
**FINAL
WETLAND DETERMINATION
AND MITIGATION
TECHNICAL MEMORANDUM
FOR PROPOSED
PIPELINE ALIGNMENTS**

VOLUME I

**SANTA ROSA SUBREGIONAL
LONG-TERM WASTEWATER PROJECT**

Prepared for

City of Santa Rosa

and

U.S. Army Corps of Engineers

June 1996

Prepared by

PARSONS ENGINEERING SCIENCE, INC.

PLANNING • DESIGN • CONSTRUCTION MANAGEMENT

1301 MARINA VILLAGE PARKWAY, ALAMEDA, CA 94501 • 510/769-0100

OFFICES IN PRINCIPAL CITIES

723129/ALA-50-10

for

HARLAND BARTHOLOMEW AND ASSOCIATES, INC.

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1 INTRODUCTION

PURPOSE

This technical memorandum contains a planning level wetland determination for potential wetlands and other waters of the U.S. subject to Section 404 jurisdiction under the Clean Water Act that could be impacted by construction and operation of transmission and distribution pipelines, Russian River direct discharge outfall and pump stations considered in the Santa Rosa Subregional Long-Term Wastewater Project (SRLTWWP) EIR/EIS. The intent of this planning level wetland determination is the following: 1) to identify potential impacts to wetlands and other waters of the U.S. with associated sensitive aquatic environments; 2) to identify and characterize the area of potential wetlands and other waters of the U.S. and associated riparian vegetation area that could be temporarily disturbed during construction; 3) to specify best construction management practices to avoid or minimize impacts to wetlands and other waters of the U.S. and mitigation measures to compensate for unavoidable losses. The tabular databases contained in this technical memorandum provide a tool to estimate the impacts that could result to potential jurisdictional wetlands and other waters of the U.S. for any combination of alternatives or components. This, in combination with planning level wetland determinations for other components, allows for a comparative analysis of the impacts to potential jurisdictional wetlands and other waters of the U.S. for alternatives considered in the SRLTWWP EIR/EIS.

PROJECT SUMMARY DESCRIPTION

The City of Santa Rosa is developing a long-term wastewater project for the expansion of headworks capacity and effluent disposal from the Laguna Wastewater Treatment Plant. The existing disposal system does not reliably dispose of existing flows under all weather conditions. The goal of the Santa Rosa Subregional Long-Term Wastewater Project is to provide for disposal of existing flows and increased wastewater flows generated by an increasing population at buildout of the General Plans of the entities comprising the Subregional System under all weather conditions.

To ensure that an appropriate range of alternatives would be considered under NEPA and CEQA, the Santa Rosa Board of Public Utilities (BPU) directed screening of alternatives which represent a wide spectrum of potential solutions to the Subregional System's need to dispose of wastewater. After 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. Five primary alternatives currently being considered for the project are as follows:

- Alternative 1: No Project/No Action
- Alternative 2: South County Reclamation, focusing on expansion of agricultural irrigation and associated reclaimed water storage in areas south of Santa Rosa.
- Alternative 3: West County Reclamation, focusing on expansion of agricultural irrigation and associated reclaimed water storage in areas west of Santa Rosa.
- Alternative 4: Geysers Steamfield Injection, focusing on injection of reclaimed water for recharge of the Geysers Steamfield located in the Mayacmas Mountains.
- Alternative 5: Direct Discharge, focusing on the discharge of reclaimed water to the Russian River designed for a maximum of 20 percent of river flow.

At its August 31, 1995 meeting, the BPU added Lakeville Bayflats Agricultural Irrigation as a project component.

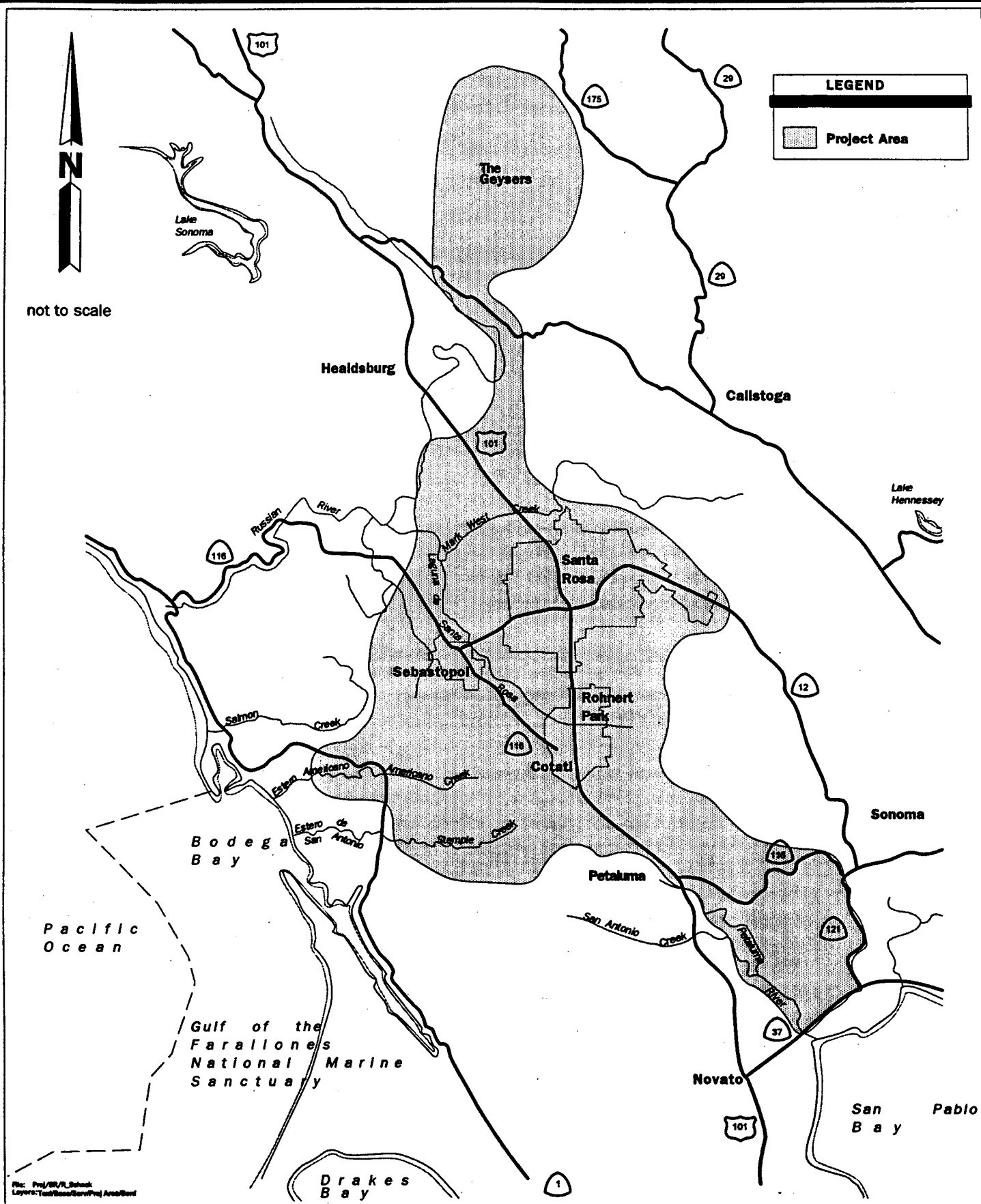
The alternatives encompass a large geographic area in Sonoma County and a portion of northern Marin County, covering approximately 400 square miles. As shown in Figure 1.1, the project area is focused on central Sonoma County, but also extends from the Geysers area north of Healdsburg to the Tolay Creek valley southeast of Petaluma, and the San Antonio Valley in northern Marin County. Major watersheds in the project area include the Russian River, the Laguna de Santa Rosa, Mark West Creek, Big Sulfur Creek, Green Valley Creek, Atascadero Creek, Americano Creek, Stemple Creek, Tolay Creek and the Petaluma River.


DESCRIPTION OF PIPELINE CONSTRUCTION ACTIVITIES

General Construction Activities

Pipelines in the three- to four-foot diameter range would be required to transport reclaimed water from the Laguna treatment plant to the storage reservoir(s), to the discharge point at the Russian River, or to the Geysers steam field. Pipelines in the one- to three-foot diameter range would generally be required to distribute stored water from reservoir sites to agricultural and urban irrigation areas, although some of the local distribution lines would be less than one foot in diameter. The various pipeline alignments and the location of all the stream crossings that were surveyed are illustrated on maps in Section 3.

All pipelines (except for those distributing water to the Geysers injection wells within the Geysers recharge steam field) would be buried and would generally follow public rights-of-way. To enter reservoir sites some segments of the pipelines follow private roads or cross-country alignments. In general, pipes would be buried with about 3 feet of cover, and constructed in one lane or shoulder of the road, typically at 10 feet off the road centerline. However, where topographic or other physical constraints (such as proximity to building, fences or vegetation) occur, the pipeline alignment may be moved closer to



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Subregional Long-Term
 Wastewater Project

FIGURE 1.1
PROJECT AREA

the centerline. With this practice, considerable repaving of roads would be required, but the pipelines would be readily accessible for maintenance.

In some cases, construction of a tunnel would be economical compared to pumping the reclaimed water up and over a hill. Consequently, the pipelines to storage reservoirs Tolay C, Sears Point, and Two Rock include a section passing through a tunnel. Tunnels did not prove economical in other cases.

Construction activities associated with installation of the pipelines and other ancillary facilities would consist, in general, of the following:

- Mobilizing construction equipment
- Locating and leasing site(s) for storage of construction materials and equipment near the construction site or site(s)
- Locating and contracting with private land owners or the county/city for disposal sites for excess excavated materials which will be produced, particularly during trenching or tunneling for pipelines
- Contracting with quarries for delivery of gravel and asphalt needed for pipeline trenches and pavement restoration
- Stockpiling lengths of piping along pipeline alignments where feasible
- Delivering water to construction sites for soil compaction and dust control
- Reconstructing/widening/stabilizing portions of Pine Flat Road, to County standards, in preparation for installation of Geysers pipeline along road
- Saw cutting edge of asphalt roadbed, breaking and removing pavement, in preparation for excavation of pipeline trenches
- Clearing and grubbing for segments of pipeline not located in the existing road bed (stream crossings and cross country segments) and sites for the pump stations and direct discharge outlet structure
- Excavating pipeline trench, stockpiling soils, delivering and placing pipeline bedding material, installing pipe sections and valves, welding joints, delivering and placing backfill material
- Installing isolation valves, air release valve stations, and blowoff valve stations along pipelines
- Delivering and placing asphalt pavement for finished pipeline trenches in roads and repaving roadway pavement damaged by construction

- Clearing and grading alignment for above-grade pipelines at the Geysers steamfields
- Excavating and constructing pipe support cradles and piers for above-grade pipelines at the Geysers steamfields
- Delivering and installing above-grade pipelines and valves at the Geysers steamfields
- Cleaning up and demobilizing site; restoring stockpile areas and yards

Estimated construction time would range from one year for construction of the Russian River Direct Discharge Pipeline and associated components under Alternative 5A, to 2.4 years for the Geysers Pipeline and associated components under Alternative 4. The construction time for the Geysers Pipeline includes 6 months for reconstructing/ widening/stabilizing portions of Pine Flat Road prior to pipeline construction. This work must be substantially completed before the pipeline construction up Pine Flat Road. In general, the factor that has the greatest effect on the time for completion of construction will be the lengths of pipelines and to a lesser extent the number of larger stream crossings. In particular, most of the time would be needed to excavate the trenches and to place and weld the sections of larger diameter pipe.

Special Pipeline Construction Techniques

Bore and jack crossings would be utilized at approximately 35 locations to avoid construction in perennial and larger vegetated, semi-permanent waterways. These stream crossing locations have surface flows or maintain substantial pools (with extensive riparian woodland, freshwater marsh and brackish marsh vegetation) throughout most years and have sufficient water quality to maintain aquatic life. Additional right-of-way (ROW) would be required off the highway on both sides of the stream crossing for construction vehicle access and bore and jack excavation staging. This would involve temporary vegetation clearing and grubbing and other ground disturbances within an approximately 50' by 100' area on both sides of the proposed crossings. Bore and jack crossings would also be used where the pipelines cross rail lines, major highways, and other major underground facilities. Three crossings near downtown Santa Rosa on the pipeline serving the Bennett Valley Urban Irrigation System would have the pipelines suspended from existing bridges.

Transmission Pipelines (Alternatives 2 and 3 - All Subalternatives)

Transmission pipelines are required to transport reclaimed water from the proposed new pump station at the Laguna Plant to the reservoir sites for storage. Alignments primarily follow public rights-of-way, except for short cross-country sections to enter the reservoirs. These pipelines are typically 48 inches in diameter. Pipelines would be welded steel pipe construction, cement mortar lined and coated, with welded joints and intermediate isolation valves (normally open) located at 2,500-foot intervals. (Additional

information on the proposed transport pipelines is contained in Technical Memorandum TM-P-3, Transmission Pipeline Routes to All Reservoir Site}

Irrigation Distribution Pipelines (Alternatives 2 and 3 - All Subalternatives)

The irrigation distribution pipeline system includes those pipelines which convey the stored reclaimed water from the irrigation pump station, located at the storage reservoir, to irrigation areas, as shown in Figures 3-4 and 3-5. (Some transmission pipelines may also function as distribution pipelines during the irrigation season). The pipeline widths for the distribution system, typically 12 to 36 inches, are smaller than for the transport pipelines. Pipelines 24 inches in diameter and larger would be welded steel pipe construction, cement mortar lined and coated with welded joints; pipelines smaller than 24-inches in diameter would be ductile iron, polyethylene encased. Intermediate isolation valves (normally open) would be located at major pipe junctions and at 1,500-foot intervals. Alignment of the distribution pipelines would follow public rights-of-way.

Pipeline Tunnel (Subalternatives 2C, 2D and 3A)

Tunnels are proposed to carry transmission pipelines through the ridge west of Tolay Valley to enter Tolay C reservoir (Subalternative 2C) or Sears Point reservoir (Subalternative 2D); and to carry the transport pipeline through the ridge north of Two Rock reservoir (Subalternative 3A). These tunnels would have a diameter of 10 feet and a length of 1,800 feet for the tunnel entering Tolay C or Sears Point reservoirs and 2,400 feet for the tunnel entering the Two Rock reservoir. The pipeline invert elevation at the bottom of the pipe through the tunnel would be 270 feet for the Tolay C or Sears Point reservoirs and 390 feet for the Two Rock reservoir. There would be concrete portal structures on either end of the tunnel, and the tunnel itself would be backfilled and the portals sealed. (Additional information on the proposed tunnels is contained in Technical Memorandum TM-P-4, Tunnel Length Optimization Analysis for Transmission Pipelines to Storage)

Geysers Pipeline (Alternative 4)

Transmission pipelines are required to transport reclaimed water from Delta Pond to the distribution tanks at the Geysers Steamfield Recharge Area. The pipeline alignment follows public rights-of-way, including Pine Flat Road, except for a short cross-country section at the top of Pine Flat Road to the two proposed storage/distribution tanks. The pipeline would be 42 and 48 inches in diameter. Along Pine Flat Road, the alignment would be along the up-slope-lane where possible. Substantial grading would be required in certain areas to provide a sufficient construction easement or to stabilize the slope prior to installing the pipeline. In locations where the cliff is rocky and steep, construction would stay in the roadbed, with construction staged from downslope areas.

The proposed Geysers Pipeline alignment would be constructed in a similar manner with exceptions of segments along Pine Flat Road and in the Geysers recharge steam field. Along Pine Flat Road the pipeline would be located within the existing disturbed area in

the roadbed or shoulder as much as possible. However, road widening and slope stabilization measures could involve a construction disturbance corridor extending 75 feet upslope from the road centerline in some locations. Three segments of the proposed Geysers Pipeline along Pine Flat Road have been classified based on the probable percentage of that roadway segment which will require a construction disturbance corridor as wide as 75 feet to accommodate road widening and slope stabilization improvements. Section I could involve an upslope construction disturbance corridor along 75 percent of that road segment, Section II - 25 percent and Section III - 10 percent. The exact location of required road widening and slope stabilization improvements along Pine Flat Road cannot be determined without further geotechnical investigations.

On some extremely steep, narrow, rocky segments of Pine Flat Road, the pipeline centerline would be shifted closer to the centerline of the road to accommodate the narrow area and avoid the steep rock wall along one side of the road. This would necessitate a change in the construction technique to a more linear arrangement, with excavation and soil removal proceeding from one end of the trench, while pipe sections and backfill material are trucked to the site and installed from the other end. Because of the narrow area, sections of pipe and soil could not be stockpiled along the pipe trench. Although the county has sufficient right-of-way along the road, we assume that the high and steep rock wall along the road would not be cut back. Construction would be confined to the existing roadbed.

Pipelines would be welded steel pipe construction, cement mortar lined and coated with welded joints. Isolation valves would be located every five miles between Delta Pond and the foot of Pine Flat Road, and every 1.25 miles beyond that location, to allow isolation and draining of short section of pipeline in the event of rupture. A valve would be located in a below ground vault atop the pipe, and there would also be an air/vacuum release valve at these locations. Pipeline air/vacuum release valve stations would be located at all local high points along the pipeline alignment, and at the isolation valve stations with a vent above grade. Pipeline blowoff valve stations also would be located at all local low points, to allow periodic flushing of the pipeline to remove accumulated solids, with a drain outlet above grade. (Additional information on the proposed Geysers transport pipeline is contained in Technical Memorandum TM-G-2, Geysers Transport Pipeline and Pumping System Design Criteria and Proposed Facilities.)

However, Merritt Smith Consulting surveyed the steamfield recharge area to evaluate potential impacts to aquatic habitat. Merritt Smith's recommendations to bore and jack four stream crossings to avoid sensitive aquatic habitat are endorsed by this report because they would also avoid the majority of impacts that could result to potential jurisdictional wetlands and other waters of the U.S. Potential impacts to wetlands and other waters of the U.S. would be avoided or further minimized by above-grade pipelines, which would require either less excavation or subsurface hydrological disturbance or both. Pre-construction surveys for special-status plant and animal species and potential jurisdictional wetlands and other waters of the U.S. would be conducted prior to excavation for pipe support cradles and piers for above-ground pipelines.

Direct Discharge Pipeline and Outfall (Subalternative 5B)

The proposed routing of the direct discharge pipeline to the Russian River would utilize an existing 27-inch pipeline and new 48- and 54-inch pipelines. The new 48-inch pipeline would exit the Delta pump station and run parallel to the existing 27-inch line, with the flow split between these two pipes to maintain a velocity of less than 2.5 feet per second. Prior to entry to the North Booster pump station, a 27-inch connecting line would join the 27-inch with the 48-inch into a 54-inch line which would lead to the river discharge location

The alignment follows public rights-of-way or city easements except for a short cross country section to the river outfall structure. Pipelines would be welded steel pipe construction, cement mortar lined and coated with welded joints. Isolation valves would be located every 5,000 feet to allow isolation and

draining of short sections for repair in the event of rupture. A valve would be located in a below ground vault atop the pipe, and there would also be an air/vacuum release valve at these locations. Pipeline air/vacuum release valve stations would be located at all local high points along the pipeline alignment, and at the isolation valve stations with a vent above grade. Pipeline blowoff valve stations also would be located at all local low points, to allow periodic flushing of the pipeline to remove accumulated solids, with a drain outlet above grade.

The direct discharge outfall site on the east bank of the Russian River would include a concrete energy dissipater structure built on the bank of the river. The outlet would be sited on the Russian River along a reach with relatively stable banks and where the direction of river flow is parallel to the bank so that there would be a minimal tendency for bank erosion. This outlet would be located well within the 100 year floodplain and designed for submergence and the capability to withstand increased scouring velocities during floods. Bank and structure stabilization measures would involve an approximately 100' by 100' permanent disturbance.

Reclaimed Water Transmission/Distribution Pump Stations (Alternatives 2, 3, 4 and 5)

Several new pumping stations would be constructed along the proposed pipeline alignments as part of the system. They would involve clearing and grading and minor excavation for construction of a cement pad foundation. Pad size varies from site to site. Nearly all pump stations would be built above grade. In addition, an approximately 100' by 100' construction zone would be necessary for equipment access and moving. Most of the pump stations can be served from existing electrical distribution lines running along public roads.

2 METHODOLOGY

PIPELINE WETLAND DETERMINATION SURVEYS

Planning-level wetland determinations were conducted at stream and wetland crossings along proposed transmission and distribution pipelines to identify the location and extent of wetlands and other waters of the U.S. that could be impacted by construction and operation of the proposed pipelines. The term “stream crossing” is used broadly in this report and includes streams, intermittent drainages, depressions, swales, and other areas subject to inundation or near surface saturation that are located within proposed pipeline construction ROWs. Areas evaluated included well defined channels, swales and depressions generally larger than 5 feet wide with a structure or channel crossing or paralleling the roadway (except for cross country areas). Stream crossings in existing urban areas (Santa Rosa) and along existing pipeline routes were not surveyed for potential jurisdictional wetlands or other waters of the U.S., but aquatic habitat was assessed by Merritt Smith Consulting (Merritt Smith, March and April 1996). Small pipelines that convey irrigation water from distribution lines to individual properties have not been designed and were not evaluated.

Parsons Engineering Science performed planning level wetland determinations along proposed transmission and distribution pipelines between April 1995 and January 1996 following the procedures contained in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) hereafter referred to as the 1987 manual. Two types of surveys were necessary: on-site and off-site.

On-site surveys were conducted solely along roadways in public rights-of-ways, usually within 30 feet of the roadway centerline. Most observations were taken from the roadway or shoulder at bridge or structure crossings. Stream crossing locations and attributes were recorded on 1"-500' aerial photos and project facility maps with topographic contours. The Routine On-site Wetland Delineation method described in the 1987 manual was used to determine if a stream crossing could impact a potential jurisdictional wetland. The Routine On-site Method relies on an evaluation of three parameters: vegetation, soils and hydrology.

Observations were recorded on Routine On-site Wetland Determination Data Forms, Pipeline Stream Crossing Habitat Description Forms, or both. There are approximately 200 potentially sensitive crossings larger than 10 feet, with permanent or semi-permanent flow, or possessing other unique attributes. This represents 40-45 percent of the stream crossings visited. Survey information for smaller crossings was recorded on 1"= 1000' project facility maps with pipeline alignments and topographic lines and 1" = 500' black and white aerial photos of the project area.

Field surveys for pipelines were not completed on private property or cross-country alignments. Cross country alignments would require an approximately 60-foot wide construction disturbance corridor. They would be located on existing rural dirt roads whenever feasible. These pipeline segments were evaluated by aerial photo interpretation, mapping generated during reservoir and agricultural irrigation area surveys, and other studies. Off-site surveys were performed on 67 potential stream crossings (15 percent of stream crossings surveyed). Off-site surveys were completed by reviewing one 1"-500' 1990 black and white aerial photographs, U.S.G.S. topographic maps, the 1972 Sonoma County Soil Survey Report and 1985 Marin County Soil Survey, earlier planning level wetland determinations performed for the proposed reservoir storage sites and agricultural irrigation areas, and a Jurisdictional Wetland Delineation for Portions of the Stemple and Americano Creeks Basins and The Tolay Valley (North State Resources June 1990).

Planning level wetland determinations were coordinated with the aquatic habitat surveys for pipelines to identify stream crossings that could impact sensitive aquatic environments. Merritt Smith Consulting characterized stream and aquatic habitats primarily on major stream crossings. Stream environment information such as percent canopy, substrate, and embeddedness was collected. Streams were classified into four types based primarily on their ability to maintain fish assemblages: Coolwater-A (intact habitat), Coolwater-B (degraded habitat), Warmwater-A (intact habitat), and Warmwater-B (degraded habitat).

Wetlands

The majority of the stream crossings did not meet all three parameters of a jurisdictional wetland. Most had seasonal or intermittent flows and were somewhat incised with steeply sloping or cut banks. The soils in flat, somewhat well defined channels, were generally well drained sands, mixed with some silt or gravel. These freshly deposited stream bed soils, or Entisols, can be problematic for hydric soils determinations because they usually contain little iron or manganese and have had little time to develop horizonation or redoximorphic soil features (hydric soil indicators). Consequently, soil samples were generally not taken nor relied on for pipeline stream crossing wetland determinations. Roadside observations of surface flow, ponding or signs of current or recent near surface saturation such as darker colors or deeply imbedded hoof prints were noted, when available, to establish the hydrology and hydric soils criterion and to evaluate stream permanence. These observations combined with the presence of a hydrophytic plant community were used to determine whether an area was a jurisdictional wetland.

Most of the potential wetlands that were encountered occurred as narrow bands adjacent to or along the fringe of other waters of the U.S. Many other potential wetlands occurred as small vegetated areas in the middle of the channel often associated with areas of seasonal ponding. A few of the potential wetlands in low-gradient reaches of streams were large areas of freshwater or brackish marsh in the channel or extensive willow or

mixed riparian forest adjacent to the channel. Many large seasonal wetlands were encountered on valley and basin floors. Most of these seasonal wetland areas have been avoided by the pipeline construction approach.

The channels of larger and mainstem creeks were often devoid of vegetation (other waters of the U.S.), but extremely low gradient areas sometimes contained a large freshwater marsh community (wetlands and other waters of the U.S.), a dense canopy cover of riparian species, or both. Channels in a few lower gradient drainages in areas closer to the Pacific Ocean and San Pablo Bay supported limited brackish marsh vegetation and were often adjoined by large seasonally wet herbaceous areas. Larger channels (usually greater than 10 feet wide) adjoined by willow riparian, mixed riparian or various types of herbaceous seasonally wet vegetation were considered to be adjacent potential jurisdictional wetland. The largest adjacent wetlands were observed along lower gradient main stem creeks located on valley or basin floors and flood plains subject to regular seasonal inundation of short duration.

Areas vegetated by willow riparian or mixed riparian habitat along or adjacent to smaller tributary channels (other waters of the U.S.) were conservatively included in the estimates of potential jurisdictional wetlands and other waters of the U.S. that could be impacted. Although these areas supported predominantly hydrophytic or wetland plant communities, the steeply sloping banks inhibit infiltration or ponding of water, and therefore, most of these areas would not meet the soils or hydrology parameters for a jurisdictional wetland. They would, however, fall within the jurisdiction of Sections 1601-1603 of the California Department Fish and Game Code requiring the preparation of stream bed alteration agreement and protecting riparian habitat.

At locations of some of the proposed stream crossings, hydrologic conveyance structures along intermittent and seasonal drainages have experienced severe sedimentation and silt deposition, which have formed small seasonal impoundments. Marginal fresh water marsh vegetation occurs in some of these formerly unvegetated ponded channels but its value for wildlife habitat is limited by existing roadway disturbances, poor water quality and fragmentation.

Isolated wetlands within the roadway ROW were noted if a prominent structure [generally 36 inch corrugated metal pipe (cmp) or larger] crossed the roadway, if they possessed other attributes such as prolonged surface ponding, or if they supported protected plant communities such as vernal pools, freshwater marsh, alkaline marsh or montane meadow. Most other isolated areas (seasonally wet vegetation, freshwater seeps and annual grassland wetlands) were not noted even if they fell within the ROW. Direct impacts for these areas would be avoided by placement of the pipeline in the roadway or existing disturbed shoulder. Indirect impacts should be minor because of the existing disturbed state of these isolated marginal potential jurisdictional wetland areas. If pipeline general construction Best Management Practices are properly implemented, indirect impacts would be avoided or minimized.

Other Waters of the U.S.

Dry areas within active channels, open water areas and smaller distinct channels or drainages that were devoid of vegetation were considered other waters of the U.S. below the limits of ordinary high water and were included in the totals of potential jurisdictional area disturbed. The presence of a distinct, flat-bottomed, sandy channel and a hydrologic conveyance structure was considered evidence enough to determine the stream crossing to be an other water of the U.S. The ordinary high water mark was used to establish the jurisdictional limits and was determined by observations of a combination of features including: a clear, natural line on the bank; shelving; changes in soil; breaks or absence of terrestrial vegetation; presence of litter and debris; and, the size and level of water stains on conveyance structures.

PIPELINE DATA BASE DEVELOPMENT

Data collected from on-site and off-site pipeline planning level wetland determinations and other studies was placed into ArcInfo GIS files. Pipeline crossings were assigned geographic located points in the GIS files and attached to a tabular database.

The tabular database consists of the following components: Habitat Mitigation Code, Crossing Number, Pipeline Segment Number, Other Studies, Location of Crossing, Pipeline Stream Crossing Description, Jurisdiction, Permanence, Impact Area, Avoidance area (404 and 1601), and Recommendations. The following text provides a description of each of the components:

Crossing Number. Crossing number is an identification number assigned to a located point representing a pipeline stream crossing. Site identification numbers are organized into five geographic areas.

- 0 to 199 West County (including the Americano Creek and Stemple Creek agricultural irrigation areas and surrounding areas)
- 200 to 299 Sebastopol (including the Sebastopol agricultural irrigation areas and surrounding areas)
- 300 to 499 South County (including the North Petaluma, Rohnert Park, Adobe Road, Lakeville, and Bayflats agricultural irrigation areas and surrounding areas)
- 500 to 699 Geysers (including the Geysers XX and surrounding areas)
- 700 to 799 Santa Rosa Plain/Russian River (including the miscellaneous agricultural irrigation areas)

Habitat Mitigation Code. The Habitat Mitigation Code is a classification system designed to characterize the attributes of wetlands and any associated riparian vegetation at each of the identified stream crossings. This classification system identifies or groups

similar resources or environmentally sensitive areas where different Best Management Practices and special construction practices should be employed to avoid or minimize impacts to wetlands, riparian vegetation and the aquatic environment. Stream crossings were assigned Habitat Migration Codes based on the following criteria: recommendations from other studies, stream permanence, area impacted, opportunities for avoidance and minimization, vegetative type and to a lesser extent, subjective evaluations of habitat quality (disturbance) and habitat continuity. Subjective quality assessments were based on observed signs of degradation or disturbance including water quality degradation from dairy/livestock waste management practices, stream bank erosion from livestock trampling or other disturbances, absence/isolation/fragmentation of vegetation, and structure and channel substrate sedimentation or debris accumulation.

- Code 1. Stream crossings recommended by Merritt Smith Consulting for bore and jack construction or suspension of pipeline from existing bridge. Merritt Smith used the following criteria: “Streams must be distinct waterways with surface flow throughout the year. Water quality must be sufficient to maintain aquatic life for most of the year. Excluded are roadside ditches; gullies created by runoff; and streams that have been biologically productive once but are severely degraded now due to diversions, erosion, reduced water quality, etc.” (Aquatic Biological Impacts Assessment Technical Memorandum, April 1996). Parsons ES concurred with all of the Merritt Smith Consulting recommendations for avoidance of certain stream crossings.
- Code 2. Additional stream crossings recommended by Parsons Engineering Science for bore and jack construction or suspension of pipeline from existing bridge. These are classified by the same criteria as code 1 but also include crossings that maintain surface flow or pools sufficient to maintain aquatic or amphibian life for most of the year, and support large areas of relatively undisturbed riparian woodland, freshwater marsh or brackish marsh. These code 2 crossings include areas not surveyed by Merritt Smith Consulting.
- Code 3. Stream crossings recommended for trench and backfill construction with measures to avoid or minimize impacts. These are large areas of seasonal wetlands or upland riparian woodland that could be avoided or have impacts greatly reduced by pipeline realignment or controlled construction techniques. Code 3 crossings would cross or encroach on 100 square feet or greater of willow riparian, mixed riparian; oak, bay, or madrone woodland; or seasonally wet vegetation on floodplains. Most code 3 stream crossings included an actual structure crossing, but some involved drainages or riparian vegetation paralleling the roadway within the proposed pipeline construction ROW that did not have a structure crossing under the roadway. If an actual structure was crossed, it generally was larger than 36 inches in diameter and the channel was generally 10 feet wide or greater with some wetland or riparian vegetation remaining.
- Code 3.5. Stream crossings similar to Habitat Migration Code 3 that have been avoided by predesign engineering layouts. These Environmentally Sensitive Areas are generally large riparian areas or seasonal wetlands on floodplains paralleling the roadway that have been avoided by locating the pipeline in the roadbed on the opposite side of the highway. They have been included to demonstrate avoidance and to identify areas that should be protected from indirect impacts and accidental disturbances during construction by Best Management Practices. Most of these crossings do not involve an actual structure; however, a few do involve crossings where a small impact could result.
- Code 4. Stream crossings that would be temporarily disturbed. They are generally small (less than 10 feet wide), isolated and degraded seasonal wetlands, roadside drainage ditches, intermittent drainages or gullies. Some larger drainages as wide as 50 feet have been included in this category if they were dry at the time of surveys, supported only scattered herbaceous vegetation, and the bed and banks consisted of disturbed, unconsolidated, well-drained coarse material. They have been identified for application of construction Best Management Practices to minimize potential impacts.

- Code 5. Scattered pipelines that could not be located on or along existing roadways. They mostly include inlet and outlet pipelines for the proposed reservoir sites, but also include small segments throughout the entire project area. These cross-country pipelines would involve a 60-foot wide construction disturbance corridor. For the most part, these cross-country pipelines would be located on existing rural dirt roads. Stream crossing widths, stream flow permanence and vegetation vary greatly among this classification.

Pipeline Segment Number. Refers to a number assigned to a specific segment of a proposed storage transmission or irrigation distribution pipeline (Note: pipeline numbers are based on the September 15, 1995 Santa Rosa Subregional Long-Term Wastewater Project Alternative Project Facilities Plan.) Geysers pipeline segment coding (G, GI, GII and GIII) is based on the estimated percentage of that segment of Pine Flat Road that will require roadway widening.

Other Study. The other study column identifies the locations and corresponding data form numbers for stream crossing aquatic habitat surveys conducted by Merritt Smith Consulting.

Location of Crossing. Usually described by an approximate distance from a road, road junction or mileage marker.

Pipeline Stream Crossing Description. A general description of features such as type and size of crossing structure, surface water and channel characteristics, degree of disturbance and vegetative cover type if any. It also indicates whether an accompanying Routine On-Site Data Form exists for that stream crossing.

Jurisdiction. A “yes” indicates that the stream crossing is a wetland or other water of the U.S. subject to Section 404 jurisdiction, a riparian area subject to CDFG Section 1601-1603, or both. A “no” indicates that it is likely that the feature potentially impacted by the stream crossing is not subject to Corps or CDFG jurisdiction. Most “no” crossings are roadside drainages.

Disturbance or Impact Area. The impact area is the estimated area (in square feet) of potential jurisdictional wetlands or other waters of the U.S. that would be temporarily disturbed by pipeline construction. The impact area is the product of the stream crossing width and the construction disturbance width. Approximately half of this disturbance would involve trenching and backfilling and would be subject to Section 404 permitting requirements and conditions. The approximate stream crossing width was measured in the field. The construction disturbance width varies as follows:

1. Existing public roads – a construction disturbance width of 30 feet from the road centerline and vegetation and wetland construction disturbance width of 20 feet at identified stream and wetland crossing locations;
2. Cross-country alignments inside agriculture areas – a construction disturbance width of 60 feet from approximate pipeline alignment centerline;
3. Geysers area – assumed pipeline construction disturbance widths for the Geysers Pipeline along Pine Flat Road as follows:
 - Section GI – 75 percent – 56.25 foot wide disturbance corridor
 - Section GII – 25 percent – 18.75 foot wide disturbance corridor
 - Section GIII – 10 percent – 7.5 foot wide disturbance corridor

This approach was developed to address the uncertainty of the locations where actual impacts to potential jurisdictional wetlands and other waters of the U.S. could occur and to derive rough estimates of the area potentially impacted for CEQA/NEPA impact analysis purposes. The actual amount of impacts would vary from location to location.

Additionally, some segments along Pine Flat Road within segments G, GI, GII and GIII are too narrow, steep and rocky for upslope road widening improvements. The pipeline would be placed as close to the centerline as possible along these segments of Pine Flat Road. It was assumed that all impacts to potential jurisdictional wetland and other waters of the U.S. would be avoided along these segments of Pine Flat Road.

Avoidance Area 404. This column estimates the amount of avoidance (square feet) of potential jurisdictional wetlands and other waters of the U.S. that would be achieved by bore and jack construction, pipeline placement or realignment and controlled construction techniques. It includes the area of all potential jurisdictional wetlands and other waters of the U.S. that could be temporarily disturbed by pipeline construction activities. The

amount of area avoided was based on the related disturbance or impact area assumptions mentioned earlier and on the Habitat Migration Code grouping.

It was assumed that all impacts to jurisdictional wetlands and waters of the U.S. at stream crossings in Habitat Migration Codes 1 and 2 would be avoided by the project design approach of avoiding perennial or semi-permanent streams with the potential to support sensitive aquatic habitat by using bore and jack or other special crossing techniques. The area of avoidance estimate for areas identified with Habitat Migration Codes 1 and 2 assumed that a 20-foot-wide temporary disturbance to potential jurisdictional wetlands and other waters of the U.S. would be avoided.

At stream crossings identified by Habitat Migration Code 3, it was assumed that pipeline design and construction avoidance and protection practices for Environmentally Sensitive Areas would avoid or minimize impacts to potential jurisdictional wetlands and other waters of the U.S. as well as riparian areas which occur immediately along the roadway by limiting pipeline construction activities to existing disturbed areas in the roadbed or shoulder as much as possible, except at the actual structure crossing location. The amount of 404 avoidance was based on an assumed 20-foot-wide temporary disturbance corridor (except along Pine Flat Road) through the potential jurisdictional wetlands or other water of the U.S. which would have been disturbed if construction avoidance measures were not applied.

In areas identified by Habitat Migration Code 3.5, it was assumed that impacts would be avoided or minimized during the project development approach and pre-engineering design stages by placement of the pipeline on the opposite side of the road or by confining pipeline construction activities to the existing roadbed. The amount of avoidance is based on the area of potential jurisdictional wetlands and other waters of the U.S. that would have been impacted if the pipeline was not placed on the opposite side or confined to the roadway.

The area of avoidance was not identified for Habitat Mitigation Code 4, stream crossings. The large number of these crossings, as well as their seasonal nature and degraded condition, makes special construction practices impractical.

Areas identified by Habitat Migration Code 5 are potential wetlands and other waters of the U.S. at stream crossings along proposed cross country pipeline alignments. Avoidance area estimates for Section 404 at stream crossing locations identified by Habitat Migration Code 5 were based on additional recommended mitigation measures, such as shifting the pipeline, which are applied on a stream crossing data point-specific basis. The amount of avoidance is contained in the recommendations column.

Avoidance Area 1601. This column estimates the amount of avoidance of upland riparian areas not subject to Section 404 jurisdiction. The amount of 1601 avoidance is related to earlier assumptions used to derive the disturbance or impact area. It usually is additional area to the avoidance achieved for potential wetlands and other waters of the U.S. Some

pipeline segments parallel riparian areas, but do not cross them. In these areas, construction zones were assumed to be constrained to avoid upland riparian habitat adjacent to the ROW. These areas are included under acreage of 1601 avoidance, even though areas under Section 404 jurisdiction were not close enough to the pipeline to require avoidance measures.

It was assumed that all riparian vegetation removal would be avoided at stream crossings identified by Habitat Migration Codes 1 and 2 by measures incorporated into the project design. Areas identified by Habitat Migration Code 3 would be avoided by project design and construction techniques contained in the project description which identify special construction avoidance measures for Environmentally Sensitive Areas (including riparian areas). Impacts to areas identified by code 3.5 were avoided by pipeline placement during engineering pipeline design surveys. Areas identified by Habitat Migration Code 4 were not avoided due to their existing degraded state and large numbers. Code 5 areas require additional mitigation measures applied on a stream crossing location-specific basis to avoid or minimize riparian impacts, and totals are not included in this column.

Permanence. This column refers to the duration of stream flows at pipeline crossings. Permanence was estimated by field observations and reference to U.S. Geological Survey quadrangles. One of the three permanence classes was chosen for each stream crossing.

Perennial streams have continuous flows throughout the year.

Seasonal streams have flow throughout much of the year and usually have standing water for the remainder.

Intermittent streams flow only a part of the year, generally during and shortly after wet periods.

Recommendations. This column identifies construction and design measures to avoid or minimize impacts to potential wetlands and other waters of the U.S.

PUMP STATION SITES WETLAND DETERMINATIONS

Planning level wetland determinations were completed for pump station sites using a combination of off-site methods and drive-by surveys. On-site wetland determinations were conducted on a few pump station sites that could be accessed during earlier surveys on the proposed reservoir storage sites and agricultural irrigation areas. Information collected during these earlier surveys was incorporated into the later wetland determinations for pump stations. Off-site surveys were performed utilizing 1" = 500' 1990 black and white aerial photographs, U.S.G.S. topographic maps, the 1972 Sonoma County Soil Survey Report, project facility maps overlain with topographic lines at 1" = 1000' scale and previous studies in the area. Off-site mapping performed as part of the Agricultural Irrigation Area wetland determinations was also used for the pump station site determinations. Additional habitat information was taken from biological surveys conducted by HBA (Biological Resources Technical Memorandum, 1996)

A spreadsheet database, similar to that constructed for pipeline wetland determinations, was compiled for the pump station determinations (see Table 3.4). Alpha-numeric coded pump stations are shown on stream crossing wetland determination figures contained in Chapter 3 of this technical memorandum and are coordinated with the pipeline tabular data base to facilitate potential impact calculations in the future. Potential jurisdictional wetland impacts were based on the foundation pad size (permanent) and a 100' by 100' construction zone (temporary).

RUSSIAN RIVER DISCHARGE OUTFALL WETLAND DETERMINATION

The site of the proposed Russian River discharge outfall structure was surveyed for potential jurisdictional wetlands and waters of the U.S. using off-site methods. Off-site surveys were completed by reviewing 1" = 500' 1990 black and white aerial photographs, U.S.G.S. topographic maps, the 1972 Sonoma County Soil Survey Report and project facility maps overlain with topographic lines at 1" = 1000' scale. The assumed area of permanent disturbance for the actual outfall energy dissipater was 100' by 100'.

3 RESULTS

PIPELINES

The proposed pipeline alignments cross or encroach upon a number of natural stream channels, channelized waterways, irrigation and drainage ditches and areas that are seasonally inundated or saturated near the surface. Over 450 stream crossings were identified in this study. The stream crossing Habitat Mitigation Code summary in Table 3.1 gives a breakdown of the different types of stream crossings encountered during surveys of pipeline alignments for potential wetlands and other waters of the U.S.

Table 3.1

Stream Crossing Habitat Mitigation Code Summary

Habitat Mitigation Code	Number of Crossings	Percentage
1 ^a	20	4
2	10	2
3	104	23
3.5	63	14
4	192	42
5	67	15
Total	456	100

Source: Parsons Engineering Science

- a This does not include bore and jack crossings in existing agricultural irrigation areas or along existing pipelines in the City of Santa Rosa or suspension from bridges in the existing Bennett Valley Urban Irrigation Area.

Overall, the majority of streams traversed by the alignments are seasonal, flowing only during the winter and early spring months as the direct result of precipitation and local runoff. The vegetation and related habitat values at the majority of crossings have been degraded from construction of the original highway and drainage structures and noise, light and vehicular movements from operation of the existing roadways. Agricultural practices and grazing have removed much of the former riparian woody vegetation along stream courses in the project area. Many of the stream crossings are dominated by non-native, annual grasses and herbaceous plants. The flow regimes of most creeks have been modified by upstream impoundments. There are several streams, however, which are perennial or maintain substantial pools of water for most of the year or have other attributes such as the presence of relatively undisturbed willow riparian, mixed riparian or freshwater marsh vegetation which warrant special construction techniques for avoiding and minimizing impacts. Most of these streams are located in the Sebastopol, Santa Rosa Plain, and Geysers areas.

The database in Table 3.2 and Figures 1 through 21 contain the detailed results of planning level wetland determinations conducted on pipeline stream crossings. Table 3.3 lists the stream crossings in existing urban irrigation areas in the City of Santa Rosa and Geysers Steamfield recharge area that were surveyed and recommended for bore and jack or other avoidance measures by Merritt Smith Consulting. The stream crossings in Table 3.3 were not surveyed for potential wetlands or other waters of the U.S.;

however, it is assumed that all these crossings qualify as either or both. The total temporary disturbance of potential jurisdictional wetlands and waters of the U.S. for all projects considered would be 13.1 acres. Demonstrated avoidance of wetlands and other waters of the U.S. would be 18.6 acres with an additional 9.0 acres of riparian vegetation impact avoidance. Additional avoidance could be achieved by relocating some cross-country pipelines as identified in the recommendations and comments column. Any combination of alternatives and components selected would be expected to actually impact much less area. This results section provides a tool to calculate the amount of potential jurisdictional wetlands and other waters of the U.S. temporarily disturbed and avoided for comparison of alternative impacts in the EIR/EIS.

PUMP STATIONS

Construction of pump stations could result in the permanent loss or temporary disturbance of potential jurisdictional wetlands and other waters of the U.S. The area of potential jurisdictional wetlands and other waters of the U.S. that could be permanently and temporarily impacted by construction of each pump station is listed in Table 3.4. Permanent disturbance due to construction of all of the pump stations prior to mitigation would be less than a half acre.

RUSSIAN RIVER OUTFALL

The wetland determinations for the pipelines that convey reclaimed water to the Russian River discharge outfall site are contained in Table 3.2 and Figures 1 through 21 located in the Draft Biological Resources Technical Memorandum Volume 4E - Maps: Index to Biological, Aquatic, and Wetland Resources Along Pipelines and Pump Stations (HBA 1996). The outfall structure outlet and energy dissipater would be below the elevation of the Russian River low flow level (approximately 45 feet above MSL). It is assumed that this 100' by 100' structure would be located below the level of ordinary high water and would involve placement of fill in a potential jurisdictional wetland or water of the U.S. Because on-site surveys were not performed, it is assumed that this area is a jurisdictional wetland or other water of the U.S. The permanent impacts to wetlands from the outlet structure should be no greater than approximately 10,000 square feet. Impacts to potential jurisdictional wetlands and other waters of the U.S. from this structure would be unavoidable because the design would require partial submergence of the structure.

Table 3.2

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Alternative Pipeline Alignments

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
2	4	W-59-S	-	Purvine Rd. @ 1500' NW of Spring Hill Rd.	Stemple Ck. Tributary. See Form PV-01: 7' x 5.5' RC bridge and 36" CMP ⁹ ; 10' wide incised channel; concrete aprons in ROW ⁹ ; riparian shrub NW side of road and outside of ROW.	Yes	Intermittent	200	0	0	
3	4	W-59-S	-	Purvine Rd. and Spring Hill Rd.	36" CMP; 8' wide drainageway; dry 8/95.	Yes	Intermittent	160	0	0	
4	3	W-59-S	-	Spring Hill Rd. @ 1300' west of Purvine Rd.	36" CMP; dry 8/95; thick road fill over culvert; 12' wide drainageway; blackberry on south side of road.	Yes	Intermittent	0	240	0	Wide shoulder and depth of fill to culvert should allow complete avoidance.
6	4	W-57-S	-	Spring Hill Rd. @ 1800' east of Sleavy Rd.	Stemple Ck. Tributary. See Form SH-02: 14' x 6' RC bridge; deeply incised, 25' wide channel; nearly barren on north side; disturbed annual grassland seasonal wetland.	Yes	Intermittent	500	0	0	Some restoration potential at this crossing location.
7	4	W-57-S	-	Spring Hill Rd. @ 1000' east of Sleavy Rd.	16" CMP; 2' wide drainageway; dry 8/95.	Yes	Intermittent	40	0	0	
8	4	W-51-S	-	Sleavy Rd. @ 1700' west of Spring Hill Rd.	12" CMP; 2' wide drainageway; dry 8/95.	Yes	Intermittent	40	0	0	
9	4	W-51-S	-	Sleavy Rd. @ 2200' west of Spring Hill Rd.	Stemple Ck. Tributary. See Form SV-01: (2) 12' x 5' RC bridge; standing water 8/30/95; 25' wide incised channel; mostly devoid of woody or marsh vegetation in ROW; remnant of freshwater marsh or riparian woodland.	Yes	Seasonal	600	0	0	Some restoration potential at this crossing location.
10	4	W-55-S	-	Sleavy Rd. @ 3500' SW of Spring Hill Rd.	dry 8/95; 5' roadside ditches along both sides of road; disturbed grassland seasonally wetland; ponding in ditch likely caused by roadway drainage and impoundment of overland flow by roadbed.	No	Intermittent	0	0	0	
11	4	W-50-S	-	Spring Hill Rd. @ 1000' north of Sleavy Rd.	24" CMP; 4' wide drainageway; dry 8/95; grassland seasonal wetland.	Yes	Intermittent	80	0	0	
12	4	W-49-S	-	Spring Hill Rd. @ 2000' south of Tomales Rd.	Stemple Ck. Tributary. See Form SH-01: 12' x 6' RC bridge; dry 8/95; incised channel; heavily disturbed grassland seasonal wetland on east side; dense willow outside of ROW on west side.	Yes	Intermittent	240	0	0	Some restoration potential at this crossing location.
13	4	W-49-S	-	Spring Hill Rd. @ 1900' south of Tomales Rd.	48" CMP; dry 8/95; disturbed grassland seasonal wetland.	Yes	Intermittent	120	0	0	
15	4	W-45-S	-	Two Rock Ranch Military Reservation	Off-site: Mixed riparian drainage headwaters 10' wide, mostly disturbed annual grasses in ROW but large mixed riparian area downstream.	Yes	Intermittent	200	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
17	4	W-61-S	-	Bodega Avenue @ 1500' east of Spring Hill Rd.	36" CMP; dry 8/95; grassland seasonal wetland.	Yes	Intermittent	100	0	0	
19	4	W-64-S	-	Pepper Rd. @ 3500' north of Bodega Ave.	36" CMP; dry 8/95; grassland seasonal wetland.	Yes	Intermittent	100	0	0	
21	3.5	W-68-S	-	Pepper Rd. @ south of Walker Rd.	Stemple Creek. See Form P-01: 70' x 8' RC bridge; 38" wide incised channel; standing water 8/95; west side large seasonal wetland and remnant willow riparian, small scour pond in large oat/hay field on east side with some disturbed freshwater marsh.	Yes	Seasonal	800	2000	0	Placement on east side provides lg seasonal wetland avoidance. Good riparian restoration potential just downstream near Walker School.
23	4	W-71-S	-	Pepper Rd @ 1600' N of Walker Rd	Small drainage/Tributary to Stemple Ck, 10' wide steep gradient seepage from reservoir on west, straightened ag drainage on east side.	Yes	Intermittent	200	0	0	
24	3.5	W-71-S	-	Pepper Rd. @ 600' south of Mecham Rd.	Stemple Ck. Tributary. 11' x 5' RCB; dry 8/95; grassland seasonal wetland on SE side; riparian woodland on NW side.	Yes	Intermittent	200	0	400	Placement on E side avoids riparian vegetation.
25	3.5	W-72-S	-	Pepper Rd. @ Stemple Cr. south of Mecham Rd.	Headwaters Stemple Ck. See Form P-02: (2) 11' x 7' RC boxes; standing water 8/95 ditch; concrete aprons, grazed freshwater marsh on SW side; grazed, disturbed grassland seasonal wetland/Marsh in cropped area on NE side.	Yes	Seasonal	500	30000	0	Placement on E side avoids 1500 linear feet of seasonal grassland/ marsh in headwaters of Stemple Cr.
26	3.5	W-75-S	-	Mecham Rd	Tributary to Stemple Creek, low gradient gullied drainage 10' wide on small basin floor with large area of seasonal grassland/ marsh along both sides of road.	Yes	Intermittent	200	10000	0	Placement on west side avoids large seasonal wetland on basin floor on east side of roadway.
27	3	W-75-S	-	Mecham Rd. and Pepper Rd.	Stemple Creek. See Form MEC-01: (2) 14' x 6' RC Boxes; moist 8/24/95; flat bottom channel; now grassland seasonal wetland but formerly a marsh.	Yes	Intermittent	600	20000	0	After structure crossing, keep pipeline in existing fill, in roadbed or shoulder to avoid large seasonal wetland along west side of road.
28	4	W-76-S	-	Mecham Rd. @ 800' south of Hammel Rd	See Form MEC-02: 46" RCP; moist 8/24/95; deeply incised channel; riparian shrub- willow thickets.	Yes	Intermittent	200	0	0	Wide shoulder and riprapped roadside drainage allows placement of pipeline in shoulder without riparian vegetation disturbance.
29	4	W-73-S	-	Rural dirt Rd off of Pepper Rd	Headwaters of Stemple Creek, 10' wide willow riparian drainage.	Yes	Intermittent	200	0	0	Keep in roadbed or shoulder of existing rural dirt road.
31	4	W-79-S	-	Bodega Avenue @ 2100' east of Pepper Rd.	3' x 5' RC box; north side seasonal wetland, low spot impounded collects overland flow impounded by roadway, ditched on southside.	Yes	Intermittent	150	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
35	3.5	W-83-S	-	Bodega Avenue @ 1600 west of Middle Rock Rd.	See Form BOD-01: (2) 4.5' x 4' RC box; dry 8/30/95; sediment deposits in channel; grassland seasonal wetland northside, dense willow riparian southside.	Yes	Intermittent	200	0	200	Placement on northside avoids riparian vegetation, good willow riparian revegetation potential upstream on northside.
38	3	W-39-S	-	Tomales Rd. @ 4000' west of Valley Ford Rd.	Stemple Ck. Tributary. See Form T-04: 45' x 8' steel bridge; standing water 8/22/95; flat bottom channel; dominated by <i>Lemna</i> sp. and submergent plants on north side; <i>Salix</i> spp. and <i>Rubus discolor</i> on south side.	Yes	Seasonal	1000	20000	2000	After structure crossing keep in existing fill in road bed or shoulder to avoid large wetland; placement on northside avoids mixed riparian on southside.
39	3	W-85-S	-	Tomales Rd. @ 3000' east of Chileno Valley Rd.	48" CMP; wet swale; large grassland seasonal wetland on basin floor.	Yes	Intermittent	120	10000	0	Keep in existing fill in shoulder or roadbed to avoid large seasonal wetlands on both sides of roadway.
40	3	W-86-S	-	Tomales Rd. @ 500' east of Chileno Valley Rd.	Stemple Ck. Tributary. See Form T-03: 8' x 6' RC bridge; dry 8/18/95; seasonal channel with thick sediment deposits; riparian shrub <i>Salix</i> spp., large seasonal wetland in swale/basin floor.	Yes	Intermittent	240	35000	2000	After structure crossing, keep in fill in shoulder of roadbed to avoid filling large wetland; wide shoulder placement on northside avoids dense willow riparian to the south; good restoration potential downstream.
41	3	W-87-S	-	Chileno Rd. @ 1100' south of Tomales Rd.	Stemple Ck. Tributary. (3) 6' x 6' RC box; willow riparian shrub.	Yes	Intermittent	400	0	1600	Placement on west side avoids encroachment on dense willow riparian; keep in middle of road or to east side to south of x-ing to avoid riparian & floodplain.
44	4	W-88-S	-	Tomales Rd. @ 4500' east of Alexander Rd.	See Form T-02: (4) oval 30" x 40" RCP under 20' x 8' RC bridge; flat channel; highly disturbed grassland seasonal wetland. Appears to be unauthorized fill in channel upstream.	Yes	Intermittent	400	0	0	
45	4	W-88-S	-	Tomales Rd. @ 2000' east of Alexander Rd.	See Form T-01: (2) 3' x 6' RC blocks; concrete apron and riprap; extremely grazed grassland seasonal wetland- no woody plants.	Yes	Intermittent	200	0	0	
46	3	W-37-S	-	Valley Ford Rd. @ 2000 east of Fallon Rd.	Stemple Creek. See Form VF-B: 12' x 6' RC box; wet 8/22/95; grassland seasonal wetland with <i>Chenopodium album</i> and <i>Mentha pulegium</i>	Yes	Intermittent	300	10000	0	Keep pipeline in disturbed fill in roadbed or shoulder to avoid large area of seasonal wetlands.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
47	3	W-36-S	W-12	Valley Ford Rd. @ 1600' east of Fallon Rd.	Stemple Creek. See Form VF-A: 40' x 6' concrete bridge; standing water 6" 8/22/95; 40' wide channel NE side; 15' wide channel SW side; freshwater marsh- <i>Polygonum</i> and <i>Mentha</i>	Yes	Seasonal	300	10000	0	Keep pipeline in disturbed fill in roadbed or shoulder to avoid large seasonal wetlands.
49	3.5	W-11-A/S	-	Fallon Rd. @ 1400' west of Valley Ford Rd.	Stemple Ck. Tributary. See Form FT-03 B: (2) 4' x 6' RC blocks; standing water 8/21/95; small scour pool south side; seasonal marsh <i>Glyceria</i> sp., <i>Polypogon</i> sp. and <i>Alisma aquatica</i>	Yes	Seasonal	600	2000	0	Placement on Northside avoids seasonal wetlands on basin floor.
50	4	W-12-A/S	-	Fallon Rd. @ 1300' west of Valley Ford Rd.	Stemple Ck. Tributary. See Form FT-03 A: 4' x 6' RC block; moist 8/21/95; highly disturbed grassland seasonal wetland.	Yes	Intermittent	400	0	0	
55	4	W-19-S	-	Alexander Rd. @ 900' south of Fallon Rd.	48" CMP; dry 8/18/95; disturbed marsh on west side; highly disturbed seasonal wetland and former marsh or riparian woodland on east side.	Yes	Intermittent	120	0	0	
56	3	W-20-A/S	-	Fallon Rd. @ 900' west of Alexander Rd.	Stemple Ck. Tributary. See Form TR-02: 10' x 5' RC bridge; dry 8/18/95; riprap; heavy deposition against bridge; highly disturbed marsh <i>Polypogon</i> sp.	Yes	Intermittent	200	10000	0	Keep in existing fill in roadbed or shoulder to avoid impacting seasonal wetland.
57	3	W-21-S	-	Carmody Rd. @ 2800' north of Fallon Rd.	Stemple Ck. Tributary. See Form C-01: RC bridge 17' wide; standing water 8/18/1995; scour pool on east side; deeply incised channel; marsh consisting of <i>Rorippa</i> sp., <i>Glyceria</i> sp., <i>Juncus</i> sp., and <i>Lemna</i> sp.	Yes	Seasonal	400	30000	0	Keep in existing fill in roadbed or shoulder to avoid seasonal wetland.
64	3.5	W-29-A/S	-	Fallon Rd. and Huntley Rd.	Stemple Ck. Tributary. See Form FT-01: (2) 6' x 8' RC blocks; wet 8/18/95; disturbed <i>Salix</i> spp. eastside of Martinoni Rd; disturbed <i>Eleocharis</i> sp., <i>Juncus</i> spp. <i>Paspalum</i> sp. on south side of Huntley Rd.	Yes	Intermittent	240	20000	0	Placement on eastside of Martinoni Rd. would avoid seasonal wetland impacts.
65	4	W-30-A/S	-	Martinoni Rd.	See Form MO-01: 48" RCP; standing water 8/18/95; flat channel; ponding on west side; grassland seasonal wetland; <i>Paspalum</i> sp. and <i>Polypogon</i> sp.	Yes	Seasonal	200	0	0	Place pipeline on east side to avoid higher quality wetland impact.
67	5	W-32A	-	50' east of Martinoni Rd. 2 miles south of the town of Bloomfield	Off-site; Proposed Huntley Reservoir Outlet Structure, see nearby ag. irrigation observation no. 408-01; incised channel <i>Glyceria</i> sp., <i>Rorippa</i> sp., <i>Polypogon</i> sp.	Yes	Intermittent	6000	0		
70	4	W-7-A/S	-	Valley Ford Rd. @ 3100' north of Fallon Rd.	Stemple Ck. Tributary. See Form VF-01: 40' x 8' RC bridge; standing water 8/21/95; riprap standing water on east side; seasonal marsh dominated by <i>Typha</i> , <i>Alisma aquatica</i> <i>Polypogon</i> .	Yes	Seasonal	800	0	0	
71	4	W-6-A/S	-	Valley Ford Rd. @ 2000' south of Walker Rd.	See Form VF-02: 48" CMP; dry 8/21/95; seasonal marsh dominated by <i>Polypogon</i> , <i>Rumex</i> , <i>Pleuropogon</i> , and <i>Typha</i> .	Yes	Intermittent	200	0	0	
73	4	W-3-A/S	-	Walker Rd. 20' east of Valley Ford Rd.	Stemple Ck. Tributary. See Form W-02: 10' x 4' RC block; livestock crossing, disturbed grassland seasonal wetland probably former willow riparian.	Yes	Intermittent	400	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
74	4	W-2-A/S	W-11	Walker Rd. @ 3000' east of Valley Ford Rd.	Stemple Ck. Tributary. See Form W-01: (2) 10' x 8' RC blocks; standing water 8/21/95; small ponds on both sides of road; irrigated seedlings on south side; former steelhead creek.	Yes	Seasonal	500	0	0	Large area suitable for willow riparian restoration or creation of freshwater marsh habitat downstream.
76	4	W-89-A/S	-	Valley Ford Rd. @ 1300' north of Walker Rd.	36" CMP; willow riparian shrub.	Yes	Intermittent	400	0	0	
78	3.5	W-91-A/S	-	Valley Ford Rd. @ 3800' east of Smith Rd.	Americano Ck. Tributary. See Form VF-03: 10' x 4' oval CRP; standing water 8/21/95; riprap; incised channel; riparian shrub, dominated by <i>Salix</i> spp., <i>Typha</i> , <i>Cyperus</i> , and <i>Polygonum</i> .	Yes	Seasonal	500	15000	0	Placement of pipeline on southside avoids drainage paralleling northside of road.
81	3	W-94-A/S	-	Valley Ford Rd. and Smith Rd.	Americano Ck. See Form VF-04: 65' wide RC bridge; inundated, 1-5 cfs; freshwater marsh <i>Typha</i> , <i>Polygonum</i> , and <i>Echinochloa</i> , large wet pasture & willow riparian corridor on flood plain/basin floor.	Yes	Seasonal	1300	15000	0	
82	4	W-95-A/S	-	Valley Ford Rd. @ 500' SW of Roblar Rd.	See Form VF-05: 48" CMP; grassland seasonal wetland dominated by <i>Chenopodium album</i> and <i>Cupressus</i> .	Yes	Intermittent	100	0	0	
84	3	W-99-A/S	-	Bloomfield Rd. @ 1000' north of Valley Ford Rd.	Americano Ck. tributary. See Form B-01: 60' x 5' RC bridge; standing water 8/22/95; concrete apron west side; pond on eastside; disturbed freshwater marsh & few willow.	Yes	Seasonal	1200	0	0	Keep in existing fill in roadbed or shoulder or hang from existing bridge if possible.
89	3.5	W-105-A/S	W-8	Valley Ford Rd. @ 1000' west of Bloomfield Rd.	See Form VF-07: 48" CMP; inundated 3" in 6/16/95, dry 8/21/95; riparian shrub <i>Salix</i> spp., <i>Conium</i> , <i>Polypogon</i> .	Yes	Intermittent	500	70000	0	Placement on N side of road avoids encroachment in seasonal wetlands & floodplain.
90	3	W-106-A/S	-	Valley Ford Rd. @ 2900' east of Carroll Rd.	See Form VF-08: 14' x 5' RC bridge; standing water 5" 8/23/95; <i>Polypogon</i> , <i>Polygonum</i> , <i>Pleuropogon</i> on north side; riparian shrub <i>Salix</i> , <i>Rorripa</i> , <i>Pleuropogon</i> on south side.	Yes	Seasonal	400	12000	0	Placement on N side avoids large seasonal wetlands, keep in existing fill in road bed or shoulder to avoid seasonal wetlands.
91	5	W-107-A/S	-	Below proposed Bloomfield Reservoir Impoundment	Tributary toAmericano Ck., incised channel 20' wide bisects 250' wide area of seasonally wet vegetation on valley/basin floor.	Yes	Seasonal	15000	0	0	Keep in disturbed area in existing farm dirt road as much as possible.
92	5	W-107-A/S	-	4000' north Valley Ford Rd. south of Bloomfield Reserv.	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	12000	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
93	3.5	W-109-A/S	-	Valley Ford Rd. east of Carrol Rd.	See Form VF-09A: 9x5 RC Block, Rip Rap apron. Moist 8/23/95, Freshwater Marsh/Willow Rip vegetation including <i>Typha</i> , <i>Glyceria</i> , <i>Mentha</i> , <i>Oenanthe</i> and a few scattered <i>Salix</i> .	Yes	Intermittent	200	25000	10000	Placement on north side avoids willow riparian & seasonal wetlands; keep in existing fill area in shoulder or road bed avoids smaller seasonal wetlands north of road.
95	4	W-111-A/S	-	Carroll Rd. @ 3500' north of Valley Ford Rd	13" CMP; dry 8/23/95.	Yes	Intermittent	40	0	0	
96	4	W-111-A/S	-	Carroll Rd. @ 4000' north of Valley Ford Rd	18" CMP; dry 8/23/95.	Yes	Intermittent	40	0	0	
97	4	W-111-A/S	-	Carroll Rd. @ 5100' north of Valley Ford Rd	36" CMP; dry 8/23/95.	Yes	Intermittent	40	0	0	
98	4	W-112-A/S	-	Carroll Rd. @ 6100' north of Valley Ford Rd	48" CMP; dry 8/23/95.	Yes	Intermittent	300	0	0	
99	3	W-113-A/S	-	Valley Ford Rd. @ 300' west of Carroll Rd.	Americano Ck. tributary. See Form VF-09B: 16' x 5' RC bridge; dry 8/23/95; concrete apron; riparian shrub- <i>Salix</i> spp., <i>Pleuropogon</i> , <i>Polypogon</i> .	Yes	Intermittent	400	10000	0	Stay in existing fill in shoulder or roadbed on northside to avoid seasonal wetlands.
100	3	W-114-A/S	-	Valley Ford Rd. @ 1700' east of Hwy.1	See Form VF-10: 5' x 4' RC block; moist 8/23/95; large concave basin/swale impounded at roadway on N side, drainage and scour pool bisects large seasonal grassland wetland on south sideAmericano Ck. flood plain.	Yes	Intermittent	300	25000	0	Keep in existing fill in roadbed or shoulder on N side to avoid large seasonal wetland.
101	2	W-115-A	W-6	Hwy. 1 @ 1100' south of Valley Ford Rd.	Americano Ck.. See Form ECR-01: 150' x 8'; inundated 8/23/95; ponds on both sides of road <i>Salix</i> spp. thickets, <i>Typha</i> , <i>Oenanthe sarmentosa</i> on both sides.	Yes	Seasonal	3000	20000	4000	Jack and bore after structure x-ing keep pipeline in existing fill in roadbed or shoulder to south to avoid large seasonal wetlands on basin floor with floodplain.
103	3	W-117-A	-	Hwy 1 @ 4000' south of Valley Ford Rd.	4' x 5' RC box.	Yes	Intermittent	200	4000	0	After structure crossing keep in existing fill in shoulder or roadbed to avoid seasonal wetlands.
104	3	W-118-A/S	-	Valley Ford Rd. @ 800' west of Hwy. 1	Americano Ck. tributary. See Form VF-11: 22' x 5' RC bridge; moist 8/23/95; dense riparian shrub <i>Salix</i> spp., <i>Pleuropogon</i> , and <i>Oenanthe</i> .	Yes	Intermittent	440	12000	2000	Keep in existing fill in roadway or shoulder to avoid large seasonal wetlands and riparian vegetation.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
105	5	W-119-A/S	-	3000' north of Valley Ford Rd. south of Valley Ford Reservoir.	Off-site; swale; grassland seasonal wetland.	Yes	Intermittent	0	0	0	
106	3	W-119-A/S	-	Below proposed Valley Ford Impoundment	Large area of seasonally wet/ponded vegetation on basin or valley floor bisected with small incised drainage.	Yes	Intermittent	30000	0	0	Place in existing fill in rural dirt road to avoid large areas of seasonal wetlands.
107	3	W-121-A	-	Valley Ford Rd.	4' x 5' RC box.	Yes	Intermittent	200	8000	0	Keep in existing fill in roadbed or shoulder or place in other side of road to avoid wetlands.
108	2	W-122-A	-	Marsh Rd. @ 300' south of Valley Ford Rd.	Americano Ck.. See Form MAR-02: 75' x 11' steel bridge; 1-5 cfs, 20" deep 8/22/95; high quality marsh, <i>Typha</i> , <i>Scirpus</i> , a few <i>Salix</i> on banks.	Yes	Perennial	0	800	400	Jack and bore and after structure keep in existing disturbed roadbed or ROW.
109	4	W-123-A	-	Marsh Rd. @ 1300' NE of Middle Rd.	40" CMP.	Yes	Intermittent	120	0	0	
111	1	W-128-A	W-7	Franklin School Rd @ 100' NE of Marsh Rd.	Estero Americano/ Americano Ck.. See Form VFE-01: 180' x 14' RC bridge; 40' channel; tidal, large water body; extensive brackish marsh.	Yes	Perennial	0	40000	0	Jack and bore; stay in existing fill in roadbed or shoulder to avoid large seasonal/ tidal brackish/ freshwater marsh complex on both sides of roadway.
112	3	W-129-A	-	Franklin School Rd. @ 100' SE of Marsh Rd.	See Form FS-01: 36" RCP; wet 8/22/95; roadside ditch; grassland freshwater marsh <i>Typha</i> sp., <i>Oenanthë sarmentosa</i> , <i>Ranunculus aquatilis</i> .	Yes	Intermittent	200	10000	0	Keep in existing fill in disturbed shoulder or roadbed to avoid large seasonal wetland.
113	3	W-129-A	-	Estero Rd. @ 300' west of Franklin School Rd.	30" CMP; dry 8/22/95; seasonal wetland, 10' wide drainage ditch parallels N side of road.	Yes	Intermittent	200	5000	0	Keep in existing fill in disturbed shoulder or roadbed to avoid drainage ditch paralleling roadway.
114	3	W-129-A	-	Estero Rd. @ 300' west of Franklin School Rd.	Americano Ck. Tributary. (2) 30" CMP, (1) 60" CMP; inundated 8/22/95; riparian shrub <i>Salix</i> spp., also 20' wide willow riparian drainage parallels N side of roadway.	Yes	Perennial	500	10000	5000	Stay in existing roadbed on both sides of x-ing to avoid riparian wetlands.
115	3	W-125-A	-	Valley Ford Rd and Ebabias RD	Ebabias Creek. See Form VF-W1: 12' x 14' RC box; 75' channel; standing water 8/22/95; riparian shrub <i>Salix</i> spp. on north side; highly disturbed freshwater marsh on south side.	Yes	Seasonal	1500	12000	0	Place pipeline in existing fill in roadbed or shoulder to avoid large seasonal wetland.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
116	3	W-126-A	-	Valley Ford Rd. @ 2500' west of Ebabias Rd.	See Form VF-W2: 6' x 6' RC box; about 20' of road fill on top of box; inundated 12' 8/28/95; disturbed freshwater marsh <i>Juncus</i> spp., <i>Cyperus eragrostis</i> , <i>Carex aquatica</i> v. <i>dives</i> .	Yes	Perennial	0	400	0	Depth of fill & width of shoulder should allow for construction without impacting wetlands. Retaining walls may be necessary to stabilize side slope.
120	3	W-96-A/S	-	Martinoni Rd. @ 600' south of Valley Ford Rd.	Americano Ck.. Riparian shrub, fresh water marsh and non-native grassland. Distribution pipeline to proposed Huntley Reservoir site. Structure approximately 60' wide.	Yes	Seasonal	1200	4000	0	Keep pipeline in existing fill in shoulder or roadbed to avoid large area of seasonal wetlands on basin floor.
122	3	W-132-A/S	W-5	Roblar Rd. @ 4000' east of Valley Ford Rd.	Americano Ck.. See Form R-01: (2) 10' wide RC blocks; inundated 8"4/14, dry 8/21/95; marginal freshwater marsh <i>Pleurepogon</i> , <i>Polygonum</i> , & <i>Polypogon</i> on north side; <i>Salix</i> spp. on south side.	Yes	Seasonal	400	25000	0	Keep in existing fill in shoulder or roadbed to avoid large area of seasonal wetlands on SW side.
123	4	W-132-A/S	-	Roblar Rd. @ 6100' NE of Valley Ford Rd.	20" CMP; dry 10/12/95; intermittent drainage south side, non-wetland north side.	No	Intermittent	80	0	0	
124	4	W-132-A/S	-	Roblar Rd. @ 7600' NE of Valley Ford Rd.	30" CMP; dry 10/12/95; side seep drains under roadway, non-wetland on NW side.	No	Intermittent	80	0	0	
125	4	W-132-A/S	-	Roblar Rd. @ 7700' NE of Valley Ford Rd.	36" CMP; dry 10/12/95, small ephemeral drainage with willow riparian vegetation on SE side, grassy seasonally wet swale NW side.	Yes	Intermittent	200	0	0	
126	3	W-133-A/S	-	Roblar Rd. @ 9000' NE of Valley Ford Rd.	Americano Ck.. See Form R-02: 16.5' x 8.5' RC bridge; inundated 1-4", <1cfs; standing water on eastside; degraded fresh water marsh, mostly devoid of woody plants on both sides.	Yes	Seasonal	360	10000	0	Keep in existing fill in shoulder or roadbed to avoid large area of seasonal wetlands on basin floor.
127	4	W-138-A/S	-	Roblar Rd. @ 4500' SW of Canfield Rd.	36" CMP; dry 10/12/95; draining roadside ditch; <i>Rubus discolor</i> .	Yes	Intermittent	100	0	0	
128	3	W-138-A/S	-	Roblar Rd. @ 5500' SW of Canfield Rd.	Americano Ck.. See Form R-03: 11' x 4.5' RC bridge; dry 10/12/95; concrete apron/wall wall <i>Juncus effusus</i> , <i>Carex aquatilis</i> on west side; small <i>Salix</i> , <i>Rubus discolor</i> on bank on eastside.	Yes	Intermittent	220	10000	0	Keep pipeline in existing fill in shoulder or roadbed to avoid large area of seasonal wetlands on basin floor.
129	3.5	W-138-A/S	-	Roblar Rd. @ 6000' SW of Canfield Rd.	36" CMP; dry 10/12/95; grassland seasonal wetland on west side; <i>Salix</i> spp. on eastside.	Yes	Intermittent	120	0	20000	Pipeline placement on NW side of roadway provides avoidance of riparian corridor.
130	3	W-139-A/S	-	Roblar Rd. @ 50' SW of Canfield Rd.	36" CMP, 6' wide ditch parallels Canfield Rd for approximately 250 feet.	Yes	Intermittent	120	1500	0	Keep in existing fill in disturbed shoulder or roadbed to avoid drainage ditch paralleling roadway.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
131	3.5	W-140-A	-	Canfield Rd. @ 300' north of Roblar Rd.	See Form CAN-01: 6' x 5' oval RCP; inundated, < 1 cfs 8/24/95; disturbed freshwater marsh & extensive seasonal wetland on eastside; extremely disturbed freshwater marsh or seasonal wetland on west side	Yes	Seasonal	200	5000	0	Placement of pipeline on west side lessens wetland impacts.
134	4	W-203-A/S	-	Bloomfield Rd. @ 3100' SW of Burnside Rd.	18" CMP; < 1cfs 10/12/95; incised channel <i>Salix</i> spp., <i>Rubus discolor</i> .	Yes	Seasonal	120	0	0	Narrow road and shoulder.
135	4	W-203-A/S	-	Bloomfield Rd. @ 3500' SW of Burnside Rd.	36" CMP; < 1cfs 10/12/95; incised channel <i>Salix</i> spp., <i>Rubus discolor</i> .	Yes	Seasonal	120	0	0	Narrow road and shoulder.
136	5	W-203-A/S	-	2100' west of Bloomfield Rd., 7300' north of Bloomfield	Mixed riparian drainage, inlet to proposed reservoir site, 3000' linear drainage encroachment.	Yes	Intermittent	60000	0	0	Pipeline should be relocated to dirt road to the NE on mod. well drained soils to avoid as much as 50' x 3000' of riparian vegetation.
137	4	W-200-A/S	-	Stony Pt. Rd. @ 1600' south of Mecham Rd.	48" CMP; dry 8/95.	Yes	Intermittent	120	0	0	
138	4	W-129-A	-	Franklin School Rd @ 3100' SE of Marsh Rd.	24" or 30" CMP.	Yes	Intermittent	200	0	0	
139	5	W-129A	-	4100' east of junction of Marsh Rd. & Franklin School Rd.	Off-site; willow riparian lined drainage.	Yes	Intermittent	2400	0	0	
140	5	W-129A	-	4400' south east of junction of Marsh Rd. & Franklin School Rd.	Off-site; mostly grassland seasonal wetland some willow riparian scrub surrounding stockpond.	Yes	Intermittent	4500	0	0	
141	3.5	W-142-A/S	-	Roblar Rd. @ 1500' east of Canfield Rd.	36" CMP; dry 8/21/95; riparian woodlands <i>Salix</i> spp.	Yes	Intermittent	200	0	800	Placement in shoulder on N side minimizes riparian impact, keep pipeline in existing fill in row or shoulder as much as possible.
142	3	W-142-A/S	-	Roblar Rd. @ 2100' east of Canfield Rd.	36" CMP; dry 8/21/95, lg wet area on stream terrace flood plain along north side of road..	Yes	Intermittent	120	10000	0	Keep in existing fill in disturbed shoulder or roadbed to avoid large seasonal wetland along northside of roadway.
143	4	W-142-A/S	-	Roblar Rd. @ 2800' east of Canfield Rd.	36" CMP; dry 8/21/95	Yes	Intermittent	120	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
144	3	W-142-A/S	-	Roblar Rd. @ 3200' east of Canfield Rd.	36" CMP; dry 8/21/95	Yes	Intermittent	120	10000	10000	Keep in existing fill in disturbed shoulder or roadbed to avoid riparian vegetation and seasonal wetland along northside of roadway.
145	3	W-15-A/S	-	gravel road 1000' north of Fallon & 7300' east of Carmody Rd.	See Form GRAV-01: Seep below farm pond; mostly grassland wetland, small area of freshwater marsh with <i>Typha</i> sp.	Yes	Intermittent	0	6000	0	Place pipeline in center of road of gravel road.
146	3	W-15-A/S	-	gravel road 1900' north of Fallon & 7300' east of Carmody Rd.	See Form GRAV-02: Freshwater pond; mostly grassland wetland, small area of freshwater marsh.	Yes	Intermittent	0	5000	0	Place pipeline in center of road of gravel road.
147	5	W-53S	-	50' east of Sleavy Rd.	Off-site; stream channel; willow riparian woodland.	Yes	Intermittent	1500	0	0	
148	5	W-53S	-	1300' east of Sleavy Rd.	Off-site; swale; grassland seasonal wetland.	Yes	Intermittent	2400	0	0	
149	5	W-65S	-	600' west of Pepper Rd. 4200' north of Bodega Ave.	Off-site; grassland seasonal wetland.	Yes	Intermittent	4200	0	0	
150	5	W-5-A/S	-	500' east of Valley Ford Rd 1200' south Walker Rd	Headwaters Stemple Ck., private road; swale and channel; grassland seasonal wetland, large meadow seasonal marsh complex.	Yes	Intermittent	6000	0	0	
151	5	W-135A	-	2300' west Roblar Rd.	Off-site; swale; seasonal wetland.	Yes	Intermittent	600	0	0	
152	5	W-104-A/S	-	2000' east Bloomfield Rd. & 1 mile NE of Bloomfield town	Off-site; narrow private road; near ag. irrigation observation 1-7/V-2 (B)8 and 358-01; swale and channel; grassland seasonal wetland.	Yes	Intermittent	15000	0	0	
153	5	W-182S	-	500' west of Bloomfield Rd.	Off-site; channel; willow riparian woodland.	Yes	Intermittent	1200	0	0	
154	5	W-203-A/S	W-3	50' west of Bloomfield Rd. & 7000' NE of Bloomfield town	Off-site; flat, sandy channel; mostly waters of U.S.	Yes	Intermittent	1200	0	0	
155	5	W-129-A	-	50' north of Estero Rd. & 1300' west of Franklin School Rd.	Off-site; swale/ channel; willow riparian woodland.	Yes	Intermittent	600	0	0	
200	4	L-150	-	Gold Ridge Rd. & Burnside Rd.	18" CMP, mixed riparian vegetation along narrow ephemeral drainage.	Yes	Intermittent	40	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
201	3	L-144	-	Burnside Rd. @ 1100' west of Gold Ridge Rd.	24" CMP; riparian woodland (redwood, Douglas fir) and wetland; deeply incised, about 15' below road	Yes	Intermittent	0	0	250	Keep in roadbed or shoulder, depth of fill should allow avoidance of wetland and riparian.
202	3.5	L-144	-	Burnside Rd. @ 2700' west of Gold Ridge Rd.	18" CMP; orchard on west side, dense mixed riparian vegetation on east side.	Yes	Intermittent	0	60	1000	Placement on west side in the roadbed or shoulder provides complete avoidance.
205	2	L-140	SB-4	Watertrough Rd. @ 1600' SE of Burnside Rd.	Atascadero Creek. See Form WT-03: 70' x 13' RC bridge; inundated 8" in 7/27/95, 4" in 9/7/95, < 1 cfs; riparian woodland/wetland <i>Salix</i> spp., <i>Fraxinus</i> , and <i>Cornus</i> .	Yes	Perennial	0	800	10000	Jack and bore; placement on east side & within existing fill in roadbed & shoulder would minimize impacts to wetlands & riparian vegetation.
206	3	L-132	SB-3	Watertrough Rd. @ 500' NE of Burnside Rd.	See Form WT-02: 6' x 5' RC bridge; riparian woodland/wetland <i>Salix</i> spp., <i>Fraxinus</i> , and <i>Cornus</i> .	Yes	Perennial	200	10000	0	Place pipeline in existing fill in shoulder or roadbed to minimize impacts to wetlands.
207	3	L-132	-	Watertrough Rd. @ 1600' south of Bodega Hwy.	See Form WT-01: 8.5' x 6' RC bridge; inundated 4"; riparian woodland/wetland <i>Alnus rhombifolia</i> and wood fern.	Yes	Perennial	200	10000	0	Place in existing fill in shoulder or roadbed.
208	3	L-151	-	Bodega Hwy. @ 1500' SE of Ferguson Rd.	2.5' x 2' RC box; <i>Rubus</i> (blackberry), riparian area along northside of road for 500'.	Yes	Intermittent	40	0	10000	Switch to south side or keep in existing fill in roadbed or shoulder to avoid mixed oak riparian along north side of road.
209	3	L-151	-	Bodega Hwy. @ 1200' SE of Ferguson Rd.	5' x 3' RC box; Oak/mixed riparian drainage along northside roadway 500'.	Yes	Intermittent	40	0	10000	Switch to south side or keep in existing fill in roadbed or shoulder to avoid mixed oak riparian.
210	3	L-138	-	Bodega Hwy. @ 600' SE of Ferguson Rd.	3' x 4.5' RC box; Oak/mixed riparian drainage 500' along northside of roadway.	Yes	Intermittent	160	0	10000	Switch to south side or keep in existing fill in roadbed or shoulder to avoid mixed oak riparian.
211	4	L-138	-	Ferguson Rd. and Bodega Hwy.	48" CMP.	Yes	Intermittent	200	0	0	
212	2	L-138	-	Ferguson Rd. @ 500' NE of Bodega Hwy.	Atascadero Ck. Trib. See Form F-02: 75' x 13' concrete bridge; 3-5 cfs 9/7/95; riparian woodland/wetland; <i>Salix</i> spp. <i>Fraxinus</i> , <i>Alnus rhombifolia</i> , <i>Umbrellaria</i>	Yes	Perennial	0	1500	1500	Jack and bore

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
213	3	L-138	-	Ferguson Rd. @ 2000' north of Bodega Hwy.	See Form F-01: 48" CMP; dry 9/7/95; 30' mixed oak riparian along 6' drainage <i>Salix</i> spp., <i>Fraxinus</i> , and <i>Cornus</i> .	Yes	Intermittent	200	0	200	Keep in existing fill in disturbed roadbed or shoulder to minimize impacts to riparian vegetation.
215	3	L-153	SB-1	Mill Station Rd. @ 400' north of Ferguson Rd.	See Form MS-03: 48" CMP encased in bridge; dry 9/7/95; riparian woodland/wetland <i>Salix</i> spp., <i>Fraxinus latifolia</i> and <i>Rubus discolor</i> .	Yes	Intermittent	200	0	0	Placement in wide shoulder would minimize impacts to riparian vegetation.
216	4	L-153	-	Mill Station Rd. @ 800' north of Ferguson Rd.	2.5' x 5' RC box; dry 9/7/95	Yes	Intermittent	120	0	0	
217	1	L-152	-	Mill Station Rd. @ 225' west of Barlow Rd.	Atascadero Ck. See Form MS-02B: 100' x 10' RC bridge; standing water 9/7/95; riparian woodland/wetland; <i>Salix</i> spp., <i>Alnus rhombifolia</i> , <i>Fraxinus</i> , <i>Alisma aquatica</i> , <i>Typha</i> & <i>Polygonum</i> .	Yes	Perennial	0	1000	10000	Jack and bore, keep in existing fill in disturbed roadbed or shoulder.
218	1	L-152	SB-12	Mill Station Rd. @ 2000' west of Barlow Rd.	Atascadero Creek. See Form MS-02A: 120' x 13' RC bridge: standing water 6" (9/7/95); mixed riparian woodland & wetland.	Yes	Perennial	0	680	0	Jack and bore
219	4	L-128	-	Mill Station Rd. @ 100' west of Ragle Rd.	48" RCP; crosses channel at diagonal; vegetation mainly <i>Rubus discolor</i> , some <i>Salix</i> and <i>Populus</i> .	Yes	Intermittent	400	0	0	
221	1	L-130	-	Bodega Hwy @ 1600' west of Ragle Rd.	Atascadero Creek. See Form BOD-S01: 75' x 23' RC bridge; 12" inundation 9/7/95; riparian woodland/wetland <i>Salix</i> spp., <i>Fraxinus latifolia</i> , <i>Lemna</i> , and <i>Rubus discolor</i> .	Yes	Perennial	0	600	10000	Jack and bore, keep pipeline in existing fill in disturbed roadbed or shoulder.
224	3.5	L-107	-	Barlowe Lane @ 300' south of Occidental Rd.	See Form BAR-01: 7' x 4' RC box; inundated, <1 cfs; riparian shrub <i>Salix</i> spp., <i>Cornus</i> , and <i>Polygonum</i> . Mixed willow riparian corridor follows drainage for 1725'	Yes	Intermittent	140	0	35500	Placement of pipeline in wide shoulder on N side of Occidental Road avoids major willow riparian encroachment.
225	1	L-101	-	Occidental Rd. @ 2000' east of Mill Station Rd.	Atascadero Ck. See Form OC-01: 200' x 6' RC bridge; inundated 5-8"; extensive riparian woodland/wetland; <i>Salix</i> spp., <i>Fraxinus latifolia</i> , <i>Alnus rhombifolia</i> , <i>Typha</i> , <i>Lemna</i> , <i>Polygonum</i> , and <i>Rubus discolor</i> .	Yes	Perennial	0	1400	15000	Jack and bore, keep in shoulder or roadbed after structure/channel has been crossed to avoid mixed riparian & seasonal wetlands.
226	3	L-126	-	Occidental Rd. @ 500' east of Mill Station Rd.	Atascadero Creek. See Form OC-01: 10' x 7' RC bridge; inundated, <1 cfs on 9/7/95; channeled; riprap/concrete; riparian woodland/wetland <i>Salix</i> spp., <i>Quercus garryana</i> , and <i>Rubus discolor</i> .	Yes	Perennial	200	0	1000	Keep in existing fill in disturbed roadbed or shoulder to minimize loss of riparian vegetation.
227	3.5	L-125	-	Occidental Rd @ 500' west of Mill Station Rd.	Tributary to Atascadero Ck. parallels southside of Occidental Rd. for approximately 1250' feet. Dense mixed riparian vegetation.	Yes	Seasonal	0	0	25000	Placement on North side avoids large riparian encroachment.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
228	4	L-89	-	Mill Station Rd. @ 2100' north of Occidental Rd.	(2) 24" CMP, (1) 18" CMP; drainage with some riparian vegetation surrounded by orchards and residential development.	Yes	Intermittent	200	0	0	
229	4	L-89	-	Mill Station Rd. @ 900' south of Dyer Ave.	24" CMP	Yes	Intermittent	200	0	0	
231	4	L-85	-	Graton Rd. @ 1000' west of Mill Station Rd.	24" CMP	Yes	Intermittent	200	0	0	
232	3.5	L-86	-	Graton Rd. @ 2500' west of Mill Station Rd.	48" CMP, 10' wide drainage, 40' wide mixed riparian corridor on north side, vineyard on south.	Yes	Intermittent	200	0	800	Placement of pipeline on the south side of the roadway avoids impacts to riparian vegetation.
233	1	L-86	-	Graton Rd. @ 3000' west of Mill Station Rd.	Purrington Creek. See Form GR-01: 20' x 10' RC bridge; 1-5 cfs 8/31/95; channeled; riparian woodland/wetland <i>Salix</i> spp., <i>Fraxinus latifolia</i> <i>Alnus rhombifolia</i> and <i>Rubus discolor</i> .	Yes	Perennial	0	400	2000	Jack and bore
234	3.5	L-86	-	Graton Rd. @ 4000' SW of Mill Station Rd.	3' x 4' RC box; willow riparian westside, Purrington Ck. parallels eastside.	Yes	Intermittent	200	0	20000	Placement on west side avoids encroachment into Purrington Cr. riparian corridor.
235	4	L-86	-	Graton Rd. @ 4300' NE of Green Hill Rd.	4' x 2' RC box; freshwater marsh and scattered willows in ditch below impoundment in vineyard.	Yes	Intermittent	100	0	0	
236	4	L-84	-	Sullivan Rd. @ 1200' south of Green Valley Rd.	24" CMP.	Yes	Intermittent	80	0	0	
237	1	L-78	-	Green Valley Rd. @ 1300' east of Thomas Rd.	Green Valley Ck. See Form GV-02: 80' x 12' RC bridge; inundated; mixed riparian woodland/wetland. SW side vegetation narrower and more disturbed than on NW side.	Yes	Perennial	0	1600	1600	Jack and bore on SW side.
239	4	L-76	-	Green Valley Rd. @ 500' west of Thomas Rd.	24" CMP.	Yes	Intermittent	100	0	0	
240	3	L-75	-	Thomas Rd. @ 1300' north of Green Valley Rd.	See Form TH-01: 48" CMP; standing water 8/31/95; channeled; riparian woodland/wetland <i>Salix</i> spp., and <i>Rubus discolor</i> .	Yes	Intermittent	200	1000	0	Keep pipeline in existing fill in disturbed roadbed or shoulder on northside.
242	1	L-79	-	Green Valley Rd. @ 1400' west of Ross Rd.	Atascadero Creek See Form GV-01: 65' x 13' RC bridge; inundated 8/31/95; mixed riparian/wetland, old riprap.	Yes	Perennial	0	1000	30000	Jack and bore, keep in existing fill in disturbed roadbed or shoulder to avoid riparian wetlands on basin floor along creek.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
243	3	L-157	-	Ross Rd. @ 2500' north of Green Valley Rd.	Atascadero Ck. Tributary. See Form RS-01: 6' x 4' RC bridge; inundated 3" 8/31/95; riparian woodland/wetland; <i>Salix</i> spp., <i>Oenanthe sarmentosa</i> , <i>Scirpus</i> sp., and <i>Rubus discolor</i> .	Yes	Perennial	120	0	1200	Switch to eastside or keep in existing fill in disturbed roadbed and shoulder.
300	4	S-121	-	Lakeville Hwy @ 2500' NW of Hwy 37	Small diameter RCP; roughly 6' wide channel; eucalyptus trees on north side, 2 channels on side of road.	Yes	Intermittent	120	0	0	
301	4	S-121	-	Lakeville Hwy @ 3600' NW of Hwy 37	See Form LV-02: 36" RCP; 3 ft. wide channel; grassland seasonal wetland.	Yes	Intermittent	60	0	0	
302	4	S-120	-	Lakeville Hwy @ 4600' NW of Hwy 37	See Form LV-03: (3) 60" CMPs with large concrete drop basin; 10' wide channel drains grassland seasonal wetland 15' from road shoulder.	Yes	Intermittent	200	0	0	
303	4	S-118	-	Lakeville Hwy @ 4600' NW of Hwy 37	See Form LV-04: 6' wide x 3' RCB; 5' wide channel; grassland seasonal wetland; some ponding on south side.	Yes	Intermittent	100	0	0	
304	4	S-118	-	Lakeville Hwy @ 3700' SE of south entrance of Lakeville Rd. 3.	Small diameter RCP; 2' wide channel.	Yes	Intermittent	40	0	0	
305	4	S-117	-	Lakeville Hwy @ 2100' SE of south entrance of Lakeville Rd. 3.	Small diameter RCP.	No	NA	0	0	0	
306	4	S-117	-	Lakeville Hwy @ 900' SE of south entrance of Lakeville Rd. 3.	See Form LV-05: 11' wide x 7' high RCB, 1-5 cfs (1/4/96); flat bottom channel; waters of U.S.	No	Intermittent	140	0	0	
307	4	S-69	-	Lakeville Hwy @ 600' SE of south entrance of Lakeville Rd. 3.	See Form LV-06: (2) 24" diameter CMPs; drains a roadside 120' long and 35' wide swale outside of ROW about 20' from paved shoulder.	No	NA	0	0	0	
308	4	S-69	-	Lakeville Hwy @ 2900' NW of south entrance of Lakeville Rd. 3.	See Form LV-07: 10' wide x 18' high RCB; <1 cfs (1/4/96); flat, gravelly bottom; water flows into a 48" diameter RCP and a 48" diameter CMP on south side of road.	No	NA	0	0	0	
309	3	S-69	-	Lakeville Hwy @ 2000' NW of south entrance of Lakeville Rd. 3.	See Form LV-08: standing water 0-6" deep (1/4/96); large seasonal swale, 10 to 60' wide and 320' long adjacent to roadway; grassland seasonal wetland.	Yes	Intermittent	0	6400	0	Place pipeline in existing fill in roadbed or shoulder to minimize loss of large seasonal wetland on north side of road.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
310	4	S-69	-	Lakeville Hwy @ 4700' SE of north entrance of Lakeville Rd. 3.	See Form LV-09: 6' wide x 4.5 high RCB; marginal herb/grass seasonal wetland outside of ROW (20' from road shoulder.	No	NA	0	0	0	
311	4	S-12	-	Lakeville Hwy @ 2400' SE of north entrance of Lakeville Rd. 3.	7' x 7' RCB; 1-2 cfs (1/4/96); 5' wide channel; grassland seasonal wetland; <i>Hordeum</i> sp., <i>Lolium</i> sp.	Yes	Intermittent	100	0	0	
312	4	S-68	-	Lakeville Hwy @ 1500' SE of north entrance of Lakeville Rd. 3.	See Form LV-10: 10' wide x 7' high RCB: asphalt drainage bottom; used to convey dairy waste and stormwater; dry 1/4/96.	No	NA	0	0	0	
313	4	S-68	-	Lakeville Hwy @ 700' SE of north entrance of Lakeville Rd. 3.	See Form LV-11: 12' wide x 8' high RCB; < 1 cfs, 6" deep (1/4/96); 12' wide channel with flat bottom & slumping banks.	Yes	Intermittent	240	0	0	
314	4	S-61	-	Lakeville Hwy. @ milepost 14.09	36" CMP; no distinct drainage features; grassland seasonal wetland.	No	NA	0	0	0	
315	4	S-61	-	Lakeville Hwy. near milepost 14.2	3' wide x 4' high RCP, well defined, barren channel.	Yes	Intermittent	240	0	0	
316	4	S-61	-	Lakeville Hwy. near milepost 14.4	6' x 8' RC box; wetland swale; cattle crossing.	Yes	Intermittent	400	0	0	
317	4	S-56	-	Lakeville Rd. milepost 14.95 south of Old Lakeville Rd. #2	42" CMP; 0.5 cfs;; incised channel; grassland seasonal wetland.	Yes	Intermittent	160	0	0	
318	3	S-56	-	Old Lakeville Rd. #2	See Form L-1: 800' long brackish marsh on east side of road; <i>Salicornia</i> sp., <i>Scirpus</i> sp., algae, <i>Distichlis spicata</i> , and <i>Lolium</i> on upper fringe; important habitat.	Yes	Intermittent	0	16000	0	Place pipeline in roadway or in dirt road on the east side outside of row to avoid large brackish marsh.
319	3	S-55	-	Lakeville Hwy. @ milepost 15.5	(2) 36" CMP's; seasonal swale and roadside ditch on east side of Hwy.; extensive (1000' long), important tidal wetland on west side of roadway just south of Winners Circle Dr. to just north of Cannon Ln.	Yes	Intermittent	0	500	0	Place pipeline in roadbed or shoulder to avoid wetlands (particularly tidal wetland on west side).
323	3	S-53	-	Lakeville Hwy. @ milepost 15.6 - 15.8	See Form L-2: Seasonally standing water; vegetation dominated by <i>Cotula coronopifolia</i> <i>Lolium</i> and <i>Hordeum</i> sp. on fringe; gleyed soil; formerly tidal brackish marsh; 800' long.	Yes	Intermittent	0	16000	0	Place pipeline in existing road fill or reroute to the eastside about 100' from road way.
324	4	S-44	-	Lakeville Hwy., north of old railroad. grade	See Form L-3: Concrete box, 3' x 3'; swale and road side ditch; inundated 4/19/95; grassland seasonal wetland.	Yes	Intermittent	200	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
325	4	S-48	-	Stage Gulch Rd.	See Form T1-A: inundated 2-4" 4/19/95 8' wide seasonal swale; dominated by <i>Lolium</i> , <i>Hordeum</i> , <i>Juncus balticus</i> , and <i>Rosa gymnocarpa</i> on eastside; rocky soils on west side.	Yes	Intermittent	160	0	0	
326	4	S-49	-	Stage Gulch Rd.	See Form T2: 36" CMP at roadway; tributary to Tolay Ck.; inundated 12" 4/19/95; 25' wide scour pool on east side; ditch on west side; dairy waste; dominated by <i>Lolium</i> , <i>Hordeum</i> and some <i>Typha latifolia</i>	Yes	Intermittent	500	0	0	
330	4	S-43	-	Lakeville Hwy./ Hwy. 116 milepost 38.85	Deeply incised, 4' wide channel on south side of roadway with a lone <i>Salix</i> sp.	Yes	Intermittent	80	0	0	
331	4	S-12	S-12	Lakeville Hwy./ Hwy. 116 milepost 38.29	See Form L-4: Wheat Creek; inundated 4/19/95; sackcrete channel and banks on north side, bare sandy channel on south side; dominated by <i>Lolium</i> sp. and <i>Avena</i> sp.	Yes	Intermittent	500	0	0	Wetland on both sides of Roadway just beyond ROW.
332	3	S-146	-	Lakeville Hwy. / Hwy. 116 @ milepost 37.87	See Form L-5: 2' x 3' RC box; wet 4/17/95 <i>Cotula coronopifolia</i> dominates disturbed wetland to drainage on north side of road; Petaluma City oxidation ponds & ancillary facilities excavated in former wetlands on south side.	Yes	Intermittent	0	20000	0	Place pipeline in existing road fill or in upland 500' to 600' north of Hwy 116.
333	4	S-146	-	Browns Lane	12" CMP; 4' - 6' wide road side ditch parallels the BROWns Ln. on NW side of the road.	Yes	Intermittent	0	0	0	Place pipeline on east side of Browns Lane.
334	4	S-146	-	South Ely Rd. and Browns Lane	12" CMP; well defined, 4' wide barren channel.	Yes	Intermittent	80	0	0	
335	4	S-146	-	South Ely Rd. @ 600' west of Brown Lane	12" CMP; well defined, 4' wide barren channel.	Yes	Intermittent	80	0	0	
336	3.5	S-11	S-11	South Ely Rd. @ 2500' west of Brown Lane	See Form SE-01: (2) 10' RC boxes; north side 36' wide, mostly barren with limited emergent plants; south side 42' wide with dense willow riparian.	Yes	Intermittent	0	0	840	Willow riparian will be avoided by placing pipeline in road fill on north side of road.
337	1	S-146	-	Adobe Rd. / Adobe Creek	Adobe Ck. See Form A-1: 8' wide RC box bridge; dry 7/11/95; north side deeply incised with <i>Aesculus</i> & <i>Quercus agrifolia</i> , extensive quality riparian wetland on south side with <i>Aesculus</i> , <i>Populus fremontii</i> <i>Salix</i> spp., and <i>Quercus lobata</i> .	Yes	Intermittent	0	600	1200	Jack and bore construction will be used to avoid important aquatic and riparian habitat.
338	3	S-146	S-5	Adobe Rd.	See Form A-2: 12' wide RC bridge; dry 7/11/95; 12' wide, flat bottom, gravelly channel; thick willow riparian on both sides of road; 25' wide on north side.	Yes	Intermittent	100	0	400	Place pipeline in existing road fill as much as possible to avoid high quality willow riparian habitat.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
339	3	S-146	-	Adobe Rd. @ 1750' NW of E. Washington St.	Washington Creek. See Form A-3: 8' wide RC box; 90' wide mixed riparian woodland on west side; 24' wide, deeply incised, barren channel on east side.	Yes	Seasonal	0	500	1300	Place pipeline in existing fill in road bed or shoulder or move to south side of roadway to avoid mixed riparian woodland.
340	4	S-146	S-10	Adobe Rd. / Lynch Creek	Lynch Creek. See Form A-4: 45' wide RC bridge; (1-5 cfs) 6/16/95, 85' wide barren channel on north side; 40' wide channel & 50' wide willow riparian on south side.	Yes	Seasonal	900	0	0	Keep pipeline on north side in existing road fill as much as possible. Wetland restoration potential on both sides.
341	4	S-146	-	Adobe Rd. @ 250' SE of Lynch Rd.	4 wide' channel on north side drains to a road side ditch; grassland seasonal wetland on both sides of road.	Yes	Intermittent	80	0	0	
342	3	S-146	-	Adobe Rd. NE of Wagner Rd.	See Form A-5: Large seasonal pond and wetland both sides of roadway, 24" inundated 4/19/95; emergent plants.	Yes	Seasonal	3500	3500	0	Place pipeline in existing road fill and on the south side if possible to minimize quality wetland habitat.
343	3	S-146	-	Adobe Rd. @ Corona Creek	Corona Creek. See Form A-6: inundated; 12-16" inundated 4/19/95 very deep road fill; emergent wetland plants (<i>Typha</i> sp., <i>Conius</i> sp., <i>Rosa</i> sp. & <i>Juncus effusus</i>) on both sides of road in creek.	Yes	Seasonal	0	240	0	Place pipeline in thick and elevated road fill to avoid wetlands.
344	4	S-146	-	Adobe Rd. @ 1000' west of Hardin Lane	See Form A-7: 8' wide x 5' high RC box; tributary to Willow Brook; incised channel on north side; scour pool 25' wide on south side; poor water quality habitat due to uncontrolled deposits of dairy waste.	Yes	Intermittent	240	0	0	
345	4	S-146	S-9	Adobe Rd. @ Willow Brook	Willow Brook Ck. See Form A-8: 18' wide RC bridge; standing water 8" (1-5 cfs) 6/16/95; concrete apron and scour pool on S side; 36'-42' disturbed willow riparian wetland on north side.	Yes	Seasonal	840	0	0	Keep pipeline on the north side preferably in existing road fill.
347	3	S-146	-	Adobe Rd. @ 400' west of Willow Brook	See Form A-9: 5' x 8' RCB; 25' wide on northeast side and 17' wide on southwest side drainage, inundated 12" 4/19/95; mainly unvegetated; minor amount of emergent and seasonal wetland	Yes	Intermittent	0	400	0	Place pipeline in existing road fill to avoid vernal pool complex in NW swale.
348	4	S-146	-	Adobe Rd. & Petaluma Hill Rd.	See Form A-10: 4' wide x 5' high RC box; 10' wide disturbed grassland seasonal wetland in retention basin.	Yes	Intermittent	200	0	0	
349	4	S-146	-	Adobe Rd. @ 800' east of Davis Lane	125' x 25' seasonal wetland in a depression paralleling road at least 35' from centerline; dominated by <i>Solium</i> sp. and <i>Hordeum</i> sp. and few scattered <i>Limnanthus douglasii</i> .	Yes	Intermittent	0	0	0	
351	3	S-23	S-7	Petaluma Hill Rd. @ Lichau Creek	See Form PH-06: 19' wide x 9' high RCB; inundated (7/27/95); sandy gravelly bottom; few isolated <i>Salix</i> ; a 10' wide ditch 200' long north of bridge; about 10'-15' off paved shoulder; lined by small willows.	Yes	Intermittent	380	0	2000	Place pipeline in disturbed road fill to avoid willow lined roadside ditch.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
355	4	S-18	S-8	Roberts Rd. @ 1300' east of Petaluma Hill Rd.	See Form RBT-01: 11' wide x 4.5' high RC bridge dry 7/27/95; incised channel, bottom covered by gravel and cobbles; mostly barren on both sides of the road.	Yes	Intermittent	220	0	0	
356	4	S-18	-	Roberts Rd. @ 3500' east of Petaluma Hill Rd.	See Form RBT-02: 13' wide x 4.5' high RC bridge dry 10/12/95; incised channel, bottom covered by gravel and cobbles; mostly barren on both sides of the road.	Yes	Intermittent	220	0	0	Narrow road shoulder.
357	4	S-18	-	Roberts Rd. @ 50' south of Prissley Rd.	30" CMP; dry 10/12/95; degraded low quality, seasonal wetlands on both sides of road.	Yes	Intermittent	200	0	0	narrow shoulder
360	4	S-16	S-4	Petaluma Hill Rd. @ Copeland Creek	Copeland Creek. See Form PH-05: 18' wide x 7' high RC bridge; dry 10/12/95; apparent heavy flows in spring; incised channel; flat, barren bottom <i>Salix</i> spp., <i>Juglans</i> , <i>Rubus</i> west side; nonwetland grasses/ forbs & <i>Juglans</i> on upper bank on east side.	Yes	Intermittent	800	0	0	Place pipeline on west side to lessen wetland impacts. Wide road shoulder.
361	4	S-6	S-3	Petaluma Hill Rd. @ Hinebaugh Creek	Hinebaugh Creek. See Form PH-04: 11' wide x 3' high RC bridge; dry 10/12/95; apparent heavy flows in spring; incised channel; gravel/cobble bottom; small scour pool eastside <i>Salix</i> spp. on both sides, isolated on eastside.	Yes	Intermittent	300	0	0	
362	3	S-5	S-2	Petaluma Hill Rd. @ 300' north of Keiser Rd.	Crane Creek. See Form PH-03: 16.5' wide x 10.5' high RC bridge; dry 7/27/95; apparent heavy flows in spring; incised channel; flat, gravel/cobble bottom; nonwetland grasses, herbs on eastside <i>Salix</i> spp., <i>Rubus</i> , <i>Acer macrophyllum</i> west side.	Yes	Intermittent	0	250	100	Place pipeline in existing wide shoulder to avoid channel in bottom, oaks & buckeye on upper banks.
364	3	S-3	-	Petaluma Hill Rd. @ 1000' south of Crane Canyon Rd.	See Form PH-02: 19' wide x 9' high RC bridge; dry 10/12/95, apparent heavy flows in spring; deeply incised channel; large boulders & riprap, gravel/ cobble bottom; nonwetland on west side <i>Salix</i> , <i>Rubus</i> , <i>Acer macrophyllum</i> east side.	Yes	Intermittent	0	0	460	Place pipeline in existing wide shoulder on east side to avoid mixed riparian vegetation on east side. Road is well above creek.
366	3	S-7	-	Crane Canyon Rd. @ 1600' east of Petaluma Hill Rd.	See Form CR-01: 60" CMP; dry 10/12/95; incised channel; 12' below Rd.; riparian <i>Salix</i> spp., <i>Juglans</i> sp., <i>Acer macrophyllum</i> , <i>Polgonum</i> sp. on north side; barren channel with <i>Quercus</i> on south side; mostly outside of ROW on both sides of road.	Yes	Intermittent	0	0	500	Place pipeline in existing upper road shoulder to avoid riparian woodland.
367	4	S-7	-	Crane Canyon Rd. @ 1000' feet east of Petaluma Hill Rd.	24" CMP; nonwetland.	No	Intermittent	0	0	0	
368	4	S-7	-	Crane Canyon Rd. @ 100' feet west of creek	18" RCP; nonwetland.	No	Intermittent	0	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
369	3	S-1	S-1	Petaluma Hill Rd. and Crane Canyon Rd.	See Form PH-01: 9.5' x 3' RC bridge; incised channel & scour pool east side with <i>Salix</i> spp., <i>Acer macrophyllum</i> , <i>Rubus</i> ; piped underground for 200' west to west side of Rd. Most of riparian/ wetland is well below road.	Yes	Intermittent	0	0	280	Place pipeline in existing upper road shoulder to avoid riparian woodland.
370	3	S-24	S-6	Redwood Rd. @ 1800' west of Petaluma Hill Rd.	Lichau Creek. See Form A-11: CMP 30" dia.; 25' wide bridge 1-5 cfs 6/16/95, 24"; natural channel; quality mixed riparian woodland and wetland.	Yes	Seasonal	0	150	350	Place pipeline in road bed or shoulder to avoid mixed riparian woodland/ wetland on both sides of road.
371	4	S-151	-	Old Redwood Hwy. @ 800' NW of Penngrove Avenue	10' wide drainageway with <i>Salix</i> spp. and <i>Rubus discolor</i> .	Yes	Intermittent	200	0	0	
372	3	S-151	-	Old Redwood Hwy. @ 2500' NW of Penngrove Ave.	20' - 40' wide channel with riparian wetland vegetated by <i>Populus</i> sp. and <i>Salix</i> spp.	Yes	Intermittent	600	0	0	Place pipeline in road bed or shoulder to avoid mixed riparian woodland & wetland on both road sides.
373	4	S-151	-	W. Railroad Ave. @ 2200' east of Stony Pt. Rd.	See Form WR-01: 5' x 5' RC block; riprap/ concrete; grassland seasonal wetland, a few <i>Salix</i> sp. downstream.	Yes	Intermittent	100	0	0	
383	4	W-200-A/S	-	W. Railroad Ave. @ 50' east of Stony Pt. Rd.	24" CMP; dry 9/95.	Yes	Intermittent	100	0	0	
384	4	W-200-A/S	-	Stony Pt. Rd. @ 50' south of W. Railroad Ave.	18" CMP; dry 8/95.	Yes	Intermittent	60	0	0	
385	4	W-200-A/S	-	Stony Pt. Rd. @ 1600' south of W. Railroad Ave.	12" CMP; 200 yards below seep; grassland seasonal wetland in channel.	Yes	Intermittent	60	0	0	
386	4	W-200-A/S	-	Stony Pt. Rd. @ 2800' south of W. Railroad Ave.	18" RCP; dry 9/95.	Yes	Intermittent	100	0	0	
388	4	S-41	-	Pepper Rd. @ 1300' west Stony Pt. Rd.	36" CMP; grassland seasonal wetland.	Yes	Intermittent	100	0	0	
389	4	S-41	-	Pepper Rd. @ 3000' west Stony Pt. Rd.	See Form PP-01: 7' wide x 4 high' RC bridge; small pond 4" deep, 9/6/95; grassland wetland formerly a freshwater marsh <i>Polygonum</i> , <i>Rorippa</i> .	Yes	Intermittent	600	0	0	
390	3	S-38	-	Stony Pt. Rd. @ 2600' north of Rainsville Rd.	See Form SP-09A: 18" CMP; dry 9/6/95; 5' wide barren channel on northeast side of road; 10' wide oak/riparian woodland on SW side.	Yes	Intermittent	100	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
391	4	S-38	-	Stony Pt. Rd. @ 2400' north of Rainsville Rd.	Petaluma Riv. headwaters. See Form SP-09B: 48' CMP; dry 9/6/95; small pond about 200' SE of Rd.; grassland seasonal wetland on both sides of road.	Yes	Intermittent	80	0	0	
392	3	S-33	-	Stony Pt. Rd. @ 2400' north of Rainsville Rd.	Petaluma Riv. headwaters. See Form SP-10: 70' wide x 16' high RC bridge; wet 9/6/95; riprap/concrete; disturbed emergent vegetation in 42' wide linear channel.	Yes	Intermittent	0	840	0	Place pipeline in upper, disturbed road shoulder to avoid disturbed emergent wetland in channel.
393	2	S-34	-	Rainsville Rd. @ 400' SE of Stony Pt. Rd.	Petaluma River. See Form RN-02: 26' wide x 9' high RC bridge; inundated 9/6/95; channelized; bordering urban development; disturbed freshwater marsh- <i>Typha</i> , and <i>Polygonum</i> ; largely devoid of woody plants except a few <i>Salix</i> .	Yes	Perennial	0	800	0	Hang pipeline on bridge or use Jack and bore construction to avoid aquatic habitat.
394	4	S-35	-	Rainsville Rd. @ 2700' SE of Stony Pt. Rd.	See Form RN-01: 70' wide x 14' high RC bridge; standing water 9/6/95; channelized; extremely disturbed freshwater marsh devoid of all woody plants- <i>Xanthium</i> , and <i>Polygonum</i> .	Yes	Intermittent	500	0	0	
397	3	S-121	-	Hwy 37 @ 700' NW of Lakeville Hwy	See Form SEP-09: 16' wide x 6' high RCB; 2' deep water (1/4/96) in scour pool feed by irrigation ditch; <i>Scirpus</i> , <i>Polygonum</i> around edge of pond.	Yes	Intermittent	0	320	0	Place pipeline in disturbed road bed or wide shoulder to avoid wetland in channel.
398	4	S-121	-	Hwy 37 @ 4600' NW of Lakeville Hwy	See Form SEP-08: 16' wide by 5' high RCB; asphalt bottom; causeway for livestock and stormwater; 12" of water covering channel, 1/4/96.	No	NA	0	0	0	
399	4	S-121	-	Hwy 37 @ 6300' NW of Lakeville Hwy	See Form SEP-07: 9'x 9' RCB; barren causeway used for livestock crossing and conveying storm water.	No	NA	0	0	0	
400	3	S-121	-	Hwy 37 @ 8200' NW of Lakeville Hwy	See Form SEP-06: 25' wide freshwater seep, apparently created from leakage of large transmission pipe above; water runs along hwy in shallow ditch 300-400' north with some <i>Typha</i> .	Yes	Intermittent	0	500	0	Place pipeline in disturbed road bed or shoulder to avoid freshwater seep & road side ditch.
401	4	S-121	-	Hwy 37 @ 9300' NW of Lakeville Hwy	See Form SEP-05: 10' wide x 5' high RCB; grassland seasonal wetland outside of ROW.	Yes	Intermittent	0	0	0	
402	3	S-123	-	Hwy 121 @ 3500' NW of Hwy 37	See Form SEP-04: extensive, degraded brackish marsh, 900' long about 5' -10' off paved road shoulder; <i>Distichlis</i> <i>Scirpus</i> , few <i>Salicornia</i> .	Yes	Intermittent	0	18000	0	Place pipeline in existing road bed or upper shoulder to avoid brackish marsh on east side of road.
403	3	S-123	-	Hwy 121 @ 4100' NW of Hwy 37	See Form SEP-03: (2) 30" CMP encased in concrete; ditch 17' wide filled with water about 3' deep.	Yes	Intermittent	0	340	0	Place pipeline in existing road upper shoulder to avoid channel on east side of road.
404	4	S-123	-	Hwy 121 @ 4400' NW of Hwy 37	See Form SEP-02: 9' wide x 3' high RCB; flat, gravelly, barren bottom; dry 1/4/96.	Yes	Intermittent	140	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
405	4	S-123	-	Hwy 121 @ 4700' NW of Hwy 37	(2) 16" CMP, nearly complete filled with silt, on opposite ends of 100' long and 3' wide ditch(12" of water 1/4/96) located about 10 to 15 feet from paved shoulder; ditch is mostly barren.	No	Intermittent	0	0	0	
406	3	S-124	B-1	Hwy 121 @ 7500' NW of Hwy 37	Tolay Ck. See Form SEP-01: 39' wide x 7.5' high RCB; 1-5 cfs (1/4/96); flat bottom channel; banks eroded; over grazed; grassland seasonal wetland.	Yes	Intermittent	0	780	0	Place pipeline in existing road upper shoulder to avoid channel on east side of road.
407	3	S-116	-	Lakeville Rd. No. 3 @ 500' NE of south entrance to Lakeville Hwy.	See Form LRN:01. Swale; grassland seasonal wetland; wetland 15' off road pavement.	Yes	Intermittent	0	2600	0	Place pipeline in existing road upper shoulder preferably on the south side of road to avoid seasonal wetland.
409	4	S-113	-	Lakeville Rd. No.3 @ 2400' NE of south entrance to Lakeville Hwy.	6' x 6' RCB; barren channel (Water of U.S.) with 1 to 2 cfs.	Yes	Intermittent	120	0	0	
410	4	S-114	-	Lakeville Rd. No.3 @ 3000' NE of south entrance to Lakeville Hwy.	16" CMP; barren channel (Water of U.S.).	Yes	Intermittent	40	0	0	
411	4	S-114	-	Lakeville Rd. No.3 @ 3600' NE of south entrance to Lakeville Hwy.	18" CMP; barren channel (Water of U.S.).	Yes	Intermittent	60	0	0	
414	5	S-64	-	2600' NE Lakeville Hwy, below Hillside Reservoir outlet structure.	Off-site; grassland seasonal wetland.	Yes	Intermittent	600	0	0	
415	5	S-112	-	800' east of ranch road south of Tolay Reservoir	Off-site; grassland seasonal wetland and Waters of U.S.	Yes	Intermittent	720	0	0	
416	5	S-156	-	south of Tolay Reservoir 700' NE of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	720	0	0	
417	5	S-156	-	south of Tolay Reservoir 1300' east of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	720	0	0	
418	5	S-156	-	south of Tolay Reservoir 2200' NE of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	600	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
419	5	S-156	-	south of Tolay Reservoir 3200' NE of ranch	Off-site; near ag. irrigation observation S39-A08; channel and swale; grassland seasonal wetland.	Yes	Intermittent	600	0	0	
420	5	S-156	-	south of Tolay Reservoir 4300' NE of ranch	Off-site; near ag. irrigation observation S39-A07; channel and swale; grassland seasonal wetland.	Yes	Intermittent	720	0	0	
421	5	S-156	-	south of Tolay Reservoir 5200' NE of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	480	0	0	
422	5	S-156	-	south of Tolay Reservoir 5700' NE of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	1800	0	0	
423	5	S-156	-	south of Tolay Reservoir 6500' NE of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	720	0	0	
424	5	S-156	-	south of Tolay Reservoir 6700' NE of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	4500	0	0	
425	5	S-156	-	south of Tolay Reservoir 7700' NE of ranch	Off-site; near ag. irrigation observation S39-A03; channel and swale; grassland seasonal wetland.	Yes	Intermittent	720	0	0	
426	5	S-156	-	south of Tolay Reservoir 8400' NE of ranch	Off-site; channel and swale; grassland seasonal wetland.	Yes	Intermittent	720	0	0	
427	3.5	S-51	-	west of Tolay Reservoir 2000' SE of Stage Coach Rd.	Off-site; swale; grassland seasonal wetland.	Yes	Intermittent	600	0	0	Keep in roadbed of rural dirt road.
428	5	S-45	-	west of Tolay Reservoir 3500' SE of Stage Coach Rd.	Off-site; swale; grassland seasonal wetland.	Yes	Intermittent	900	0	0	
429	5	S-30	-	1500' SW Adobe Rd north of Willow Creek	Off-site; about 35' wide, incised stream channel with emergent vegetation in bottom.	Yes	Intermittent	2100		0	Keep pipeline away as far as possible from stream channel; cross channel or perpendicularly.
430	5	S-42	-	3000' west Stony Pt. Rd 2300' south Pepper Rd.	Off-site; large swale, alluvial basin.	Yes	Intermittent	60000	0	0	
431	5	S-36	-	100' south Rainsville Rd. 2900' east of Liberty Rd.	Off-site; See nearby ag. irrigation observation 031-01; swale, alluvial basin.	Yes	Intermittent	18000	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
432	4	S-27	-	5000' east of Petaluma Hill Rd., 4400' south of E. Railroad Ave.	Off-site; channel; 15' wide channel; grassland seasonal wetland.	Yes	Intermittent	300	0	0	
433	4	S-159	-	E. Railroad Ave. 4000' east of Petaluma Hill Rd.	Off-site; 10' wide channel; grassland seasonal wetland.	Yes	Intermittent	200	0	0	
434	4	S-22	-	E. Railroad Ave. 700' east of Petaluma Hill Rd.	Off-site; 10' wide barren channel.	Yes	Intermittent	200	0	0	
435	5	S-18	-	1300' east Petaluma Hill Rd. ne of Sonoma University	Off-site; linear, 10' wide ditch; willow shrub.	Yes	Intermittent	600	0	0	
436	5	S-9	-	1400' west of Petaluma Hill Rd. & 5000' north of university	Off-site; 1100' long grassland seasonal wetland and channel with 30' wide mixed riparian woodland.	Yes	Intermittent	77800	0	0	
437	5	S-12	-	100' east Petaluma Hill Rd. 500' north of Crane Creek	Off-site; grassland seasonal wetland.	Yes	Intermittent	6000	0	0	
438	5	S-4	-	100' west Petaluma Hill Rd. 100' north of Crane Cr.	Off-site; grassland seasonal wetland.	Yes	Intermittent	18000	0	0	
439	5	S-124	-	west of Sears Pt. Reservoir	Off-site; grassland seasonal wetland.	Yes	Intermittent	1200	0	0	
440	5	S-163	-	5500' NW of p. Tolay Reservoir outlet structure	Off-site; 10' wide linear channel; lined by Typha sp.	Yes	Intermittent	600	0	0	
441	5	S-163	-	3800' NW of p. Tolay Reservoir outlet structure	Off-site; 50' wide swale; willow riparian with emergent wetland.	Yes	Intermittent	3000	0	0	
442	5	S-163	-	1600' north of p. Tolay Reservoir outlet structure	Off-site; 10' wide drainageway.	Yes	Intermittent	600	0	0	
443	5	S-163	-	1600' NE of p. Tolay Reservoir outlet structure	Off-site; 10' wide drainageway.	Yes	Intermittent	600	0	0	
444	5	S-163	-	500' NE of p. Tolay Reservoir outlet structure	Off-site; 10' wide drainageway.	Yes	Intermittent	600	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
445	5	S-163	-	600' SE of p. Tolay Reservoir outlet structure	Off-site; Tolay Ck.; 50' wide channel with seasonal wetland.	Yes	Intermittent	3000	0	0	
446	5	S-156	-	700' south of p. Tolay Reservoir outlet structure	Off-site; 25' wide swale/ channel with seasonal wetland.	Yes	Intermittent	1500	0	0	
447	5	S-156	-	500' south of p. Tolay Reservoir outlet structure	Off-site; 12' wide drainageway.	Yes	Intermittent	720	0	0	
448	5	S-156	-	1000 west of p. Tolay Reservoir outlet structure	Off-site; 300' wide swale & drainageway.	Yes	Intermittent	18000	0	0	
449	5	S-156	-	1500 west of p. Tolay Reservoir outlet structure	Off-site; 150' wide swale & drainageway.	Yes	Intermittent	9000	0	0	
450	5	S-156	-	2100 NW of p. Tolay Reservoir outlet structure	Off-site; 10' wide drainageway.	Yes	Intermittent	600	0	0	
451	5	S-156	-	2800 NW of p. Tolay Reservoir outlet structure	Off-site; 10' wide drainageway.	Yes	Intermittent	600	0	0	
452	5	S-156	-	3000 NW of p. Tolay Reservoir outlet structure	Off-site; 150' wide swale & drainageway.	Yes	Intermittent	9000	0	0	
453	5	S-67	-	3600' of p. Tolay Reservoir outlet structure	Off-site; See Form S31-07, near by wetland determination observation for Lakeville Hillside Reservoir; 12' wide swale; grassland seasonal wetland.	Yes	Intermittent	720	0	0	
454	5	S-67	-	3100' of p. Tolay Reservoir outlet structure	Off-site; 15' wide swale; grassland seasonal wetland.	Yes	Intermittent	900	0	0	
455	5	S-67	-	2900' of p. Tolay Reservoir outlet structure	Off-site; 10' wide swale; grassland seasonal wetland.	Yes	Intermittent	600	0	0	
456	5	S-67	-	2700' of p. Tolay Reservoir outlet structure	Off-site; 10' wide swale; grassland seasonal wetland.	Yes	Intermittent	600	0	0	
457	5	S-67	-	1900' of p. Tolay Reservoir outlet structure	Off-site; See Form S31-24, near by wetland determination observation for Lakeville Hillside Reservoir; 10' wide incised channel.	Yes	Intermittent	600	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
458	5	S-67	-	1500' of p. Tolay Reservoir outlet structure	Off-site; See Form S31-19, near by wetland determination observation for Lakeville Hillside Reservoir; 150' swale & drainageway.	Yes	Intermittent	9000	0	0	
460	5	S-10	-	2000' west of Petaluma Hill Rd. & 4900' north of university	Off-site; crosses large creek (100' wide) with high quality mixed riparian woodland and 400' seasonal wetland.	Yes	Intermittent	30000	0	0	Consider abandoning pipeline segment or relocating pipeline to avoid important mixed riparian woodland when it crosses creek.
500	5	G-III	-	Pine Flat Rd., below Socrates Mine	See Form G-3: Freshwater seep road converges with 10' wide roadside ditch & crosses under road to headwaters of Anna Belcher Ck.	Yes	Intermittent	600	0	0	
501	3.5	G-III	-	Pine Flat Rd.	See Form G-4A: Cut and fill pad; 100' wide ditch on north (inboard) side of road; grassland wetland and small amount of willow shrubs.	Yes	Intermittent	0	750	0	Disturbed road cut provides good construction staging area. Pipeline has been confined to roadbed.
502	3.5	G-III	-	Pine Flat Rd.	See Form G-4B: 48" CMP; < 1 cfs, incised channel upslope, headwaters of Anna Belcher Ck.; 6' wide north side of road, up to 20' wide south side; freshwater marsh.	Yes	Intermittent	25	25	0	Pipeline has been confined to roadbed.
503	2	G-III		Pine Flat Rd.	See Form G-4C: (2) 30" CMPs, 1.25 cfs, incised drainage, headwaters of Anna Belcher Ck. 10' wide on both sides of road; freshwater seep.	Yes	Perennial	0	70	0	Jack and bore construction. Pipeline has been confirmed to roadbed.
504	3.5	G-III	-	Pine Flat Rd.	See G-5A: 2- lobed seep feeding 150' wide ditch on north (inboard) side of road; washout below road; road way widening will likely be required.	Yes	Intermittent	0	1130	0	Pipeline has been confined to roadbed
505	3.5	G-III	-	Pine Flat Rd.	See G-5B: 30" CMP, 6' wide barren channel in serpentine, seasonal flow. 6' wide both sides of road.	Yes	Intermittent	0	40	0	Pipeline has been confined to roadbed
506	3.5	G-III	-	Pine Flat Rd.	18" CMP, 4' wide barren channel on both sides of road.	Yes	Intermittent	0	30	0	Pipeline has been confined to roadbed
507	3.5	G-III	-	Pine Flat Rd.	12" CMP, seep above road way feeding small channel. 2' wide seasonal drainage on both sides of road.	Yes	Intermittent	0	10	0	Pipeline has been confined to roadbed
508	3.5	G-III	-	Pine Flat Rd.	See Form G-6: 18" CMP; barren, seasonal incised headwater channel < 0.1 cfs.; 4' wide on both sides of road; mixed monentane hardwood adjacent to channel.	Yes	Intermittent	0	30	0	Pipeline has been confined to roadbed
509	3.5	G-III	-	Pine Flat Rd.	See Form G-7: 24" CMP, 0.5-0.75 cfs; inboard ditch parallels west side of rd. for 0.2 mile then joins incised drainage; dominated by <i>Carex</i> spp.	Yes	Intermittent	0	1600	0	Pipeline has been confined to roadbed
510	3.5	G-III		Pine Flat Rd.	Wet mine tunnel drainage.	No	NA	0	0	0	Pipeline has been confined to roadbed

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
511	1	G-III	G-5	Pine Flat Rd.	See Form G-8: Anna Belcher Ck, 12' X 14' RC box; 7-8 cfs. 20' incised channel, 40' wide willow riparian woodland; stream terrace appears to be fairly well drained. Small x-country section of pipeline.	Yes	Perennial	0	0	450	Jack and bore construction will be used to avoid willow riparian woodland.
512	4	G-III	-	Pine Flat Rd.	12" CMP, rocky dry channel 2' wide on both sides of road way	Yes	Intermittent	20	0	0	
513	3	G-III	-	Pine Flat Rd.	See Form G-9: 12" RCP, somewhat unique wet meadow swale up to 100' wide east side of road way to less than 30' wide west side of road way; seasonal grassland wetland.	Yes	Intermittent	0	750	0	Place pipeline in existing road bed or in shoulder to avoid wetland.
514	3	G-III	-	Pine Flat Rd.	See Form G-10: 20' wide stream and adjacent wet meadow ;< 1 CFS, wetland meadow with <i>Juncus</i> sp., <i>Montia</i> sp., <i>Ranunculus</i> sp.	Yes	Intermittent	0	150	0	Place pipeline in existing road bed or in shoulder to avoid wetland.
515	1	G-III	G-8	Pine Flat Rd.	See Form G-11: Hurley Ck, 15' multi-plate arch w/ grouted rock bottom, well defined, 15' wide channel, cobbles & gravels, 2-3 cfs.	Yes	Intermittent	0	110	0	Jack and bore construction will be used to avoid important aquatic habitat.
516	3	G-III	-	Pine Flat Rd.	See Form G-12: wet meadow 30' x 150' disturbed, grassland wetland on northeast side of road way, 25' wide barren channel on southwest side.	Yes	Intermittent	0	1120	0	Place pipeline in existing road bed or shoulder on NE side to avoid large wetland.
517	4	G-III	-	Pine Flat Rd.	12" CMP; Barren, rocky dry seasonal channel. 2' wide on both sides of the road.	Yes	Intermittent	20	0	0	
518	4	G-III	-	Pine Flat Rd.	See Form G-13: 12" RCP; scattered wet meadow vegetation in rocky channel; 15' wide wetland both sides of road; vegetated by <i>Juncus balticus</i> .	Yes	Intermittent	110	0	0	
519	3.5	G-III	-	Pine Flat Rd.	See Form G-14: Little Sulphur Ck. wet meadow 150' along west side of road way on stream terrace, main channel almost nearby road way.	Yes	Intermittent	0	1120	0	Place pipeline in existing disturbed ROW on NE side of road way to avoid wetlands.
520	1	G-III	G-7	Pine Flat Rd.	See Form G-15: Little Sulphur Ck., 20' wide, 3-4 cfs, well defined channel, cobble, gravel and sand.	Yes	Perennial	0	150	0	Jack and bore construction will be used to avoid aquatic habitat; possible site of special status Iris.
521	4	G-III	-	Pine Flat Rd.	Off-site: Spring-fed high gradient, ephemeral drainages, 4' wide barren channel.	Yes	Intermittent	30	0	0	
522	3.5	G-II	-	Pine Flat Rd.	Off-site: Spring-fed high gradient, ephemeral drainages, 4' wide barren channel.	Yes	Intermittent	80	0	0	Pipeline has been confined to roadbed.
523	3.5	G-II	-	Pine Flat Rd.	Off-site: Spring-fed high gradient, ephemeral drainages, 4' wide barren channel.	Yes	Intermittent	80	0	0	Pipeline has been confined to roadbed.
524	3.5	G-II	-	Pine Flat Rd.	Off-site: Spring-fed high gradient, ephemeral drainages, 4' wide barren channel.	Yes	Intermittent	80	0	0	Pipeline has been confined to roadbed.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
525	3.5	G-II	-	Pine Flat Rd.	Off-site: Spring-fed high gradient, ephemeral drainages, 4' wide barren channel.	Yes	Intermittent	80	0	0	Pipeline has been confined to roadbed.
530	3.5	G-II	-	Pine Flat Rd.	20' of Riparian woodland encroachment on southeast side of road.	Yes	Intermittent	0	370	0	Place pipeline in the road bed or shoulder of north side of road to avoid wetland riparian woodland.
531	4	G-II	-	Pine Flat Rd.	See Form G-16A: Barren, seasonal drainage; 4' wide well defined channel emerging from culvert well beneath road way, 1'-2' deep, approx. 1 cfs.	Yes	Intermittent	80	0	0	
532	4	G-II	-	Pine Flat Rd.	See Form G-16 B: Spring emerging from below road bed with 4' wide drainage <i>Lolium</i> sp., <i>Rorippa</i> sp., <i>Rumex crispus</i> under <i>Quercus lobata</i> , <i>Pseudotsuga</i>	Yes	Intermittent	80	0	0	
533	4	G-II		Pine Flat Rd.	See Form G-16 C: Seep on north side of road flows to large pond south of road; 10' wide drainage.	Yes	Intermittent	190	0	0	
534	3.5	G-II	-	Pine Flat Rd.	See Form G-16 D: 10' wide head waters to George Young Ck. on north side of road feeds large stock pond on southwest side of road.	Yes	Intermittent	190	600	0	Wetland on south side of road has been avoided by placing pipeline on east side.
535	3	G-II	-	Pine Flat Rd.	See Form G-17: 60" CMP; Spring feeding George Young Ck., 50' wide riparian wetland with detention basin on east side of road, steep barren channel on west side of road.	Yes	Intermittent	0	940	0	Place pipeline in existing road bed or shoulder fill to avoid wetland on east side of road.
536	4	G-II	-	Pine Flat Rd.	4' wide seasonal drainageway and spring.	Yes	Intermittent	80	0	0	
537	4	G-II	-	Pine Flat Rd.	4' wide seasonal drainageway.	Yes	Intermittent	80	0	0	
538	3.5	G-II	-	Pine Flat Rd.	4' wide seasonal drainageway.	Yes	Intermittent	0	0	0	Pipeline has been confined to roadbed.
539	3.5	G-II	-	Pine Flat Rd.	4' wide seasonal drainageway.	Yes	Intermittent	0	80	0	Pipeline has been confined to roadbed.
540	3.5	G-II	-	Pine Flat Rd.	80'-100' wide detention basin on east side of road.	Yes	Intermittent	0	1870	0	Pipeline has been confined to roadbed.
541	3.5	G-II	-	Pine Flat Rd.	2' wide seasonal drainageway.	Yes	Intermittent	0	40	0	Pipeline has been confined to roadbed.
542	3.5	G-II	-	Pine Flat Rd.	2' wide seasonal drainageway.	Yes	Intermittent	0	40	0	Pipeline has been confined to roadbed.
543	3.5	G-II	-	Pine Flat Rd.	2' wide seasonal drainageway.	Yes	Intermittent	0	40	0	Pipeline has been confined to roadbed.
544	3.5	G-II	-	Pine Flat Rd.	2' wide seasonal drainageway.	Yes	Intermittent	0	40	0	Pipeline has been confined to roadbed.
545	3.5	G-I	-	Pine Flat Rd.	See Form 2G-3: Spring above road flows into 30" CMP, 60' wide wetland east side, 10' wide wetland/water of U.S. on west side.	Yes	Intermittent		3000	0	Place pipeline in existing road bed or east side to avoid freshwater seep.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
546	4	G-I	-	Pine Flat Rd.	2' wide seasonal drainageway.	Yes	Intermittent	110	0	0	
547	4	G-I	-	Pine Flat Rd.	2' wide seasonal drainageway.	Yes	Intermittent	110	0	0	
548	4	G-I	-	Pine Flat Rd.	2' wide seasonal drainageway.	Yes	Intermittent	110	0	0	
549	4	G-I	-	Pine Flat Rd.	30' wide freshwater seep on east side of road.	Yes	Intermittent	1690	0	0	
550	4	G-I	-	Pine Flat Rd.	50' wide freshwater seep on east side of road.	Yes	Intermittent	2810	0	0	
551	3	G-I	-	Pine Flat Rd.	4' wide seasonal drainage on south side of road.	Yes	Intermittent	0	220	0	Place pipeline in fill shoulder or off road way to avoid wetland on south side of road.
552	4	G-I	-	Pine Flat Rd.	50' wide wetland on south (inboard) side of road.	Yes	Intermittent	2810	0	0	
553	3	G-I	-	Pine Flat Rd.	100' wide freshwater seep on south (inboard) side of road.	Yes	Intermittent	0	5620	0	Place pipeline in existing road bed or disturbed fill to avoid wetland seep on south side of road.
554	3	G-I	-	Pine Flat Rd.	See Form 2G-4: Tributary to George Young Ck. 30' CMP 2-5 cfs; channel 30' wide and detention basin on south side of Pine Flat Rd.; 6' wide waters of U.S. south side of road way.	Yes	Intermittent	340	515	0	Place pipeline in existing road bed or fill to avoid wetland.
555	4	G-I	-	Pine Flat Rd.	4' wide freshwater seep.	Yes	Intermittent	220	0	0	
556	4	G-I	-	Pine Flat Rd.	4' wide freshwater seep.	Yes	Intermittent	220	0	0	
557	4	G-I	-	Pine Flat Rd.	4' wide freshwater seep.	Yes	Intermittent	220	0	0	
558	3	G-I		Pine Flat Rd.	20' wide riparian woodland.	Yes	Intermittent	0	220	900	Place pipeline in existing road bed or fill to avoid riparian wetlands.
559	4	G-I	-	Pine Flat Rd.	4' wide seasonal drainage	Yes	Intermittent	220	0	0	
560	4	G-I	-	Pine Flat Rd.	20' wide freshwater seep.	Yes	Intermittent	1130	0	0	
561	4	G-I	-	Pine Flat Rd.	4' wide seasonal drainage	Yes	Intermittent	220	0	0	
562	3	G-I	-	Pine Flat Rd.	80' wide freshwater seep on south (inboard) side.	Yes	Intermittent	1130	3370	0	Place pipeline in existing road bed or fill to avoid wetlands on south side of road.
563	3	G-I	-	Pine Flat Rd.	100' wide freshwater seep on south (inboard) side.	Yes	Intermittent	110	4500	0	Place pipeline in existing road bed or fill to avoid wetlands on south side of road.
564	4	G-I	-	Pine Flat Rd.	75' wide quarried area/wetland upslope; 6' wide seasonal channel downslope.	Yes	Intermittent	4280	0	0	
565	4	G-I	-	Pine Flat Rd.	50' wide freshwater seep on east (inboard) side of road.	Yes	Intermittent	2810	0	0	
566	4	G-I	-	Pine Flat Rd.	10' wide seasonal drainage on both sides of road.	Yes	Intermittent	560	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
567	4	G-I	-	Pine Flat Rd.	50' wide freshwater seep on southeast (inboard) side of road.	Yes	Intermittent	2810	0	0	
568	3	G-I	-	Pine Flat Rd.	20' wide willow riparian woodland with understory of <i>Rumex</i> sp. and <i>Dipsacus</i> sp. on SE side of road.	Yes	Intermittent	110	340	0	Place pipeline in existing road bed or fill to avoid riparian wetland on SE side of road.
569	4	G-I	-	Pine Flat Rd.	4' wide seasonal drainage.	Yes	Intermittent	230	0	0	
570	3.5	G	-	Pine Flat Rd.	2' wide seasonal drainage.	Yes	Intermittent	0	20	0	Pipeline has been confined to roadbed.
571	3.5	G	-	Pine Flat Rd.	2' wide seasonal drainage.	Yes	Intermittent	0	20	0	Pipeline has been confined to roadbed.
572	3.5	G	G-8	Pine Flat Rd.	20' wide barren, seasonal drainage, 12" CMP.	Yes	Intermittent	0	150	0	Pipeline has been confined to roadbed.
573	3.5	G	-	Pine Flat Rd.	4' wide barren, seasonal drainage.	Yes	Intermittent	0	30	0	Pipeline has been confined to roadbed.
574	3.5	G	-	Pine Flat Rd.	2' wide seasonal drainage.	Yes	Intermittent	0	20	0	Pipeline has been confined to roadbed.
575	3.5	G	-	Pine Flat Rd.	2' wide seasonal drainage.	Yes	Intermittent	0	20	0	Pipeline has been confined to roadbed.
576	3.5	G		Pine Flat Rd.	6' wide barren, seasonal drainage.	Yes	Intermittent	0	50	0	Pipeline has been confined to roadbed.
577	3.5	G	G-9	Pine Flat Rd.	8' wide seasonal drainage.	Yes	Intermittent	0	60	0	Pipeline has been confined to roadbed.
578	3.5	G		Pine Flat Rd.	6' wide seasonal drainage.	Yes	Intermittent	0	50	0	Pipeline has been confined to roadbed.
579	1	G	G-10	Pine Flat Rd.	Sausal Ck. See Form G-579: 25' wide mixed riparian woodland (<i>Acer</i> sp., <i>Populus</i> sp., <i>Salix</i> sp., <i>Sambucus</i> sp.) surrounding barren, sandy channel; 10-15 cfs 4/5/95.	Yes	Perennial	0	500	300	Jack and bore construction will be used to avoid wetland and mixed riparian woodland.
580	1	G	G-11	Hwy 128	Sausal Ck. See Form G-580: 35' wide mixed riparian woodland (<i>Alnus</i> sp., <i>Populus</i> sp., <i>Salix</i> sp., <i>Juglans</i> sp.) surrounding barren sandy channel; flowing 10 cfs 4/4/95	Yes	Perennial	0	700	300	Jack and bore construction will be used to avoid important wetland and mixed riparian woodland.
581	4	G	-	Hwy 128	Tributary to Sausal Ck.; 4' wide channel; .5 to 1 cfs, channelized and devoid of vegetation on both sides of road.	Yes	Intermittent	80	0	0	
582	4	G-	-	Hwy 128	Tributary to Russian River; 3' x 8' RC box; flowing 2 cfs on 4/4/95; 10' wide both sides of road, channelized.	Yes	Intermittent	200	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
583	3.5	G	-	Hwy 128 mi. post 13.54	Channelized tributary to Russian River; 4'x8' RC box, flowing 3 cfs on 4/4/95; 8' wide on south side, 8' wide on north side paralleling road for 600'.	Yes	Intermittent	160	4800	0	Place pipeline in existing road bed or shoulder to avoid channel paralleling roadway.
584	4	G	G-12	Hwy 128 mi. post 13.88	Hoot Owl Ck., tributary of Russian River, 6'x9' RC box, 3-5 cfs 4/4/95, sandy-gravelly channel; 20' wide wetland both sides of road; oak riparian overstory on upper banks.	Yes	Intermittent	400	0	0	
585	4	G	-	Hwy 128 mi. post 14.2	6' wide seasonal channel on northside, 2' wide wetland swale on southside.	Yes	Intermittent	40	0	0	
586	3	G	-	Hwy 128 mi. post 14.41	24" CMP; 3' wide wet swale on south side broadens out to 50' wide wetland swale outside of ROW.	Yes	Intermittent	60	900	0	Limit construction to existing fill disturbance in shoulder as much as possible.
587	5	G	-	Hwy 128 mi. post 14.65	60" CMP, sandy channel 20' wide both sides of road way with some narrow strip riparian wetland vegetation along banks, flowing 1 cfs. (Note taken nearby along road directly across new XC alignment.)	Yes	Intermittent	1500	0	0	
588	5	G	-	Hwy 128 mi. post 14.80	18" CMP conveys flow of 2' wide channel mostly devoid of vegetation, carries vineyard runoff. (Note taken nearby along road directly across new XC alignment.)	Yes	Intermittent	120	0	0	
589	3	G	-	Hwy 128 mi. post 14.95 - 15.16	6' wide ditched wetland parallels south side of highway for 1100' feet.	Yes	Intermittent	0	6600	0	Place pipeline in existing road bed, in shoulder or relocate to north side of the road to avoid wetland.
590	4	G	-	Hwy 128 approx. 250' west of Chalk Hill Road	4' wide sandy/gravelly channel on both sides of highway; some mixed riparian vegetation on upper banks.	Yes	Intermittent	80	0	0	
591	3.5	G	-	Chalk Hill Rd.	See form CH-1: 18" CMP; on south side two seeps drain into a roadside channel lined by disturbed seasonal wetland grasses and herbs; 500' wide.	Yes	Intermittent	0	1000	0	Place pipeline in existing road bed or shoulder or relocate to north side of the road to avoid wetland.
592	3.5	G		Chalk Hill Rd	See form CH-2: Tributary to Maacama Ck.; 2' x 5' RC box; 8' to 20' wide rocky channel; flowing 0.5cfs 4/17/95; parallels west side of road for 1700'; mixed riparian woodland.	Yes	Intermittent	400	1000	2400	Place pipeline on east side of road to avoid wetlands/ mixed riparian woodland. Large riparian encroachment would still occur between 592 & 593.
593	3	G	-	Chalk Hill Rd.	See form CH-3: Tributary to Maacama Ck.; 2' x 5' RC box; 0.3 cfs 4/17/95; mixed riparian woodland parallels east side of road for 1000' between 592 and 593; 6' wide channel at crossing.	Yes	Intermittent	120	500	1500	Placement of pipeline in existing fill in road bed or disturbed shoulder.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
594	4	G	-	Chalk Hill Rd.	See form CH-4: Tributary to Maacama Ck.; 30" RCP, flowing 0.2 cfs on 4/17/95; barren 4' wide channel west side of road; barren channel 6' wide on east; <i>Fraxinus latifolia</i> on upper bank outside of ROW.	Yes	Intermittent	120	0	0	Ditched area through pasture, grazing or other disturbances have eliminated riparian vegetation.
595	1	G	G-13	Chalk Hill Rd.	See form CH-5: Maacama Ck., 75' wide water of U.S.; 75-100 cfs on 4/17/95; 150' wide mixed riparian woodland (<i>Salix</i> spp., <i>Alnus</i> sp., <i>Fraxinus</i> sp., <i>Quercus</i> sp.)	Yes	Perennial	3000	1500	3000	Bore and jack construction to avoid mixed riparian vegetation and Water of U.S.
596	4	G	-	Chalk Hill Rd.	Rock lined vineyard/roadside 2' wide drainage ditch on east side of road, 2' wide seasonal drainage on west side.	None	Intermittent	40	0	0	
597	3.5	G	-	Chalk Hill Rd.	See form CH-6: 12" CMP; rock lined vineyard/roadside ditch drains to 50' wide wetland on east side of road; a 225' long riparian woodland/ wetland on west side.	Yes	Intermittent	1000	0	4500	Major riparian encroachment along Maacama Creek on west side of road has been avoided by placement on east side.
598	3	G	-	Chalk Hill Rd.	See Form CH-7: Rock lined vineyard/drainage ditch on east side and 50' swale with emergent vegetation on west side of road.	Yes	Intermittent	0	1000	0	Place pipeline on east side of road to avoid wetlands.
599	1	G	G-14	Chalk Hill Rd.	See Form CH-8: Franz Ck. 100' wide water of U.S.; 20 cfs on 4/17/95, sandy/cobbly channel; large stream terrace/flood plain meander along west side of road. Existing steep fill slope on both sides.	Yes	Perennial	0	2000	0	Jack and bore construction will be used to avoid important aquatic habitat.
600	3.5	G		Chalk Hill Rd.	See form CH-9: Tributary to Franz Ck., 36" CMP, 0.5 cfs, 9' wide barren channel on east side of road.	Yes	Intermittent	180	0	2000	Riparian woodland vegetation which parallels road way on west side has been avoided.
601	4	G	-	Chalk Hill Rd.	See Form CH-10: Seasonal wetland in 12' wide swale on east side of road, roadside drainage ditch parallels west side of road way.	Yes	Intermittent	240	0	0	
602	3	G	-	Chalk Hill Rd.	See Form CH-11: Seasonal drainage with willows and riparian woodland vegetation along east side of road way, riparian vegetation is located more than 30' from centerline on east side of road	Yes	Intermittent	0	0	0	
603	2	G	G-15	Chalk Hill Rd.	See Form CH-12: Brooks Ck.; 70' bankful and 50' bridge/culvert, 10 cfs; eastside slightly mixed riparian woodland, small strip wetland 10' on east bank.	Yes	Perennial	1200	1200	400	Jack and bore construction will be used to avoid wetlands, waters of U.S. and mixed riparian woodland.
604	4	G	-	Chalk Hill Rd.	See Form CH-13: Tributary to Brooks Ck., 60" RCP, 1-5 cfs, 8' wide water of U.S./ riparian woodland on east side of road, 8' wide wetland on west.	Yes	Intermittent	160	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
605	4	G	-	Chalk Hill Rd.	4' wide seasonal drainage.	Yes	Intermittent	80	0	0	
606	4	G	-	Chalk Hill Rd.	4' wide wetland swale; <1 cfs, 36" RCP; vegetated by <i>Juncus</i> sp. and other wetland species.	Yes	Intermittent	80	0	0	
607	4	G	-	Chalk Hill Rd.	3' wide wetland swale, 3'x6' box, Vegetated by <i>Juncus</i> and other wetland species.	Yes	Intermittent	60	0	0	
608	4	G	-	Chalk Hill Rd.	24" RCP; waters of U.S. west of road, Wetlands east of road, 12' wide channel vegetated by <i>Juncus</i> sp.	Yes	Intermittent	240	0	0	
609	4	G	-	Chalk Hill Rd.	See CH-17: 3' x 6' RC box, 0.5 cfs; 6' waters of U.S. on the westside, 8' wide area of wetlands on the east, east has some wetland vegetation.	Yes	Intermittent	160	0	0	
610	4	G	-	Chalk Hill Rd.	2' wide seasonal drainage.	Yes	Intermittent	40	0	0	
611	4	G	-	Chalk Hill Rd.	5' wide barren channel, 36" CMP, 0.5 cfs.	Yes	Intermittent	100	0	0	
612	4	G	-	Chalk Hill Rd.	6' wide seasonal drainage; 0.1 cfs.	Yes	Intermittent	160	0	0	
613	4	G	-	Chalk Hill Rd.	6' x 6' RC box; 2+ cfs.; 6' wide well defined barren channel.	Yes	Intermittent	120	0	0	
614	3.5	G	-	Chalk Hill Rd.	0.1 mile long riparian woodland encroachment on east side of road.	Yes	Intermittent	0	300	800	Riparian woodland vegetation paralleling road way on the east side has been avoided.
615	4	G	-	Chalk Hill Rd.	2' wide riparian encroachment on both sides of road.	Yes	Intermittent	40	0	0	
616	4	G	-	Chalk Hill Rd.	2' wide seasonal drainage, barren sandy channel with blackberry on upper banks.	Yes	Intermittent	40	0	0	
617	3.5	G	-	Chalk Hill Rd.	40' wide emergent wetland and barren 6' - 8' deep and 8' - 12' wide channel, 0.5 cfs on west side of road.	Yes	Intermittent	0	0	800	Placement of pipeline in the road way has avoided riparian woodland on west side of road.
618	3.5	G	-	Chalk Hill Rd.	Riparian encroachment > 1000' on west side of road; 12' wide and 8' deep barren channel on east side.	Yes	Intermittent	0	0	20000	Placement pipeline in east side of road way has avoided riparian woodland on west side of road.
619	4	G	-	Chalk Hill Rd.	See CH-22: 3' x 6' RC box, < 1 cfs, 6' - 8' wide wetland on west side, 12' - 15' wide wetland on east side.	Yes	Intermittent	300	0	0	
620	4	G	-	Chalk Hill Rd.	10' wide ditch on west side of road, vineyard on east side.	None	Intermittent	200	0	0	
621	3	G	-	Chalk Hill Rd.	See CH-23: Wright Ck., (2) 60" CMPs, 3+ cfs, 20' - 25' wide willow riparian woodland wetland on east side, fewer willows on west side.	Yes	Intermittent	300	0	200	Place pipeline on west side of road way south of crossing or place in existing road bed to avoid willow riparian woodland.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
622	3	G	-	Chalk Hill Rd.	Inundated willow riparian woodland on east side of road way , 15' wide.	Yes	Intermittent	0	0	1300	Place pipeline on west side of road way south of point 622 or place in existing road bed to avoid willow riparian woodland.
623	3	G	-	Chalk Hill Rd.	See CH-24A: 3' x 8' RC box; >1 cfs; 180' of mixed riparian woodland encroachment.	Yes	Intermittent	160	0	3600	Place pipeline on west side of road way south of crossing or in existing road bed to avoid mixed riparian woodland on east side.
624	3	G	-	Chalk Hill Rd.	1300' riparian encroachment.	Yes	Intermittent	0	0	26000	Place pipeline on west side of road way south of crossing or place in existing road bed to avoid mixed riparian woodland on east side.
625	3	G	-	Chalk Hill Rd.	See CH-24B: 18' wide x 5' tall bridge, 1.5 cfs. mixed riparian woodland on east side.	Yes	Intermittent	360	0	360	Place pipeline on west side of road way south of crossing or place in existing road bed to avoid mixed riparian woodland on east side.
626	3.5	G	-	Chalk Hill Rd.	0.1 mi riparian woodland encroachment along west side of road.	Yes	Intermittent	0	0	10000	Place pipeline in on east road shoulder or existing road way to avoid riparian woodland on west side.
627	4	G	-	Chalk Hill Rd.	See CH-25: Pool Ck., (2) 10' wide x 5' high RC boxes; inundated 6-12" 4/13/95; deeply incised, barren channel, 30' wide x 20'+ deep; small amount of riparian woodlands along west side.	Yes	Intermittent	600	0	0	
628	4	G	-	Corner of Chalk Hill Rd. and Pleasant Ave.	30" CMP, 4' wide sideboard drainage on north side.	Yes	Intermittent	80	0	0	
629	3	G	-	Pleasant Ave.	See P-1: Pool Ck., 25'-30' wide gravel channel; 150' wide wetland/ mixed riparian woodland on north side of road; 10'-12' wide barren channel on south side.	Yes	Intermittent	600	0	3000	Place pipeline in existing road way or move to south of road to avoid wetland / riparian encroachment.
630	4	G	-	Pleasant Ave.	10' wide wet swale on north side of road in vineyards.	Yes	Intermittent	200	0	0	
631	4	G	-	Pleasant Ave.	See P-2: 36" CMP; 4'-6' wide, mostly barren, channel with rip rapped banks; outlet basin 20' diameter on north side of road.	Yes	Intermittent	400	0	0	
632	4	G	G-16	Conde Lane	See P-3: 36" CMP; 4' wide flood control channel with flat bottom, 30" RCP under 101 <i>Rumex</i> sp., <i>Cyperus</i> sp., <i>Juncus</i> spp., <i>Potamogeton</i> sp.	Yes	Intermittent	80	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
633	3	G	G-17	Conde Lane	See P-4: Pool Ck., 25' RC box; 12'-16' low flow channel, 50' wide willow riparian woodland. Main channel of creek is a Water of U.S., willows along edge form an adjacent strip wetland.	Yes	Intermittent	500	0	1000	Place pipeline 20'-30' east of shoulder in area bare of vegetation.
634	4	G	-	Conde Lane	See P-5: Tributary to Pool Ck., Concrete culvert; 20' wide barren, flat bottomed channel with 40'-50' wide strip of wetland vegetation along banks.	Yes	Intermittent	1400	0	0	
635	4	G	-	Shiloh Rd.	Large seasonally wet swale 50' wide on south side of road.	Yes	Intermittent	1000	0	0	
636	4	G	-	Shiloh Rd.	Large wet swale, 80' wide, south side crosses road and flows to large pond on north.	Yes	Intermittent	1600	0	0	
637	4	G	-	Shiloh Rd. and Windsor Rd.	Seasonally wet swale, 80' wide, on south east side of road.	Yes	Intermittent	1600	0	0	
638	4	G	-	Saunders Rd. and Windsor Rd.	Ponded depression.	Yes	Intermittent	120	0	0	
639	3	G	-	Windsor Rd.	See P-6: Tributary to Windsor Ck., 30' wide RC box under and parallel to east side of Windsor Rd.; 2' pipe serving organic farm; mixed riparian wetland/willow encroachment 200' to the east and 50' to the west.	Yes	Intermittent	1000	0	10000	Place pipeline in existing road way or move to west shoulder of road to avoid mixed riparian woodland.
640	4	G	-	Windsor Rd.	Drainageway	Yes	Intermittent	0	0	0	
641	3	G	-	Windsor Rd.	8'-10' wide seasonal wetland on both sides of Windsor Rd.; vegetated by <i>Lolium</i> sp. and <i>Juncus</i> sp.	Yes	Intermittent	200	0	0	Place pipeline in existing road way or move to the west of road to avoid wetlands.
642	3	G	-	Slusser Rd.	Terrace above drainage channel supports depressions which could support vernal pool vegetation; 20' wide.	Yes	Intermittent	0	400	0	Place pipeline in existing road bed or shoulder to avoid vernal pool vegetation.
643	3	G		Slusser Rd.	See P-7: 30" concrete culvert; inundated possible vernal pools near airport. Large wet depressions on west side of road.	Yes	Intermittent	80	0	0	Place pipeline in existing road bed or either shoulder.
644	4	G	-	Slusser Rd.	20' wide wet meadow/swale, vernal pools in area of airport.	Yes	Intermittent	400	0	0	
645	4	G		Slusser Rd.	See Form G-8: inundated; willow riparian encroachment 20' wide on east side of road.	Yes	Intermittent	400	0	0	
646	3	G	-	Slusser Rd.	Large wetland in depression on the east side of road, smaller wetland area in depression along the west side of road.	Yes	Intermittent	2000	0	0	Place pipeline in existing road bed or shoulder on west side of road.
647	1	G	G-18	Slusser Rd.	See G-9: Mark West Ck., 60' wide low flow channel, 125' mixed riparian woodland encroachment.	Yes	Perennial	0	1200	1300	Jack and bore construction will be used to avoid mixed riparian woodland & waters of U.S.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
648	3	G	SR-11	Slusser Rd.	200' of riparian encroachment on east side of road along Mark West Ck.	Yes	Intermittent	0	0	4000	Place pipeline in existing road bed or shoulder to avoid mixed riparian woodland.
649	3	G	-	Highway 116	1000' of mixed riparian woodland encroachment on north side of road.	Yes	Intermittent	0	0	20000	Place pipeline in existing road bed or shoulder, in south side, or along small street that parallels Hwy. 116 to avoid mixed riparian woodland.
650	4	G	-	Olivet Rd.	30" CMP; wet swale 10' wide along both sides of road.	Yes	Intermittent	200	0	0	
651	4	G	-	Olivet Rd.	Wet swale 8' on both sides of road, 30" CMP.	Yes	Intermittent	160	0	0	
652	4	G	-	Olivet Rd.	Wet swale 8' on both sides of road, 30" CMP.	Yes	Intermittent	160	0	0	
653	3	G	-	Piner Rd. / Willowside Rd.	Wet swale 20' wide SE corner of road, crosses road way roadside drainage 6' wide and parallels Piner Rd. for 2000'	Yes	Intermittent	400	40000	0	Place pipeline in existing road bed or shoulder on north side of road.
654	4	G	-	Willowside Rd.	See Form G-10: 3' x 8' RC box; 10'-12' wide flat bottom, channelized wetland.	Yes	Intermittent	240	0	0	
655	4	G	-	Willowside Rd.	Culvert under road way, wet swale on both sides.	Yes	Intermittent	160	0	0	
656	5	G	-	Pine Flat Rd.	5' wide seasonal channel.	Yes	Intermittent	300	0	0	
657	5	G	-	Pine Flat Rd.	20' wide willow riparian and grassland wetland swale.	Yes	Intermittent	300	0	0	
658	5	G	-	Hwy 128 mi. post 14.54	3' x 2' RC box; 8' wide sandy channel northside of road, 6' wide wetland swale on southside of road. (Note taken nearby along road directly across new XC alignment.)	Yes	Intermittent	1500	0	0	
660	5	G	-	Hwy 128 mi. post 14.88	24" CMP, sandy channel 5' wide both sides of road way and downstream. (Note taken nearby along road directly across new XC alignment.)	Yes	Intermittent	300	0	0	
700	2	W-201-A/S	W-1	Long Pine Rd. @ 1500' west of Hwy 116	Blucher Ck. See Form LP-01: 50' wide x 10 high RCB; 25' wide channel; 5 cfs (1/5/96); thick <i>Kalix</i> along channel.	Yes	Seasonal	0	0	1000	Jack and bore construction will be used to avoid willow riparian woodland.
703	2	W-202-A/S	W-2	Bloomfield Rd. @ 1550' SE of Canfield Rd.	Blucher Ck. See Form BL-01: (2) 9' wide x 6' high RCB; 1 to 3 cfs, 1'-4" deep (1/5/96); 20' wide channel; <i>Alnus rhombifolia</i> <i>Salix</i> spp.	Yes	Seasonal	0	100	300	Jack and bore construction will be used to avoid willow riparian woodland.
705	3	W-202-A/S	-	Bloomfield Rd @ 1800' NE of Burnside Rd.	16" CMP; riparian woodland along ravine mostly out of ROW; <i>Alnus</i> , <i>Salix</i> , some <i>Quercus</i> .	Yes	Intermittent	200	0	0	Place pipeline in existing road shoulder to avoid woodland on the west side.
709	4	W-142-A/S	-	Roblar Rd. @ 4400' west of Petersen Rd.	40" CMP; 8' wide channel.	Yes	Intermittent	160	0	0	
710	4	W-142-A/S	-	Roblar Rd. @ 3600' west of Petersen Rd.	30" CMP; 10' wide channel.	Yes	Intermittent	200	0	0	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
711	4	W-142-A/S	-	Roblar Rd. @ 1900' west of Petersen Rd.	30" CMP; 5' wide channel; dry 9/95.	Yes	Intermittent	100	0	0	
716	4	W-141-A	-	Canfield Rd. @4500' north of Roblar Rd.	11' x 5' RC block; seasonal 10' wide channel; dry 10/12/95.	Yes	Intermittent	200	0	0	
717	3.5	W-141-A	-	Canfield Rd. @3400' north of Roblar Rd.	Blucher Creek headwaters. See Form CAN-02: 36" CMP, 12" CMP; dry 8/21/95; highly grazed, grassland, seasonal wetland on eastside; riparian with <i>Salix</i> spp. <i>Rubus discolor</i> on west side.	Yes	Intermittent	120	0	5000	Place pipeline in road bed east side to avoid willow riparian on west side.
720	5	W-205-A/S	-	200' south of Hwy. 116 near Stony Pt. Rd.	Off-site; See nearby ag. irrigation observation No. 470-01; swale; grassland seasonal wetland.	Yes	Intermittent	4500	0	0	
721	5	W-205-A/S	-	500' south of Hwy. 116 near Stony Pt. Rd.	Off-site; See nearby ag. irrigation observation No. 470-02; swale and 20' channel Gossage Ck.; grassland seasonal wetland.	Yes	Intermittent	10500	0	0	
722	4	W-141-A	-	Private Rd 5000' north of Roblar Rd. 600' west of Canfield Rd.	Off-site; 50' Wide grassland seasonal wetland along private rd.; adjacent to channel with willow riparian.	Yes	Intermittent	1000	0	0	
723	3	W-207-A/S	-	Roblar @ 800' west of Petersen Rd.	See Form ROB-01: 12' x 6' RC box, (2) 38" CMP; dry 8/24/95; flat bottom channel; dense <i>Salix</i> spp. on north side; grassland seasonal wetland on south side.	Yes	Intermittent	240	0	0	Place pipeline on south side to lessen wetland impacts.
724	4	W-145-A/S	-	Petersen Rd. @ 1900' north of Roblar Rd.	36" CMP; 8' wide channel; dry 8/24/95.	Yes	Intermittent	160	0	0	Place pipeline on south side to lessen wetland impacts.
725	4	W-145-A/S	W-4	Petersen Rd. @ /3800' north of Roblar Rd.	Gossage Ck. See Form PET-02: 14' x 6.5' RC bridge; concrete apron in ROW; inundated 8" 4/13/95, wet 8/24/95; 14' wide, flat bottom channel <i>Salix</i> spp., & <i>Populus</i> sp.	Yes	Seasonal	280	0	0	
726	4	W-145-A/S	-	Petersen Rd. @ 4400' north of Roblar Rd.	See Form PET-01: 14' x 5' RC box; concrete apron in ROW; wet 8/24/95; flat bottom channel; riparian shrub- <i>Salix</i> spp. eastside; Waters of U.S. with grassland on eastside.	Yes	Intermittent	320	0	0	
729	2	W-200-A/S	SR-12	Llano Rd. @ Santa Rosa Cr. 2900' north of Hwy 116	Santa Rosa Cr. See Form LL-01: 160' wide x 11' high RCB; standing water, 1'-6' deep (1/5/96); channel 60' wide; riparian & wetland <i>Salix</i> spp., <i>Alisma</i> .	Yes	Seasonal	0	1000	1800	Jack and bore construction will be used to avoid willow riparian woodland & seasonal wetland.
730	3	W-200-A/S	-	Llano Rd. @ Santa Rosa Cr. 2200' north of Hwy 116	See Form LL-02: Wet area drains road and edge of freshwater marsh, 10' to 15' off paved shoulder on west side of road; willow lined ditch parallels road on east side.	Yes	Intermittent	0	5000	0	Place pipeline in existing road bed or road shoulder to avoid road side willow ditch and seasonal wetland.

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Impact Area (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
731	3	W-200-A/S	-	Llano Rd. @ Santa Rosa Cr. 100' north of Hwy 116	Thick willow/oak riparian woodland & and seasonal wetland along west side of road side; willow lined ditch, about 10' off shoulder, parallel road on east side.	Yes	Intermittent	200	2000	4000	Place pipeline in existing road bed or east road shoulder to avoid valuable woodland & wetland on west side.
732	4	W-200-A/S	-	Hwy 116 @ 600' south of Petersen Rd	24" diameter CMP; swale area below road; small surface water (1/5/96); mainly <i>Rubus discolor</i> , a few annual grasses & herbs.	Yes	Intermittent	160	0	0	
733	4	W-200-A/S	-	Hwy 116 @ 20' north of Llano Rd.	See Form SP-11: 12' wide x 6' high RCB, concrete bottom extending 10' from road shoulder; 2-5 cfs (1/5/96); <i>Salix</i> spp., <i>Rubus discolor</i> .	Yes	Intermittent	240	0	0	
734	4	W-200-A/S	W-10	Hwy 116, Stony Pt. Rd. and Gossage Cr.	Gossage Ck. See Form SP-13: (2) 12' wide x 6' high RCB, crosses creek at a diagonal; about 5 cfs, 1.5' deep (1/5/96); <i>Typha</i> , <i>Lemna</i> , <i>Rubus</i> .	Yes	Seasonal	500	0	0	
735	4	W-200-A/S	-	Stony Pt. Rd. @ 2800' south of Hwy 116	40" CMP; seasonal wetland in channel outside of ROW.	Yes	Intermittent	0	0	0	
736	4	W-200-A/S	W-9	Stony Pt. Rd. @ 5700' south of Hwy 116	Washoe Creek. See Form SP-15: 18' wide 8' high RCB; 2-5cfs (1/4/96), gravelly bottom; bank degraded from excessive grazing <i>Pleuropogon</i> , <i>Rorippa</i> , <i>Eleocharis</i> .	Yes	Intermittent	360	0	0	
748	1	D-3	-	River Rd. @ 2400' west of Slusser Rd.	Mark West Ck. See Form RIV-02: 225' x 10' to 15' RC bridge; standing water, < 1cfs; natural channel; riparian woodland/wetland <i>Salix</i> spp., <i>Fraixnus</i> , <i>Alnus rhombifolia</i> <i>Typha</i> , <i>Lemna</i> ; many 1" to 3" minnows north side of road.	Yes	Perennial	0	500	1500	Jack and bore construction will be used to avoid mixed riparian woodland, wetland, and waters of the U.S.
749	1	D-3	SR-10	River Rd. @ Mark West Creek	Mark West Ck. See Form RIV-01: 300' x 35' RC bridge; >5 cfs; natural channel; riparian woodland/wetland <i>Salix</i> spp. <i>Fraixnus</i> , <i>Alnus rhombifolia</i> , <i>Quercus garrayana</i> , <i>Scripus</i> .	Yes	Perennial	0	500	1500	Jack and bore construction will be used to avoid mixed riparian woodland, wetland, and waters of the U.S.
750	4	D-3	-	Healdsburg Rd. @ 400' north of River Rd.	36" CMP; small seasonal drainageway.	Yes	Intermittent	40	0	0	
751	1	D-3	-	Healdsburg Rd. @ 2400' north of River Rd.	Mark West Ck. See Form, HE-01: 175' x 24' RC bridge; >5 cfs, 20' to 30' natural channel; riparian woodland/wetland <i>Salix</i> spp. <i>Fraixnus</i> , <i>Polygonum</i> , <i>Ranunculus</i> .	Yes	Perennial	0	1400	0	Jack and bore construction will be used to avoid mixed riparian woodland, wetland, and waters of the U.S.
752	4	D-3	-	Healdsburg Rd. @ 2900' north of River Rd.	48" CMP; drains road side ditch.	Yes	Intermittent	80	0	0	
TOTAL ACRES								13.10	18.64	9.05	

Table 3.2 (continued)

Jurisdictional Wetlands and Other Waters of the U.S. Within Proposed ROW

Alternative Pipeline Alignments

- (1) CMP = Corrugated metal pipe
- (2) ROW = Right-of-way
- (3) RC or RCP = Reinforced concrete or reinforced concrete pipe

Table 3.3

Storage Transmission and Irrigation Distribution Pipelines

Stream Crossings Outside Study Area*

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Disturb. (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
	1		G-1	Geyers steamfield recharge area.	Big Sulfur Cr. ⁽¹⁾ Average width of 7' of natural channel; clear, 1-5 cfs 6/12/95; 70 percent canopy with both mature and young trees on bank.		Perennial				Jack and bore construction.
	1		G-2	Geyers steamfield recharge area.	Cobb Cr. Average width of 10' of channel; clear, 1-5 cfs ⁽²⁾ 6/12/95; 90 percent canopy with both mature and young trees on bank.		Perennial				Jack and bore construction.
	1		G-3	Geyers steamfield recharge area.	Squaw Cr. Average width of 3' of natural channel; clear, <1 cfs 6/12/95; 100 percent canopy with mature conifer trees.		Seasonal				Jack and bore construction.
	1		SR-3	Santa Rosa Cr. @ Willowside Rd. (Urban irrigation area)	Santa Rosa Cr. Average width of 50' of channelized channel; clear, >5 cfs 6/12/95; emergent plants 0 percent canopy with mature trees, young trees, shrubs, and forbs.		Perennial				Jack and bore construction.
	1			Santa Rosa Cr. @ Madison St. (Urban irrigation area)	Information not available.						Suspend from bridge along existing pipeline.
	1			Santa Rosa Cr. @ Olive St. (Urban irrigation area)	Information not available.						Suspend from bridge along existing pipeline.
	1			Santa Rosa Cr. @ 3rd St. (Urban irrigation area)	Information not available.						Suspend from bridge along existing pipeline.

Table 3.3 (continued)

Storage Transmission and Irrigation Distribution Pipelines
Stream Crossings Outside Study Area*

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Disturb. (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
	1			Spring Cr. @ Franquette Ave. (Urban irrigation area)	Information not available.						Jack and bore construction.
	1		SR-1	Matanzas Cr. @ Farmers Ln. (Urban irrigation area)	Matanzas Cr. Average width of 7' of natural channel; stained, <1 cfs 6/19/95; emergent plants, 80 percent canopy with mature trees, young trees, shrubs, and forbs.		Unknown				Jack and bore construction.
	1		SR-2	Matanzas Cr. @ Hoen Ave. (Urban irrigation area)	Matanzas Cr. Average width of 6' of natural channel; stained, <1 cfs 6/19/95; 90 percent canopy with mature trees, young trees, shrubs, and forbs.		Unknown				Jack and bore construction.
			SR-4	Santa Rosa Cr. @ Stony Pt. Rd. (Urban irrigation area)	Santa Rosa Cr. Average width 20' wide of channelized drainage; clear 1 to 5 cfs 7/27/95; forbs.		Perennial				
			SR-5	Flood Control @ Marlow & West College (Urban irrigation area)	Flood Control. Average width 3' wide of channelized drainage; 20' wide concrete bridge, turbid (sediment) <1 cfs 7/27/95; emergent plants, forbs.		Unknown				
			SR-6	Flood Control @ Marlow & Greeneich (Urban irrigation area)	Flood Control. Average width 3' wide of channelized drainage; 20' wide concrete bridge; turbid (sediment) <1 cfs 7/27/95; emergent plants, forbs.		Unknown				

Table 3.3 (continued)

Storage Transmission and Irrigation Distribution Pipelines
Stream Crossings Outside Study Area*

Cross. No.	H.M. Code	Pipe Seg.	Other Study	Crossing Location	Pipeline Stream Crossing Description	Jurisdiction	Permanence	Disturb. (sq ft)	Avoid. 404 (sq ft)	Avoid. 1601 (sq ft)	Recommendations and Comments
			SR-7	Flood Control @ Apache St. (Urban irrigation area)	Flood Control. Average width 8' wide of channelized drainage; CMP ⁽³⁾ ; clear <1 cfs 7/27/95; emergent plants, young trees and forbs.		Unknown				
			SR-8	Laguna @ Stony Pt. Rd. (Existing irrigation area)	Laguna. Average width 8' wide of channelized drainage; 100' wide concrete bridge; stained and turbid (sediment) <1 cfs 7/27/95; emergent plants, 60% canopy with mature, young trees, shrubs and forbs.		Perennial				
			SR-9	Laguna @ Delta Pond & Guerneville bridge (Existing irrigation area)	Laguna. Average width 20' wide of channelized drainage; stained and turbid (sediment & algalgae) 1 to 5 cfs 7/27/95; emergent plants, 40% canopy with mature, young trees, shrubs and forbs.		Perennial				

*Evaluated separately by Merrit Smith

- (1) CR - Creek
- (2) cfs - cubic feet a second
- (3) CMP - corrugated metal pipe

Table 3.4

Pump Station Wetland Determination for Sites

Pump Station	Pad Size	Permanent Disturbance (sq ft)	Temporary Disturbance (sq ft)	Habitat Type ⁽³⁾	Site Description	Recommendations and Comments
S	40' X 80'	0	0	ANG, MR	Urban, Santa Rosa Wastewater Treatment Plant Site	
B	40' X 80'	0	0	ANG, MR	Urban, Santa Rosa Wastewater Treatment Plant Site	
SEB	40' X 80'	0	0	ANG, WR	Disturbed area; reservoir retention slope.	
G1	40' X 80'	0	0	ANG, WR	Site in an existing disturbed area; reservoir retention slope.	
G2	one acre	0	0	VINE	Nonwetland. Agriculture.	
G3	one acre	12,500	6,300	ANG, OW	Wetland. Large, 60' wide, freshwater seep on concave slope.	Relocate pump station to nonwetland area nearby.
G4	one acre	0	0	OBW	Nonwetland. Ridge top.	
D	40' X 80'	0	0	ANG, WR	Disturbed area; reservoir retention slope.	
DR	40' X 80'			VINE	Agriculture.	
SBPS-3	20' X 40'	800	9,200	ANG, MR (1*)	Nonwetland. Fallow, weedy agricultural field.	Avoid drainage and mixed riparian vegetation to the north. Setback of 100' needed from Crane Creek.
SBPS-7	30' X 90'	2,700	7,300	ANG	Nonwetland. Agricultural field.	Avoid Copeland Creek located to the south.
SBPS-8	30' X 50'	0	0	CROP	Nonwetland. Agricultural field.	
SBPS-9	20' X 40'	0	0	ANG	Nonwetland. Agricultural field.	
SBPS-10	30' X 90'	0	500	ANG, DR	Nonwetland & very small grassland seasonal wetland & waters of the U.S. Agricultural field used as rangeland adjacent to urban land.	Avoid stock pond to the east and Lichau Ck. drainage to the north.
SBPS-11	30' X 50'	0	0	CROP	Nonwetland. Agricultural field used for hayland and pasture.	
SBPS-12	30' X 90'	0	0	PAS, EUC	Nonwetland. Agricultural field.	
WBPS-1	20' X 40'	800	9,200	ANG	Wetland. Grassland seasonal wetland. Agricultural field used for livestock grazing & hayland.	

Table 3.4 (continued)

Pump Station Wetland Determination for Sites

Pump Station	Pad Size	Permanent Disturbance (sq ft)	Temporary Disturbance (sq ft)	Habitat Type ⁽³⁾	Site Description	Recommendations and Comments
WBPS-3	20' X 40'	0	100	CROP (2*)	Nonwetland and small seasonal wetland. 5' wide road side ditch.	Avoid road side drainage ditch & associated seasonal wetlands.
WBPS-4	30' X 50'	1,500	8,500	PAS	Wetland. Grassland seasonal wetland. Agricultural field used for livestock grazing.	
WBPS-5	30' X 90'	0	0	PAS	Nonwetland. Agricultural field used for livestock grazing.	
WBPS-6	30' X 50'	0	0	PAS (3*)	Nonwetland. Agricultural field.	Avoid small, about 3'-5' wide, drainage & associated small wetland to the west. 150' setback from tree dripline & 100' setback from drainage.
WBPS-7	30' X 50'	1,500	8,500	ANG, NWR, J-WET	Wetland. Grassland seasonal wetland & 10' wide drainage & willow riparian vegetation.	Avoid drainage & willow riparian vegetation.
WBPS-8	30' X 50'	500	1,000	PAS, J-WET	Wetland. 10-15' wide grassland seasonal wetland & drainage. Rangeland.	Avoid drainage and associated grassland seasonal wetland.
LBPS-1	20' X 40'	0	0		Nonwetland. Cleared graded area between vineyards near pond.	
LBPS-2	30' X 90'	0	0		Nonwetland.	
LBPS-3	30' X 50'	0	0		Nonwetland. Uncultivated apple orchard.	
LBPS-4	30' X 50'	0	0		Nonwetland.	
TASW	40' X 80'			PAS	Agriculture	See note 1).
TCSW	40' X 80'			CROP, DR	Agriculture	See note 1).
T	40' X 80'			ANG, MR	Agriculture	See note 1).
SP	40' X 80'			PAS	Agriculture	See note 1).
L	40' X 80'			ANG OW, MR	Agriculture	See note 1).
TR	40' X 80'			MR, ANG	Agriculture	See note 1).
CR	40' X 80'			PAS	Agriculture	See note 1).

Table 3.4 (continued)

Pump Station Wetland Determination for Sites

Pump Station	Pad Size	Permanent Disturbance (sq ft)	Temporary Disturbance (sq ft)	Habitat Type ⁽³⁾	Site Description	Recommendations and Comments
VF	40' X 80'			ANG, J-WET	Agriculture	See note 1).
H	40' X 80'			PAS	Agriculture	See note 1).
FGS	40' X 80'					See note 1).
FGB	30' X 50'			URB	Hillside adjacent to urban & Old Redwood Hwy	See note 1).
BVS	40' X 80'					See note 1).
BVB	30' X 50'			URB	Parking lot for Sonoma County Fairgrounds.	See note 1).
PS-CR		0	0		Nonwetland. agricultural field footslopes near drainage. (Located below Carrow Rd. N. Reservoir outlet structure.)	See note 2).
PS-VF		0	0		Nonwetland. agricultural field. (Located below Valley Ford Reservoir outlet structure.)	See note 2).
PS-B		0	0		Nonwetland. agricultural field. (Located below Bloomfield Reservoir outlet structure.)	See note 2).
PS-TASW		0	0		Wetland. Seasonal wetland in agricultural field. (Located above Tolay Reservoir inlet structure.)	See note 2).
PS-TR		0	0		Wetland. Freshwater seep. (Located below Adobe Road Reservoir outlet structure.)	See note 2).
PS-AR		0	0		Wetland. Seasonal wetland in adjacent to Washington Cr. (Located below Two Rock Reservoir outlet structure.)	See note 2). If possible, avoid Washington Ck. and seasonal wetland to the west.
PS-H		0	0		Wetland. Grassland seasonal wetland. Agricultural field used for livestock grazing. (Located below Huntley Reservoir outlet structure.)	See note 2).
PS-L		0	0		Wetland. Seasonal wetland in and adjacent to drainage. (Located below Lakeville Hillside Reservoir outlet structure.)	See note 2). If possible, avoid drainage and associated wetlands.

Table 3.4 (continued)

Pump Station Wetland Determination for Sites

Pump Station	Pad Size	Permanent Disturbance (sq ft)	Temporary Disturbance (sq ft)	Habitat Type ⁽³⁾	Site Description	Recommendations and Comments
PS-T		0	0		Nonwetland. Hillside footslope adjacent to Tolay Ck. (Located below Tolay Reservoir outlet structure.)	See note 2). If possible, avoid drainage and associated wetlands.
PS-SP		0	0		Nonwetland. Hillside footslope adjacent to Tolay Ck. (Located below Sears Point Reservoir outlet structure.)	See note 2). If possible, avoid drainage and associated wetlands.
Total Square Feet		20,300	50,600			

Notes:

- (1) Pump station was not evaluated. It is in the urban irrigation pipeline alignment.
- (2) Pump station is inside the reservoir construction boundary which has already been evaluated in Reservoir Wetlands Determinations.
- (3) ANG - Annual grassland; MR - Mixed riparian; WR - Willow riparian; Vine - Vineyard; OW - Oak woodland; OBW - Oak bay woodland; Crop - Cropland; DR - Drainage; PAS - Pasture; EUC - Eucalyptus; NWR - Non-wooded riparian; URB - Urban; JWET - Juncus wetland

4. STREAM AND WETLAND PIPELINE CROSSING, PUMP STATION AND RUSSIAN RIVER DISCHARGE OUTFALL CONSTRUCTION AND MITIGATION PROCEDURES

This conceptual plan identifies general pipeline construction and design measures and additional measures to avoid, minimize, and compensate for impacts to potential jurisdictional wetlands and other waters of the U.S. that could result from construction and operation of the project pipelines, pump stations and the Russian River direct discharge outlet. For the most part, pipeline construction impacts to potential jurisdictional wetlands and other waters of the U.S. would be temporary. Construction and operation of the pump station sites and Russian River Direct Discharge outfall structure could result in some permanent losses prior to mitigation. Potential impacts of pipeline construction, maintenance and ruptures on the water quality and aquatic biology at stream crossings are addressed in separate technical memoranda prepared by Merritt Smith Consulting including: Water Quality Impact Analysis Report, Aquatic Biological Resources Impacts Assessment, Aquatic Habitat Survey Results and Stream Crossings Assessment (March and April 1996).

Although unlikely, impacts to potential jurisdictional wetlands and other waters of the U.S., and any associated sensitive aquatic habitat, could occur at or immediately downstream of pipeline stream crossings and pump station sites during operation of the project due to pipeline failure or leakage. The potential for these operational failures or impacts as a result of earth movement, seismic shaking, corrosion, or weld failure would be minimized substantially by application of engineering design and construction quality control Best Management Practices. Furthermore, potential leakage or rupture of the pipeline was determined to be a less than significant impact to water quality and aquatic organisms in the technical memoranda prepared by Merritt Smith Consulting (Merritt Smith Consulting, April 1996).

PROJECT DESIGN AND CONSTRUCTION APPROACH

Pipelines

Impacts to potential jurisdictional wetlands and other waters of the U.S. have been avoided or minimized by locating pipelines along existing roadway ROWs, generally with 10 feet of the centerline. This minimizes the amount of disturbance to vegetation, native soils, isolated seasonal wetlands, and roadside drainages. This approach also avoids impacting higher quality potential jurisdictional wetlands and other waters of the U.S. in less disturbed, natural and agricultural areas nearby. It was assumed that the value of potential jurisdictional wetlands and other waters of the U.S. within the footprint of the existing roadway ROWs has been degraded relative to adjacent parcels. Disturbances include alteration of vegetation, soils, and hydrology due to construction of the original roadway and light, noise, vehicular traffic, and roadway runoff associated with continuing operation of the highway. However, it is not always feasible or practical to place the pipeline in the roadbed within 10 feet of the centerline or along existing roadways. The pipeline stream and wetland crossings listed in Tables 3.2 and 3.3 require additional construction ROW off the roadway and could involve temporary impacts to potential jurisdictional wetlands and other waters of the U.S. In locations where it was necessary to route pipelines cross-country, they would be aligned to follow existing ROWs or rural dirt roads as much as practicable.

Although most of the potential jurisdictional wetlands and other waters of the U.S. have been degraded, some pipeline stream crossings have the potential to impact a few remaining sensitive aquatic environments. Sensitive aquatic habitats were determined to be stream crossings with permanent flows or areas of extensive ponding for most of the year with emergent or relatively undisturbed riparian vegetation. The project development approach would be to bore and jack or suspend pipelines from bridges along existing pipelines to avoid impacts to potential jurisdictional wetlands and other waters of the U.S. with associated sensitive aquatic habitat.

Additional avoidance of major riparian corridors, flood plains and broad low lying basins subject to seasonal inundation or saturation was achieved during the preliminary pipeline alignment engineering siting studies. Whenever possible, the pipeline alignment was relocated or shifted to the other side of the highway to avoid the potential jurisdictional wetlands, other waters of the U.S., or riparian vegetation. The purpose of avoiding these areas was for dual concerns of corrosion protection and protection of biological resources. Cathodic protection would be included in the final design in areas with corrosive soils, wet areas or in areas of low pH soils. Other engineering Best Management Practices and construction quality control Best Management Practices for pipelines minimize the potential occurrence of failure during operation and/or severity if failure occurs.

The following design and construction practices should be implemented to avoid or minimize potential impacts to jurisdictional wetlands and other waters of the U.S. and any associated sensitive aquatic sites:

1. Place pipeline in roadbed or shoulder within 10 feet of centerline or limited to ROW as much as possible along existing roadways.
2. Place pipeline in existing rural dirt roads in cross country areas whenever possible.
3. Bore and jack or suspend from existing bridge all pipeline stream crossings with the potential to support sensitive aquatic habitat or provide some other unique biological value. All of the pipeline stream crossings proposed for bore and jack or suspension from existing bridges are listed in Table 3.2 and are identified by

Habitat Mitigation Codes 1 and 2 and in Table 3.3, which contains stream crossing which were not surveyed for wetlands.

4. Orient pipeline stream crossings as close to perpendicular (90 degree angle) as practicable.
5. Minimize cut and fill along streams through the use of steepened side slopes, retaining walls and extended culverts whenever possible.
6. Use biotechnical slope stabilization methods whenever possible, limit use of rip-rap and, at a minimum, comply with all conditions of Nationwide Permit 13.
7. Implement a weld quality assurance program including radiographic testing of welds in all sensitive areas such as bore and jack crossings of major waterways, railroads, highways and at pipeline tie-ins.
8. Install a cathodic protection system to protect pipelines buried in Reyes and other corrosive soils.
9. Install isolation valves on both sides of active fault zones, bore and jack pipeline stream crossings and stream crossings suspended from bridges along existing pipelines.
10. Implement a leak detection and repair program.
11. Contain and dispose of periodic pipeline maintenance flushing residue at appropriate Class II landfill or Regional Wastewater Treatment Plant.

Pump Stations

A biologist familiar with the procedures for identification of potential jurisdictional wetlands accompanied the design team during the preliminary engineering siting for pump stations to assess environmental constraints on potential pump station sites. All efforts were made during the siting of pump stations and associated construction staging areas to avoid potential jurisdictional wetlands or other waters of the U.S. The pump station sites and construction staging areas were designed to allow a minimum 100-foot exclusionary buffer from all other sensitive biological resources, other than special status plants, wherever possible. Some small isolated potential jurisdictional wetlands were determined to be present on a few of the pump station sites during later surveys. Pre-construction wetland delineations would be performed prior to the final project design. All pump stations would be located outside jurisdictional wetlands.

Long-term operational impacts such as noise and occasional human presence at or near pump station sites could result in disturbance to wildlife that use potential jurisdictional wetlands and other waters of the U.S. This potential degradation of value has been avoided or minimized by siting and design measures.

Russian River Discharge Outfall

The outfall would be located on the Russian River flood plain, and therefore it would need to be designed for submergence and capable of withstanding high scour velocities. It is a water dependent structure. Long term impacts that could result from the operation of the Russian River Outfall, such as increased bank and bed scour and erosion, have been avoided or minimized by siting the outfall in a previously

disturbed area and designing proper energy dissipaters and rip-rap. The outlet was sited on the Russian River along a reach with relatively stable banks and where the direction of the river flow is parallel to the bank so that there is minimal tendency for bank scour (Christensen 1995). The design of the outlet structure and bank stabilization measures would comply with Nationwide Permits 7 and 13 to minimize potential erosion and sedimentation impacts to downstream wetlands along the river. Some riparian restoration would be required to compensate for the small loss of riparian vegetation and fill of potential wetlands or other waters of the U.S. along the fringe that would be required to construct the outfall in the lower reach of the river.

PRE-CONSTRUCTION SURVEYS

Once an alternative or component is selected, the actual pipeline alignments, pump stations, Russian River outfall site, and equipment staging areas would be surveyed for project-level delineation of potential jurisdictional wetlands and other waters of the U.S. and the presence of any associated special-status species prior to actual construction. The purpose of the survey would be to identify any additional environmentally sensitive areas that should be avoided and to refine impact estimates for mitigation planning and permitting.

The pre-construction delineation should be performed at 1 inch to 100 feet scale at all major wetland and stream crossings. It should include a vegetative assessment to inventory the amount (square feet or acreage to the nearest 0.01 acre) and type of riparian vegetation that would temporarily disturbed. The survey should include counts of all trees protected by Sonoma and Marin County tree protection ordinances.

TIME WINDOW FOR CONSTRUCTION

Construction in seasonal or intermittent streams should be limited to the low flow period, June 1 through October 15. All perennial stream crossings would be either bored and jacked or suspended from existing bridges to avoid all potential jurisdictional wetlands and other waters of the U.S. and any associated woody riparian vegetation. The construction timing restrictions and special crossing procedures would avoid construction activities in a flowing stream, thereby minimizing any potential downstream impacts to wetlands and aquatic habitat. Disruption of intermittent and seasonal flows would be avoided in most cases by seasonal restrictions. However, areas of intermittent/seasonal ponding should be dewatered prior to excavation. Trenches should be dewatered into

upland areas in such a manner that no silt laden water flows into any perennial stream or river. Pumped water could be returned to the channel immediately downstream if the channel is dry. If the channel is flowing or ponded downstream, pumped water must meet the Regional Board's ambient turbidity standards prior to discharge to the channel. Energy dissipaters should be in place at discharge points to limit scour and stream bank erosion. Temporary settling tanks or haul-off by trucks to an approved upland disposal site may be necessary.

CLEARING AND GRADING

All required local, county, state and federal permits would be obtained prior to clearing and grading. The City would provide notification to the Corps concerning the proposed construction activities and obtain a blanket Section 404 permit for major crossings with special conditions and minor crossings with standard conditions. Pipeline construction activities should, at a minimum, comply with the conditions of Section 404 Nationwide Permits 12 and 14 (33 CFR 330). An individual Section 404 permit may be required for other components of this project and additional mitigation measures may be required as special conditions to the permit. The City would obtain the required Stream Bed Alteration Agreements with CDFG under Section 1601-1603 of the California Fish and Game Code; the 1601 agreement and the Section 404/10 permit would be coordinated to provide consistent mitigation conditions and save effort. A Section 401 water quality certification or waiver from the RWQCB would also be required.

The following design and construction practices should be implemented to avoid or minimize potential impacts to jurisdictional wetlands and other waters of the U.S. and any associated sensitive aquatic sites:

1. Postpone grading of ROW through riparian zone or wetlands until in-stream work is ready to commence.
2. Limit grading to the minimum area necessary to allow for movement of construction machinery and subsequent ditching and pipe installation operations.
3. Cut vegetation only at ground level, leaving existing root systems intact, and compost on site or remove for disposal at a Class III landfill or other suitable composting facility.
4. Limit pulling of tree stumps and grading activities to directly over the trench. Do not remove stumps or root systems from the rest of the right of way in wetlands unless safety-related construction constraints require it.
5. Salvage all woody and rhizomatous vegetation for restoration use at the site or elsewhere unless major channel destabilization will result.

STAGING AREAS/ADDITIONAL RIGHT-OF-WAY

The following design and construction practices should be implemented to avoid or minimize potential impacts to jurisdictional wetlands and other waters of the U.S. and any associated sensitive aquatic sites:

1. The size of staging areas and ROWs should be limited to the minimum size needed for prefabrication of pipe segments for stream crossings. Whenever possible, no additional ground clearing or grading should be performed.

2. Along existing roadways, pipeline construction corridors would be limited to 30 feet from roadway centerline. In areas of identified Environmentally Sensitive Areas, pipeline construction disturbances along existing roadways should be confined to within 10' of the roadway center line or the existing disturbed area until the actual structure or stream crossing to avoid and minimize losses of adjacent wetlands and riparian vegetation.
3. Where potential jurisdictional wetlands and waters of the U.S. or riparian areas parallel existing roadways but no bridge or culvert structure is crossed, impacts would be avoided or minimized by confining pipeline construction activities to within 10' of roadway centerline or the existing disturbed ROW as much as possible.
4. The pipeline construction corridor would be wider in areas of steep, rocky unstable terrain. Due to the steep grade and narrow existing roadway, the Geysers pipeline alignment could require road widening and a construction corridor extending as much as 75 feet upslope from the roadway centerline. Wherever possible, pipeline construction activities should be limited to the existing roadway.
5. Along cross country alignments, pipeline construction corridors would be limited to 60 feet wide. At the location of stream and wetland crossings, this width should be reduced to 30 feet and, if a loop access road is available, heavy equipment should be driven around to the other bank.
6. Equipment pads and staging areas should be located within the existing roadway ROW or nearby suitable upland location, and not be located within wetlands and other waters of the U.S. or riparian vegetation. Wherever possible, locate staging areas for stream crossings at least 50 feet back from streambanks or wetlands where topographic conditions permit. Pads for bore and jack operations and construction staging areas for pump stations should be located outside of the limits of potential jurisdictional wetlands and other waters of the United States and riparian or native vegetation.
7. Do not store hazardous materials, chemicals, fuels and lubricating oils, or refuel construction equipment, within 100 feet of streambanks or within any municipal watershed
8. Additional staging areas would be required for bore and jack crossings. Additional temporary workspace for staging or pad area for bore and jack crossings should be limited to a maximum 5,000 square-foot pipeline construction staging area, typically 50' by 100'.

EXCAVATION AND SPOIL PILE PLACEMENT/CONTROL

If feasible, excavation and pipeline placement equipment should be kept out of the channel and these activities should be performed from the edge of the road. At many bridge and culvert crossings, construction activities would require access to the natural bank or channel. At the roadway bridge or culvert crossing, trenching for the pipeline should be as close to the roadway as possible but allow for equipment access. Cross country pipeline alignments have been located along existing easements or rural

dirt roads as much as possible. Trenching and soil stockpiling activities along cross country pipelines would be limited to existing disturbed areas as much as possible to avoid isolated wetlands. The width of the area that would be disturbed by trenching, pipeline placement and stockpiling of soils is approximately 10 feet, but could vary. An additional 10- to 20-foot-wide temporary disturbance area could be required for equipment to access the crossing.

The following design and construction practices should be implemented to avoid or minimize potential impacts to jurisdictional wetlands and other waters of the U.S. and any associated sensitive aquatic sites:

1. Do not allow topsoil to be mixed with other material. Keep topsoil separate by tarps, signs, fence or equivalent means. Excavate the top one foot of soil and stockpile and segregate along trench. In some areas where construction activities have been confined to the roadbed, different stockpiling methods would be acceptable as long as the top one foot of top soil is sorted and not buried when stockpiled. It is not necessary to sort unconsolidated (i.e. stream bed sand and gravel) deposits with little horizonation.
2. Remove sediment that has accumulated in the channel at roadway bridge and culvert crossings.
3. Trench spoil should not be placed within wetlands and should be placed at least 10 feet back from streambanks and wetland boundaries on relatively flat and previously disturbed ground.
4. Spoil piles should be protected with silt fences backed by hay bales by the end of each working day to prevent the chance of erosion from wind or rain. Hay bales shall not be used without silt fencing.
5. Utilize hay bales, silt fences and other appropriate sediment filter devices to prevent flow of spoil from ROW and staging areas.
6. Replace topsoil to original horizon or unconsolidated streambed deposits to original location.
7. Backfill, cover with steel plates or fence open trenches at the end of each work day.
8. Consider substrate rebound in calculations of fill requirements, and leave at least a 1- to 2 - inch crown to allow for settling.
9. Do not dispose of excess trench spoil, removed vegetation or stumps in stream channels or wetlands. Compost excess soils and debris at class III landfill or other approved site.

TEMPORARY EROSION AND SEDIMENT CONTROL

A NPDES general stormwater permit is generally required for construction activities that involve soil disturbance greater than 5 acres. This permit also requires preparation of a Storm Water Pollution Prevention Plan (SWPPP) containing measures to control runoff and non-point source pollution and

properly manage hazardous materials used during construction (e.g., fuels, oils, lubricants, and herbicides). Construction activities for any selected project would involve soil disturbance exceeding 5 acres. Measures contained in the SWPPP would limit uncontrolled runoff and minimize erosion. Compliance with measures contained in local City and County erosion control ordinances would also be required. The following permit conditions and mitigation measures should be implemented to control runoff and minimize bank scour and erosion:

1. The SWPPP will be reviewed and approved by the BPU/City and RWQCB prior to construction.
2. All major contractors performing vegetation clearing, earth work, or restoration will become signatory parties to the SWPPP responsible for implementation, inspection, maintenance and corrective action items as needed to maintain compliance with the NPDES general permit and Section 401 water quality certification conditions.
3. Perform daily inspections during construction and repair as needed.
4. Install and maintain sediment filter devices such as silt fencing and hay bales to protect riparian areas and wetlands.
5. Spread a cover of straw (rice straw if available) over all areas of disturbed soils and use a straw punch to work into soil.
6. Apply an organically based tackifier on disturbed areas to reduce air and water erosion of soils

SPECIFIC STREAM AND WETLAND CROSSING PROCEDURES

Different project design approaches, construction practices and mitigation measures in addition to those already identified have been developed for minor, moderate and major stream crossings and have been related to Habitat Mitigation Code groupings (i.e., 1, 2, 3, 3.5, 4 and 5). Stream crossings identified by Habitat Mitigation Code 5 are located along cross country alignments and vary tremendously. Areas identified by Habitat Migration Code 5 can involve minor, moderate or major stream crossings. It is recommended that concrete encased pipes buried 5 feet below evidenced bed scour line be used at all stream crossings greater than 10 feet wide.

1. Minor stream and wetland crossings primarily involve Habitat Migration Code 4 and some Habitat Migration Code 5's. These drainages have a low flow bank width, generally less than 10 feet wide at the structure crossing, intermittent or seasonal flows, and are mostly devoid of native woody or emergent vegetation. Most of these drainages were completely dry when surveyed. Some larger stream crossings, up to 50 feet wide, were included in this grouping if they were disturbed and supported limited or no riparian or emergent vegetation. The following measures are proposed:
 - All construction activities in these creeks should occur during the low flow season and no work should be performed in a live flowing surface stream. If streams are flowing beyond the time of

seasonal restrictions, pipeline stream crossing construction should be delayed until cessation of flow.

- The pipeline stream crossing should be backfilled within 48 hours of trenching.
 - All pipelines should be buried 5 feet below the bed scour line at stream crossings.
2. Moderate stream crossings involve primarily Habitat Migration Code 3 and some Habitat Migration Codes 3.5 and 5. These crossings generally involve streams wider than 10 feet, with seasonal to intermittent flows, and some riparian or emergent wetland vegetation. Most of these drainages were dry at the time of survey, but many were intermittently ponded. These crossings offer avoidance opportunities for adjacent wetland and riparian areas by limiting construction activities to the existing roadbed until the actual roadway bridge or culvert crossing. Other areas have been avoided by confining construction activities to the existing roadbed and replacing existing culverts that cross the roadway. Potential wetlands and other waters of the U.S., or riparian vegetation that parallels the roadway that do not involve bridge or culvert roadway crossings, have been completely avoided by placement of the pipeline in the roadbed or opposite side of the roadway. The following measures are proposed:

- Confine pipeline construction ROW to the existing roadway or disturbed shoulder as much as possible until the actual structure crossing.
 - In-channel/wetland equipment operation should be limited to that needed to construct the crossing and the construction zone limited to 20 feet along existing roadways and 30 feet wide along cross country alignments when feasible.
 - All construction activities in these creeks should occur during the low flow season and no work should be performed in a live flowing stream. If streams are flowing beyond the time of seasonal restrictions, pipeline stream crossing construction should be delayed until cessation of flow, or proper diversion structures should be installed for flows less than 1 cfs.
 - If standing water or saturated soils are present, utilize wide-track or balloon-tire construction equipment, or operate normal equipment on timber or pre-fabricated equipment pads.
 - Remove all timber or prefabricated equipment pads upon completion of construction.
 - In-stream trenching and backfill work should be completed within 48 hours in most instances, and should not exceed 72 hours.
3. Major Stream Crossing include all crossings identified by Habitat Migration Codes 1 and 2 and would involve special construction practices to avoid impacts to sensitive aquatic environments. Major crossings are generally wider than 10 feet with perennial or semi-permanent flows. Some crossings that support large seasonal ponds with extensive riparian or emergent habitat are also included in this grouping. Special construction practices such as bore and jack construction and suspension of the pipeline from bridges along the existing alignment will be used to avoid potential impacts on the following 36 stream crossings:
- Americano Creek at Highway 1 (101)¹
 - Americano Creek at Marsh Road (108)
 - Americano Creek (Estero Americano) at Franklin School Road (111)
 - Atascadero Creek at Mills Station Road (217, 218)
 - Atascadero Creek at Bodega Highway (221)
 - Atascadero Creek at Water Trough Road (205)

¹ Stream crossing number

- Atascadero Creek at Green Valley Road (242)
- Atascadero Creek at Occidental Road (225)
- Atascadero Creek tributary at Ferguson Road (212)
- Green Valley Creek at Green Valley Road (237)
- Purrington Creek at Graton Road (233)
- Adobe Creek at Adobe Road (337)
- Big Sulfur Creek at Geysers property (MS1)
- Cobb Creek at Geysers property (MS1)
- Squaw Creek at Geysers property (MS1)
- Anna Belcher Creek (or tributary) at Pine Flat Road (503)
- Anna Belcher Creek at Pine Flat Road (511)
- Hurley Creek at Pine Flat Road (515)
- Little Sulfur Creek at Pine Flat Road (520)
- Sausal Creek (1) at Pine Flat Road (579)
- Sausal Creek (2) at Highway 128 (580)
- Maacama Creek at Chalk Hill Road (595)
- Franz Creek at Chalk Hill Road (599)
- Brooks Creek at Chalk Hill Road (603)
- Mark West Creek at Slusser Road (647)
- Blucher Creek at Lone Pine Road (700)
- Blucher Creek at Bloomfield Road (703)
- Mark West Creek at Trenton Healdsburg Road (748)
- Mark West Creek at River Road (1)(749)
- Mark West Creek at River Road (2) (751)

- Laguna de Santa Rosa at Llano Road (729)
- Santa Rosa Creek at Willowside Road (MS2)
- Spring Creek at Franquette Avenue (MS2)
- Matanzas Creek at Farmers Lane (MS2)
- Matanzas Creek at Hoen Lane (MS2)
- Petaluma River at Rainsville Road (393)

Bore and jack operations for individual crossings should be completed within one week of initial excavation. At three stream crossings the pipeline would be suspended from an existing bridge.

- Santa Rosa Creek at Madison Street (MS2)
- Santa Rosa Creek at 3rd Street (MS2)
- Santa Rosa Creek at Olive Street (MS2)

CLEAN UP, BANK STABILIZATION AND REVEGETATION

Final clean up, bank stabilization and revegetation measures would restore the original contours and hydrology, and ensure successful regeneration of vegetation removed along the alignments. After construction, areas of herbaceous vegetation along disturbed pipeline alignments would be reseeded with a grass mixture to ensure adequate revegetation, provide erosion control, and obscure visual construction scars.

Disturbed herbaceous and emergent wetland communities should not be seeded but allowed to naturally regenerate from the existing seedbank in stockpiled and replaced topsoil and immediately surrounding vegetated areas. Recent studies suggest that seeding of disturbed herbaceous wetland communities (for linear ROW projects) may be unnecessary and counter productive (Van Dyke 1994). It is assumed that no vernal pools would be impacted by pipeline alignments along existing roadways or cross country or montane meadows along Pine Flat Road that would require special revegetation and maintenance measures. Seeding can actually inhibit seedling recruitment from the existing seedbank. A robust and diverse herbaceous or emergent wetland community would be expected develop from natural seedling recruitment within one to three years after construction of the pipeline if topsoil is properly salvaged and replaced, and the original contours and hydrology are restored. If areas immediately along stream banks are stabilized, leaving a barren strip to revegetate naturally should not create erosion problems. The surrounding vegetated areas would trap the majority of any dislodged sediments before they reach surface waterways. The success of natural revegetation measures should be determined from a qualitative comparison of vegetative cover with

similarly vegetated areas immediately adjacent or nearby the disturbed site. If within two years, the disturbed pipeline ROW has developed at least 75 percent and after 3 years 100 percent of the ground cover as adjacent non-disturbed areas or another chosen reference site then no corrective actions would be required. If artificial seeding is required, species that naturally occur in the immediate area of the disturbed site should be used. Artificial seeding would be considered successful after two years of sustaining similar cover vegetation to immediately adjacent areas without human intervention. An alternative method would be to use fixed photo reference points and qualitatively compare the amount and composition of vegetative cover before the disturbance with photos taken periodically during monitoring.

Wetland areas which support shrubby or woody vegetation should be revegetated by artificial means. Revegetation measure would vary for different community types, and in some instances, for different locations. Willow and mixed willow riparian communities should be revegetated by either the using willow wattles or container plantings. It is recommended that willow wattles or planting sleeves be used in a high density planting to minimize future maintenance requirements for control of exotic or weedy species. Plantings should be random and spaced on 3 to 5 foot offset centers. If wattles are to be used they should be stored properly and installed within 24 hours of cutting. Cuttings should be taken from a similar microclimate as close to the disturbed stream crossing as possible. Revegetated willow and mixed willow riparian areas should be irrigated regularly the first dry season after planting and supplemental watering would likely be required for one to two more seasons. After three years revegetated willow and mixed riparian communities should be self sufficient and should not require additional irrigation or maintenance. Successful regeneration should be based on the establishment of at least the same amount of areal coverage of that vegetation type which was removed for two continuous seasons. Corrective actions such as additional plantings, weeding and irrigation would be required until this is achieved.

Impacts to more complex wooded wetland communities such as various combinations of oak woodlands, redwoods and mixed riparian forest should be avoided as much as feasible. These complex communities could require a time frame longer than the actual project itself to be restored to existing conditions. If it is necessary to construct the pipeline alignment through one of these communities, only those trees required to allow access, trenching and placement of the pipeline should be removed. The species mix for revegetation should be site specific. Surveys should be performed to determine the number of trees larger than 6 inches diameter at breast height (dbh) and the amount of any other vegetation to be removed. All trees greater than six inches dbh should be replaced at a ratio adequate to ensure at a minimum a one to one replacement ratio. Initial planting ratios should range from 3 to 5 trees planted for each removed. Replacement ratios for trees should take into consideration any local tree protection ordinances. Cuttings or seed stock should be collected from a similar microclimate as close to the disturbed crossing as possible. These plantings should be irrigated and maintained for a minimum of five years. The success of the plantings should be determined by three continuous years of self sustained survival without human

intervention of, at a minimum, a one to one replacement ratio by type removed. If at any time during monitoring the survival ratio drops below the one to one replacement ratio, additional plantings, irrigation and maintenance would be required. An alternative method would be to use fixed photo reference points and qualitatively compare the vegetation height, composition and stratification of the undisturbed community with that which is being restored.

The following measures would be necessary to minimize the severity of impacts to potential wetlands and other waters of the U.S. If successfully implemented, disturbances to potential wetlands and other waters of the U.S. along pipeline alignments and at pump station sites would be temporary. The following measures should be integrated with mitigation measures for terrestrial biological and aquatic resources in the EIR/EIS.

Immediately After Construction

1. Remove any sediments deposited in stream channels due to construction activities.
2. Restore original contours and drainage patterns.
3. Implement immediate stream bank stabilization measures such as revegetating with willow wattles or container plantings at woody crossings and covering disturbed herbaceous stream banks with a biodegradable fiber (jute) cloth, coconut fiber roll, or another similar erosion control fabric. Biotechnical measures should be designed for site-specific conditions.
4. Collect seed stock or cuttings for any woody riparian revegetation as near to the stream crossing as possible (taking into consideration microclimate and time of year for propagation) and preferably from vegetation removed at that stream crossing.
5. Limit artificial seeding to non-wetland areas and use only species that are known to naturally occur in the immediate area. Standard hydroseeding practices should be employed and a non-toxic, preferably organic-based tackifier should be applied. The use of soil amendments such as lime or fertilizer should be avoided.
6. Encourage natural regeneration of native herbaceous vegetation from surrounding areas/wetlands.
7. Use artificial plantings to revegetate shrubby and woody wetland vegetation.
8. Replace any fences that are removed.

Monitoring

1. The entire pipeline alignment should, at a minimum, be monitored annually for five years following pipeline completion for successful restoration of vegetation and to repair any washouts, gullying, or subsidence.

2. Stream crossings where woody riparian vegetation restoration has been attempted should be monitored, at a minimum, for five years or until it is determined that restoration has been successful.
3. Monitoring reports should be submitted annually to the Corps, CDFG and any other responsible agencies for at least five years or until it is demonstrated that success criteria have been met.
4. If it is determined during annual monitoring events that pipeline stream crossings are not successfully revegetating, then additional measures would be required to ensure the successful establishment of cover vegetation at these locations. These areas would be monitored for an additional three years from the time corrective action measures are taken or until corrective actions are determined to be successful.
5. Additional measures in herbaceous and emergent wetland communities could include seeding with grasses and herbs which naturally occur in the region from nearby seed stock. Two successive years of successful unassisted regeneration of herbaceous or emergent wetland vegetation would be a reasonable standard of performance in herbaceous communities.
7. Additional measures in woody riparian communities could include additional plantings, provision of irrigation, weeding, or grubbing for exotics control. Establishment of approximately the same areal coverage of woody species for three successive years would be a reasonable standard of performance for riparian revegetation.

HYDROSTATIC TESTING

Freshwater should be used for testing. No biocides should be used. As much as possible, the same water should be reused for different sections of the pipeline. It may be possible to contain water used for hydrostatic testing in the pipeline until it can be discharged to a completed storage site or agricultural irrigation area. If water for hydrostatic testing can not be contained and discharged to the completed storage site or agricultural irrigation area, it should be discharged in accordance with federal, state and local regulatory requirements.

ADDITIONAL WETLAND MITIGATION MEASURES

The measures identified in previous sections should be incorporated into the project design or construction program. The measures identified below and the previously identified revegetation and monitoring measures should be included as mitigation measures to avoid or further minimize temporary and permanent impacts to potential jurisdictional wetlands and other waters of the U.S., and associated riparian vegetation along the pipeline alignments and at the proposed pump station and Russian River sites.

Pipelines

1. After a project is selected but prior to construction, pipelines should be oriented to the natural contour along cross country alignments and within agricultural irrigation areas (where the underlying geologic structure warrants) to reduce long term erosion and to visually integrate them into the surrounding environment.
2. Cross country pipeline segments (Habitat Migration Code 5) that would impact large areas of wetlands or other waters of the U.S. should be relocated to nearby upland areas as indicated in the recommendations column of the stream crossing database, Table 3.2.
3. At the location of stream and wetland crossings along cross country alignments, the construction disturbance width should be limited to 30 feet and, if a loop access road is available, heavy equipment should be driven around to the other bank.

Pump Stations

Once a project is selected but prior to construction, pump station sites and construction staging areas should be surveyed to determine if any isolated wetlands subject to Section 404 Corps jurisdiction are present that could not be avoided by the application of normal construction Best Management Practices for Environmentally Sensitive Areas. Pump stations should be reoriented on the site to avoid impacts to wetlands, and if they cannot be avoided, the pump station should be re-sited in a non-wetland area. Table 3.4 identifies those pump stations which could potentially impact isolated jurisdictional wetlands.

Russian River Outfall

1. If this component is selected, a wetland delineation and vegetative assessment should be performed to determine the actual amount of jurisdictional wetlands or other waters of the U.S. and riparian vegetation that would be filled or otherwise disturbed to determine the amount of mitigation that would be required for permitting purposes.
2. Permanent impacts to wetlands and riparian habitat at this location require the preparation of a habitat restoration plan. After construction of the outfall, revegetate surrounding areas on the Russian River bank with native riparian trees and shrubs to offset permanent loss of small areas of fringe wetlands and to restore the historic wooded riparian corridor. This would also provide visual integration with surroundings. Riparian habitat, jurisdictional wetlands, and other waters of the U.S. should be restored at a 3:1 ratio and monitored for at least 5 years. Success would be determined by areal establishment and survival for 2 consecutive years without artificial assistance.

5 REFERENCES

- Christensen, Ronald. 1995. Santa Rosa Subregional Long-Term Wastewater Project (Job No. 723129) Design of the Russian River Outlet for the Direct Discharge Alternative to the Russian River, Technical Memorandum. 7 August
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical report Y-87-1. 100 pgs.
- HBA. 1996. Draft Biological Resources Technical Memorandum Volume 4E - Maps: Index to Biological, Aquatic, and Wetland Resources Along Pipelines and Pump Stations. May
- Maurer, Rich. 1995. Santa Rosa Subregional Long-Term Wastewater Project Electrical Service to Pump Stations, Memorandum. 27 September
- Merritt Smith Consulting. 1996. Aquatic Biological Impacts Assessment Technical Memorandum. April
- Merritt Smith Consulting. 1996. Aquatic Habitat Survey Results Technical Memorandum. March
- Merritt Smith Consulting. 1996. Draft Water Quality Impact Analysis Report. April
- Merritt Smith Consulting. 1996. Stream Crossings Assessment Technical Memorandum. March
- Reed, P.B. 1988. National list of plant species that occur in wetlands: California (Region 0). U.S. Fish and Wildlife Service, Biological Report 88 (26.10). 135 pgs.
- Soil Conservation Service (SCS). 1972. Soil Survey of Sonoma County, California. U.S. Department of Agriculture, SCS, Washington D.C. 187 pgs.
- United States Department of Defense, et al. 1995. Federal Guidance for the Establishment, Use and Operation of Mitigation Banks. November 28.
- United States Department of the Army. 1991. Habitat Mitigation and Monitoring Proposal Guidelines. October.
- United States Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds, and United States Department of the Army, U.S. Army Corps of Engineers. 1993. Memorandum to the Field. August 23.
- Van Dyke, G.D., L.M. Shem, P.L. Wilkey, R.E. Zimmerman, and S.K. Alsum. 1994. Pipeline corridors through wetlands — Summary of seventeen plant-community studies at ten wetland crossings. December

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