources

The visual resources setting section will be prepared as described in Task 37 (Land Use and Visual Resource Analysis). The setting will be taken from the visual resources technical report and included in the Draft EIR/EIS setting section document.

Geology, Soils and Seismicity

This section will summarize the regional geology of the project area and will include a discussion of the regional setting, principal geologic units, seismicity, faulting, soils, and geologic/soil hazards. This section will also include a detailed discussion of these topics as they relate to the various alternatives being evaluated under this EIR and will summarize the results of the relevant technical studies which are being undertaken as part of the EIR including geotechnical engineering for reservoirs and pipeline routes, and induced seismicity. The section will include the following elements:

- A summary of the contents of relevant reports (including project documents, and relevant literature) in order to describe existing site conditions, including topographic, geologic, and soils conditions.
- A summary of the various relevant technical studies that are being conducted as part of the EIR as they relate to this section.
- A summary of relevant state laws and regulations pertaining to the various project alternatives.
- The location of active and potentially active faults in the vicinity of the project and the maximum credible earthquake magnitudes and their probability of occurrence based on recent U.S. Geologic Survey (USGS) publications.
- Identify potential seismic hazards in the vicinity of the sites caused by strong ground shaking including liquefaction and subsidence hazards and earthquake-induced slope failure.
- Discuss potential impacts that could result from a major earthquake within the project vicinity. Describe emergency response plans and earthquake contingency plan elements.
- Identify components of the proposed project and alternatives that could affect geotechnical stability.
- Review and discuss the adequacy of current and proposed engineering mitigation measures including design, construction, operation, and monitoring recommendations, as necessary to mitigate geotechnical impacts.
- Identify additional mitigation measures and/or monitoring that would be necessary to mitigate geologic, soils, or seismic impacts of the proposed project.

Hydrology & Water Quality

The hydrologic setting will be described for the entire project area. A description of watersheds throughout the study area and information about existing surface water runoff rates and streamflow rates will be included.

Impacts Analysis and Mitigation

The hydrology special studies provide data required for various impact analysis. A separate hydrologic impact analysis is not required. The impact sections written by others will be reviewed as required to confirm consistency with the hydrologic analysis.

Impacts

The water quality impacts section will be written for the following components:

- Laguna and Russian River Discharge. An evaluation will be conducted to assess the impacts of discharge on dissolved oxygen and other water quality parameters in the Laguna and Russian River. The cumulative impacts on water quality of planned growth in Russian River will also be evaluated.
- Irrigation and Storage. An evaluation will be conducted to assess project impacts to irrigation streams, storage site streams, and groundwater recharge streams.
- Pipeline Crossing. The potential impact of pipeline construction on water quality will be described.

Groundwater

This section will include a description of the regional groundwater setting for the project area. The section will focus on the potential of the various alternatives to affect groundwater conditions in the vicinity of the site and will include an assessment of potential impacts on groundwater quality and mitigation measures. The section will include the following:

- A summary and synthesis of relevant reports (project documents, and relevant literature including Department of Water Resource documents and records) in order to describe existing site conditions, including groundwater occurrence, locations of wells and usage of wells in select areas, groundwater quality and beneficial uses, depth to groundwater, and potential impacts from the various alternatives.
- Summarize the requirements of the Regional Water Quality Control Board's (RWQCB) Waste Discharge Requirements and all other relevant regulations. This discussion will include water quality monitoring requirements.
- Identify components of the proposed project and alternatives that could affect groundwater.
- Identify measures and/or monitoring (groundwater sampling) that would be necessary to mitigate groundwater impacts of the project alternatives.

Biological Resources

Impacts to be assessed for terrestrial and aquatic resources for project components that will result in significant surface disturbance (Reservoirs Sites, Pipeline Alignments, Direct Discharge Site) include but are not limited to:

- Wildlife habitat, vegetation community, and wetlands removal due to construction and/or inundation
- Potential take of special status plant and wildlife species
- Loss of foraging habitat for raptors and carnivores
- Potential impacts to movement corridors
- Potential downstream impacts from dam siting.
- Water Quality changes resulting in impacts to organisms in the receiving water bodies including reservoirs, the Esteros, Russian River, and other regional creeks and drainage.

Impacts to be assessed for terrestrial and aquatic resources for project components that may result from supplying effluent for irrigation include but are not limited to:

- Decreased salinity levels in the Esteros and Petaluma Marsh due to potential subsurface lateral hydrological flow from irrigation reuse. Potential resultant vegetation shifts could alter wildlife and plant composition and diversity.
- Shift in community type due to application of wastewater effluent on rangelands
- Resultant impact on wildlife and plants from conversion of rangelands to cropped lands.
- Habitat loss for ground dwelling species
- Loss of foraging habitat for raptors and carnivores
- Potential subsurface lateral hydrological flow from irrigation reuse. Potential resultant vegetation shifts in intermittent streams and drainages could alter wildlife and plant composition and diversity.

The aquatic life impacts section will be written for the following components:

- **Laguna and Russian River Discharge.** A risk assessment will be conducted to evaluate potential toxicity and bioaccumulation impacts on key species. Impacts of discharge on fish migration and cumulative impacts of planned growth in Russian River. This evaluation will be based on existing information and studies conducted in Tasks 20, 28 and 34.
- **Irrigation and Storage.** A risk assessment will be conducted to evaluate potential toxicity and bioaccumulation impacts on key species. Salinity and biostimulation impacts on aquatic life will also be evaluated. Secondary impacts of manure production and pesticide use in each irrigation area will be evaluated. The effect of the project on species interactions in the Esteros will also be evaluated.
- **Geysers.** The information provided by the soil scientist will be used with the characterization of biota typical of Geysers-area streams to conduct a risk assessment (per methodology described in Task 19). A technical memorandum describing the results of this evaluation will be prepared.
- **Pipeline Crossings.** Potential impacts on aquatic biota of pipeline construction across creeks will be evaluated.

Cultural and Historical Resources

The cultural and historical resources setting section will be prepared as described in Task 36 (Cultural and Historical Resources). The setting will be taken from the cultural and historical report of findings and recommendations and included in the Draft EIR/EIS setting section document.

Public Health and Safety Hazards

The setting section will be divided into two sections; hazardous materials/wastes and public health.

Hazardous Materials/Wastes

The HBA team will discuss and summarize the technical reports regarding human health effects of estrogen-like compounds, and Russian River and effluent water quality. The setting will also describe existing public health conditions regarding drinking water quality, vector-borne diseases, seismic hazards, and flooding hazards, referring to other sections of the EIR/EIS as appropriate. The HBA team will consult lists compiled by the Department of Toxic Substances Control, the Regional Water Quality Control Board, and the California Waste Management Board, pursuant to Section 65962.5 of the Government Code of the State of California, to determine whether the project or any alternatives are located on a site which is included on any of these lists. The Federal National Priorities List (NPL, aka Superfund) and the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) will also be consulted. Listed hazardous waste sites will be tabulated and located on a base map. The potential for these sites to impact the project or alternatives will be discussed. Because of the magnitude of the project area and the number of alternatives a complete hazardous waste initial site assessment (ISA) is not proposed. It is recommended that an ISA be conducted for the selected alternative only. Current use of hazardous materials at the treatment plant will be described.

Public Health

The HBA team will discuss and summarize the technical report regarding human health effects of estrogen-like compounds, and Russian River and effluent water quality. The setting will also describe Results of the analysis of existing public health conditions regarding drinking water quality, vector-borne diseases, seismic hazards, and flooding hazards, referring to other sections of the EIR/EIS as appropriate. ~~will be summarized for the EIR/EIS.~~

Prepare Public Health Impact Analysis and Mitigation Section

The Impact Analysis will be performed by using the Public Safety and Hazards Environmental Impact Criteria previously developed. These criteria will be used to evaluate whether the project will:

- Expose the public to pathogenic viruses, bacteria, or other disease organisms;
- Expose the public to estrogenic chemicals;
- Increase the potential to expose the public to hazardous materials/wastes;
- Interfere with an emergency response or evacuation plan; and
- Increase the potential to expose the public to disease vectors.

Mitigation measures will be proposed, as appropriate, based on the outcome of the Impact Analysis.

Transportation

The HBA team will assemble the information needed to describe the existing transportation system in the project study area. The information to be collected, either through field studies, from previously prepared documents, or from governmental agencies includes the following:

- Roadway System
 1. Right-of-way width;
 2. Pavement width;
 3. Shoulder width;
 4. Shoulder composition (i.e., paved or unpaved);
 5. Number of lanes;
 6. Daily traffic volume;
 7. Hourly traffic volume;
 8. Parking conditions/restrictions;
 9. Drainage system (curb/gutter or open ditch);
 10. Adjacent land uses;
 11. Driveways/access facilities; and
 12. Intersection traffic control (i.e., signalized or unsignalized).
- Transit System
 1. Transit routes; and
 2. Transit schedules.

In addition to conducting field observations, videotape will be used to provide a permanent record of roadway conditions on the potentially affected roads. This videotape can then be referred to whenever questions arise regarding the characteristics of any of the study roadways, thereby eliminating the potential need to return to the field.

For the purposes of this proposal, it is assumed that 24-hour traffic counts will be required at up to 33 locations, to supplement the information available from governmental agencies. While Caltrans maintains an up-to-date system on traffic volume information, it appears that Sonoma County and the various local jurisdictions have only limited data.

Results of the information gathering process (existing setting) will be documented in a memorandum report.

The impact section will describe potential impacts of all project alternatives upon the County roadway system, with particular emphasis on access points, construction traffic, and safety. Mitigation measures will be suggested as needed.

Air Quality

The Santa Rosa Water Treatment Plant Project would generate emissions of regulated air pollutants temporarily during construction, and increased emissions of these pollutants for an

indefinite period during project operation of the expanded wastewater treatment plant (WWTP). These new emissions, added to existing sources of air pollution and cumulative (approved, under consideration, or under construction) development, would temporarily (during construction) or indefinitely (during project operation) degrade local and regional air quality. The degree of degradation may be significant and must be assessed in light of state or federal air quality standards, and long-term air quality goals outlined in the Bay Area Air Quality Management District (BAAQMD) 1994 Clean Air Plan Implementing the California Clean Air Plan, air quality planning by the Northern Sonoma County Air Pollution Control District (NSC APCD) and planning implementing the 1990 Federal Clean Air Act Amendment.

Setting

- Briefly review local and regional climate, meteorology, and topography as they affect the accumulation or dispersal of air pollutants in the regions of the project.
- Identify federal, state, and local regulatory agencies responsible for air quality management, and briefly summarize federal, state, and local air quality policies, regulations, and standards as they pertain to the proposed project and its alternatives.
- Summarize existing air quality conditions and recent trends in the project area on the basis of the most recent annual air quality monitoring data summarizes published by the California Air Resources Board (ARB). Identify any existing major sources of air pollution in the vicinity of the project, on the basis of an inspection of the site and its environs, the latest BAAQMD emissions inventory, discussions with the City of Santa Rosa, and other available sources of information.
- Briefly discuss projections of future air quality trends over the life of the project, as presented in the BAAQMD 1994 CAP, NSC APCD planning goals, planning documents which implement the federal Clean Air Act, and the assumptions upon which the projections are based.
- Identify any air pollution-sensitive land uses or activities in the vicinity of the project, or along roads providing access to the project sites.

Impacts

- Discuss at an appropriate level of detail the potential for short-term emissions of regulated air pollutants generated by project construction to contribute to violations of state or federal air quality standards. This discussion will be based upon proposed construction generic construction scenarios for earthmoving operations and construction equipment use involved in the construction of pipelines and reservoirs provided by the project sponsor. Emissions factors cited in this analysis will be those in EPA's AP-42 Compilation of Air Pollutant Emission Factors, or equivalent published emission factors.
- Describe the types of air pollutants likely to be emitted by expansion of the WTP headworks.

- Discuss the potential for increased air pollutant emissions of regulated air pollutants from the expanded operation of the WTP as a result of headworks expansion to adversely affect sensitive land uses or activities, or to impede attainment of air quality goals. Increased emissions of the WTP resulting from the headworks expansion are to be determined on the basis of existing engineering estimates of the designed performance of plant equipment and control equipment relative to emission points and control equipment, extrapolation of existing performance tests of plant equipment extrapolated to increased throughput, scaling of past WTP emissions of similar equipment in use at the WTP, or scaling of permitted emissions from the WTP at increased throughput. Discuss conformance with the 1994, CAP planning goal, NSC APCD air quality and federal Clean Air Act, and determine whether project impacts of air quality would meet any of the BAAQMD's significance tests or do not comply with rules of the BAAQMD or NSC APCD.
- Discuss the potential of the WTP expansion to generate increased odor complaints on the basis of the odor complaints resulting from current plant operation and existing controls extrapolated to the expanded plant and planned odor controls. The increased emissions of odor causing pollutants, and the effectiveness of planned odor controls, is to be based on existing or design engineering estimates to be supplied by the project sponsor. Compliance of the project with BAAQMD's odor rule (Rule 7) will also be discussed as well as door nuisance rules of the BAAQMD and NSC APCD.
- Describe cumulative development in the project areas (i.e., development that is under formal consideration, has been approved, or is under construction) and discuss the potential for the combined emissions from the project and cumulative development to adversely affect air quality or impede attainment of air quality goals of affected air quality regulatory jurisdictions.
- Evaluate, at a general level of detail, the potential air quality impacts of the five project alternatives, and compare these with the impacts that would result from the project.

Mitigation

- Identify practical, feasible measures to mitigate the adverse impacts of the project on air quality that are identified in the impact section, and the entities that would be responsible for imposing and carrying out the mitigation measure. For each measure, discuss generally whether the measure would, by itself or in concert with other proposed measures, fully or partially mitigate the impact it addresses. Mitigation measures would be developed in consultation with the lead agency, responsible agencies as appropriate and the project sponsor.

Noise

~~Noise sensitive receptors will be documented during the land use field survey for the project area. This data will be used to supplement the existing noise setting prepared and included in the March 1994 Preliminary Report. Potential project noise impacts include noise generated by~~

earthmoving equipment, and other construction activities as well as pumps and other equipment items at the adjacent lands will be evaluated. Appropriate treatment measures will be recommended to mitigation noise impacts from project to the surrounding areas. The following tasks will be completed to assess the potential noise impact.

- Review proposed project layout drawing, noise ordinances, noise element, and recent noise measurement results. No noise measurements will be conducted in the project vicinity.
- Earthmoving equipment and other construction activity noise impacts at selected receptor locations will be evaluated, and necessary mitigation measures and monitoring requirements will be recommended.
- The FHWA highway traffic noise prediction model will be used to predict the noise levels generated by the construction related vehicular traffic.
- Project related traffic and operational noise impacts at the project site and surrounding areas will be evaluated.
- Noise abatement measures will be recommended to mitigate noise impacts at the nearby sensitive areas from the project.

Public Services and Utilities

The HBA team will use existing data collected for public services and utilities and supplement it with information collected from each service provider. A questionnaire will be prepared and distributed in order to obtain the most recent service levels.

Recreation

Existing recreational uses within the project area will be inventoried and described. Information will be collected from previously prepared documents, the local jurisdictions and project area mapping.

Socio-Economics

The Socio-Economics setting section will be prepared from data generated in Task 33 (Socio-Economics). The setting will be taken from the technical report and included in the Draft EIR/EIS setting section document.

Energy

The setting section is complete, and no further work is proposed.

Energy use figures developed by the engineering staff will be presented for each alternative. Potential energy generation by the geysers recharge alternative will be presented.

Setting and Impacts

This task covers the preparation of the settings and impacts text summarizing the results of the Technical Report provided in Tasks 37-V11 and 37-V18.

Responses to Comments

This subtask covers the response to city/public/agency comments on the settings and impacts text sections, with attendance at up to two public and/or BPU/team meetings. A revision of the setting and impacts/mitigation sections will be prepared if required. We assume only minor revisions will be necessary.

<u>TASK 39</u>		<u>SUMMARY</u>	
<u>Product</u>	<u>Medium</u>	<u>Copies</u>	
<u>Sections of EIR/EIS</u>	<u>Print</u>	<u>25 (includes City and Consultants)</u>	

TASK 40 PREPARATION OF ADMINISTRATIVE DRAFT EIR/EIS

Administrative Draft EIR

Following preparation of preliminary sections in Task 39, the Consultant will:

- Respond to City and Corps comments and information requests on draft section of EIR/EIS;
- Roundtable Workshops - members of the consultant team will attend relevant workshops; and
- Response to public comments on preliminary sections of the EIR/EIS.

Preparation of ADEIR/ADEIS.

The Consultant Team will prepare an ADEIR/ADEIS. The ADEIR/ADEIS will conform to the format and content prescribed by CEQA and NEPA. The EIR/EIS will include all elements required by CEQA and NEPA to assess the environmental effects of the alternatives including the Mitigation Monitoring Plan. The EIR/EIS will include an Executive Summary which will contain a summary table of impacts. An introduction will discuss the purpose and scope, issues and organization of the EIR/EIS.

<u>TASK 40 SUMMARY</u>		
<u>Product</u>	<u>Medium</u>	<u>Copies</u>
<u>ADEIR/EIS</u>	<u>Print</u>	<u>25 (includes City and Consultants)</u>

TASK 41 DRAFT EIR/EIS

Draft EIR

The Consultant Team will:

- Respond to City and Corps comments on the ADEIR/ADEIS;
- Prepare a “proof” DEIR/DEIS;
- Respond to City and Corps comments on the administrative DEIR/DEIS;
- Prepare and publish the DEIR/DEIS;
- Circulate the DEIR/DEIS;
- Prepare the Notice of Completion to be submitted to the State Clearinghouse; and
- Attend the public hearing.

TASK 41 SUMMARY

<u>Product</u>	<u>Medium</u>	<u>Copies</u>
<u>Proof of DEIR/EIS</u>	<u>Print</u>	<u>10 (includes City and Consultants)</u>
<u>DEIR/DEIS</u>	<u>Print</u>	<u>65 (includes City and Consultant)</u>
<u>1 camera ready for City</u>		
<u>1 camera ready for COE</u>		

5. GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ADWF	Average Dry Weather Flow
BPU	Santa Rosa Board of Public Utilities
CAD	Computer Aided Design
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
City	The City of Santa Rosa
COE	U.S. Army Corps of Engineers
dB	Decibel
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information System
KFDW	Kelly Farm Demonstration Wetlands
Laguna Plant	The Laguna Wastewater Treatment Plant
LOS	Level of Service (traffic measure)
mg	Million Gallons
mgd	Million Gallons Per Day
NEPA	National Environmental Policy Act
NOA	Notice of Availability
NOI	Notice of Intent
NOP	Notice of Preparation
NWIC	North West Information Center
PAC	Policy Advisory Committee
PAI	Potentially Affected Interests
pH	Measure of acidity or alkalinity
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
RWQCB	Regional Water Quality Control Board
SCS	Soil Conservation Service
SCWA	Sonoma County Water Agency
Subregional System	Subregional Wastewater Reclamation System
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
TRG	Technical Review Group
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Waters of the U.S.	Wetlands and navigable waters of the United States
WHR	Wildlife Habitat Relationships

6. NOP/NOI

7. INITIAL STUDY

8. LIBRARY CATALOG

9. AGENCIES AND PROJECT TEAM

10. SCOPING MEETING RESPONSES

11. WRITTEN COMMENT RESPONSES

12. SCOPING MEETING TRANSCRIPT

13.WRITTEN COMMENT LETTERS

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