DIABLO GRANDE
WATER RESOURCES PLAN

DRAFT SUPPLEMENTAL
ENVIRONMENTAL IMPACT REPORT

Stanislaus County
January 27, 1998

Diablo Grande Water Resources Plan

Draft Supplemental Environmental Impact Report

Prepared for:

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Table of Contents

Summary S-1

1.0 Introduction 1-1

1.1 Authorization and Purpose 1-1
Court Action 1-1
Background 1-1
Purpose 1-7

1.2 Project Objectives 1-8

1.3 Project Description 1-8
Marshall-Davis Well Site (Option 1) 1-10
Project Area Groundwater - Phase 1 (Option 2-1) 1-12
Patterson Wastewater Treatment Plant Algal Turf Scrubber 1-16
Shallow County Groundwater (Option 4) 1-20
Berrenda Mesa Water District (Option 5) 1-42
Bravo Management Company, Inc. (Option 8) 1-44

1.4 State Legislation 1-45

1.5 EIR Uses 1-47

2.0 Environmental Setting, Impacts and Mitigation Measures 2-1

2.1 Marshall-Davis Well Site (Option 1) 2-1
Water Supply (Hydrology) 2-1
Water Conveyance 2-5
Consistency with Applicable Plans, Policies and Ordinances 2-5
Cumulative Impacts 2-6
Growth Inducing Impacts 2-6

2.2 On-Site Groundwater (Option 2-1) 2-6
Water Supply (Hydrology) 2-6
Water Supply (Biotic Resources) 2-10
Water Supply (Health Hazards) 2-17
Water Conveyance 2-18
Consistency with Applicable Plans, Policies and Ordinances 2-18
Cumulative Impacts 2-18
Growth Inducing Impacts 2-18

2.3 **Patterson Algal Turf Scrubber (Option 3-1)** 2-19
Air Quality 2-19
Biological Resources - Treatment/Discharge Element 2-20
Biological Resources - Diversion Element 2-21
Biological Resources - Diversion Element 2-22
Aesthetics 2-23
Cultural Resources 2-24

2.4 **Shallow County Groundwater (Option 4)** 2-24
Water Supply (Hydrology) 2-24
Water Supply (Biotic Resources) 2-77
Water Conveyance (Biotic Resources) 2-89
Water Conveyance (Agricultural Resources) 2-94
Water Conveyance (Air Quality) 2-96
Water Conveyance (Archaeological Resources) 2-97
Consistency with Applicable Plans, Policies and Ordinances 2-97
Cumulative Impacts 2-99
Growth Inducing Impacts 2-100

2.5 **Berrenda Mesa Water District (Option 5)** 2-100
Water Supply (Surface Water) 2-101
Water Supply (Groundwater) 2-102
Water Supply (State Water Project Facilities) 2-103
Water Supply (Agricultural Resources) 2-104
Water Supply (Groundwater Banking) 2-106
Water Conveyance (Archaeological Resources) 2-107
Water Conveyance (Biotic Resources) 2-108
Consistency with Applicable Plans, Policies and Ordinances 2-108
Cumulative Impacts 2-108
Growth Inducing Impacts 2-109

2.6 **Bravo Management Company, Inc. (Option 8)** 2-110
Water Supply (Groundwater) 2-110
Water Conveyance (Biotic Resources) 2-111
Water Conveyance (Archaeological Resources) 2-111
Consistency with Applicable Plans, Policies and Ordinances 2-112
Cumulative Impacts 2-112
Growth Inducing Impacts 2-112

3.0 Related Environmental Issues 3-1

3.1 Unavoidable Significant Adverse Environmental Impacts 3-1

3.2 Alternatives 3-1

Algal Turf Scrubber - City of Ceres (Water Plan Option 3-2) 3-2

Algal Turf Scrubber - City of Modesto (Option 3-3) 3-7

No-Project Alternative 3-9

Environmentally Superior Alternative 3-10

3.3 Cumulative Impacts 3-10

4.0 Literature Cited, Persons Contacted and Report Preparers 4-1

4.1 Literature Cited 4-2

4.2 Persons Contacted 4-5

4.3 Report Preparers 4-6

Appendices

Appendix A	Diablo Grande Water Master Plan
Appendix B	Notice of Preparation and Responses to Notice of Preparation
Appendix C	Summary Report, Hydrogeologic Evaluation Northern Portion of Diablo Grande
Appendix D	Patterson Algal Turf Scrubber Water Reclamation Project Expanded Initial Study
Appendix E	Excerpts from Monterey Agreement EIR
Appendix F	Reconnaissance Evaluation of Ground Water Resources Available to the City of Patterson, Groundwater Monitoring Data and Marshall-Davis Well Mitigation Monitoring Plan

List of Figures

Figure 1 Regional Location 1-3

Figure 2 Project Vicinity 1-5

Figure 3 Water Source Locations 1-13

Figure 4 Phase I Potable Water System 1-17

Figure 5	Patterson ATS Conveyance Facilities	1-21
Figure 6	Vicinity Map Showing Diablo Grande and Well Field Location	1-25
Figure 7	Well Field Site Location Map Within TID Boundaries	1-27
Figure 8	Location of Wells and Transmission Pipeline for Alignment A	1-29
Figure 9	Location of Wells and Transmission Pipeline for Alignment B	1-31
Figure 10	Monthly Distribution of Pumpage from Project Wells	1-33
Figure 11	Diablo Grande Pipeline Route	1-37
Figure 12	San Joaquin River Crossing	1-39
Figure 13	Southern Area Water Sources	1-49
Figure 14	Conceptual Plan for Diablo Grande California Aqueduct Pumping Plant	1-51
Figure 15	California Aqueduct Turnout Facilities	1-53
Figure 16	Schematic of Aquifer System	2-27
Figure 17	Shallow Aquifer Depth to Groundwater - December 1994	2-33
Figure 18	Shallow Aquifer Depth to Groundwater - July 1995	2-35
Figure 19	Existing and Proposed Wells	2-37
Figure 20	Average and Minimum Monthly Flow in the San Joaquin River	2-41
Figure 21	Loss of Accretion as Percent of Streamflow Above Tuolumne River	2-51
Figure 22	Estimated Changes in Groundwater Levels in Shallow Aquifer. Well Alignment A. Climate Scenario A. Summer 2028	2-53
Figure 23	Estimated Changes in Groundwater Levels in Upper Aquifer. Well Alignment A. Climate Scenario A. Summer 2028	2-55
Figure 24	Estimated Changes in Groundwater Levels in Shallow Aquifer. Well Alignment A. Climate Scenario B. Summer 2028	2-57

Figure 25 Estimated Changes in Groundwater Levels in Upper Aquifer. Well Alignment A. Climate Scenario B. Summer 2028 2-59

Figure 26 Estimated Changes in Groundwater Levels in Shallow Aquifer. Well Alignment B. Climate Scenario A. Summer 2028 2-61

Figure 27 Estimated Changes in Groundwater Levels in Upper Aquifer. Well Alignment B. Climate Scenario A. Summer 2028 2-63

Figure 28 Estimated Changes in Groundwater Levels in Shallow Aquifer. Well Alignment B. Climate Scenario B. Summer 2028 2-65

Figure 29 Estimated Changes in Groundwater Levels in Upper Aquifer. Well Alignment B. Climate Scenario b. Summer 2028 2-67

Figure 30 Water Level at Center of Well Field. Alignment A, Scenario B 2-69

Figure 31 Water Level at Center of Well Field. Alignment B, Scenario B 2-71

List of Tables

Table 1 Diablo Grande Water Use 1-10

Table 2 Well Installation Schedule 1-24

Table 3 Well Construction Details 2-9

Table 4 Existing Groundwater Use 2-25

Table 5 Analytical Results of Groundwater Samples from TID Drainage Wells 2-30

Table 6 FERC Flow Schedule 2-45

Table 7 Difference Between New Tuolumne River Minimum Flow Requirements and Modeled Actual Flows 2-46

Table 8 Groundwater Level Impacts 2-73

Table 9 Sensitive Plant Species 2-80

Table 10 Comparison of Options 3-11

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Summary

This summary is intended to be an overview of the Diablo Grande Water Resources Plan Supplemental Environmental Impact Report (SEIR). Therefore, in order for the reader to gain a greater understanding of the project, the reader should read the entire SEIR.

The SEIR provides an analysis of the potential environmental impacts arising from the implementation of the proposed Diablo Grande Water Resources Plan, which addresses the long term water supply for the Diablo Grande project. This summary and the SEIR describes the proposed project, any significant adverse environmental impacts resulting from the implementation of the proposed project, and mitigation measures recommended to reduce or eliminate those impacts.

This summary also describes any unavoidable significant adverse environmental impacts resulting from the implementation of the proposed project, as well as alternatives to the proposed project, including the environmentally superior alternative.

Authorization and Purpose

Court Action

In response to an order from the Superior Court of Stanislaus County and Opinion No. F023638 of the California Court of Appeal, Fifth Appellate District, this Supplemental Environmental Impact Report (hereinafter "SEIR") has been prepared to provide an analysis of the significant environmental effects of the long-term supply of water for the Diablo Grande project.

EMC Planning Group, Inc. (hereinafter "consultant") has prepared this SEIR under contract to Diablo Grande Limited Partnership, pursuant to CEQA Guideline 15084(d)(3), in response to the court opinion. This SEIR considers the environmental effects associated with supplying water to the Diablo Grande project and the environmental effects of water extraction. Before distributing the Draft SEIR for public review, the County of Stanislaus, the lead agency, subjected the document to the agency's own review and analysis. Therefore, the Draft SEIR reflects the independent judgment of the lead agency.

Background

Diablo Grande is a proposed 29,500 acre planned destination resort and residential community located in southwestern Stanislaus County, seven miles west of Interstate 5. Diablo Grande will include scenic open spaces, a wilderness

conservation area, six golf courses, swim and tennis facilities, a hotel and executive conference center, a winery, vineyards, research campus, municipal facilities, town center, shops and offices, and 5,000 dwelling units in five villages, or phases.

Stanislaus County approved a specific plan and environmental impact report (titled the Diablo Grande Specific Plan EIR and hereinafter referred to as the Diablo Grande EIR) for the project in 1993 (SCH# 91032066). This document is available for review at the Stanislaus Planning Department which is located at 1100 H St., Modesto, CA 95354 and is incorporated herein by reference. The Diablo Grande EIR included program-level analysis of the Specific Plan as well as project-specific level analysis of the Preliminary Development Plan (PDP) for Phase 1 of the project. Phase 1 includes approximately 2,000 residential units, two golf courses, the hotel conference center, winery, town center, and other appurtenant facilities. To date, the two golf courses have been constructed and both are in operation.

The entire Diablo Grande project will require approximately 12,800 acre-feet (AF) of water at full buildout and approximately 5,000 AF of water for Phase 1. Upon preparation of detailed PDPs for the other three phases, additional project-specific environmental analysis will be carried out. This analysis will tier off of the previous environmental review carried out for the project.

The Appellate Court directed the County to attempt in good faith to fulfill its obligation under CEQA to provide sufficient meaningful information regarding the types of activity and environmental effects from the supply of water to the project that are reasonably foreseeable. The SEIR addresses the environmental effects associated with the water supply options considered in the Water Plan that are presently under consideration as potential sources for the project.

Some of the options contained in the Water Plan have been defined to a degree sufficient to support project-specific level analysis per CEQA Guideline section 15161. Project descriptions for these options are addressed in Section 1.3, below. Other options have been defined at a more conceptual level and are therefore evaluated as project alternatives pursuant to CEQA Guideline section 15126(d). Analysis of environmental impacts of these options is provided to a level of detail commensurate with the description of the Option. Analysis of project alternatives is contained in Section 3.4. Additional environmental review will be required should any of these options be pursued to assess project-specific impacts.

Given the overall scope of the Diablo Grande Project, this SEIR has been prepared as a program EIR, although, in accordance with section 15168(c)(5) of the CEQA Guidelines, every effort has been made to present sufficient detail as to each of the options to minimize the need for further environmental documentation in the future.

Purpose

This SEIR has been prepared in compliance with the California Environmental Quality Act (CEQA) of 1970, as amended, and to respond to the order of the superior court, to inform public decision makers and their constituents of the environmental impacts of the proposed project. In accordance with CEQA guidelines, this report describes both beneficial and adverse impacts generated by the proposed project and suggests measures for mitigating significant adverse environmental impacts resulting from the proposed project. The County of Stanislaus prepared and distributed a notice of preparation (NOP) in accordance with CEQA guidelines section 15082.

Project Objectives

The purpose of the proposed project is to identify possible sources of water for the Diablo Grande project to facilitate an adequate long-term water supply for the project. A future water source may come from one source or from any combination of water sources discussed herein.

Project Description

The development of Phase 1 of Diablo Grande is expected to take approximately 15 years, and the development of the entire project is expected to occur over an approximately 25 to 30 year period. Because Diablo Grande's needs for water at the site are phased, it is expected that the water will be supplied to the site on a phased basis, including incremental purchases of water to provide distinct increments of the Phase 1 development.

The 1992 LSA EIR estimated the total water needs for the Diablo Grande project to be 12,881 AF per year at full buildout, with approximately 5,000 AF (40 percent of total water use) being required for the first phase. Subsequent phasing would occur only in the case where there is a proven and reliable water supply. The remaining areas of development include the remainder area of Oak Flat (phase 2 portion) (1.5 percent of total water use), Copper Mountain (6 percent), Indian Rocks (23 percent), Crow Creek (18 percent), Orestimba (11 percent).

Diablo Grande expects to purchase water as needed from one or a number of the sources discussed in the Water Plan. Diablo Grande also expects that during the life of the project other economically feasible sources will come to their attention as viable long-term water sources.

This SEIR evaluates the environmental impacts associated with the water supply options in the Water Plan. These options have the potential to supply the entire

water requirements of the Diablo Grande project. In the event that another water source not contained in the Water Plan is ultimately determined to be a feasible water source and is planned to be used to provide water to the project, additional environmental review will be required to evaluate the environmental impacts of such water source.

As described in the previous section, some of the options addressed in the Water Plan have been defined to a degree sufficient to support project-specific environmental analysis. These options consist of:

- Marshall-Davis Well Site (Water Plan Option 1)
- Project Area Groundwater (Water Plan Option 2-1)
- Patterson Algal Turf Scrubber (Water Plan Option 3-1)
- Shallow County Groundwater (Water Plan Option 4)
- Berrenda Mesa Water District (Water Plan Option 5)
- Bravo Management Company (Water Plan Option 8)

Table S-1 provides a summary matrix showing the acre-feet associated with each option.

Marshall-Davis Well Site (Option 1)

Water Supply

Diablo Grande owns agricultural property in the Del Puerto Water District, previously known as the Salado Water District (the Marshall-Davis Farms). This land is located on the valley floor at the intersection of Marshall and Davis Roads in western Stanislaus County, about two miles south of the City of Patterson.

This land has both surface water (from the Delta-Mendota Canal by allocation through the Del Puerto Water District) and groundwater supplies (from on-site wells). The Diablo Grande Specific Plan included a proposal to construct wells on this property and pipelines necessary to pump up to 1,200 AF of water per year to the Diablo Grande site. The Diablo Grande EIR included analysis of the environmental impacts of this proposal and recommended mitigation measures to reduce adverse impacts. The project approval included a condition restricting the use of this water supply to a five-year period (from 1996-2000), at the end of which this supply would be limited to emergency use only. Another condition limited use of this water to non-residential uses.

TABLE S-1

Diablo Grande Water Use Table

Water Source	Acre-Feet (af)/yr
Project Specific Options	
Marshall-Davis Well Site (Option 1)[1]	1,200 af
Project Area Groundwater (Option 2-1)	464 af
Patterson Algal Turf Scrubber (Option 3-1)	1,000 to 3,000 af
Shallow County Groundwater (Option 4)	11,000 af
Berrenda Mesa Water District (Option 5)	8,000 af
Bravo Management Company (Option 8)	1,000 af
Alternative Options	
Ceres Algal Turf Scrubber (Option 3-2)	2,000 af
Modesto Algal Turf Scrubber (Option 3-3)	12,000 af

[1] "Options" are based on the Bookman-Edmonston Engineering report titled - *Water Resources Plan for Diablo Grande, December 1996.*

Note: Some of the options indicated above may not, by themselves, supply all the water needed by the Diablo Grande project. However, a combination of the above options could provide the needed water.

Source: EMC Planning Group Inc.

The Diablo Grande EIR recommended two mitigation measures to ensure that groundwater pumping from the Marshall-Davis Farms does not result in significant adverse impacts to nearby agricultural lands. Monitoring of potential effects on nearby wells (Diablo Grande EIR Mitigation IV-2) is required and, in the event that groundwater levels on nearby wells are found to decline by 10 percent or greater as a result of the pumping, the Western Hills Water District (WHWD) is required to offset the increased pumping by allocating portions of their Salado Creek Water District water allocations to the affected neighboring owners (Diablo Grande EIR mitigation IV-3).

Considering that the limitations placed on the type and duration of water extraction from the Marshall-Davis Farms in the approvals pursuant to the Diablo Grande EIR were not based on environmental constraints or concerns, but rather a negotiated agreement, this SEIR includes analysis of the environmental impacts that would occur should this water be made available for use on the Diablo Grande site without any restrictions in term or use. The applicant has not requested that such changes actually be implemented. Rather, the SEIR includes this analysis addressing the environmental impacts that would result if these changes were made.

Water Conveyance

The Diablo Grande EIR included analysis of the raw water conveyance system and the "backbone" potable water system for the entire project and a more detailed analysis of the Phase 1 water system. The system includes four pumping facilities and a well-head booster pumping plant at the Marshall-Davis well site. This conveyance system has been constructed and is in operation. No changes to this system would be required for an extension of water usage from the Marshall-Davis Farms with respect to time or type of use.

Water from the Marshall-Davis Farms is currently being used for golf course irrigation. Use of this water for potable uses would require its conveyance to the proposed Salado Creek filtration facility and storage tanks. Details and impacts associated with these facilities are addressed in the 1992 Diablo Grande EIR and do not require further analysis in this SEIR.

Project Area Groundwater - Phase 1 (Option 2-1)

A reconnaissance-level groundwater study for the entire 29,500-acre Diablo Grande project area was prepared in 1989. This report, which was cited in the Diablo Grande EIR, concluded there could be up to 725 AF of water per year available from the 4,600 acres in and around the Phase 1 PDP (Diablo Grande EIR page IV-165). The report concluded the available quantity is very dependent upon rainfall because there is limited groundwater storage. The report did not include on-site drilling or other site-specific investigation.

Since the approval of the Diablo Grande project, Diablo Grande has conducted extensive exploration activity in the Phase 1 area. Several test wells have been constructed and pumped to determine their possible yields, if they were to be used to supply long-term water to the project.

Water Supply

There are nine existing wells located within the Phase 1 area of the Diablo Grande project site that are being considered for water supply to the project. Two of these wells draw water from the alluvium of Salado Creek and the balance draw from the bedrock aquifer. The applicant proposes to use the water from these existing wells to provide domestic water supply to a portion of Phase 1.

Approval of any of these wells for use as domestic supply will require the approval of an appropriate amount of capacity by the State of California Department of Health Services (hereinafter "DHS"). As part of this review process, DHS has required that the wells be pumped for a seven-day period in September, which is considered to be the driest period of any year. This pumping is anticipated to result in the lowest potential well water production levels, thus defining supply constraints. This seven-day pumping period is intended to approximate a worst case scenario at the site.

However, for the purpose of domestic supply, only an amount of groundwater which meets the DHS standards under the seven-day pumping test will be approved for use as a domestic supply. This seven-day pumping test is based upon a peak flow, over a seven-day period, and not either yearly average or one-day maximums.

In September of 1997, Diablo Grande undertook the DHS seven-day pump test on the FPR and YF-6 wells. The test showed that a maximum sustainable yield for these wells is approximately 50 gallons per minute for each well. The DHS also requires a 50 percent reduction in actual uses to accommodate drought conditions. Therefore, the DHS is expected to approve a total supply of 50 gpm (80.6-acre feet per year) for the two wells.

Based upon the foregoing, approximately 80-acre feet currently is available per year to provide domestic water to Diablo Grande from onsite sources. As these wells are used, further data will become available and the DHS will determine whether to expand the allowed production from these wells.

Prior to any other wells being connected to the system or brought online for domestic use, and prior to additional development beyond that which can be served by the "approved" 80-acre feet, it will also be necessary for these wells to be tested in conformance with the DHS water supply requirements. Additional pump tests will be required for future on-site water wells.

Water Conveyance

The water system to deliver the water to Phase 1 land uses (water lines and water treatment plant) was included in the Phase 1 Preliminary Development Plan and was evaluated in the Diablo Grande EIR (Section IV-F). Therefore the environmental analysis of this option addresses only impacts associated with use of the existing wells for domestic water supply. This option does not involve any construction.

Patterson Wastewater Treatment Plant Algal Turf Scrubber (Option 3-1)

The Algal Turf Scrubber (ATS) process consists of running effluent (including secondarily treated sanitary wastewater) over a sloping runway at low flows and shallow depths to create an environment in which algae will grow and thrive on the constituents in the water. The algae are periodically harvested. Once these constituents are removed from the water, the water at the end of the ATS runway will be of a quality which will allow its discharge into natural and man made water courses for blending with other supplies.

Therefore, the ATS process creates a fungible commodity—water, which may be traded to others or discharged into, and diverted from, natural water courses and then delivered to Diablo Grande. This is water which is currently lost through percolation, evaporation, or by crops for disposal.

Water Supply/Water Conveyance

In 1996, the City of Patterson prepared an expanded initial study on an ATS facility at the Patterson Wastewater Treatment Plan (SCH#: 96062039). This initial study also addressed the discharge of the ATS treated water into the San Joaquin River, diversion of an equal amount of water from the River, and conveyance of that water to Diablo Grande.

Two alternative points of diversion were evaluated which would allow rediversion for Diablo Grande through existing facilities of the Patterson Water District (PWD). One alternative would be at the intake to the PWD canal, and the other alternative would be farther upstream of the intake near the Las Palmas Avenue bridge to achieve greater mixing with water in the river. Adequate mixing is a safety consideration in securing a permit from the Department of Health Safety for potable use and a concern of the PWD in using some reclaimed water for crop irrigation. In the preferred alternative, water would be conveyed by pipeline to a point near the existing Las Palmas Avenue bridge about 1,200 feet upstream of the PWD intake.

Based upon the results of the initial study and public comments received, the City of Patterson adopted a mitigated negative declaration for the ATS project.

As an alternative diversion and conveyance method, a separate new pumped diversion on the San Joaquin River was evaluated. The pipeline from the ATS facility to the San Joaquin River will be about one mile long and the pipeline from the PWD main canal to the present WHWD pipeline from the Marshall-Davis Farms will be about 1.6 miles long.

As the City of Patterson grows, the amount of effluent through the ATS facility will increase. Up to 3,000 AF per year may ultimately be treated at the Patterson ATS facility, discharged to the San Joaquin River, and diverted through the PWD facilities to Diablo Grande.

Upon completion of the system and compliance with the water quality standards, approximately 1,000 AF of water per year could be available from the City of Patterson to the Diablo Grande project, in perpetuity, with a projected increase to 3,000 AF per year as the City of Patterson grows.

No additional environmental review is necessary for this option. The option is included in this SEIR to provide complete documentation of the water sources under consideration for Diablo Grande. The expanded initial study/mitigated negative declaration prepared for Option 2 is available at the document depositories listed in Section 4 of the SEIR.

Shallow County Groundwater (Option 4)

This proposed water supply would consist of pumped drainage water from agricultural areas east of the San Joaquin River. The Turlock Irrigation District (TID) routinely pumps shallow groundwater to control high groundwater levels. This pumped groundwater is known as drainage water. This drainage water is one of the

proposed water sources for the Diablo Grande development. One of two proposed well field alignments with ten wells each are proposed to be developed to obtain the groundwater (referred to as Alignment A and Alignment B). Both well field options are analyzed in the SEIR. With the proposed Diablo Grande groundwater pumping, the TID will begin to reduce their historical groundwater pumping. The TID has historically supplied irrigation water and electric power to an area located east of the San Joaquin River, and between the Merced and Tuolumne rivers.

Water Supply Wells

The preliminary design includes a total of 10 wells to meet a majority of the ultimate annual demand for Diablo Grande of 12,881 acre-feet. The proposed well field location of Alignment A consists of 10 wells near Crows Landing and Bradbury Roads. The proposed well field location of Alignment B consists 10 wells near Crows Landing, Bradbury and Morgan Roads.

The well installation schedule is the same for each well field. It is proposed that three wells would be installed in 1998, with each additional well being installed according to a predetermined schedule. Each well would have an estimated capacity of approximately three cubic feet per second.

Water Conveyance

There are two components to the water conveyance system. One component will be sited and installed by the TID east of Carpenter Road. The other component will be sited and installed by the Diablo Grande project's water purveyor, Western Hills Water District.

TID Component. The proposed water supply would be delivered to the Diablo Grande development through a closed pipe system. The TID component includes installation of wells and a water conveyance pipeline that would connect the project wells to the Diablo Grande transmission pipeline and pumping station near the intersection of Carpenter Road and the Harding Drain. Diablo Grande would be responsible for constructing the pumping station and pumping the water through pipeline under the San Joaquin River.

Western Hills Water District Component. The conveyance pipeline from the well field to the existing Diablo Grande pipeline near Marshall Road will necessitate a crossing under the San Joaquin River. This is proposed to be accomplished by directionally drilling a tunnel under the river and installing the pipeline. The drilling would not require disturbance of the river channel as the drilling would take place 30 to 40 feet below the water course.

The drilling would be accomplished as follows. A drilling machine would be located on the east side of the river (outside the levee), either on the west or east side of Carpenter Road. The machine would bore a hole under the levee and the river channel and would come out on the west side of the river, within the west levee

boundary. The remaining pipeline segment within the levee boundary would use open cut trench installation methods.

The boring procedure would include initially drilling a small diameter pilot hole, then reaming to an oversize hole suitable for placement of a 36-inch diameter pipe. Once the bore hole is completed, the pipe would be pulled through the bore hole from the west side of the river. Pipe material would be either steel pipe, or a high density polyethylene (HDPE). The proposed boring process has been used since the mid-1980's on rivers in the vicinity including the San Joaquin and Sacramento River. This process has also been used throughout the world.

Two staging areas would be necessary. On the east side of the river, west or east of Carpenter Road. On the west side of the crossing, a staging area approximately 75 feet wide by 1,500 feet long would be necessary. The pipe would be fully assembled in this area prior to starting pull-back operations.

All excavations would be refilled and returned to their original state. Any compacted areas would be scarified and disturbed areas would be returned to their pre-construction condition.

Approximately 600 cubic yards (CY) of soil would be removed from the bore hole. This soil is proposed to be given away or sold and spread onto nearby lands with permission obtained from landowners. A water treatment plant would be located at the Diablo Grande development which would treat the water supply to meet the state's drinking water requirements.

Pipeline Alignment. The proposed Diablo Grande pipeline would cover approximately 5.5 lineal miles, from the starting point east of the San Joaquin River adjacent to the Harding Drain, to the end point west of the river at the existing Diablo Grande water conveyance facilities adjacent to Marshall Road. The pipeline alignment would traverse agricultural fields and parallel existing roadways along most of the alignment. The San Joaquin River in the area of the proposed crossing is confined within a flood plain approximately one-half mile wide between the east- and west-side levees.

Berrenda Mesa Water District (Option 5)

Shortages of State Water Project (SWP) deliveries in recent years prompted SWP Contractors to consider amendments to their water supply contracts with the State Department of Water Resources (DWR). Negotiations between the interested parties resulted in the Monterey Agreement, signed in December 1994. A Program EIR was prepared to analyze the environmental effects that would result from implementation of the Monterey Agreement (Central Coast Water Authority, October 1995. SCH# 95023035). This EIR was certified and its substantive provisions have withstood court challenge.

The Monterey Agreement contains 14 principles intended to settle disputes over water allocations and certain operational aspects of the SWP. Principle 4 provides

for permanent transfer by sale, between willing sellers and willing buyers, of 130,000 AF of annual entitlement between agricultural contractors and urban contractors, with Kern County Water Agency (KCWA) being responsible for any portion of this amount not made available by other Agricultural contractors. Principle 4 further states that agricultural contractors and the DWR will expeditiously approve such sales.

KCWA member units have 90 days to exercise a right of first refusal to purchase entitlement being offered to urban contractors by agreeing to pay the same price offered by the urban purchaser.

Project Location

The BMWD occupies about 55,000 acres in northwestern Kern County at the easterly edge of the Temblor Range. The topography of the BMWD is gentle, with foothills lying near the western boundary. The western portion of the BMWD, called Antelope Valley, is enclosed on three sides by the Temblor Range; the eastern half is the Antelope Plain.

Project Description

Under this option, the WHWD would purchase up to 8,000 AF per year of water entitlement of BMWD from the KCWA with the water to be delivered at a new turnout on the California Aqueduct to be built near the Oak Flat Road.

The water could be delivered to the Diablo Grande main supply line at its crossing of the California Aqueduct near Oak Flat Road southwest of Patterson. This turnout would be upstream from the existing turnout to the BMWD. Except for the turnout and connection to existing Diablo Grande water supply lines nearby, no new facilities or construction would be needed.

The turnout would be located in the vicinity of the existing pumping plant on the 30-inch Diablo Grande pipeline that carries water from the Marshall-Davis Farms to Diablo Grande. The facilities would consist of an aqueduct turnout structure, a meter vault, a pipeline to the existing pump station (located about 100 feet west of the aqueduct), an additional pumping unit at an existing WHWD pump station and a 30-inch water pipeline from the pump station to the existing water line on the north side of Oak Flat Road. The existing pump station is used to pump water from the Marshall-Davis wells to Diablo Grande. The distance from the pump station to Oak Flat Road is approximately 60 feet.

Bravo Management Company, Inc. (Option 8)

Project Location

The Bravo Management Company (BMC) is a private company with land and water rights in Kern County.

Project Description

The BMC lands include developments adjacent to the Kern River east of the City of Bakersfield. Water rights on the Kern River date back to 1888 and are not under the jurisdiction of the State Water Resources Control Board. The Kern River is currently managed by a watermaster.

Under previous agreements, the Buena Vista Water Storage District (BVWSD) has banked 20,000 acre-feet of water for BMC in the groundwater basin of Kern County. The BVWSD, through the Kern County Water Agency (KCWA), could deliver up to 1,000 acre-feet per year of its State Water Project (SWP) water to a new Oak Flat turnout on the California Aqueduct to accommodate Diablo Grande (i.e., Western Hills Water District). The water will be delivered for a period of up to twenty consecutive years at a rate of about 1,000 acre-feet per year. In the same year that the BVWSD makes a delivery of SWP water to Diablo Grande, a like amount of BMC previously banked groundwater will be pumped from the groundwater basin by BVWSD.

State Legislation

Senate Bill 901(SB 901) is codified in Water Code Section 10901 et. seq. This law requires that, with respect to new development project, certain consultation be undertaken between a county or city and a water system which may or will provide water service to a development project. While the original Diablo Grande project was approved before these provisions were added to the Water Code, and while the Fifth District Appellate Court of the State of California requested that Diablo Grande prepare a review of possible water sources that provides information which in some instances is similar to that required by SB 901, it was unclear whether compliance was necessary. However, Stanislaus County, Diablo Grande and the Western Hills Water District (WHWD) have complied with SB 901 requirements to the extent possible.

Senate Bill 901 generally requires that, since Diablo Grande had made a development request of Stanislaus County, Stanislaus County request of WHWD a statement of whether or not the WHWD will be able to provide water to Diablo Grande. In response, the WHWD adopted Resolution 97-23 on December 4, 1997, approving the WHWD response to the County's request. This response is the response required under the code sections. The entire response of the WHWD is available from the Stanislaus County Department of Planning & Community Development.

EIR Uses

This SEIR, with respect to the water options, is intended to be used for acquisition purchase and delivery of water to the Diablo Grande project. As such, each option has an approval criteria, which are discussed above. Furthermore, there are federal, state, regional and local agencies that will use this SEIR in their planning and decision making pertaining to the following: contracts to purchase water, contracts to deliver water, grading and building permits, rights of access, and streambed alterations.

Areas of Environmental Concern

The areas of environmental concern are different for each water option, but each option's area of environmental concern is premised on impacts associated with two project characteristics: water supply (i.e., extraction) or water conveyance. The areas of environmental concern associated with water supply and conveyance include hydrology, biotic resources, health hazards, agricultural resources, archaeological resources, and air quality. The growth-inducing and cumulative impacts associated with each option is also analyzed.

Each of these areas of environmental concern is evaluated in detail in Section 2.0, *Environmental Setting, Impacts and Mitigation Measures*, and Section 3.0, *Related Environmental Issues*, of the SEIR, to determine the potential significant impacts of the proposed project. The proposed project was found to have no significant adverse environmental impacts. Following is a summary of the potential environmental impacts and mitigation measures. All potentially significant environmental impacts identified in this SEIR are reduced to a *Less than Significant Level* after implementation of mitigations.

The following is a summary of the potential environmental impacts associated with the water options and their respective mitigation measures, which reduce the potential impacts to a less than significant level.

MARSHALL-DAVIS FARMS (Option 1)

Water Supply Impact - Hydrology. This option would result in the continued extraction of up to 1,200 AF/year of groundwater from the Marshall-Davis Farms and conveyance of that water to Diablo Grande beyond the year 2001. The environmental impact to the aquifer underlying the Marshall-Davis Farms and surrounding area is less than significant based on the findings of the Patterson Report, monitoring data obtained to date and considering that in the absence of Diablo Grande, groundwater extracted from the Farms would likely be used for agricultural uses, with only a portion returning to groundwater. However, continued pumping does have the potential to affect water levels in wells on adjacent properties, especially should irrigation in the Patterson vicinity decline

substantially or a long-term drought occur. Therefore, this impact is considered to be potentially significant. However, implementation of the following mitigation measure will reduce the impacts associated with continued and permanent use of the Marshall & Davis Farm well as a water source for Diablo Grande will be reduced to a level of insignificance.

Mitigation Measure 1: Should groundwater extraction from the Marshall-Davis Farms wells continue beyond the year 2001 as a water source for Diablo Grande, the Monitoring Plan for Operation of the Marshall-Davis Well by the Western Hills Water District shall continue to be carried out.

Water Supply Impact - Hydrology. City of Patterson water data indicate the City's wells have met all EPA and Department of Health Services standards to date (as of 1991) (Patterson Report). However, available data indicates that some of the groundwater in the area exceeds secondary drinking water standards for total dissolved solids, chloride, and sulfate. Water supplies delivered to Diablo Grande intended for domestic use will be treated pursuant to mitigation measures included in the Diablo Grande EIR. No additional mitigation is warranted.

Water Supply Impact - Hydrology. The State Department of Water Resources has expressed concern regarding potential subsidence in the vicinity of groundwater pumping at the Marshall-Davis Farms and resulting impacts to the nearby California Aqueduct. The Aqueduct is about two miles from the Marshall-Davis Farms at the closest point. Groundwater pumping at the Farm is limited to 1,200 acre-feet per year. The combination of distance and the relatively small amount of water extracted will not result in a potential impact to the aqueduct (Paul Selsky, pers. com., December 10, 1997).

Water Conveyance Impact. Water conveyance infrastructure related to this option and associated impacts were evaluated in the Diablo Grande EIR. No additional construction beyond that evaluated in the Diablo Grande EIR would be required to continue pumping on a permanent basis as proposed by this option. Furthermore, this infrastructure has been constructed and is currently in operation. Further discussion of this conveyance system in this SEIR would not be appropriate. However, if the reader is interested in greater details of the conveyance system, refer to the Diablo Grande Specific Plan EIR (LSA 1992).

Cumulative Impacts. As discussed above, the City of Patterson General Plan projects a buildout population of 21,000. There are no identified reasonably anticipated future projects in the vicinity of Patterson that would rely on groundwater. Continuation of extraction and conveyance of groundwater from the Marshall-Davis wells would contribute incrementally to impacts on groundwater resources associated with buildout of Patterson. Based on the conclusions of the Patterson Study that groundwater supplies will be adequate to meet increases in water demands in the City of Patterson to the planned population, the cumulative impacts of this option on groundwater resources are considered to be less than significant.

Growth Inducing Impacts. There are no identified growth inducing impacts associated with continuing the existing extraction of water from the Marshall-Davis Well Site other than providing for construction of a portion of the Diablo Grande project: the purpose of this option.

ON-SITE GROUNDWATER (Option 2-1)

Water Supply Impact - Hydrology. The groundwater sources within the Phase 1 area of Diablo Grande are isolated and are not depended upon by any off-site users. Extraction of water up to the long-term safe yield limits proposed under this option and identified in the hydrogeologic evaluation from the nine wells within the Phase 1 area will not result in any long-term depletion of groundwater resources and therefore would not result in a significant adverse impact with respect to groundwater resources. In essence, the groundwater extracted from the Salado Creek alluvium will constitute a portion of the added runoff to the alluvium resulting from the Diablo Grande golf course irrigation. No mitigation is necessary.

Water Supply Impact - Hydrology. The State Department of Water Resources has expressed concern regarding potential subsidence in the vicinity of groundwater pumping at the on-site wells and resulting impacts to the California Aqueduct. The Aqueduct is over six miles from the on-site wells at the closest point. Considering that the area of influence of the wells is no more than two miles, no impacts to the California Aqueduct are expected. No mitigation is necessary.

Water Supply Impact - Biotic Resources. Extraction of approximately 13 gpm from the Sq well could cause localized drawdown of the alluvial aquifer, which could affect water levels in Salado Creek and associated riparian habitat in the vicinity of the Sq well, and potentially affect breeding habitat for the western spadefoot toad. This impact is considered to be less than significant.

Because the proposed extraction rates from this well are relatively low, and the known locations of western spadefoot toad breeding pools appear to be outside the radius of influence of the Sq well, increased pumping from this well is not expected to substantially affect the spadefoot toad. Furthermore, a Habitat Management Plan (HMP) has been developed for this species in the Phase 1 area. Implementation of the HMP will provide additional breeding habitat for the spadefoot toad on the project site near known upland habitats of this species. No additional mitigation is warranted.

Water Supply Impact - Biotic Resources. Groundwater extraction from the FPR well could cause localized drawdown of the alluvial aquifer in the vicinity of the FPR well, which could affect water levels in the Frog Pond and associated wetland/riparian area of Salado Creek, and potentially affect habitats for the southwestern pond turtle and western spadefoot toad. This impact is considered to be potentially significant.

The Frog Pond is known to provide habitat for the southwestern pond turtle, and Salado Creek in the vicinity of the FPR well is known to provide breeding habitat for

the western spadefoot toad. A Habitat Management Plan (HMP) has been developed to protect and enhance existing habitat for these species on the Phase 1 project site. Implementation of the HMP will provide additional breeding habitat for the spadefoot toad on the project site, and is expected to offset any potential impacts to this species resulting from pumping of the FPR well. However, the HMP does not contain measures to prevent desiccation of the Frog Pond, which could potentially result from the project, and could adversely affect the southwestern pond turtle.

Implementation of the following mitigation measure, in combination with the HMP, will reduce this impact to a less than significant level.

Mitigation Measure 2: Prior to the proposed increase in water extraction from the FPR well, a regular monitoring program for the Frog Pond shall be established by the WHWD, in conjunction with the Stanislaus County Environmental Coordinator. A depth gauge will be placed at a representative location in the pond to be determined in collaboration with the environmental coordinator. Water levels shall be monitored by a qualified technician monthly from November 1 to April 30, and biweekly from May 1 to October 31, and the data evaluated by the environmental coordinator to insure compliance with reasonable standards for pond depth and rate of drawdown, given seasonal variations in water availability and requirements for the pond turtle.

The following standards shall be adopted for maintenance of the Frog Pond:

a. The water level in the Frog Pond shall be maintained at the existing high level, established by the elevation of the outflow culverts, during the period from November 1 to July 31.

b. The Frog Pond shall not be dry (i.e., without standing water) for more than one month per year. A dry period of up to one month shall be allowed only between August 1 and October 31.

In the event that water levels in the pond fall below the prescribed level during the period from November 1 to July 31, or water levels decline at an excessive rate (> 6 inches per month) during any one month period, the Diablo Grande environmental monitor in conjunction with the environmental coordinator will conduct a directed review to assess the reasons for such decline and develop remedial measures as necessary to insure continued viability of habitat for pond turtles. In the event that the Frog Pond is dry for a period of more than one month during the period from August 1 to October 31, WHWD in collaboration with the environmental coordinator shall implement compensatory measures to restore water to the Frog Pond. These measures could include reducing extraction from the FPR well and/or diverting water to the Frog Pond from other suitable sources. Additionally, in order to maintain water quality in the Frog Pond, untreated surface runoff from roads or developed areas shall not be introduced into the Frog Pond.

Note: The Frog Pond has been observed to dry out for as long as 3 months during drought years from 1990 to 1993. However, the presence of pond turtles in the Frog Pond was not established before 1993, and the pond has contained water year-round from 1994 to 1996. Pond turtles require aquatic habitats for foraging, and can probably tolerate seasonal dry periods, but specific information is lacking on the duration of drought that this species can tolerate. The period of one month was estimated, based on general knowledge of the biology of this species.

Water Supply Impact - Health Hazards. Use of the water from these wells for domestic purposes without treatment could result in creation of a health hazard. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measure 3: Prior to any domestic, commercial, or other non-irrigation use of the water generated from this option, the water from each well to be used for such purposes shall be treated as necessary to meet all applicable health standards. The WHWD shall be responsible for ensuring compliance with this measure.

The water will be treated to meet state and local requirements. Environmental effects relating to the filtration plant were evaluated in the certified Diablo Grande EIR (see section IV, p. 173). Installation of any treatment system other than that described above may require additional environmental review.

Water Conveyance Impact. The water system to deliver the water to Phase 1 land uses (water lines and water treatment system) was included in the Phase 1 Preliminary Development Plan and was evaluated in the Diablo Grande EIR (Section IV-F). Conveyance pipelines are predominantly located in proposed roadways. Mitigation pertaining to this system is included in the Mitigation Monitoring and Reporting Program. To date, development of water conveyance infrastructure has not been completed. This option does not involve any construction not already evaluated in the Diablo Grande EIR. No additional environmental analysis of the water conveyance system is necessary.

Cumulative Impacts. There are no other existing or proposed projects that are known to draw from the alluvial or bedrock materials within the Phase 1 area or within the area of influence of the wells included in this option. Therefore, this option will not contribute to any cumulative effects.

Growth Inducing Impacts. No growth inducing impacts have been identified associated with this option. Implementation of this option will facilitate construction of a portion of Diablo Grande Phase 1: the objective of the option.

PATTERSON ALGAL TURF SCRUBBER (Option 3-1)

The environmental effects of this option were evaluated at a project-specific level in the Patterson Algal Turf Scrubber Water Reclamation Project Expanded Initial Study. The City of Patterson adopted a negative declaration for this project in June 1996. This option would provide 1,000 to 3,000 acre-feet of water per year. The

Initial Study for this option is included in Appendix D of the SEIR. It is not the intention to re-evaluate the impacts of this project in the SEIR but only to include this water source as an option. No additional environmental analysis is required for this option.

SHALLOW COUNTY GROUNDWATER (Option 4)

Water Supply Impact - Hydrology. The proposed project would reduce groundwater levels in the vicinity of the well fields. Groundwater levels are anticipated to drop approximately 16 to 20 feet at the center of the well field, and by up to 2 feet two miles from the center of the well field. This would result in a positive impact in the shallow aquifer where root zones need to be above the groundwater level. However, a negative secondary impact is projected due to reduced capacity of existing domestic and irrigation wells. This is considered to be a potential significant impact. However, implementation of the following mitigations will reduce the impact to a less-than-significant level.

Mitigation Measure 4: Historical groundwater pumping has been ongoing in the TID for many years in order to lower the groundwater level in some areas to allow agricultural operations. Groundwater pumping by the Diablo Grande project would reduce and potentially eliminate the need for this historical groundwater pumping by the TID. The proposed project would have a positive impact to agricultural operations in this context. However, there is a potential secondary impact associated with the project's proposed groundwater pumping relative to existing wells. A declining groundwater level may result in reductions to groundwater pumping in existing wells. To address this potential, the following mitigation is proposed.

> A mitigation program shall be established to protect existing wells within a two mile radius of the center of the well field. The elements of this mitigation program are as follows:
>
> a. Well Inventory. Prior to operation of project wells, a well inventory of all wells within two miles of the center of the well field shall be conducted to develop baseline data on the pre-project status of the groundwater levels, as well as the condition and characteristics of individual wells. The county shall cooperate by providing any relevant groundwater data and well information it has to the TID. General threshold criteria are defined below in section "c".
>
> b. Well Monitoring Plan. Prior to operation of project wells, a groundwater monitoring plan shall be developed. Existing wells, the new project wells, and any new monitoring wells that are deemed necessary, within two miles of the center of the well field, shall be monitored as set forth in the monitoring plan. The Well Monitoring Plan reports shall be evaluated to determine impacts based upon thresholds defined in the Well Monitoring Plan.

c. Define Thresholds. Thresholds of significance are as follows:

1. The groundwater level drops below an existing operational well's bowl level and said drop is due to the proposed project's groundwater pumping, not natural conditions.

2. The groundwater level drops such that the capacity of the existing well's pump is significantly reduced and said drop is due to the proposed project's groundwater pumping, and not natural conditions.

d. Groundwater Modeling. An element of the Well Monitoring Plan is groundwater modeling, calculations, or other scientific method that will determine if an impact to a well or wells is occurring and determine if the impact is the result of the proposed groundwater pumping from the well field. If impacts are the result of the proposed project's groundwater pumping, then certain mitigation measures would be triggered to offset those impacts. For example, the plan will include who shall pay for the cost to lower the pump bowls, or replace the well as necessary on existing wells projected by the model to be significantly adversely impacted by project pumping. As an alternative, pumping could be reduced in some wells, while increasing pumping in another project well. Modeling would be done per the requirements of the Well Monitoring Plan.

Water Supply Impact - Biotic Resources. Construction of the project wells and associated pipeline along well Alignments A or B could affect plant communities or wildlife habitats in the vicinity of the well fields. This impact is not considered to be significant.

The areas in the immediate vicinity of the well sites consist of large-parcel agricultural fields and dairy farming operations. These areas do not support intact natural plant communities, nor are they known to provide habitat for any sensitive wildlife species. Some animals commonly found in these croplands could be temporarily displaced by construction activities, but these effects would be short-term and reversible by restoring the project site to pre-construction conditions following completion of the project. No mitigation is required.

Water Supply Impact - Biotic Resources. Extraction of up to 11,000 AF per year from the project wells would lower the groundwater level in the local zone of influence of these wells, which could affect plant communities or wildlife habitats in the vicinity of these wells, including those associated with the Prairie Flower Drain. This is considered to be a potential significant impact.

The agricultural fields in the vicinity of the well sites do not support intact natural vegetation communities or sensitive wildlife habitats. Therefore, reduction of the groundwater level would not substantially affect biological resources and would likely improve agricultural productivity of these fields. Lowering of the water table could also reduce or eliminate groundwater influx into unlined drainage channels in

the vicinity of the well field. The majority of these are artificial drainage channels and provide little biological resource value. However, an approximately 3,600 linear foot section of the Prairie Flower Drain located west of Crows Landing Road and south of Lateral 5 1/2 appears to follow pre-existing topographic contours and has more naturalized wetland-type features. Perennially moist conditions are maintained in this channel partly by accretion from the shallow aquifer. The resulting moisture and hydrophytic vegetation in this section provide a zone of relatively high habitat value for wildlife.

According to the hydrological model, pumping of the project wells would lower the water level in this section of Prairie Flower Drain, which could cause this channel to become dry intermittently or continuously for up to several years during and following a prolonged drought, depending on the location of the well alignment and the intensity and duration of drought (see Section 2, Hydrology). If this section of the channel remains dry for a prolonged period (i.e., several months or longer), hydrophytic vegetation and associated wildlife habitat in this section could be adversely affected. However, the model assumes no inflow of surface water. Surface inflows from local tailwater runoff, adjoining drainage channels, and precipitation runoff could prevent drying of the channel or reduce the duration of the dry period. Therefore, the severity of this impact and its potential effect on biological resources would depend on the quantity and timing of surface water inflows, as well as pumping rate, climatic conditions, and location of the well field. Under a worst-case scenario and considering the expected inflows of surface water, the Prairie Flower Drain could potentially dry out seasonally for up to several months during drought years at full project build-out.

Implementation of the following mitigation will reduce this impact to a less-than-significant level.

Mitigation Measure 5: Following the onset of pumping of the project wells, a quarterly monitoring program for the Prairie Flower Drain between Crows Landing Road and Lateral 5 1/2 shall be implemented. The presence of water or saturated soils in this section of the drain shall be assessed visually and the water level estimated and recorded. If the channel is found to be dry (i.e., no water or saturated soils present in the channel) in two or more consecutive quarterly monitoring surveys, measures shall be implemented to restore sufficient water to this section of the channel to re-establish saturated soil conditions and support hydrophytic vegetation. Such measures could include allowing supplemental backflow into the drain channel from Lateral 5 1/2, or diverting agricultural drainage runoff from adjacent fields to the affected section of the drain.

Water Supply Impact - Biotic Resources. Extraction of up to 11,000 AF per year from the project wells would reduce inflow of groundwater to the San Joaquin River, which could contribute to cumulative effects on fall-run Chinook salmon (Merced River run) that migrate through this section of the river. This is considered to be a potential significant impact.

Groundwater accretion to the San Joaquin River in the project area represents a relatively minor component in the context of the various regulated and uncontrolled water inputs that affect this stretch of the river, the most important of which is inflow from the Merced River. According to the hydrological model, groundwater inflow to the river during a prolonged drought at full project build-out would be reduced by up to 5,300 to 6,500 AF per year, depending on well alignment. These reductions of flow would amount to less than 0.5 percent of the mean annual San Joaquin River flow in this section of the river. Therefore, potential impacts to fall-run Chinook salmon in years with near average or higher than average flow (i.e., Below Normal, Above Normal or Wet water years) are not expected to be significant. However, during a prolonged drought, average summer flow in the river could be reduced by up to 4.2 percent or 5.7 percent, depending on the well alignment. Reductions in San Joaquin River flow in low flow years (i.e., Dry or Critical water years) could affect adult salmon during the fall upstream migration (October-December) or juveniles during the spring emigration period (March-May). The impact on river flow resulting from the project is expected to be relatively minor during late fall and early spring because of lower pumping rates and higher stream flows during those periods. However, during early fall (October-November) and mid-spring (April-May), any reduction in San Joaquin River flow resulting from the project in Dry or Critical water years could potentially have an adverse effect on the fall-run Chinook salmon.

Implementation of the following mitigation will reduce this impact to a less-than-significant level.

Mitigation Measure 6: Mitigation measures shall be implemented during water years classified as Dry or Critical by the DWR for the San Joaquin River basin, as indicated in DWR Bulletin 120. Bulletin 120-3 (April 1) shall be referred to annually, starting on the first year of pumping of the project wells. If Dry or Critical conditions are forecast for that water year, the following measures shall be implemented:

a. An adaptive management program shall be implemented to offset the project impacts to San Joaquin River flow, as predicted by the hydrological model, for a 30-day period between April 1 and May 15, and a 30-day period between October 1 and November 15. The primary component of this management program will consist of release of an appropriate amount of water into the San Joaquin River on a continuous basis during the mitigation period in the affected reach of the river, to offset project impacts as projected by the hydrological model. Options available to implement this discharge of water to the San Joaquin River could include:

    1) Release of surface water. If during the mitigation period, TID or some other water district in the project vicinity has water available which could be released into the river, this water may

be purchased and released in the affected area of the river to supplement the river and meet the mitigation requirement.

2) Increase in project groundwater pumping. This option would provide additional water to be discharged to the river in the required amount, plus an amount to offset the additional loss of accretion to the river that could result from this measure. This option generally would be implemented when groundwater levels in the area of the well field remain high.

3) Reduction in project groundwater pumping. Under this option, the groundwater pumping would be reduced in an amount to permit increased accretion based on the required discharge amounts. This option generally would be implemented when groundwater levels in the area of the well field are low.

4) Release of groundwater from other areas of the TID. The TID has groundwater drainage wells in many other areas of the District. If, during the required mitigation period, the groundwater level in the well field area is low, but the groundwater remains substantially high in other areas of the TID, then TID could increase pumping in those areas to supply the appropriate amount of discharge to the river.

5) These options may be used individually or in combination to ensure that the river is supplemented as set forth in this mitigation measure.

If reduced project pumping, or increased project or drainage pumping is to be included as a component of this mitigation measure, a hydrological analysis would be required prior to implementation of this measure to assess how much the proposed reduction or increase would affect project impacts to the river during the mitigation period; the quantity of supplemental water purchased and discharged to the river would then be adjusted accordingly. The timing of this mitigation shall be coordinated with scheduled Merced River pulse flow releases under the pending VAMP agreement, to support migration of salmon through the affected reach of the river. Mitigation requirements shall be phased to match the phased increases in project pumping and offset resultant impacts to the river. For example, at 25 percent project build-out, the estimated loss in accretion would average approximately 2 cfs during a drought year, and the mitigation requirement would total approximately 240 AF for the 60-day mitigation period. At full project build-out, the estimated loss in accretion would average approximately 8 cfs during a drought year, and the mitigation requirement would total approximately 950 AF for the 60-day period. If scheduled Merced River pulse flow releases are

implemented for a period of less than 30 days in either spring or fall, the mitigation period and quantity shall be reduced accordingly.

b. This mitigation program shall be reviewed each year that it is implemented to assess its feasibility. Pursuant to this review, specific alternatives may be recommended, in consultation with the CDFG, USFWS and/or regional water resource agencies, which may be implemented in lieu of measure (a) above, to mitigate potential cumulative impacts of the project on fisheries resources of the San Joaquin River. Such alternatives could include contributing funds to local or regionally-based programs for riparian and instream habitat restoration and management of chinook salmon populations in the San Joaquin River basin.

Water Conveyance Impact - Biotic Resources. Trench excavation and pipeline installation activities in the sections of the pipeline outside of the San Joaquin River floodplain could affect plant communities or wildlife habitats in the vicinity of the pipeline alignment. This impact is not considered to be significant.

For most of the proposed alignment outside of the San Joaquin River floodplain, the pipeline operations would be limited to a narrow zone in agricultural fields and disturbed roadside areas. With the exception of the slough west of the river (considered under a separate impact below) these areas do not support significant natural vegetation communities or sensitive wildlife habitats. Some wildlife species may forage in or move through areas of the proposed alignment. Individual animals could potentially be displaced by the project, but these effects would be temporary and reversible. No mitigation is required.

Water Conveyance Impact - Biotic Resources. Pipeline installation operations in the east staging area would disrupt and compact soils in this area, which could affect plant communities or wildlife habitats in the vicinity of this staging area. This impact is not considered to be significant.

The staging and drilling activities would be expected to cause substantial disruption and compaction of the soil in the staging area, and possible displacement of wildlife in the immediate vicinity. These activities would be confined to a relatively small area in an agricultural field which does not support natural vegetation or sensitive wildlife habitats. Therefore, no significant impacts to biological resources are expected. In addition, approximately 600 cubic yards of excavation spoils would be placed onto adjacent agricultural fields. Following installation of the pipeline, these fields may be re-leveled to accommodate the excess soil. This volume of material would constitute a relatively negligible quantity in relation to the area of the surrounding agricultural fields. Therefore, placement of this excess soil would not be expected to have any adverse affect on biological resources. No mitigation is required.

Water Conveyance Impact - Biotic Resources. Directional drilling and pipeline installation under the San Joaquin River could affect the river channel and associated riparian vegetation and habitats. This impact is not considered to be significant.

The drilling operation would place the pipeline 30-40 ft under the river bed, and would thereby avoid the river channel and root zones of riparian plants. Previous applications of the directional drilling procedure indicate that this method can be implemented without significant disturbance of the river channel or associated riparian habitats. No mitigation is required.

Water Conveyance Impact - Biotic Resources. Pipeline installation operations inside the levee on the west side of the San Joaquin River could affect riparian habitats or sensitive wildlife in this area, including Swainson's hawk or other raptors. This is considered to be a potential significant impact.

The west staging area and adjoining section of the pipeline inside the western levee would be situated in a floodplain that supports riparian vegetation and associated wildlife habitats, including potential nesting sites for Swainson's hawk and other raptors. Pipeline installation activities would result in soil compaction, removal of vegetation and general disturbance of this area, and could potentially displace nesting raptors or other wildlife during the construction period. Section 3.503.5 of the California Fish and Game Code protects all birds-of-prey, their eggs, and active nests from destruction. In addition, Swainson's hawk is protected as a state-listed threatened species. Therefore, removal of any trees containing active raptor nests, or activities resulting in the abandonment of an active Swainson's hawk nest, would be considered a significant impact.

Implementation of the following mitigation measures will reduce this impact to a less-than-significant level.

Mitigation Measure 7: Prior to construction, a qualified biologist shall survey the project site and surrounding areas in the floodplain to determine the extent of the riparian vegetation zone, and identify any other sensitive plant communities or habitats (e.g., wetlands) that may occur in this area. Based on this survey, the construction area shall be located at least 100 feet from the edge of the riparian vegetation zone. The limits of the construction zone shall be clearly marked with flags or temporary fencing, and construction activities shall be contained within this zone. If loss of sensitive plants or habitats can not be avoided, a habitat restoration plan shall be developed and approved by the Environmental Coordinator in consultation with the CDFG, and implement restoration activities following completion of construction.

Mitigation Measure 8: Prior to construction, both prior to (February-March) and during (March-September) the breeding season, a qualified biologist shall conduct surveys to identify potential raptor nests in all suitable nest trees within one-half mile of the west staging area. If an unoccupied nest that could potentially be used by Swainson's hawk is identified in the vicinity of the construction site prior to the breeding season, a cover shall be placed on the nest to prevent nest establishment at

that site, and shall remain in place until completion of construction activities. Authorization from the CDFG shall be obtained prior to implementing nest covering activities. All nest covers installed shall be removed following construction. If an active raptor nest is found during the breeding season, its location shall be marked and a site-specific buffer zone established by the biologist. For raptor species other than Swainson's hawk, construction activities shall be avoided within this buffer zone while the nest is occupied by adults and/or nestlings. For Swainson's hawk, construction activities shall be avoided within one-half mile of an active nest site between March 1 and September 15 (or August 15 if authorization is obtained from CDFG). If construction can not be avoided during the period when an active raptor nest is present, the biologist shall monitor the nest site(s) during construction. If a Swainson's hawk nest is abandoned during construction, or any active raptor nest is removed as a result of the project, the WHWD shall contribute funds for recovery and controlled release of nestlings, as specified in the current CDFG mitigation guidelines/management conditions for Swainson's hawk.

Water Conveyance Impact - Biotic Resources. Installation of the pipeline crossing of the slough west of the San Joaquin River could temporarily affect water quality and aquatic resources in the slough. This is considered to be a potentially significant impact.

Construction of the pipeline crossing would likely involve temporary dewatering of a section of the slough to excavate the trench and install the pipeline, and could result in sediment discharges and temporary increases in water turbidity in the vicinity of the installation. Dewatering or increases in water turbidity could potentially impact aquatic life in the affected area of the slough. These activities would likely be subject to U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the Clean Water Act, and may thus require authorization from the Corps (possibly under a nationwide permit number 12). These activities could also require a streambed alteration agreement with the CDFG (under Section 1600 et seq. of the California Fish and Game Code).

Implementation of the following mitigation measure would reduce this impact to a less-than -significant level.

Mitigation Measure 9: Following project approval and prior to construction, Diablo Grande shall consult with the Corps and CDFG to determine the extent of jurisdiction of these agencies and obtain any necessary authorizations. Best management practices and methods acceptable to the Corps and/or CDFG shall be employed to minimize potential impacts of construction within the slough. A qualified environmental technician shall be present during construction to monitor sediment discharges, and recommend appropriate measures as needed and these measures shall be implemented, to minimize potential impacts on water quality in the slough.

Water Conveyance Impact - Biotic Resources. Installation of the pipeline crossing of the slough west of the San Joaquin River could affect riparian vegetation including valley oaks adjacent to the slough, and could result in abandonment or

removal of Swainson's hawk or other raptor nests in these areas. This is considered to be a potentially significant impact.

The riparian vegetation bordering this slough provides habitat value for a variety of wildlife, and the mature valley oaks bordering the slough could potentially provide nesting sites for raptors. Active raptor nests are protected under Section 3.503.5 of the California Fish and Game Code, and Swainson's hawk is further protected as a state-listed threatened species. Therefore, removal of trees containing active raptor nests, or activities resulting in the abandonment of an active Swainson's hawk nest, would be considered significant impacts.

Mitigation Measures 10: Refer to mitigation measure 7.

Mitigation Measures 11: The pipeline alignment shall be placed so as to minimize disruption of riparian vegetation and avoid removal of mature valley oaks or other potential nesting trees along the slough. If removal of such trees can not be feasibly avoided, WHWD shall replant an equal number of trees of the same species as those removed on the site. If riparian vegetation is removed, the affected areas shall be restored by replanting appropriate native riparian species following completion of the pipeline crossing.

Water Conveyance Impact - Agricultural Resources. The conveyance pipeline will require installation of about 32,000 linear feet of pipeline in trenches along the edge of agricultural fields and across agricultural fields. This will cause a temporary disruption of agricultural activities and could lead to long term adverse effects on agricultural productivity should site restoration not be properly conducted. This is considered to be a potentially significant impact. However, implementation of mitigation 12 below will reduce the impact to a less than significant level.

Water Conveyance Impact - Agricultural Resources. The staging areas for the River Crossing will temporarily remove a total of about 3.5 acres of agricultural land from production during installation of the pipeline under the River. This will cause a temporary disruption of agricultural activities, soil compaction and could lead to long term adverse effects on agricultural productivity should site restoration not be properly conducted. This is considered to be a potentially significant impact. However, implementation of mitigation 12 will reduce the impact to a less than significant level.

Mitigation Measure 12: Prior to issuance of a grading permit for pipeline installation, the application shall submit an agricultural restoration plan identifying the exact pipeline route in relation to adjacent land uses and the specific measures that will be taken to restore disturbed agricultural lands to their pre-project condition. This plan should include such measures as stockpiling strippings and measures necessary to enhance soil structure for compacted areas. The plan shall be reviewed and approved by the County Environmental Coordinator prior to initiation of trenching activities.

Implementation of this mitigation measure will reduce project impacts associated with agricultural resources to a level of insignificance.

Water Conveyance Impact - Air Quality. The use of construction vehicles and trenching activities will temporarily increase local PM_{10} emissions during the installation of the water pipeline.

Pipeline installation activities typically involve three elements: trenching, backfilling and materials delivery. Each element includes different activities and different construction vehicles. Trenching activities are expected to include one backhoe vehicle. During backfilling, it is expected that one front loader would be used to push soils into the trench around the pipeline. Materials delivery typically includes dump trucks for transporting back fill materials and possibly removal of some soils from the pipeline site, and flatbed trucks to deliver pipeline materials to the project site.

PM_{10} emissions associated with trenching are difficult to ascertain because the work surface area consists of a three-sided ditch. Exposure to wind is minimal in this situation. However, soil is scooped out and placed along side the trench. In the case of pipeline installation along roadway shoulders, the exposed berm generally remains during the day, with backfilling taking place at the end of the day. For pipelines sections located in agricultural fields, it would be expected that immediate backfilling would not be a critical issue, unless interruption of agricultural operations must be minimized and backfill operations must be conducted continuously and on the "heels" of the trenching and pipe laying activities.

Depending on wind conditions, pipeline installation could result in increased local PM_{10} levels. As such increases are not expected to be dramatically different from those typically associated with agricultural activities and there are no identified sensitive receptors in the immediate vicinity of the proposed pipeline route, this impact is considered to be insignificant. However, the consultant recommends that dust minimization measures be used during project construction such as watering of construction areas, covering of haul trucks and covering inactive storage piles. Mitigation is not warranted.

Water Conveyance Impact - Archaeological Resources. The potential exists for disruption of archaeological sites during the pipeline construction phase. This is considered to be a potentially significant impact. Implementation of the following mitigations will reduce the impact to a less than significant level.

Mitigation Measure 13: Prior to digging trenches for water conveyance pipelines, the applicant shall be responsible for conducting a site reconnaissance of the pipeline location and a literature search through the relevant California Information Center.

Mitigation Measure 14: If a resource is found prior to or during construction, the applicant will be required to implement the conditions contained in Appendix K of CEQA. Appendix K outlines actions that must be implemented in the case resources are found.

Cumulative Impacts. This option would result in extraction and transfer of up to 11,000 AF of groundwater from a well field located on the east side of the San Joaquin River about eight miles east of Patterson to Diablo Grande. The TID has extracted groundwater from this area since the 1920's to lower the groundwater table and thereby increase agricultural productivity as well as to supply irrigation water to farmers in the vicinity. In addition, a portion of the drainage water is discharged to the San Joaquin River. Project implementation will result in lower groundwater levels and would therefore reduce the need for drainage pumping to lower groundwater levels.

The primary cumulative effects relate to the hydrology of the San Joaquin River. The project would result in reductions in flows to the San Joaquin River by a relatively small amount, even during the prescribed drought scenarios. As described in the previous sections, the proposal does not have the potential to contribute to long-term adverse reduction in groundwater of any groundwater basins.

Other existing water supply projects draw water from the San Joaquin River. For example, the Patterson Water District (PWD) diverts water from the River upstream near the City of Patterson. During the years 1992 to 1995, the PWD diverted an average of 26,500 AF from the River during its March to September irrigation season or an average diversion rate of 6.3 cubic feet per second (for 210 days or 3,786 AF per month). Over time, the proposed project and other urban projects would incrementally reduce the groundwater table.

Growth Inducing Impacts. This option would directly facilitate development of Diablo Grande: the stated project objective. The option will not free up any additional water supplies or provide infrastructure that could be used for other development. The option would likely increase the productivity of agricultural practices in the immediate vicinity of the new drainage wells through reductions in groundwater elevations, thereby fostering economic growth to some extent.

BERRENDA MESA WATER DISTRICT (Option 5)

Water Supply Impact - Surface Water. Implementation of the proposed project would not cause any significant adverse impacts with regard to surface water resources. No mitigation is warranted.

Water Supply Impact - Groundwater. It is not anticipated that the proposed sale of up to 8,000 AF per year of BMWD water entitlement will cause significant adverse impacts to groundwater resources. No mitigation is warranted.

Water Supply Impact - State Water Project Facilities. The proposed project would not result in any substantial changes to SWP operations over the existing setting. Water previously delivered to the BMWD through the California Aqueduct would be diverted farther to the north near the City of Patterson at the Diablo Grande main supply line crossing of the Aqueduct. This would increase the capacity downstream

of the new diversion within the California Aqueduct over current conditions. Since the current operation conditions would continue to be applied, the project would not result in any significant adverse impacts relating to SWP facilities. No mitigation is warranted.

Water Supply Impact - Agricultural Resources. The transfer of 130,000 AF of entitlement water from agricultural contractors to urban uses may result in a significant loss to agricultural production. Based on the above discussion, this is not determined to be a significant impact. No mitigation is warranted.

Water Supply Impact - Groundwater Banking. The Semitropic Water Storage District (SWSD) Groundwater Bank could be used in accordance with the existing operation criteria to store a portion of the transferred water entitlement on a long-term basis to maximize the useability of the BMWD water. The use of the Groundwater Bank to the degree contemplated (up to a maximum of 8,000 feet of deposit or withdrawal per year) is within the design and operations parameters of the Groundwater Bank and would not impact other users. Therefore, no adverse impacts would occur.

As described above, during times when the historical water flows through the Delta associated with the transferred water entitlement exceed the Diablo Grande demands, water may be deposited in the SWSD Groundwater Bank via the California Aqueduct. When the historical flows through the Delta associated with the transferred water entitlement are less than the Diablo Grande demands, water diverted through the Delta for SWSD would be diverted to Diablo Grande and water previously stored in the SWSD Groundwater Bank would be used by SWSD. This operation would not change Delta flow patterns and would not increase flows in the California Aqueduct and San Luis Reservoir as compared to conditions described under the environmental setting. No mitigation is warranted.

Water Conveyance Impact - Archaeological Resources. There is the potential for disruption of archaeological sites during the pipeline construction phase. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measure 15: Refer to mitigations 13 and 14.

Water Conveyance - Biotic Resources. As described in the project description in Section 1, the only construction required for this option is a turnout from the California Aqueduct just north of Oak Flat Road and installation of a 30-inch water pipeline connecting to the existing Diablo Grande water pipeline in Oak Flat Road. This construction would take place within and adjacent to existing California Aqueduct facilities and within the areas between the existing pump station and Oak Flat Road, which is flat and devoid of vegetation. Construction and operation of these facilities are not anticipated to result in any significant adverse impacts.

Cumulative Impact. Cumulative impacts associated with the transfer of water entitlements must consider the impacts of other water transfers that would occur in

the Kern County area and throughout the Central Valley. Initially, most of the other transfers may occur under the Monterey Agreement, as addressed in the Final EIR for the Monterey Agreement. That EIR noted that similar projects that provide a long-term or permanent transfer of water entitlements or water rights may occur but have not been identified at this time.

The Monterey Agreement EIR found that transfer of up to 130,000 AF of water entitlements from the KCWA would have negligible impacts on most environmental elements on a statewide basis. However, the EIR did note that indeterminate impacts may occur to biological, cultural and recreation resources and to health and safety concerns on a statewide basis. The EIR also indicated that adverse, but not significant impacts may occur to land use and socio-economic concerns on a statewide basis and within the KCWA/Tulare Lake region. This determination was reached because the amount of land that would become non-irrigated would represent about one percent of the total irrigated cropland in the Tulare Lake region.

Other water transfers are expected to occur in the future. For example, water users located in the watersheds of the upper Sacramento, Feather, Yuba, Bear, Merced, and Stanislaus Rivers have participated and/or are considering participation in short-term water transfers of one- to five-year periods for water supplies and/or fish and wildlife uses. However, projects and locations have not been identified at this time. The extent of these other transfer programs will depend on the length of the contract period.

Future water transfers may involve permanent transfer of water entitlements such as that proposed by this option, or the transfers may involve year-to-year agreements during periods of water restrictions. If future SWP water entitlement transfers do not change the pattern of Delta diversions, SWP operations should not be impacted. Prior to any potential future water transfer, an application to the DWR would be required for a "change in place of use". At that time, the DWR would determine if this SEIR is adequate, or if additional environmental analysis would be required.

Overall, implementation of water transfer programs will be part of the water demand that has been identified by the State Department of Water Resources as being unmet by current water supplies. The DWR identified 2.9 to 4.9 million AF of projected water demand that would not be met by existing water facilities, conservation, and reclamation if all water entitlements and water rights continued to be delivered to existing users. Water transfers can be used in the future to reduce the currently unmet future demand. Therefore, water transfers may be beneficial from a cumulative statewide perspective, depending largely upon one's own perspective. Regardless, each transfer proposal must be evaluated individually to determine direct or indirect impacts at a project-specific level. This would be for the DWR to determine as part of a "change in place of use" review.

Growth Inducing Impact. This option would directly facilitate development of Diablo Grande: the stated project objective. This option could provide up to three-quarters of the water demand of the entire Diablo Grande project. If a cut back of 50 percent were included, this option, in conjunction with on-site water, and reclaimed

water discussed in the original EIR, could supply all of the water needed for the Phase 1 of the Preliminary Development Plan (PDP) and possibly a portion of the supply for Phase 2. No water would be made available for other uses. The infrastructure constructed as part of this option would not be available for other uses. On this basis, the project is not considered to be growth inducing.

BRAVO MANAGEMENT COMPANY (Option 8)

Water Supply Impacts - Groundwater. Implementation of the proposed project would not cause any significant adverse impacts with regard to surface water resources. No mitigation is warranted.

Based on the total amount of water supplied by the BVWSD (170,000 AF per year), the use of 1,000 acre-feet per year for 20 years is not considered to have a significant on total groundwater supplies.

Water Conveyance Impact - Biotic Resources. The only construction required for this option is a turnout from the California Aqueduct just north of Oak Flat Road and installation of a 30-inch water pipeline connecting to the existing Diablo Grande water pipeline in Oak Flat Road. This construction would take place within and adjacent to existing California Aqueduct facilities and within the areas between the existing pump station and Oak Flat Road, which is flat and devoid of vegetation. Construction and operation of these facilities are not anticipated to result in any significant adverse impacts.

Water Conveyance Impact - Archaeological Resources. There is the potential for disruption of archaeological sites during the pipeline construction phase. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measure 16: Refer to mitigations 13 and 14.

Cumulative Impacts. The Bravo Management Company water is water which is specifically owned and is stored in an existing groundwater storage area. This water is currently available for transfer to an urban use and may be transferred either to the Diablo Grande project or some other project. As this water is of a limited supply and it is not available in larger amounts, the impact associated with this supply source is limited to the actual usage of 1,000 acre feet per year for 20 years. There are no known cumulative effects related to this supply.

Growth Inducing Impact. This option would directly facilitate development of Diablo Grande: the stated project objective. No water would be made available for other uses. The infrastructure constructed as part of this option would not be available for other uses. On this basis, the project is not considered to be growth inducing.

ALTERNATIVES

Algal Turf Scrubber - City of Ceres (Water Plan Option 3-2)

Project Description. This alternative involves construction of an Algal Turf Scrubber (ATS) at the City of Ceres Wastewater Treatment Plant, infrastructure to discharge treated effluent to the San Joaquin River, extraction of an equal amount of water from the River and conveyance of the water to the existing Diablo Grande water pipeline. The ATS facility would operate the same way as the ATS for the City of Patterson described in the initial study for this facility. If needed, please refer to that discussion for a full description of the ATS operation.

The Ceres wastewater treatment plant is located on a 200-acre site in the southern part of Ceres at 4200 Morgan Road. The treatment plant includes approximately 125 acres used for treatment disposal. Existing facilities include aerated lagoons and ponds used for evaporation and percolation. The lagoons will be replaced by an activated sludge facility in the near future (Bill Riddle, pers. com., April 15, 1997).

The City of Ceres presently generates up to 2,000 acre-feet per year of secondary effluent which is used for irrigation (Bookman-Edmonston Engineering 1997). This effluent could be treated with the ATS process and discharged to the San Joaquin River. An equivalent amount of water would be diverted from the River and conveyed to the existing Diablo Grande pipeline near the Marshall-Davis Well Site. With a discharge permit from the Central Valley Regional Water Quality Control Board (CVRWQCB), the Western Hills Water District (WHWD) could recover all of the new water from the San Joaquin River minus channel losses, if any. Under the Water Code section applicable to the exchange (section 1485), the discharge and diversion rates would have to match to some extent.

New construction would include an ATS facility at the Ceres Wastewater Treatment Plant, a pumping plant and 12-mile long pipeline from the Treatment Plant to the San Joaquin River and its associated outfall facility, a diversion facility on the River and a 4.8-mile pipeline to WHWD's existing pipeline in Marshall Road. The discharge pipeline would likely be installed in Central Avenue south of the treatment plant to Harding Avenue approximately 9 miles south of the City of Ceres. At this juncture, the pipe would be directed west to cross Crows Landing Road and then traverse across agricultural land to the San Joaquin River. As an alternative, the pipeline could be directed south in Crows Landing Road to the San Joaquin River.

The diversion pipeline to carry water from the San Joaquin River to the existing Diablo Grande water conveyance infrastructure would be located along the same route as the water conveyance pipeline proposed and analyzed in Section 2.4, Shallow County Groundwater.

The diversion facility would include pumps likely housed in a masonry structure with approximate dimensions of 20 feet by 20 feet.

Water Supply Impact - Hydrology. The Turlock Irrigation District (TID) annually receives approximately 200 to 250 acre feet of treated effluent per year from the City of Ceres for use as boiler feed water in the Almond Power Plant. The TID is entitled to take up to the first 400 acre feet of the highest quality treated effluent available from the City of Ceres wastewater facilities. The amount of treated effluent available to Diablo Grande would likely be limited by the TID entitlement.

The project would result in water that is currently applied to agricultural lands in the vicinity of the treatment plant being conveyed to Diablo Grande. It is likely that a portion of the water applied to the agricultural lands reaches the groundwater table. As a result of elimination of the water supply for the irrigation of these agricultural lands, it is possible that an alternative irrigation source would be used, possibly groundwater. The project would therefore likely result in a net reduction in the amount of groundwater in the vicinity. This is a potentially significant impact. However, it could also be a benefit if groundwater were pumped near the San Joaquin, because it would lower the groundwater table and provide improved agricultural use of the land.

A water balance should be prepared as part of project-specific environmental review to quantify the hydrological effects of this alternative if it is pursued.

Water Conveyance Impact - Air Quality. Monitoring of the pilot ATS plant in the City of Patterson included monitoring for creation of objectionable odors. Over the monitoring period, no objectionable odors were noticed (Report of Waste Discharge, Section 3). The consultant conducted a site visit on February 19, 1996 of the Patterson pilot ATS facility and noticed no objectionable odors at that time. The effluent input into the ATS is secondary treated effluent and is discharged as tertiary treated effluent. Therefore, it would be expected that any odor emitted from the ATS facility would be less than that which already exists. Furthermore, the City is currently using its effluent treated to a secondary level for irrigation purposes, which to date has not raised odor issues.

Construction Impacts - Introduction. Environmental impacts relating to construction would occur associated with the following elements of the project: construction of the ATS at the City of Ceres Wastewater Treatment Plant; construction along the route selected for the 12-mile discharge pipeline; construction of the outfall; construction of the diversion facility and construction of the 4.8-mile diversion pipeline. These elements are discussed in the context of environmental issues that are considered to be potentially relevant.

Construction Impacts - Air Quality. As it pertains to construction impacts, refer to the *Water Conveyance (Air Quality)* discussion on air quality impacts in section 2.4 of this SEIR.

Construction Impacts - Biotic Resources. Wastewater Treatment Plant: The ATS facility would be installed within the existing treatment plant. It is not anticipated that this element of the project would affect any biotic resources.

Conveyance Pipelines. Installation of pipelines within road rights-of-way would not be expected to result in significant biotic impacts as these areas are generally devoid of vegetation. However, pipeline routes should be surveyed as part of project-specific environmental review. Installation of pipelines across agricultural fields would result in temporary disturbance to agricultural operations and could affect biotic resources depending upon the route selected. Site-specific surveys would be required to identify impacts associated with the conveyance pipelines to determine the level of impact.

Discharge Pipeline Outfall and Diversion Facility. Construction of the outfall and diversion facilities would likely result in minor bank disturbance and removal of a small amount of riparian habitat. Within this habitat may be plant and/or animal species that are threatened and/or endangered or classified as species of special concern by the State of California. Installation of these facilities would require a Streambed Alteration Permit from the California Department of Fish and Game (CDFG) and/or an Army Corps of Engineers Section 404 Permit. Compliance with these requirements would ensure that biotic impacts are less than significant.

There are areas in the County of Stanislaus which are considered "sensitive" (i.e., likely to have archaeological or historic cultural resources). These sensitive areas are often located near natural watercourses, springs or ponds, and on elevated ground. Many archaeological sites in the Central Valley have been buried by silt and might not be evident by inspection of the surface of the ground. The channel of natural watercourses change (meander) over the years and springs dry up, therefore, archaeological sites may be found in areas that are distant from present sources of water (Stanislaus County 1987).

Only an estimated eight percent of the county has been surveyed for evidence of archaeological or historical cultural resources. Based on the most current information on the archaeological resources of the county (i.e., the Stanislaus County's General Plan Support Document, June 1987), there are 230 recorded cultural resource sites in the county: 206 are archaeological sites and 24 are historical sites. These records of known archaeological and historical sites are filed with the Office of Historic Preservation, Central California Information Center, California State University, Stanislaus, Turlock, California. The exact locations are kept confidential to protect these valuable resources.

Water conveyance pipelines would be placed about three to four feet below the ground surface along road rights-of-way and across agricultural fields. No deep grading would be required. These areas have been subject to previous disturbance. The outfall and diversion facilities would be constructed adjacent to the San Joaquin River and would involve minor bank disturbance. Implementation of the measures

described in CEQA Guidelines Appendix K would provide adequate guidance in the event cultural resources are discovered during construction activities.

Algal Turf Scrubber - City of Modesto (Option 3-3)

Project Description. The Algal Turf Scrubber (ATS) in the City of Modesto would operate the same way as the ATS for the City of Patterson described previously in this EIR.

The City of Modesto presently generates approximately 25,000 acre-feet of treated effluent per year (Jim Lake, pers. com., April 18, 1997). The city treats its effluent at its Las Palmas Avenue treatment plant. This plant consists of a 1,000 acre treatment facility and an adjacent 3,500 acre ranch located near the San Joaquin River. The ranch is used for irrigating pasture with treated effluent.

Approximately 1,000 acres plus 100 acres of the ranch property contain oxidation ponds, recirculation channels and storage ponds. According to the City Public Works Department, Modesto currently reclaims and beneficially reuses up to 100 percent of its treated wastewater each year on the ranch. However, in 1995, the Plant discharged about 17,192 AF to the San Joaquin River and applied about 7,368 AF to the ranch for irrigating pasture.

Depending on the amount and timing of precipitation, the amount of treated effluent going to the river will fluctuate. For example, in wet years treated effluent discharged to the river will be higher than in dry years when irrigating the city owned pasture requires more water (ibid.). In the fiscal year 1996-1997, 15,350 AF was discharged to the San Joaquin River and 9,210 AF were applied to pasture.

Under this alternative, up to 12,000 AF of treated effluent would be conveyed to the ATS and discharged into the San Joaquin River and an equal amount of water would be diverted from the River for conveyance to Diablo Grande. New construction would include the ATS facility, facilities to convey and discharge the new water to the San Joaquin River and a diversion facility and pipeline from the River to WHWD's existing pipeline in Marshall Road. The total length of the pipelines would be about 7.7 miles. Under the Water Code section applicable to the exchange (section 1485), the discharge and diversion rates would be required to match to some extent.

Alternatively, arrangements could be made with the Patterson Water District (PWD) to convey the new water to the vicinity of State Highway 33 for use of wastewater from the City of Patterson. The amount of mixing of the reclaimed water with flow in the San Joaquin River would be a factor in the expanded use of new water from an ATS facility.

Water Supply Impact - Hydrology. The project would result in water that is currently applied to agricultural lands in the vicinity of the treatment plant and deposited in the San Joaquin River being conveyed to Diablo Grande. It is likely that

a portion of the water applied to the agricultural lands reaches the groundwater table. As a result of elimination of the water supply for the irrigation of these agricultural lands, it is possible that an alternative irrigation source would be used, possibly groundwater. The project would therefore likely result in a net reduction in the amount of groundwater in the vicinity. This is a potentially significant impact. A water balance should be prepared as part of project-specific environmental review to qualify the hydrological effects of this alternative if the applicant pursues this alternative.

Water Conveyance Impact - Air Quality. As it pertains to construction impacts, refer to the *Water Conveyance (Air Quality)* discussion on air quality impacts in section 2.4 of this SEIR.

Construction Impacts - Introduction. Environmental impacts relating to construction would occur associated with the following elements of the project: construction of the ATS at the City of Modesto Wastewater Treatment Plant; construction along the route selected for the discharge pipeline; construction of the outfall; construction of the diversion station; and construction of the diversion pipeline. These elements are discussed in the context of environmental issues that are considered to be potentially relevant.

Construction Impacts - Biotic Resources. Refer to the biotic resources discussion for the City of Ceres Algal Turf Scrubber alternative, above.

Construction Impacts - Archaeological Resources. Refer to the archaeological resources discussion for the City of Ceres Algal Turf Scrubber alternative.

Construction Impacts - Air Quality. As it pertains to construction impacts, refer to the *Water Conveyance (Air Quality)* discussion on air quality impacts in section 2.4 of this SEIR.

No-Project Alternative

CEQA guidelines section 15126(d)(2) requires that the specific alternative of "no project" be evaluated. The "no project" alternative shall discuss the existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved. The "project" analyzed in this SEIR is the provision of a long-term water supply for the Diablo Grande project. Without a long-term water supply, the Diablo Grande project will be limited to an on-site water source only, plus temporary provision of 1,200 acre-feet from the Marshall-Davis Well Site. After the year 2001 when the 1,200 acre-feet from the Marshall-Davis Well Site water source terminates, the Diablo Grande project would be limited to its on-site water resources only. This "no project alternative" scenario considers "what would be reasonably expected to occur in the foreseeable future" to be a scenario where Diablo Grande is limited to on-site water sources only. However, it is possible that beyond the foreseeable future the proposed project would expand incrementally as new off-site water sources are found.

Because of the lesser amount of water available from on-site sources (estimated to be 464 acre-feet per year maximum and most likely significantly less), this alternative would result in significantly fewer impacts relative to all environmental issues. However, it is fair to assume that over time, the property owners could obtain off-site long-term water supplies, whereupon impacts discussed in the 1992 and this SEIR would occur, and, consequently, be mitigated.

Environmentally Superior Alternative

CEQA Guideline section 15126(d) requires identification of the environmentally superior project alternative. Based on the information contained in this EIR, the environmentally superior alternative can either be the Shallow County Groundwater option, because it will provide the greatest amount of water for the proposed project, thus meet project objectives without significant adverse environmental impacts; or, any combination of the other options, which, when combined, could fulfill the project objectives without project specific or cumulative significant adverse environmental impacts. Table S-2 provides a comparison of the options.

Though the Ceres and Modesto ATS options listed in Table S-2 contain the note "cannot determine" in the context of biotic resources, the lack of specific biological analysis associated with their respective conveyance pipelines should not be construed to mean that any potential future impacts associated with these two ATS options would not be mitigated to a level of insignificance. It should be understood that conveyance pipelines will, in large part, be installed in agricultural lands and existing roadways, thereby avoiding significant impacts. Any potential impacts to plant or animal species are expected to be identified and fully mitigated. Therefore, in light of this information, all options could be construed to be equally environmentally superior.

Cumulative Impacts

The discussion of cumulative impacts is prepared in compliance with CEQA Guidelines Section 15130. For the purposes of this SEIR, the cumulative impacts should be discussed first, to analyze the possible inter-relation between the options set forth in this SEIR and second, to discuss where other reasonably foreseeable future projects may create additional significant cumulative impacts related to water.

Cumulative Impacts Between the Water Options

Cumulative impacts relating to each of the water options are discussed in Section 2 of this SEIR. If two or more of the water options are combined, there may be cumulative impacts above those impacts associated with each option. Based on the possibility that the sum of impacts associated with a combined water option is greater than the impacts for each water option individually, it is necessary to assess such cumulative impacts.

TABLE S-2

Comparison of Options

Option	Hydrology[2]	Biotic Resources	Agricultural Resources	Air Quality
Marshall-Davis[1]	less than significant	less than significant	less than significant	less than significant
On-Site Groundwater[1]	less than significant	less than significant	less than significant	less than significant
Patterson ATS	less than significant	less than significant	less than significant	less than significant
Shallow County Groundwater	less than significant	less than significant	less than significant	less than significant
Berrenda Mesa	less than significant	less than significant	less than significant	less than significant
Bravo Management Company	less than significant	less than significant	less than significant	less than significant
Ceres ATS	less than significant	cannot determine[3]	less than significant	less than significant
Modesto ATS	less than significant	cannot determine[3]	less than significant	less than significant

1 This option's impacts were discussed in the 1992 EIR prepared for the Diablo Grande project. Therefore, impacts relative to this discussion relate to those impacts associated with extension of the contract between Diablo Grande and Marshall-Davis Farms, whereby Diablo Grande continues to use approximately 1,200 acre-feet of groundwater per year beyond the year 2001.

2 "Less than significant" designation indicates the impact would be reduced to a less than significant level after implementation of recommended mitigation measures.

3 Though the impacts associated with these two alternatives have been discussed in section 3 of the SEIR, the level of environmental analysis is not at a great enough level of detail to determine what the specific impacts would be relating to biotic resources. As stated in the SEIR (para. 2, page 3-5), any future pipeline routes shall be required to be surveyed as part of project specific environmental review. The lack of specific biological analysis associated with these alternative's respective conveyance pipelines should not be construed to mean that any potential future impacts associated with these two alternative options would not be mitigated to a level of insignificance. Any potential impacts to plant or animal species shall be identified as part of any future pipeline construction final environmental evaluation, and therefore will be fully mitigated. It is important to note that conveyance pipelines will, in large part, be installed in agricultural lands and existing roadways, thereby avoiding significant impacts. In light of this information, all options could be construed to be equally environmentally superior.

Note: The water conveyance impacts associated with each long-term water option is included in the biotic resources, agricultural resources and air quality columns in the above table.

Source: EMC Planning Group Inc.

The potential for cumulative impacts depends on proximity of the options chosen. To provide a theoretical "worst case scenario", this section analyzes the cumulative impacts assuming the two options in closest proximity to one another were selected: the Shallow County Groundwater option (11,000 AF) and the Patterson Algal Turf Scrubber option (1,000 to 3,000 AF). The Patterson Algal Turf Scrubber option is approximately 8 miles from the proposed shallow county groundwater well fields.

Shallow County Groundwater (Option 4) and the Patterson ATS (Option 3-1): The only potential cumulative environmental impacts determined to have potential significance relate to groundwater hydrology.

The analysis contained in Section 2 (Table 8) indicates that at two miles away from the well field for alignments A or B, the groundwater level decline is approximately 2 1/2 feet during a period of prolonged drought (Alignment A, Scenario B, which is the worst case scenario). Figures 22 through 29 contained in this SEIR indicate the area of groundwater decline is localized and because the known drop of groundwater levels two miles from the center of the well filed is only up to two feet, interconnection to wells eight miles to the west is highly unlikely (Paul Selsky, pers. com., January 6, 1998). Therefore, because of the groundwater level decline characteristics and proximity of the project wells to the City of Patterson wells, it is concluded that there is no hydrological connection between the two which would result in potential significant cumulative impacts.

Cumulative Impacts Related to Other Reasonably Anticipated Future Projects

Overall, while there are other development projects throughout the State of California which are in the water market, these projects are looking at many different water supplies, a majority of which are not known to the preparers of this EIR. Furthermore, it is possible that some of these projects are looking at some of the water options discussed in this EIR.

For the purpose of this EIR, and as set forth in CEQA Guidelines Section 15145, it is too speculative to attempt to analyze all the reasonably foreseeable development projects in the state which could either attempt to acquire one of the water options, or may be considering other supplies of unknown origin, and then attempt to determine whether they are inter-related and somehow the cause of significant cumulative impacts. As such, there cannot be further cumulative impact analysis with respect to other development projects and other water sources which are currently not specifically defined or are unknown to the preparer of this EIR.

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1.0 Introduction

1.1 Authorization and Purpose

Court Action

In response to an Order from the Superior Court of Stanislaus County and Opinion No. F023638 of the California Court of Appeal, Fifth Appellate District, this Supplemental Environmental Impact Report (hereinafter "SEIR") has been prepared to provide an analysis of the significant environmental effects of the long-term supply of water for the Diablo Grande project.

EMC Planning Group, Inc. (hereinafter "consultant") has prepared this SEIR under contract to Diablo Grande Limited Partnership, pursuant to CEQA Guideline 15084(d)(3), in response to the court opinion. This SEIR considers the environmental effects associated with supplying water to the Diablo Grande project and the environmental effects of water extraction. Before distributing the Draft SEIR for public review, the County of Stanislaus, the lead agency, subjected the document to the agency's own review and analysis. Therefore, the Draft SEIR reflects the independent judgment of the lead agency.

Background

Diablo Grande is a proposed 29,500 acre planned destination resort and residential community located in southwestern Stanislaus County, seven miles west of Interstate 5. The regional location and vicinity of Diablo Grande are illustrated on Figures 1 and 2, respectively. Diablo Grande will include scenic open spaces, a wilderness conservation area, six golf courses, swim and tennis facilities, a hotel and executive conference center, a winery, vineyards, research campus, municipal facilities, town center, shops and offices, and 5,000 dwelling units in five villages, or phases.

Stanislaus County approved a specific plan and environmental impact report (titled the Diablo Grande Specific Plan EIR and hereinafter referred to as the Diablo Grande EIR) for the project in 1993 (SCH# 91032066). This document is available for review at the Stanislaus Planning Department which is located at 1100 H St., Modesto, CA 95354 and is incorporated herein by reference. The Diablo Grande EIR included program-level analysis of the Specific Plan as well as project-specific level analysis of the Preliminary Development Plan (PDP) for Phase 1 of the project. Phase 1 includes approximately 2,000 residential units, two golf courses, the hotel conference center,

winery, town center, and other appurtenant facilities. To date, the two golf courses have been constructed and both are in operation.

The entire Diablo Grande project will require approximately 12,800 acre-feet (AF) per year of water at full buildout and approximately 5,000 AF per year for Phase 1. Upon preparation of detailed PDPs for the other three phases, additional project-specific environmental analysis will be carried out. This analysis will tier off of the previous environmental review carried out for the project.

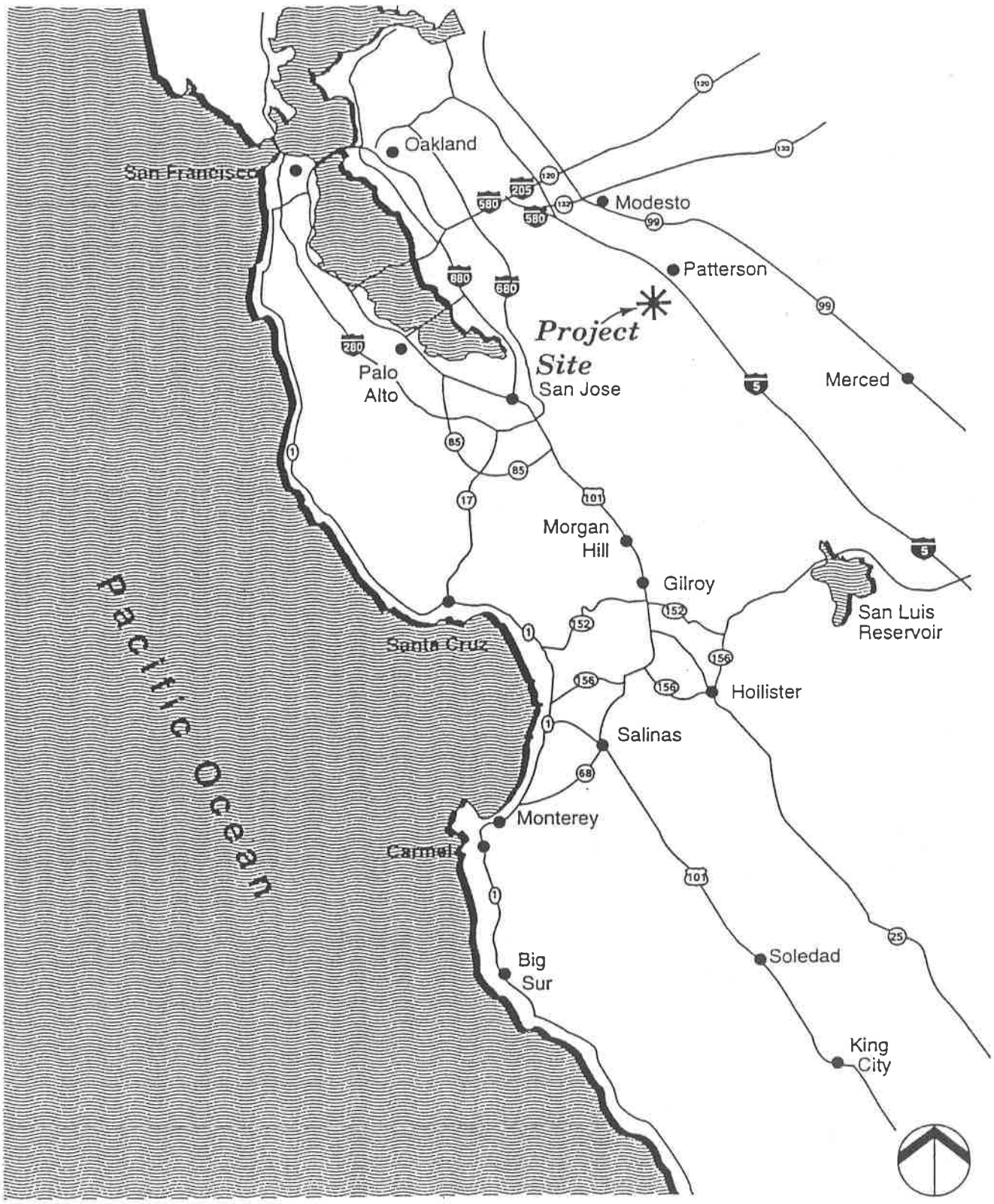
The Diablo Grande EIR included a tiered water analysis. A detailed analysis was provided of the supply for the first five years of the project, a well site located on the valley floor near the City of Patterson (the Marshall-Davis Well Site), and a general discussion of possible long-term sources. A more specific discussion of water supplies was to be provided in later environmental documentation. Provision of water from the Marshall-Davis Well Site is discussed in Section 1.3.

The original project analyzed in the Diablo Grande EIR included approvals of general plan amendments, rezoning applications, Williamson Act contract cancellation, and others. The Fifth District Appellate Court found the Diablo Grande EIR sufficient in all respects except the discussion of long-term water sources. In response to that finding, Stanislaus County Superior Court Judge Vander Wall commanded that the County "void the certification of the EIR and to set aside your 1993 approvals of the Diablo Grande project including rezoning, the Phase 1 Preliminary Development Plan, Stanislaus County General Plan Amendments, and adoption of the Diablo Grande Specific Plan." According to the judgment, the County may again consider approval of the Diablo Grande project only after preparation and certification of additional EIR analysis of long-term water supply for the entire project.

In response to this decision and previous requirements of the County of Stanislaus Board of Supervisors, the applicant has prepared a document titled *Water Resources Plan for Diablo Grande* (hereinafter "Water Plan"). The Water Plan contains a general overview of water sources and transfer prospects and a more detailed discussion of several possible long-term water supply sources for the Diablo Grande project. The Water Plan addresses the environmental impacts of water extraction and supply. The Water Plan serves as the basis for the project description for this SEIR and is contained in Appendix A.

The Appellate Court directed the County to attempt in good faith to fulfill its obligation under CEQA to provide sufficient meaningful information regarding the types of activity and environmental effects from the supply of water to the project that are reasonably foreseeable. The SEIR addresses the environmental effects associated with the water supply options considered in the Water Plan that are presently under consideration as potential sources for the project.

Some of the options contained in the Water Plan have been defined to a degree sufficient to support project-specific level analysis per CEQA Guideline section 15161. Project descriptions for these options are addressed in Section 1.3, below.



Source: California State Automobile Association and EMC Planning Group Inc.

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Diablo Grande Water Plan SEIR

Regional Location

Figure 1

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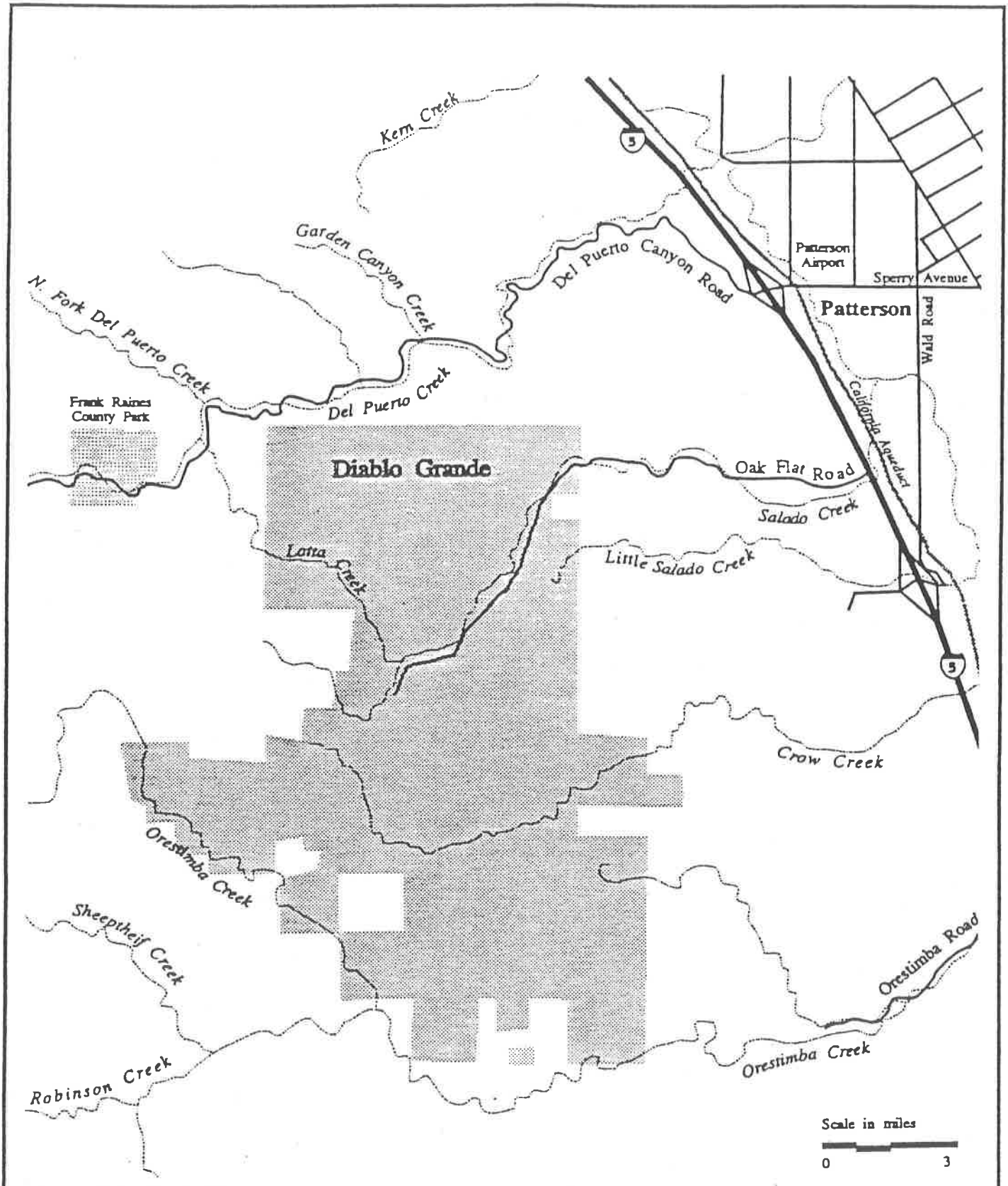

Source: Diablo Grande EIR

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Diablo Grande Water Plan SEIR

Project Vicinity

Figure 2

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Other options have been defined at a more conceptual level and are therefore evaluated as project alternatives pursuant to CEQA Guideline section 15126(d). Analysis of environmental impacts of these options is provided to a level of detail commensurate with the description of the Option. Analysis of project alternatives is contained in Section 3.4. Additional environmental review will be required should any of these options be pursued to assess project-specific impacts.

Given the overall scope of the Diablo Grande Project, this SEIR has been prepared as a program EIR, although, in accordance with section 15168(c)(5) of the CEQA Guidelines, every effort has been made to present sufficient detail as to each of the options to minimize the need for further environmental documentation in the future.

Purpose

This SEIR has been prepared in compliance with the California Environmental Quality Act (CEQA) of 1970, as amended, and to respond to the order of the superior court, to inform public decision makers and their constituents of the environmental impacts of the proposed project. In accordance with CEQA guidelines, this report describes both beneficial and adverse impacts generated by the proposed project and suggests measures for mitigating significant adverse environmental impacts resulting from the proposed project.

Given the overall scope of the Diablo Grande Project, this SEIR (like the original EIR itself) has been prepared as a program EIR, although, in accordance with section 15168(c)(5) of the CEQA Guidelines, every effort has been made to present sufficient detail as to each of the options to minimize the need for further environmental documentation in the future.

The County of Stanislaus prepared and distributed a notice of preparation (NOP) in accordance with CEQA guidelines section 15082. CEQA guidelines section 15375 defines an NOP as:

> ...a brief notice sent by the lead agency to notify the responsible agencies, trustee agencies, and involved federal agencies that the lead agency plans to prepare an EIR for the project. The purpose of the notice is to solicit guidance from those agencies as to the scope and content of the environmental information to be included in the EIR.

The NOP and responses to the NOP are contained in Appendix B.

This SEIR contains a description and evaluation of the existing environmental setting of the project site and surrounding areas, discussion of the characteristics of the proposed project, identification of environmental impacts associated with the proposed project, and provision of feasible mitigation measures that can be implemented to reduce or avoid identified adverse environmental impacts. This EIR also contains an evaluation of a reasonable range of alternatives to the proposed project.

Where an EIR identifies a significant adverse impact, the lead agency may not approve the project unless it finds that changes to the project or mitigation measures have been required of the project to reduce the impact's significance or that changes are infeasible for specified social, economic, and/or other reasons. (Public Resources Code § 21081).

When a mitigation measure is associated with a project impact that is identified as significant in the EIR, the lead agency may not exclude the mitigation measure from the project conditions without making specific findings regarding the omission.

Recommendations, not associated with significant project effects, whether identified as such or included in the text discussion, have no comparable requirement attached. The lead agency, at its own discretion, may or may not include such recommendations in the project conditions without making a finding regarding the recommendation.

Upon adequately fulfilling the Order of the Superior Court of Stanislaus County and the Opinion of the Court of Appeals, the County may, at its discretion, issue a building permit for the proposed residential use and may, at its discretion, approve a Site Plan, Final Development Plan or Tentative Map beyond the non-residential part of the Five-year Concept Plan area.

This EIR is a factual, objective public disclosure document that takes no position on the merits of the project, but rather provides information on which decisions about the project can be based. Thus, the findings of this EIR do not advocate a position "for" or "against" the proposed project. The EIR has been prepared according to the professional standards and practices of the EIR participants' individual disciplines and in conformance with the legal requirements and informational expectations of CEQA and its implementing guidelines. The preparers of this EIR are independent professionals under contract to Diablo Grande Limited Partnership.

Before distributing the Draft SEIR for public review, the County of Stanislaus, lead agency, subjected the document to the agency's own review and analysis. Therefore, the Draft SEIR reflects the independent judgment of the lead agency.

1.2 Project Objectives

The purpose of the proposed project is to identify possible sources of water for the Diablo Grande project to facilitate an adequate long-term water supply for the project. A future water source may come from one source or from any combination of water sources discussed herein.

1.3 Project Description

The development of Phase 1 of Diablo Grande is expected to take approximately 15 years (the Phase 1 buildout estimate has been revised since the 1992 LSA EIR,

which stated Phase 1 would take up to 10 years), and the development of the entire project is expected to occur over an approximately 25 to 30 year period. Because Diablo Grande's needs for water at the site are phased, it is expected that the water will be supplied to the site on a phased basis, including incremental purchases of water to provide distinct increments of the Phase 1 development.

The 1992 LSA EIR estimated the total water needs for the Diablo Grande project to be 12,881 AF per year at full buildout, with approximately 5,000 AF (40 percent of total water use) being required for the first phase. Subsequent phasing would occur only in the case where there is a proven and reliable water supply. The remaining areas of development include the remainder area of Oak Flat (phase 2 portion) (1.5 percent of total water use), Copper Mountain (6 percent), Indian Rocks (23 percent), Crow Creek (18 percent), Orestimba (11 percent).

Diablo Grande expects to purchase water as needed from one or a number of the sources contained in the Water Plan. Diablo Grande also expects that during the life of the project other economically feasible sources will come to their attention as viable long-term water sources.

This SEIR evaluates the environmental impacts associated with the water supply options identified in the Water Plan. These options have the potential to supply the entire water requirements of the Diablo Grande project. In the event that another water source not contained in the Water Plan is ultimately determined to be a feasible water source and is planned to be used to provide water to the project, additional environmental review will be required to evaluate the environmental impacts of such water source.

As described in the previous section, some of the options addressed in the Water Plan have been defined to a degree sufficient to support project-specific environmental analysis. These options consist of:

- Marshall-Davis Well Site (Water Plan Option 1)
- Project Area Groundwater (Water Plan Option 2-1)
- Patterson Algal Turf Scrubber (Water Plan Option 3-1)
- Shallow County Groundwater (Water Plan Option 4)
- Berrenda Mesa Water District (Water Plan Option 5)
- Bravo Management Company (Water Plan Option 8)

The project description for each of these options are set forth below. The balance of the Water Plan Options are described and evaluated in Section 3.4, Project Alternatives.

For clarity, the description of each Option is separated into two sections: water supply and water conveyance. The analysis of the environmental impacts of each of these options (Section 2) follows the same format. In addition, under the project description of each Option, the agencies that are expected to use the EIR in their decision making and the approvals for which the EIR will be used are identified.

These lists are required under section 15124 of the CEQA guidelines and are based on information that is known to the lead agency. Table 1 provides a summary matrix showing the acre feet associated with each option.

Marshall-Davis Well Site (Option 1)

Water Supply

Diablo Grande owns agricultural property in the Del Puerto Water District, previously known as the Salado Water District (the Marshall-Davis Well Site). This land is located on the valley floor at the intersection of Marshall and Davis Roads in western Stanislaus County, about two miles south of the City of Patterson (see Figure 3).

TABLE 1

Diablo Grande Water Use Table

Water Source	Acre-Feet (af)/yr
Project Specific Options	
Marshall-Davis Well Site (Option 1)[1]	1,200 af
Project Area Groundwater (Option 2-1)	464 af
Patterson Algal Turf Scrubber (Option 3-1)	1,000 to 3,000 af
Shallow County Groundwater (Option 4)	11,000 af
Berrenda Mesa Water District (Option 5)	8,000 af
Bravo Management Company (Option 8)	1,000 af
Alternative Options	
Ceres Algal Turf Scrubber (Option 3-2)	2,000 af
Modesto Algal Turf Scrubber (Option 3-3)	12,000 af

[1] "Options" are based on the Bookman-Edmonston Engineering report titled - *Water Resources Plan for Diablo Grande, December 1996.*

Note: Some of the options indicated above may not, by themselves, supply all the water needed by the Diablo Grande project. However, a combination of the above options could provide the needed water.

Source: EMC Planning Group Inc.

This land has both surface water (from the Delta-Mendota Canal by allocation through the Del Puerto Water District) and groundwater supplies (from on-site wells). The Diablo Grande Specific Plan included a proposal to construct wells on this property and pipelines necessary to pump up to 1,200 AF of water per year to the Diablo Grande site. The Diablo Grande EIR included analysis of the environmental impacts of this proposal and recommended mitigation measures to reduce adverse impacts. The project approval included a condition restricting the use of this water supply to a five-year period (from 1996-2000), at the end of which this supply would be limited to emergency use only. Another condition limited use of this water to non-residential uses.

The Diablo Grande EIR recommended two mitigation measures to ensure that groundwater pumping from the Marshall-Davis Well Site does not result in significant adverse impacts to nearby agricultural lands. Monitoring of potential effects on nearby wells (Diablo Grande EIR Mitigation IV-2) is required and, in the event that groundwater levels on nearby wells are found to decline by 10 percent or greater as a result of the pumping, the Western Hills Water District (WHWD) is required to offset the increased pumping by allocating portions of their Salado Creek Water District water allocations to the affected neighboring owners (Diablo Grande EIR mitigation IV-3).

Considering that the limitations placed on the type and duration of water extraction from the Marshall-Davis Well Site in the approvals pursuant to the Diablo Grande EIR were not based on environmental constraints or concerns, but rather a negotiated agreement, this SEIR includes analysis of the environmental impacts that would occur should this water be made available for use on the Diablo Grande site without any restrictions in term or use. The applicant has not requested that such changes actually be implemented. Rather, the SEIR includes this analysis addressing the environmental impacts that would result if these changes were made. The environmental impacts of this option are evaluated in Section 2.1.

Water Conveyance

The Diablo Grande EIR included analysis of the raw water conveyance system and the "backbone" potable water system for the entire project (Diablo Grande EIR, Section F) and a more detailed analysis of the Phase 1 water system. The conveyance system for Phases 1 and 2 runs from the valley floor generally along the alignment of Oak Flat Road and Salado Creek. The system includes four pumping facilities and a well-head booster pumping plant at the Marshall-Davis well site. This conveyance system has been constructed and is in operation. No changes to this system would be required for an extension of water usage from the Marshall-Davis Farms with respect to time or type of use.

Water from the Marshall-Davis Well Site is currently being used for golf course irrigation. Use of this water for potable uses would require its conveyance to the

proposed Salado Creek filtration facility and storage tanks. Details and impacts associated with these facilities are addressed in the 1992 Diablo Grande EIR section F (LSA 1992) and do not require further analysis in this SEIR.

Approvals Necessary

Extending the use of water from the Marshall-Davis Well Site beyond the year 2001 would require approval of the WHWD and the County of Stanislaus and agreement by the owners of the Marshall-Davis Well Site. Changing the allowed uses of the water would require approval of the WHWD and the County of Stanislaus. The California Department of Health Services will also have to approve of the water source, conveyance and treatment systems for eventual domestic use.

Project Area Groundwater - Phase 1 (Option 2-1)

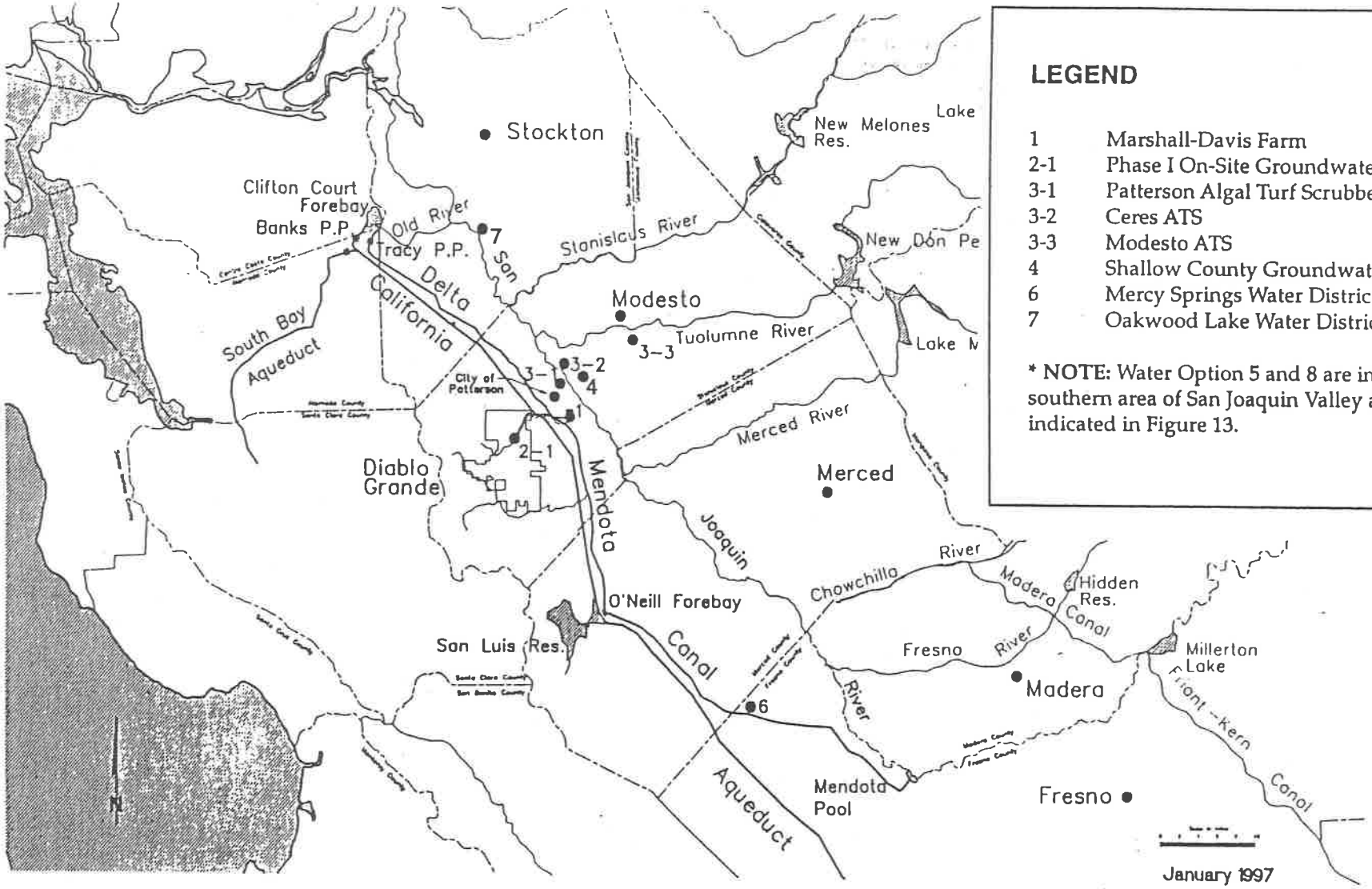
Richard C. Slade prepared a reconnaissance-level groundwater study (1989) for the entire 29,500-acre Diablo Grande project area. This report, which was cited in the Diablo Grande EIR, concluded there could be up to 725 AF of water per year available from the 4,600 acres in and around the Phase 1 PDP (Diablo Grande EIR page IV-165). The report concluded the available quantity is very dependent upon rainfall because there is limited groundwater storage. The report did not include on-site drilling or other site-specific investigation.

Because of the Slade report's conclusion that the possible 725 AF of on-site groundwater beneath the Phase I PDP would not be a dependable and adequate supply to serve the entire project or Phase 1, the Diablo Grande EIR did not evaluate this groundwater as a potential water source. Instead the EIR, while recognizing the existence of this groundwater report, stated that there was not an adequate supply of water on-site to serve the Diablo Grande project.

Since the approval of the Diablo Grande project, Diablo Grande has conducted extensive exploration activity in the Phase 1 area. Several test wells have been constructed and pumped to determine their possible yields, if they were to be used to supply long-term water to the project. The results of this analysis have been documented in a document titled "Summary Report, Hydrogeologic Evaluation Northern Portion of Diablo Grande" (hereinafter "Hydrogeologic Investigation") prepared by Geoconsultants, Inc. in January 1997 and an addendum to that report prepared in June 1997. These documents are included in Appendix C.

Water Supply

There are nine existing wells located within the Phase 1 area of the Diablo Grande project site that are being considered for water supply to the project. Two of these wells draw water from the alluvium of Salado Creek and the balance draw from the bedrock aquifer. The applicant proposes to use the water from these existing wells to provide domestic water supply to a portion of Phase 1. The Hydrogeologic Investigation concludes these wells can produce a long-term theoretical "safe yield" of 464 AF per year.



LEGEND

1	Marshall-Davis Farm
2-1	Phase I On-Site Groundwater
3-1	Patterson Algal Turf Scrubber
3-2	Ceres ATS
3-3	Modesto ATS
4	Shallow County Groundwater
6	Mercy Springs Water District
7	Oakwood Lake Water District

* **NOTE:** Water Option 5 and 8 are in the southern area of San Joaquin Valley and are indicated in Figure 13.

Source: Bookman-Edmonston Engineering, Inc.

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Diablo Grande Water Plan SEIR

Water Source Locations

Figure 3

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The applicant proposes to operate the wells pursuant to the recommendations of the Hydrogeologic Investigation. The exact type and number of uses and units to which the water may be provided depends upon the results of this environmental analysis, the exact amount of water required by the various uses, the applicant's decision concerning what uses to supply, and the County's approval of the water source and uses.

While the previous discussion sets forth theoretical limits for long-term safe yield, approval of any of these wells for use as domestic supply will require the approval of an appropriate amount of capacity by the State of California Department of Health Services (hereinafter "DHS"). As part of this review process, DHS has required that the wells be pumped for a seven-day period in September, which is considered to be the driest period of any year. This pumping is anticipated to result in the lowest potential well water production levels, thus defining supply constraints. This seven-day pumping period is intended to approximate a worst case scenario at the site.

However, for the purpose of domestic supply, only an amount of groundwater which meets the DHS standards under the seven-day pumping test will be approved for use as a domestic supply. This seven-day pumping test is based upon a peak flow, over a seven-day period, and not either yearly average or one-day maximums.

In September of 1997, Diablo Grande undertook the DHS seven-day pump test on the FPR and YF-6 wells. The test showed that a maximum sustainable yield for these wells is approximately 50 gallons per minute for each well. The DHS also requires a 50 percent reduction in actual uses to accommodate drought conditions. Therefore, the DHS is expected to approve a total supply of 50 gpm (80.6-acre feet per year) for the two wells (Michael King, Layne GeoSciences, Inc. Letter to Mr. Keith Schneider, Diablo Grande Limited Partnership, dated December 17, 1997). Only these wells have been tested as they are the most easily assessable and available for the expected first area of development in Phase 1.

Based upon the foregoing, approximately 80-acre feet currently is available per year to provide domestic water to Diablo Grande from onsite sources. As these wells are used, further data will become available and the DHS will determine whether to expand the allowed production from these wells.

Prior to any other wells being connected to the system or brought online for domestic use, and prior to additional development beyond that which can be served by the "approved" 80-acre feet, it will also be necessary for such these wells to be tested in conformance with the DHS water supply requirements. Additional pump tests will be required for future on-site water wells.

Water Conveyance

The water system to deliver the water to Phase 1 land uses (water lines and water treatment plant) was included in the Phase 1 Preliminary Development Plan and was evaluated in the Diablo Grande EIR (Section IV-F). Therefore the environmental

analysis of this option addresses only impacts associated with use of the existing wells for domestic water supply. This option does not involve any construction. The Phase 1 potable water system and existing wells are illustrated in Figure 4.

Approvals Necessary

Approvals required to use on-site groundwater at Diablo Grande include:

- WHWD approval of construction and acceptance of necessary facilities, including wells, pumps, and pipelines;
- Approval of the quality of water by the Department of Health Services;
- Affirmation of supply by County of Stanislaus; and
- Approval of Water Plan by County Board of Supervisors.

Patterson Wastewater Treatment Plant Algal Turf Scrubber (Option 3-1)

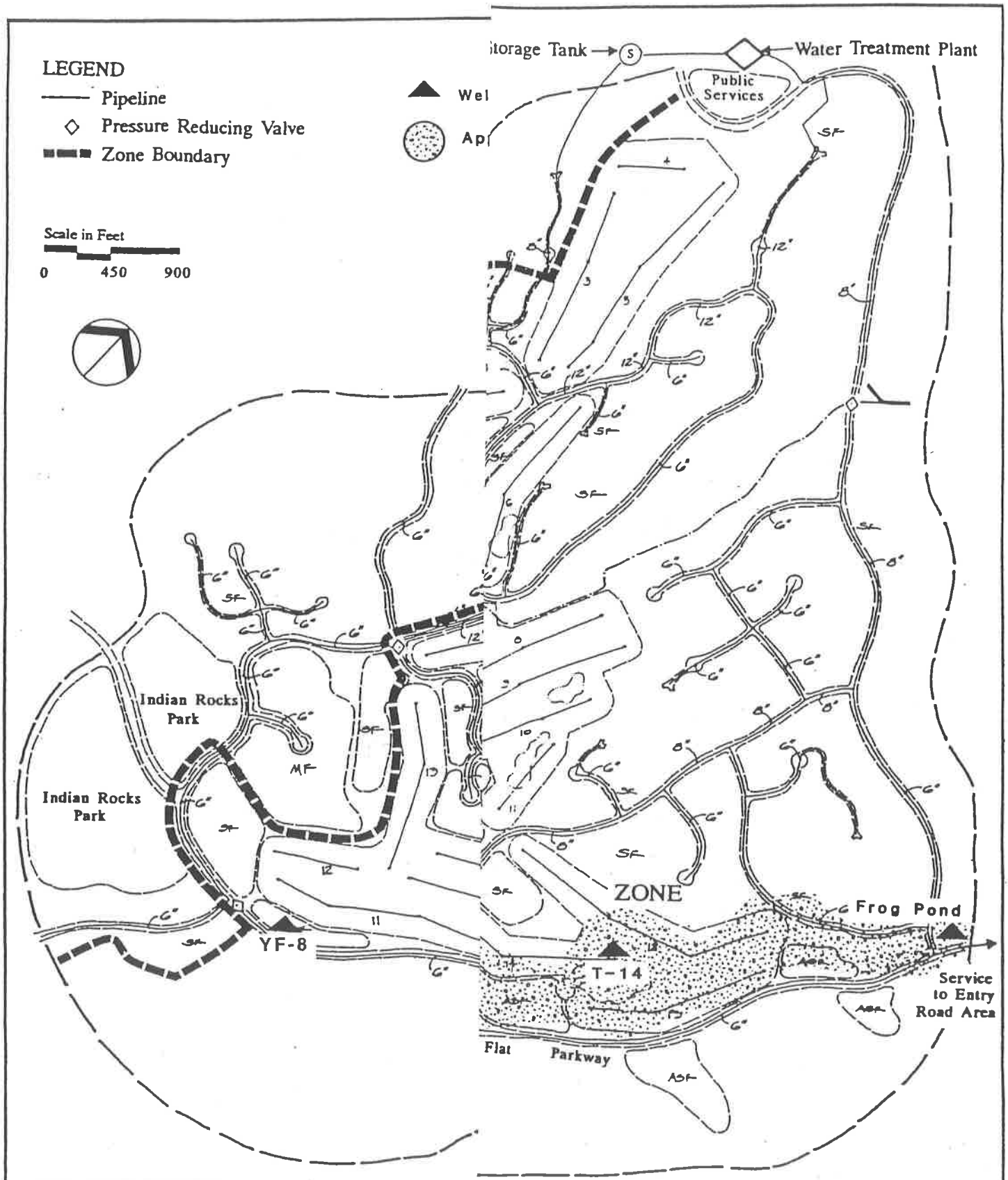
Aquatic BioEnchancement Systems, Inc. (ABES), a Texas-based corporation, owns several patented water reclamation technologies created by Dr. Walter Adey of the Smithsonian Institute. These technologies are collectively used in a process known as the Algal Turf Scrubber (ATS). The ATS process consists of running effluent (including secondarily treated sanitary wastewater) over a sloping runway at low flows and shallow depths to create an environment in which algae will grow and thrive on the constituents in the water. The algae are periodically harvested. Once these constituents are removed from the water, the water at the end of the ATS runway will be of a quality which will allow its discharge into natural and man made water courses for blending with other supplies.

Therefore, the ATS process creates a fungible commodity—water, which may be traded to others or discharged into, and diverted from, natural water courses and then delivered to Diablo Grande. This is water which is currently lost through percolation, evaporation, or by crops for disposal.

During 1993 and 1994, the ATS process was thoroughly tested by the laboratories of the University of California, Berkeley, which determined it is possible to treat water to a level that would make its discharge into the San Joaquin River acceptable.

Water Supply/Water Conveyance

In 1992, ABES entered into an agreement with the City of Patterson to construct an ATS pilot facility at the City of Patterson Wastewater Treatment Plant. The location of this facility is shown on Figure 3. The treatment plant is located about three miles northeast of Patterson on Poplar Avenue.



Source: Diablo Grande EIR

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Figure 4

As part of the agreement between the City of Patterson and ABES, ABES was required to obtain all necessary permits to construct the ATS facility at the Patterson Wastewater Treatment Plant. The City of Patterson has a National Pollutant Discharge Elimination System (NPDES) permit to discharge its effluent to the San Joaquin River, although the current Patterson Wastewater Treatment Plant has been unable to clean the water to a level that would permit such discharge to the San Joaquin River consistent with the requirements of the Waste Discharge Permit.

In 1996, the City of Patterson prepared an expanded initial study on an ATS facility at the Patterson Wastewater Treatment Plan (SCH#: 96062039). This initial study also addressed the discharge of the ATS treated water into the San Joaquin River, diversion of an equal amount of water from the River, and conveyance of that water to Diablo Grande.

Two alternative points of diversion were evaluated which would allow rediversion for Diablo Grande through existing facilities of the Patterson Water District (PWD). One alternative would be at the intake to the PWD canal, and the other alternative would be farther upstream of the intake near the Las Palmas Avenue bridge to achieve greater mixing with water in the river. Adequate mixing is a safety consideration in securing a permit from the Department of Health Safety for potable use and a concern of the PWD in using some reclaimed water for crop irrigation. In the preferred alternative, water would be conveyed by pipeline to a point near the existing Las Palmas Avenue bridge about 1,200 feet upstream of the PWD intake.

Based upon the results of the initial study and public comments received, the City of Patterson adopted a mitigated negative declaration for the ATS project consisting of:

- treatment of secondary treated effluent from the Patterson Wastewater Treatment Plant by the ATS system;
- construction of conveyance facilities and discharge facilities which would discharge this water into the San Joaquin River;
- diversion of this water at the PWD main canal intake; and
- conveyance of this water from the PWD main canal near State Highway 33 to the existing Diablo Grande pipeline.

As an alternative diversion and conveyance method, a separate new pumped diversion on the San Joaquin River was evaluated. Preliminary alignments of conveyance facilities are shown on Figure 5. The pipeline from the ATS facility to the San Joaquin River will be about one mile long and the pipeline from the PWD main canal to the present WHWD pipeline from the Marshall-Davis Well Site will be about 1.6 miles long.

As the City of Patterson grows, the amount of effluent through the ATS facility will increase. Up to 3,000 AF per year may ultimately be treated at the Patterson ATS

facility, discharged to the San Joaquin River, and diverted through the PWD facilities to Diablo Grande.

ABES took the adopted mitigated negative declaration to the Central Valley Regional Water Quality Control Board (CVRWQCB) with a request for a new NPDES permit and waste discharge requirements related to the discharge of the ATS treated water into the San Joaquin River. The regional board has issued a permit, and ABES is authorized to proceed with construction of the ATS facility and the discharge of this new water into the San Joaquin River upon compliance with certain water quality standards.

Upon completion of the system and compliance with the water quality standards, approximately 1,000 AF of water per year could be available from the City of Patterson to the Diablo Grande project, in perpetuity, with a projected increase to 3,000 AF per year as the City of Patterson grows.

No additional environmental review is necessary for this option. The option is included in this SEIR to provide complete documentation of the water sources under consideration for Diablo Grande. The expanded initial study/mitigated negative declaration prepared for this option is included in Appendix D.

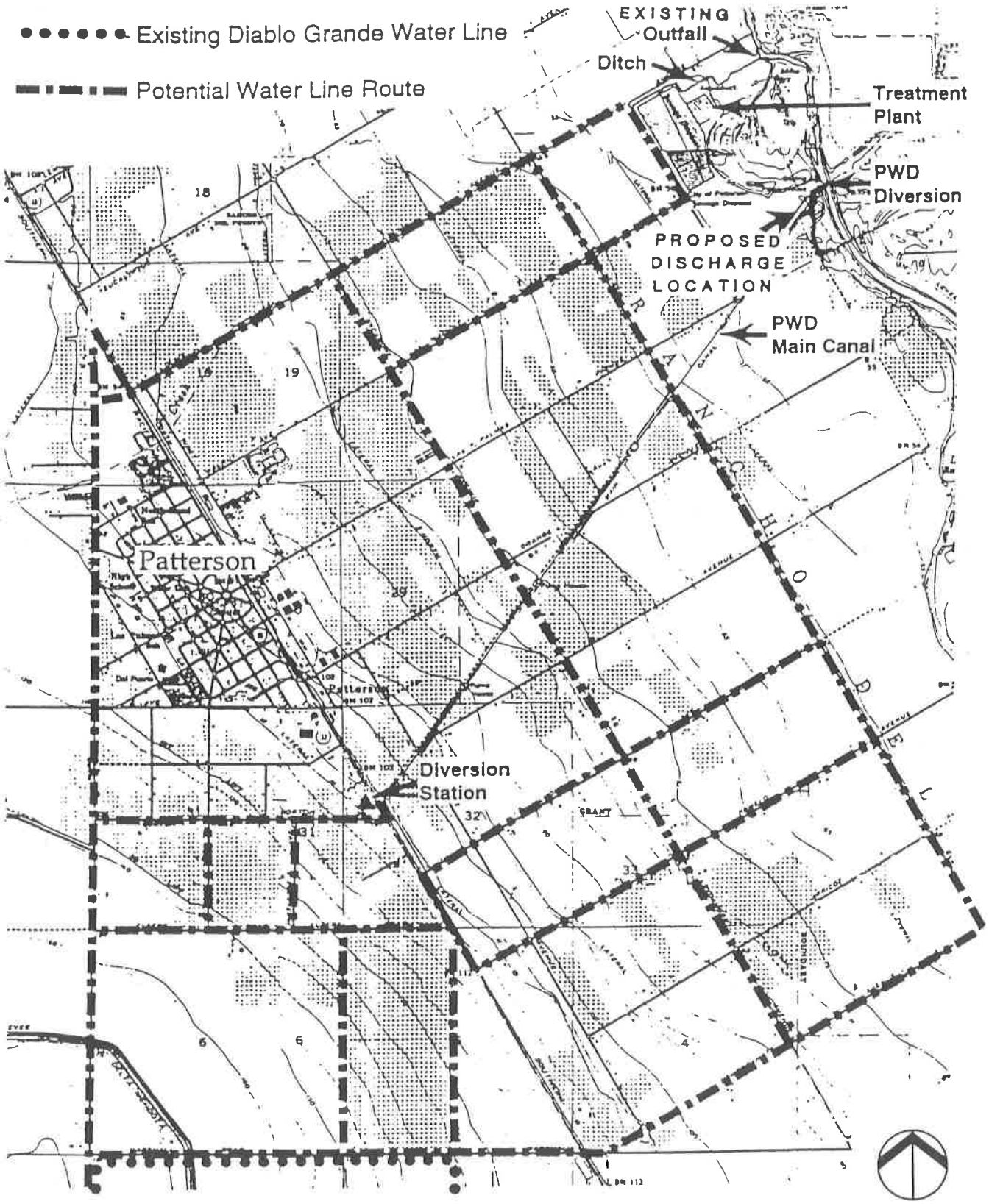
Approvals Necessary

Approvals necessary for implementation of Option 3-1 are listed in the expanded initial study contained in Appendix D. Approval of the Water Plan by the County Board of Supervisors will be necessary.

Shallow County Groundwater (Option 4)

This discussion is based on the Brown and Caldwell report titled *Evaluation of Shallow County Groundwater Alternative*, dated January 1998. This report is included within Section 1 and subsection 2.4 in this SEIR.

This proposed water supply would consist of pumped drainage water from agricultural areas east of the San Joaquin River. The Turlock Irrigation District (TID) routinely pumps shallow groundwater to control high groundwater levels. This pumped groundwater is known as drainage water. This drainage water is one of the proposed water sources for the Diablo Grade development. One of two proposed well field alignments with ten wells each are proposed to be developed to obtain the groundwater (referred to as Alignment A and Alignment B). Both well field options are analyzed in this SEIR. With the proposed Diablo Grande groundwater pumping, the TID will begin to reduce their historical groundwater pumping (a detailed discussion of this historical pumping relative to Diablo Grande's proposed groundwater pumping is included in section 2.4 of this SEIR). The TID has historically supplied irrigation water and electric power to an area located east of the San Joaquin River, and between the Merced and Tuolumne rivers.



Source: Patterson ATS Initial Study

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Diablo Grande Water Plan SEIR

Patterson ATS Conveyance Facilities

Figure 5

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Figure 6 indicates the proposed well alignment field relative to the Diablo Grande development. Figure 7 indicates the proposed well alignment in the context of the TID irrigation boundary lines.

Water Supply Wells

The preliminary design includes a total of 10 wells to meet a majority of the ultimate annual demand for Diablo Grande of 12,881 acre-feet. The proposed well field location of Alignment A, as shown in Figure 8, consists of 10 wells near Crows Landing and Bradbury Roads. The proposed well field location of Alignment B, as shown in Figure 9, consists 10 wells near Crows Landing, Bradbury and Morgan Roads.

The well installation schedule is the same for each well field. It is proposed that three wells would be installed in 1998, with each additional well being installed according to the schedule presented in Table 2. Each well would have an estimated capacity of approximately three cubic feet per second (1,350 gallons per minute). The wells would be approximately 150 feet deep, perforated between 20 and 100 feet below ground surface (bgs) with a 20 foot annular seal.

The quantity of water pumped by the well field would initially be 1,640 acre-feet per year in 1998, and would gradually increase to 11,000 acre-feet per year in 2022. The well field capacity is sized to meet the maximum month in project demand. Water production would vary by month, as depicted in Figure 10. As part of the project, the TID would reduce its historic drainage pumping as described in Section 2.4.

Water Conveyance

There are two components to the water conveyance system. One component will be sited and installed by the TID east of Carpenter Road. The other component will be sited and installed by the Diablo Grande project's water purveyor, Western Hills Water District.

TID Component. The proposed water supply would be delivered to the Diablo Grande development through a closed pipe system. The TID component includes installation of wells and a water conveyance pipeline that would connect the project wells to the Diablo Grande transmission pipeline and pumping station near the intersection of Carpenter Road and the Harding Drain. Diablo Grande would be responsible for constructing the pumping station and pumping the water through pipeline under the San Joaquin River.

Public right-of-way would be used to the extent possible, though it is likely that some private right-of-way will have to be acquired (Janet Atkinson, Bookman-Edmonston Engineering. Memo to Joseph Karnes, subject: WHWD/TID, dated May 9, 1997).

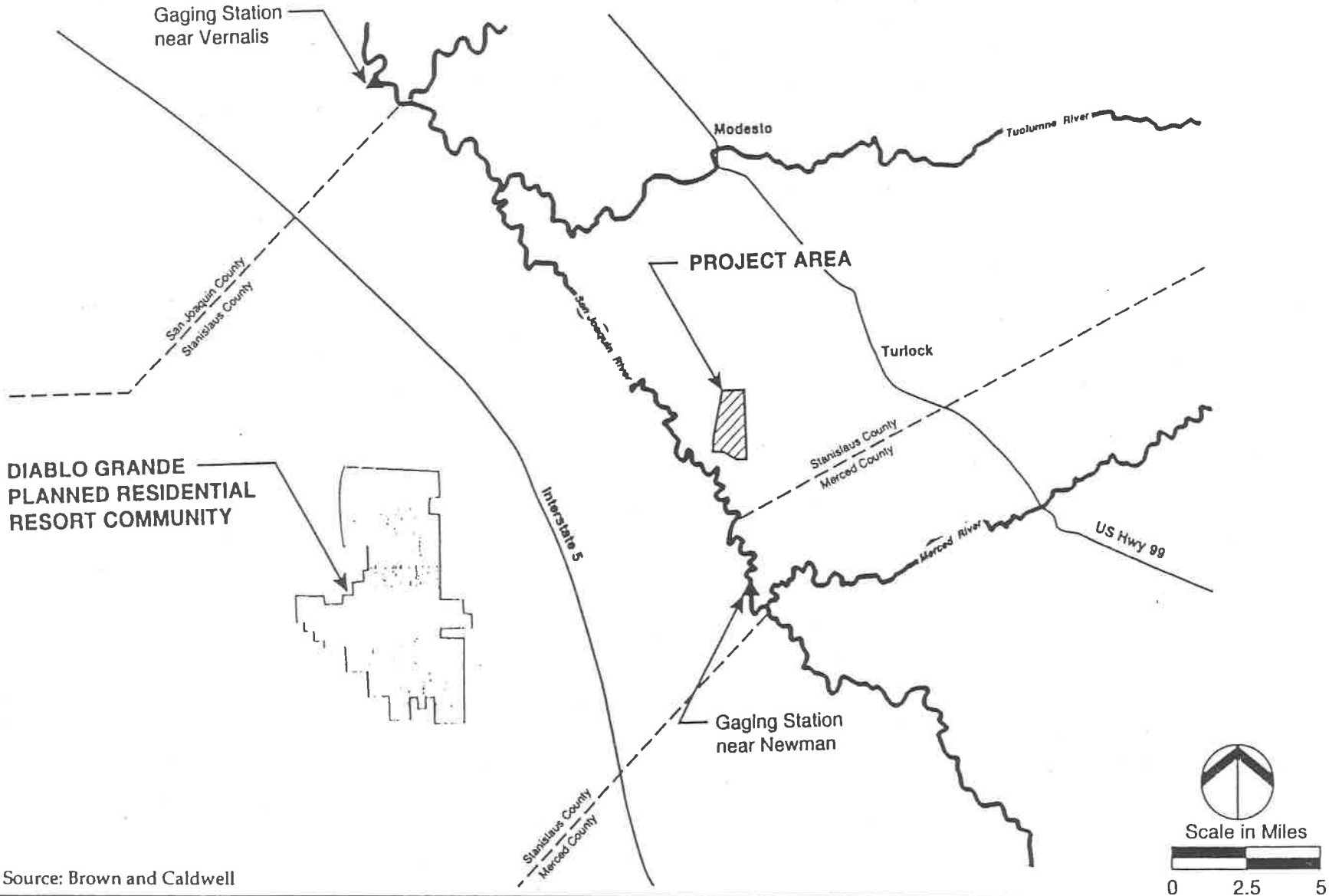
TABLE 2

Well Installation Schedule

Year	Well ID Number	Total Wells, Number	Total Capacity (cfs)	Annual Usage (acre-feet)
1997		0	0	0
1998	DBG 01, 02, 03	3	9	1,640
1999		3	9	1,780
2000		3	9	1,920
2001		3	9	2,060
2002		3	9	2,200
2003		3	9	2,340
2004	DBG 04	4	12	2,480
2005		4	12	2,620
2006		4	12	2,760
2007		4	12	2,900
2008	DBG 05	5	15	3,440
2009		5	15	3,980
2010		5	15	4,520
2011	DBG 06	6	18	5,060
2012		6	18	5,600
2013		6	18	6,140
2014	DBG 07	7	21	6,680
2015		7	21	7,220
2016	DBG 08	8	24	7,760
2017		8	24	8,300
2018	DBG 09	9	27	8,840
2019		9	27	9,380
2020	DBG 10	10	30	9,920
2021		10	30	10,460
2022		10	30	11,000

Source: Brown and Caldwell

The transmission pipeline would have a minimum of four feet of cover between the ground surface and the top of the pipe. The bottom of the excavation would be about seven and one-half feet below the ground surface (allowing for pipe wall thickness and bedding below the pipe). The excavation side slopes would vary depending on the soil conditions present, but would likely be one horizontal to one vertical. The trench would be about 20 feet in width at the ground surface (if shoring is not used). Pavement cutting will be minimized and shoring will likely be used in some locations to minimize the amount of cut required and accommodate areas in which utilities and/or existing structures are located (ibid.). In high traffic areas it is anticipated that pavement cutting would not be an option. Instead, a bore and jack type crossing would be required.



Source: Brown and Caldwell

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Diablo Grande Water Plan SEIR

Vicinity Map Showing Diablo Grande and Well Field Location

Figure 6

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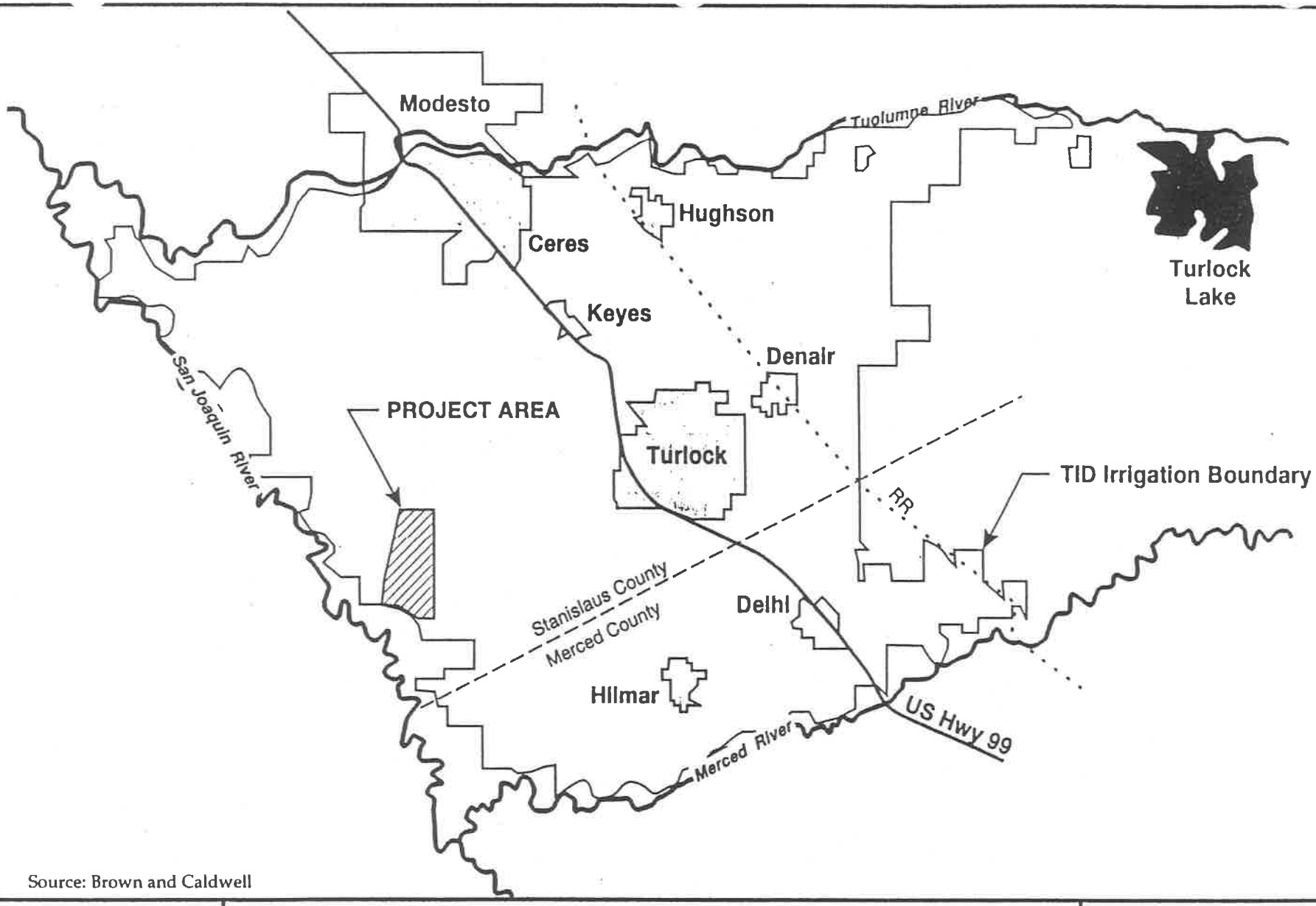

Source: Brown and Caldwell

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Diablo Grande Water Plan SEIR

Well Field Site Location Map Within TID Boundaries

Figure 7

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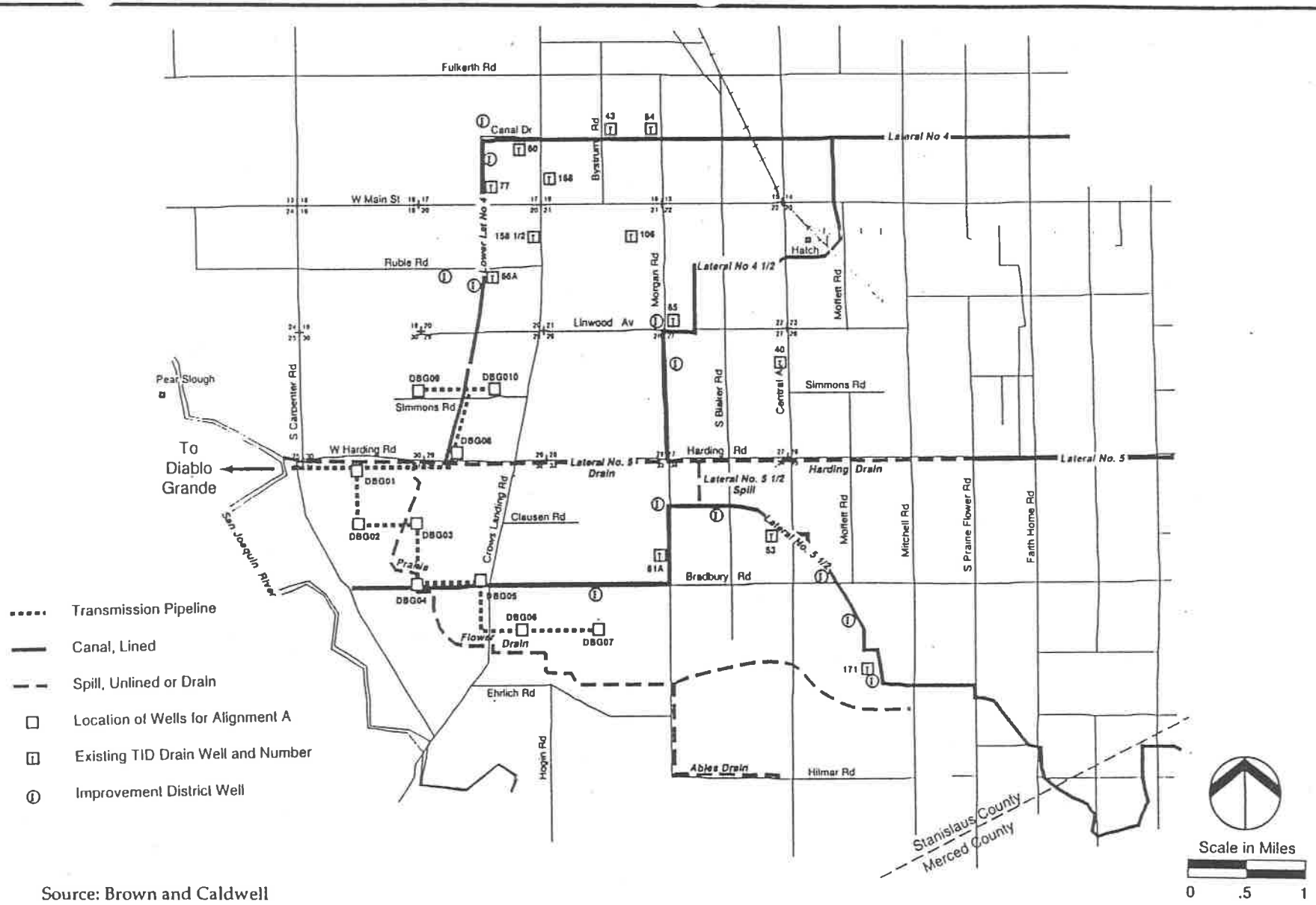

Source: Brown and Caldwell

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Diablo Grande Water Plan SEIR

Location of Wells and Transmission Pipeline for Alignment A

Figure 8

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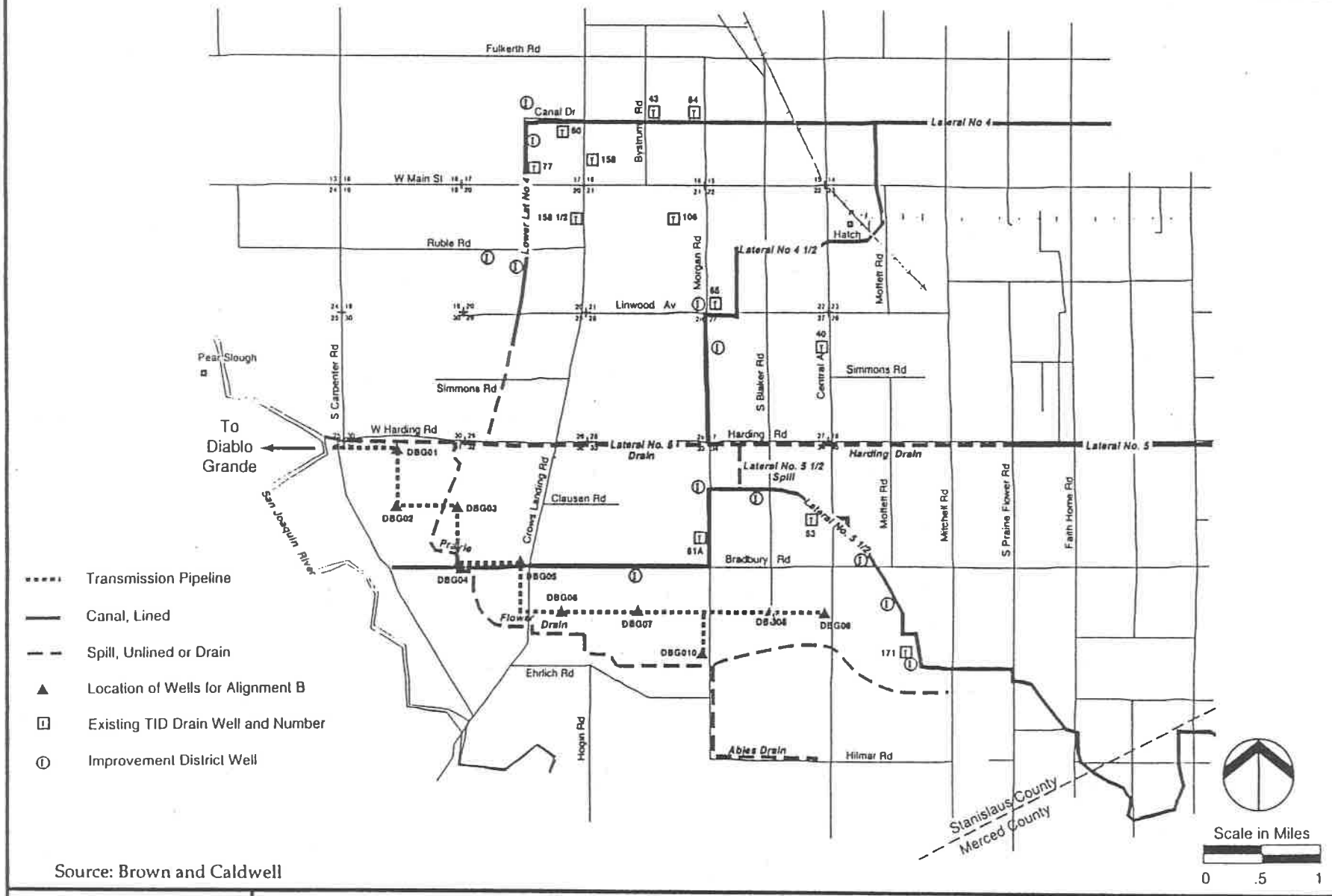

Source: Brown and Caldwell

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Diablo Grande Water Plan SEIR

Location of Wells and Transmission Pipeline for Alignment B

Figure 9

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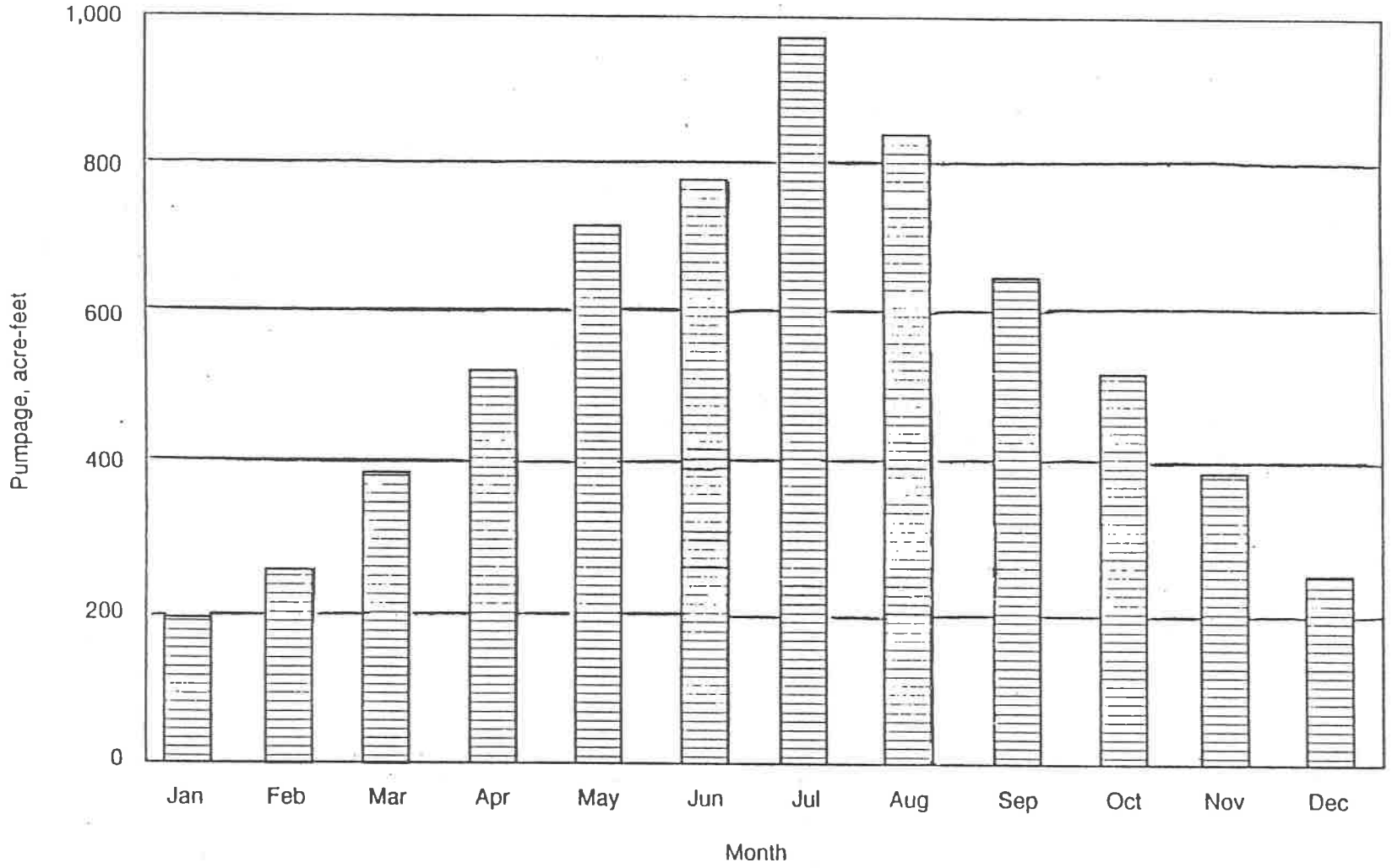

Source: Hydrologic Consultants, Inc.

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Diablo Grande Water Plan SEIR

Monthly Distribution of Pumpage from Project Wells

Figure **10**

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Trench excavation, pipe placement, bedding and backfilling operations would be accomplished by backhoe and/or trackhoe and possibly bulldozers (ibid.). After trenching operations, there is expected to be some re-leveling of fields to ensure proper sloping for irrigation purposes.

Western Hills Water District Component. The conveyance pipeline from the well field to the existing Diablo Grande pipeline near Marshall Road will necessitate a crossing under the San Joaquin River. This is proposed to be accomplished by directionally drilling a tunnel under the river and installing the pipeline. Figure 11 indicates the approximate location of the future pipeline under the San Joaquin River. A conceptual cross-section of the proposed river crossing is illustrated in Figure 12. The drilling would not require disturbance of the river channel as the drilling would take place 30 to 40 feet below the water course (Janet Atkinson, Bookman-Edmonston Engineering. Memo to Joseph Karnes, subject: WHWD/TID, dated May 9, 1997).

The drilling would be accomplished as follows. A drilling machine would be located on the east side of the river (outside the levee), either on the west or east side of Carpenter Road. The machine would bore a hole under the levee and the river channel and would come out on the west side of the river, within the west levee boundary. The remaining pipeline segment within the levee boundary would use open cut trench installation methods (ibid.).

The boring procedure would include initially drilling a small diameter pilot hole, then reaming to an oversize hole suitable for placement of a 36-inch diameter pipe. Once the bore hole is completed, the pipe would be pulled through the bore hole from the west side of the river. Pipe material would be either steel pipe, or a high density polyethylene (HDPE). The proposed boring process has been used since the mid-1980's on rivers in the vicinity including the San Joaquin and Sacramento River. This process has also been used throughout the world (ibid.).

Two staging areas would be necessary (see Figure 11). On the east side of the river, west or east of Carpenter Road, an approximately 200 feet by 200 feet area would be required for the drilling machine and associated equipment. On the west side of the crossing, a staging area approximately 75 feet wide by 1,500 feet long would be necessary. The pipe would be fully assembled in this area prior to starting pull-back operations. Both of these areas are mostly level. Compaction of soils could be required for placement of the drilling rig and associated equipment. Temporary facilities would include pipe storage, trailer storage, power generators, fuel and lubricant tanks in shallow containment areas to contain a potential spill, and lined containment pits for slurry and cuttings (ibid.).

All excavations would be refilled and returned to their original state. Any compacted areas would be scarified and disturbed areas would be returned to their pre-construction condition.

Approximately 600 cubic yards (CY) of soil would be removed from the bore hole. This soil is proposed to be given away or sold and spread onto nearby lands with permission obtained from landowners. To date, an exact location has not been identified, though there is a considerable amount of open farmland adjacent to the staging areas that could possibly accommodate this soil. The acreage required would vary depending on the depth of the soil placement. For example, if the soil were placed one foot in depth, less than one-half acre would be necessary. This soil could also be given away or sold for use as fill material at construction sites (ibid.). Regardless, any future disposal program should be evaluated for potential environmental impacts and mitigations prescribed if necessary.

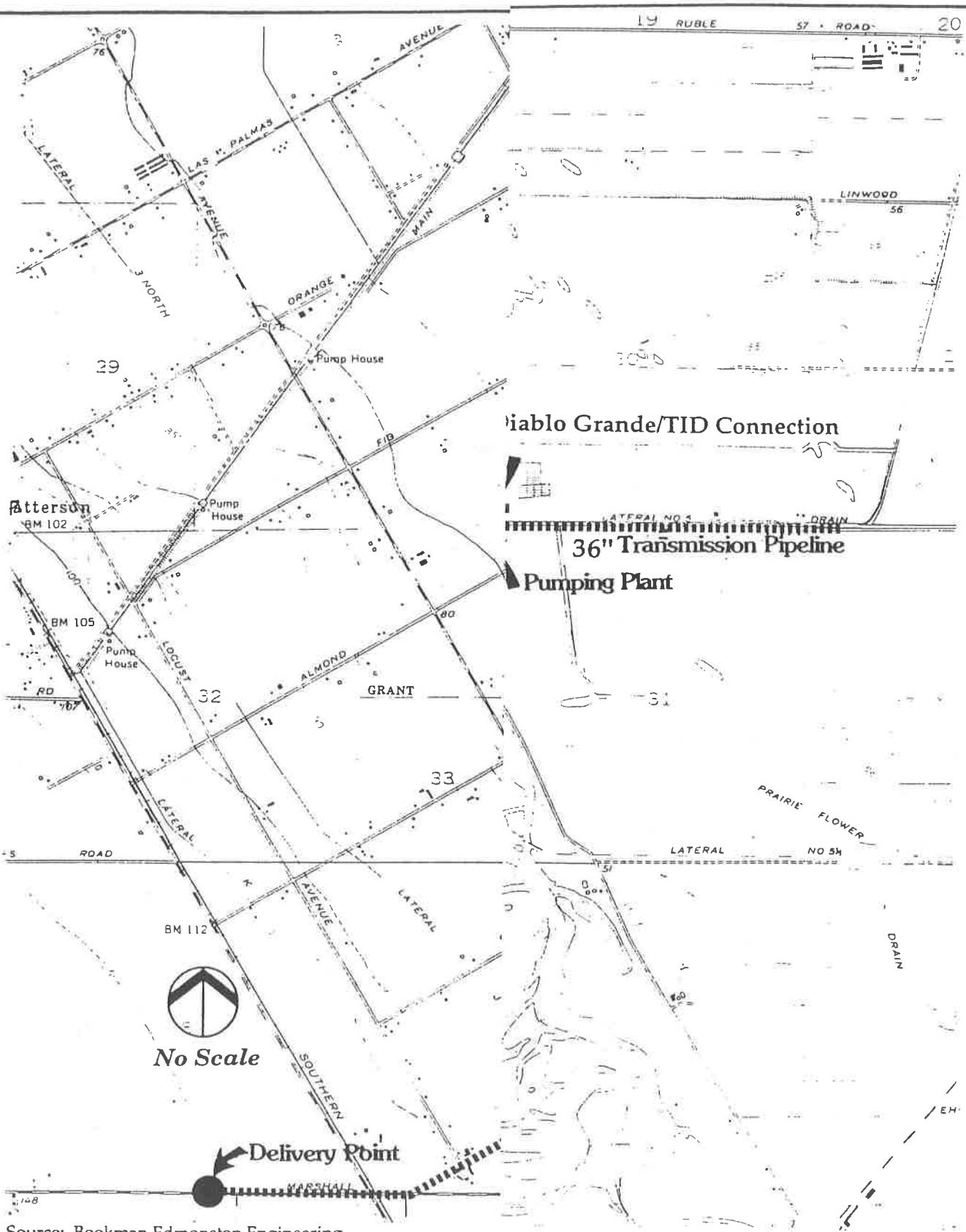
One or more minor waterway crossings would be necessary west of the western levee. These crossings will be made using open trench installation procedures with de-watering provided as necessary.

The pipeline within the levee boundary would be installed in a similar fashion to that described above (along public and private rights-of-way), except that the pipeline cover depth would be increased due to its location in the floodplain. The trench dimensions would depend on the soil conditions, depth of cover selected, and the method of construction. With un-shored excavation, side slopes would most likely be benched with trench top widths in the reach of 100 feet and excavation depths in the range of 25 feet. With shored excavation, the trench top width would be on the order of 20 to 25 feet. Some type of de-watering system, such as wells points, would be necessary.

Construction equipment required would include, but not be limited to, a drilling machine, cranes, backhoes, pumps, vacuum trucks, tanks (for drilling mud), and pickup trucks. It is estimated that the actual drilling and pipe placement in the bore hole would take about two weeks. Mobilization, preparatory work, and demobilization would take another four to six weeks.

Figure 11 illustrates the pipeline route between Carpenter Road and the Marshall Road delivery point to the west. A water treatment plant would be located at the Diablo Grande development which would treat the water supply to meet the state's drinking water requirements.

Pipeline Alignment. The proposed Diablo Grande pipeline would cover approximately 5.5 lineal miles, from the starting point east of the San Joaquin River adjacent to the Harding Drain, to the end point west of the river at the existing Diablo Grande water conveyance facilities adjacent to Marshall Road. The pipeline alignment would traverse agricultural fields and parallel existing roadways along most of the alignment. The San Joaquin River in the area of the proposed crossing is confined within a flood plain approximately one-half mile wide between the east- and west-side levees. For the purposes of this analysis, the alignment can be divided into five sections:



Source: Bookman Edmonston Engineering

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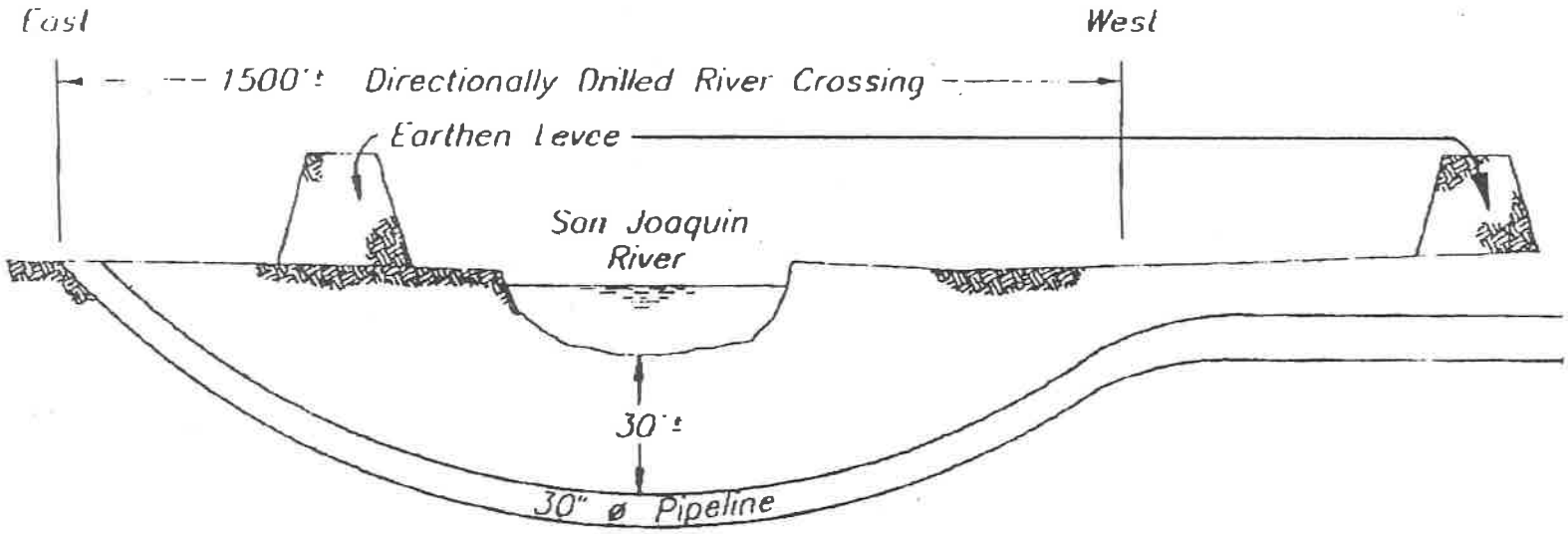
Figure 11



Source: Bookman Edmonston Engineering

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Diablo Grande Water Plan SEIR

San Joaquin River Crossing

Figure 12

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- The *eastern section* would begin at the starting point approximately 0.7 mile west of the Lower Lateral 4/Harding Drain junction. This section would run parallel to the Harding Drain, alongside a dirt road adjacent to large-parcel agricultural fields dedicated primarily to alfalfa and sod production.

- The *east staging area* for the under-channel crossing would be located outside the east-side levee and just east of Carpenter Road, in the northwestern corner of an open agricultural field.

- The *under-channel crossing* would cover approximately 1,500 lineal feet, through a directionally-bored tunnel under the San Joaquin River between the east and west staging areas.

- The *west staging area* would be located in the floodplain inside the west-side levee, along a prominent hairpin bend of the river. The riverbank in this area supports a zone of riparian woodland vegetation approximately 200-400 feet wide. This grades into a zone of sandy alluvium that covers most of the area inside the river bend.

- The *western section* of the alignment would pass under the west-side levee and traverse open agricultural fields and orchards, west of the levee and alongside Pomegranate Avenue and Marshall Road, to the endpoint of the pipeline. This section includes a crossing of a finger slough approximately 0.6 mile west of the main river channel. The slough channel is approximately 50 feet wide, and supports a narrow corridor of valley oak (*Quercus lobata*) and scattered understory vegetation along its banks.

Approvals Necessary

Approvals required to deliver this groundwater to WHWD include:

- Approval of the sale and construction of wells, pumps and pipelines by TID.

- WHWD approval of sale and construction of pumps and pipelines.

- County of Stanislaus affirmation of long-term supply.

- Approval of water treatment plant and quality of water by the State Department of Health Services.

- A permit from the State Reclamation Board to cross the levees.

- Encroachment Permits from Southern Pacific Railroad and Caltrans to cross the railroad and State Highway 33 with the conveyance pipeline.

Berrenda Mesa Water District (Option 5)

Shortages of State Water Project (SWP) deliveries in recent years prompted SWP Contractors to consider amendments to their water supply contracts with the State Department of Water Resources (DWR). Negotiations between the interested parties resulted in the Monterey Agreement, signed in December 1994. A Program EIR was prepared to analyze the environmental effects that would result from implementation of the Monterey Agreement (Central Coast Water Authority, October 1995. SCH# 95023035). This EIR was certified and its substantive provisions have withstood court challenge.

The Monterey Agreement contains 14 principles intended to settle disputes over water allocations and certain operational aspects of the SWP. Principle 4 provides for permanent transfer by sale, between willing sellers and willing buyers, of 130,000 AF of annual entitlement between agricultural contractors and urban contractors, with Kern County Water Agency (KCWA) being responsible for any portion of this amount not made available by other Agricultural contractors. Principle 4 further states that agricultural contractors and the DWR will expeditiously approve such sales. Pertinent excerpts from the Monterey Agreement EIR are contained in Appendix E.

KCWA member units have 90 days to exercise a right of first refusal to purchase entitlement being offered to urban contractors by agreeing to pay the same price offered by the urban purchaser.

The Berrenda Mesa Water District (BMWD) is a member unit of the KCWA and has a contract with the KCWA for approximately 155,000 AF of which it is attempting to sell approximately 75,000 AF. KCWA contracts with the SWP for 13 member agencies, including BMWD. BMWD purchases the water from the KCWA, which has the master SWP contract for state water delivered in Kern County. The only source of usable water for BMWD is surface water from the SWP.

Project Location

The BMWD occupies about 55,000 acres in northwestern Kern County at the easterly edge of the Temblor Range. Figure 13 illustrates the location and vicinity of the BMWD. The topography of the BMWD is gentle, with foothills lying near the western boundary. The western portion of the BMWD, called Antelope Valley, is enclosed on three sides by the Temblor Range; the eastern half is the Antelope Plain.

Project Description

Under this option, the WHWD would purchase up to 8,000 AF per year of water entitlement of BMWD from the KCWA with the water to be delivered at a new turnout on the California Aqueduct to be built near the Oak Flat Road.

Purchase of water from BMWD would require assumption by the WHWD of the obligations and conditions of KCWA/BMWD to the DWR for SWP water. These would include financing obligations to assure repayment of SWP bonds, operating

costs and operation conditions. The WHWD would probably not become a contractor for SWP water with the DWR because it does not have sufficient assets to meet bond requirements.

If WHWD acquires some of BMWD's contract entitlements, the water could be delivered to the Diablo Grande main supply line at its crossing of the California Aqueduct near Oak Flat Road southwest of Patterson. This turnout would be upstream from the existing turnout to the BMWD. Except for the turnout and connection to existing Diablo Grande water supply lines nearby, no new facilities or construction would be needed.

The DWR cannot provide all of the its delivery commitments to all contractors in many years because storage facilities have not been constructed and restraints on pumping from the Sacramento-San Joaquin Delta for the California Aqueduct.

The DWR has been able to provide 100 percent of the entitlement requests by its contractors 30 out of 35 years. However, during water shortage years (1976, 1977, 1991, 1992 and 1994), the DWR supplied an average of only about 50 percent of the demand (Bookman-Edmonston 1997).

The water supply would be subject to deficiencies in drought years, and an alternative source or banking of a portion of the BMWD water would be required to meet such shortages. In addition, 8,000 AF per year is more than would be required by the project in the early years of project development and such surpluses could also be banked. Two existing banking arrangements that would be available to the project include the Semitropic Water Storage District in Kern County and a joint powers authority bank in the Kern Fan area near Bakersfield. In years when withdrawals from the bank are required, the water would be used locally and an equivalent amount of KCWA water would be available at the Oak Flat turnout.

The turnout would be located in the vicinity of the existing pumping plant on the 30-inch Diablo Grande pipeline that carries water from the Marshall-Davis Well Site to Diablo Grande. The facilities would consist of an aqueduct turnout structure, a meter vault, a pipeline to the existing pump station (located about 100 feet west of the aqueduct), an additional pumping unit at an existing WHWD pump station and a 30-inch water pipeline from the pump station to the existing water line on the north side of Oak Flat Road. The existing pump station is used to pump water from the Marshall-Davis wells to Diablo Grande. The distance from the pump station to Oak Flat Road is approximately 60 feet. Figure 14 illustrates the location and a conceptual plan of the proposed turnout and associated facilities. Figure 15 illustrates an example of a turnout facility on the California Aqueduct and the location of the proposed infrastructure in relation to existing facilities and land uses.

Approvals Necessary

Approvals required to deliver BMWD's state water entitlement to WHWD include:

- BMWD approval of sale;

- KCWA approval of sale and water transfer and a new turnout from the California Aqueduct;
- DWR approval of transfer;
- WHWD approval of purchase and construction of needed facilities;
- County of Stanislaus affirmation of long-term supply;
- Approval of Water Plan by the County Board of Supervisors;
- Approval of water treatment plant by Department of Health Services;
- Approval by SWRCB of change in place of use; and
- Water banking agreements.

Bravo Management Company, Inc. (Option 8)

Project Location

The Bravo Management Company (BMC) is a private company with land and water rights in Kern County.

Project Description

The BMC lands include developments adjacent to the Kern River east of the City of Bakersfield. Water rights on the Kern River date back to 1888 and are not under the jurisdiction of the State Water Resources Control Board (SWRCB). The Kern River is currently managed by a watermaster.

Under previous agreements, the Buena Vista Water Storage District (BVWSD) has banked 20,000 acre-feet of water for BMC in the groundwater basin of Kern County. The BVWSD, through the Kern County Water Agency (KCWA), could deliver up to 1,000 acre-feet per year of its State Water Project (SWP) water to a new Oak Flat turnout on the California Aqueduct to accommodate Diablo Grande (i.e., Western Hills Water District). The water will be delivered for a period of up to twenty consecutive years at a rate of about 1,000 acre-feet per year. In the same year that the BVWSD makes a delivery of SWP water to Diablo Grande, a like amount of BMC previously banked groundwater will be pumped from the groundwater basin by BVWSD.

Approvals Necessary

Approvals required to deliver BMC water to WHWD include:

- Agreement by WHWD to purchase water;
- Agreement by BMC to sell water;

- Agreement by Buena Vista Water Storage District and KCWA to exchange water;
- Agreement by DWR to wheel water in the California Aqueduct and to provide a new turnout;
- Agreement by DWR and the SWRCB that a change in place of use for SWP water is not required because it is equivalent to groundwater. If DWR and/or SWRCB do not agree that the water delivered to WHWD is equivalent to groundwater, DWR would need to petition SWRCB for a change in place of use.

1.4 State Legislation

Senate Bill 901 (SB 901) is codified in Water Code Section 10901 et. seq. This law requires that, with respect to new development project, certain consultation be undertaken between a county or city and a water system which may or will provide water service to a development project. While the original Diablo Grande project was approved before these provisions were added to the Water Code, and while the Fifth District Appellate Court of the State of California requested that Diablo Grande prepare a review of possible water sources that provides information which in some instances is similar to that required by SB 901, it is unclear whether compliance is necessary. However, Stanislaus County, Diablo Grande and the Western Hills Water District (WHWD) have complied with SB 901 requirements to the extent possible.

Senate Bill 901 generally requires that, since Diablo Grande had made a development request of Stanislaus County, Stanislaus County request of WHWD a statement of whether or not the WHWD will be able to provide water to Diablo Grande. In response, the WHWD adopted Resolution 97-23 on December 4, 1997, approving the WHWD response to the County's request. This response is the response required under the code sections. The entire response of the WHWD is represented below:

> "Because the Western Hills Water District ("District") is a California water district still in its phase of acquiring water supplies, the District considered not submitting an assessment to the County of Stanislaus ("County") as contemplated by Water Code Section 10910(f) and CEQA Guidelines Section 15093.5(c) because it does not have information to add to the assessments and analysis being undertaken by the County in Diablo Grande Water Resources Plan and the Supplemental Environmental Impact Report now underway and required by the California Court of Appeal, Fifth Appellate District in Opinion No. F023638 ("Water Resources Plan and SEIR"). If the District submitted no response, the County is required to assume that

the District had no information to submit and the County would continue with its obligations under Water Code Section 10910 et seq. However, the District has chosen to respond to the request from the County in an effort to comply.

First, the County has requested that the District indicate whether the projected water demand associated with the Diablo Grande Specific Plan was included in the District's last urban water management plan. [Water Code Section 10910(d); CEQA Guidelines Section 15083.5(b).] The water demand associated with the Diablo Grande Specific Plan could not be included as part of the most recently adopted urban water management plan for the District because the District is not yet an urban water supplier required to adopt such a plan. [Water Code Sections 10620(a), 10617.] Under the Urban Water Management Planning Act ("Act")(Water Code Section 10610 et seq.) a water supplier is not an "urban water supplier" subject to the Act until it provides water for municipal purposes to more than 3,000 customers or supply more than 3.000 acre feet of water annually [Water Code Section 10617]. Since the District does neither, it has not yet adopted an urban water management and thus cannot include the water demand associated with the Diablo Grande Specific Plan within this as yet to be prepared plan.

Second, the County has requested that the District indicate whether the District's total projected water supplies available during normal, single-dry, and multiple dry years included in the 20-year projection included in the urban water management plan will meet the projected demand associated with the Diablo Grande Specific Plan, in addition to the District's existing and planned uses [Water Code Section 10910(d) CEQA Guidelines 15053.5(b)]. Again, however, since the District is not yet required to have such an urban water management plan, the water supply and demand analysis based upon such a plan cannot be made.

If the assessment required by Water Code Sect;on 10910(d) could be made and concluded that water supplies are, or will be, insufficient, the District would provide to the County its plans for acquiring additional water supplies, setting forth the measures[1] that are being undertaken to acquire and develop those water supplies [Water Code

[1] Those plans may include, but are not limited. to, information concerning all of the following: the estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies; all federal, state, and local permits, approvals or entitlement that are anticipated to be required in order to acquire and develop the additional water supplies; based upon the considerations of these first two items, the estimated time frames within which the District expects to be able to acquire additional water supplies. Water Code Section 10911 (a).

Section 1091 1 (a); CEQA Guidelines 15083.5(c)]. Since the assessment cannot be made since the District is not yet required to have an urban water management plan, the analysis of measures to acquire water supplies is more properly found in the Water Resources Plan and SEIR. In addition, the District has previously provided its Water Resources Plan for Diablo Grande prepared for it by Bookman-Edrnonston Engineering (February, 1997) and this document is included as Exhibit "A" in the administrative draft SEIR sent to the District November 24, 1997, and contains the information available to the District regarding water supplies.

Based upon the foregoing response from the District, the County has requested that this information be included in this SEIR pursuant to Water Code Section 10911(b).

As the District could not make the evaluations contemplated under the code sections since it is not yet a public water system required to adopt an urban water management plan, the County has chosen not to conduct the optional evaluation, pursuant to Water Code Section 10911(c), of the information provided by the District for inclusion in the SEIR.

Rather, using the information in the SEIR and based upon the entire record, the lead agency [i.e., the County] shall determine whether projected water supplies will be sufficient to satisfy the demands of the proposed project, in addition to existing and planned future uses, as is required by Water Code Section 10911(c). If the lead agency determines that water supplies will not be sufficient, the lead agency must include that determination in its CEQA findings."

1.5 EIR Uses

This SEIR, with respect to the water options, is intended to be used for acquisition, purchase and delivery of water to the Diablo Grande project. As such, each option has approval criteria, which are discussed above. Furthermore, there are federal, state, regional and local agencies that will use this SEIR in their planning and decision making pertaining to the following: contracts to purchase water, contracts to deliver water, grading and building permits, rights of access, and streambed alterations.

The following list of agencies and list of approvals is intended to supplement the approvals necessary pertaining to each of the water sources discussed above.

List of Agencies

Federal

U.S. Fish and Wildlife Service (Responsible agency- threatened species)

U.S. Army Corps of Engineers (Permitting agency)

State

California Department of Fish and Game (Responsible agency- threatened species (Permitting agency- streambed alternation)

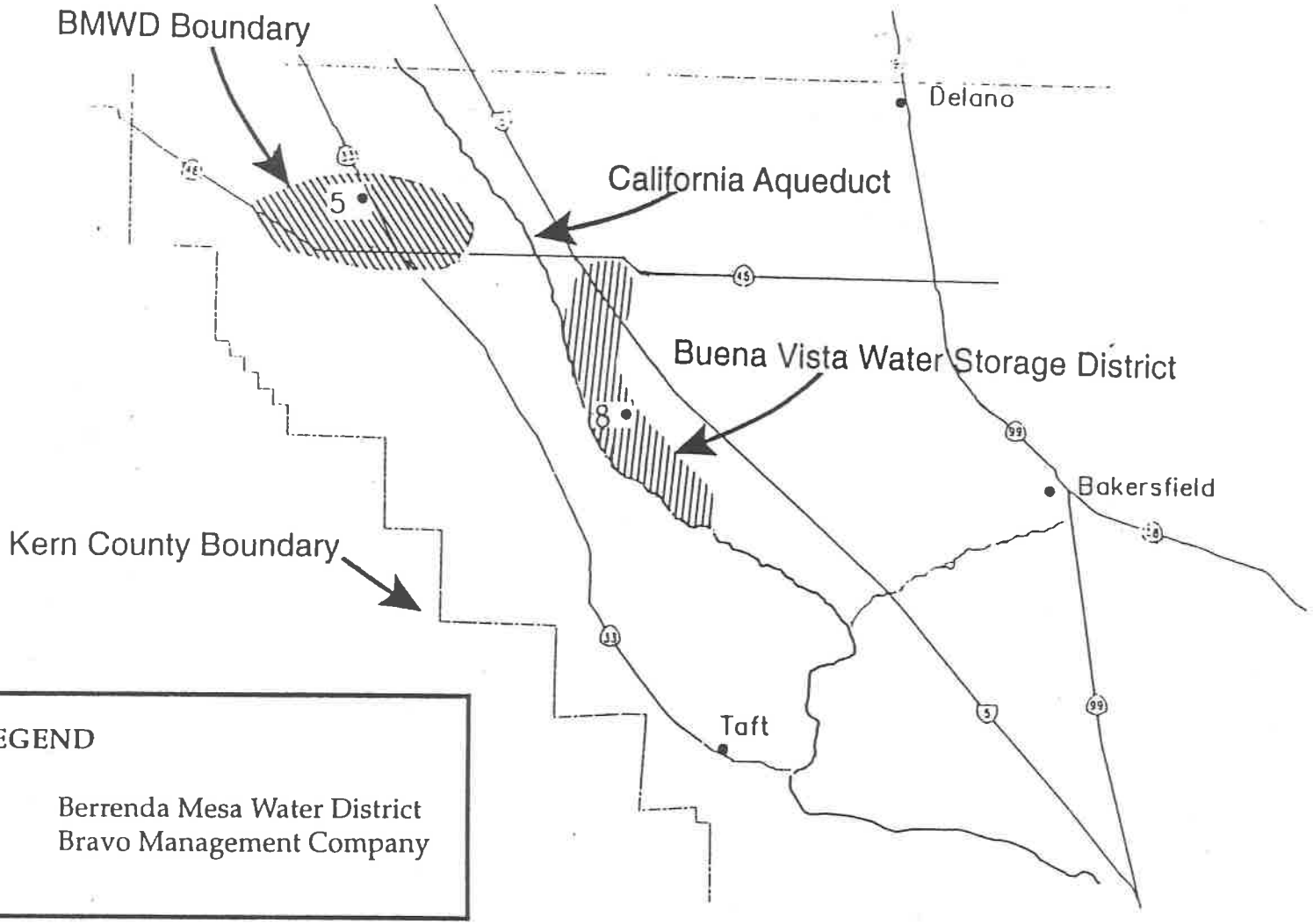
Local

Cities and counties where wells and/or conveyance pipelines may be installed.

List of Approvals

If the Stanislaus County Planning Commission and Board of Supervisors approve the proposed project, then the Planning Commission or Board may take one or more of the following actions:

1. Certification of the Supplemental Environmental Impact Report
2. Adoption of a General Plan Amendment
3. Rezoning of the Project Site
4. Adoption of a Specific Plan
5. Adoption of a Preliminary Development Plan for Phase 1
6. Adoption of a Development Agreement
7. Cancellation of Williamson Act Contracts
8. Approval of Subdivision Maps, including vesting tentative maps, vesting parcel map, parcel maps, and/or final maps
9. Approval of all necessary construction permits
10. Issuance of building permits



Source: Bookman-Edmonston Engineering, Inc.

No Scale

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Diablo Grande Water Plan SEIR

Southern Area Water Sources

Figure 13

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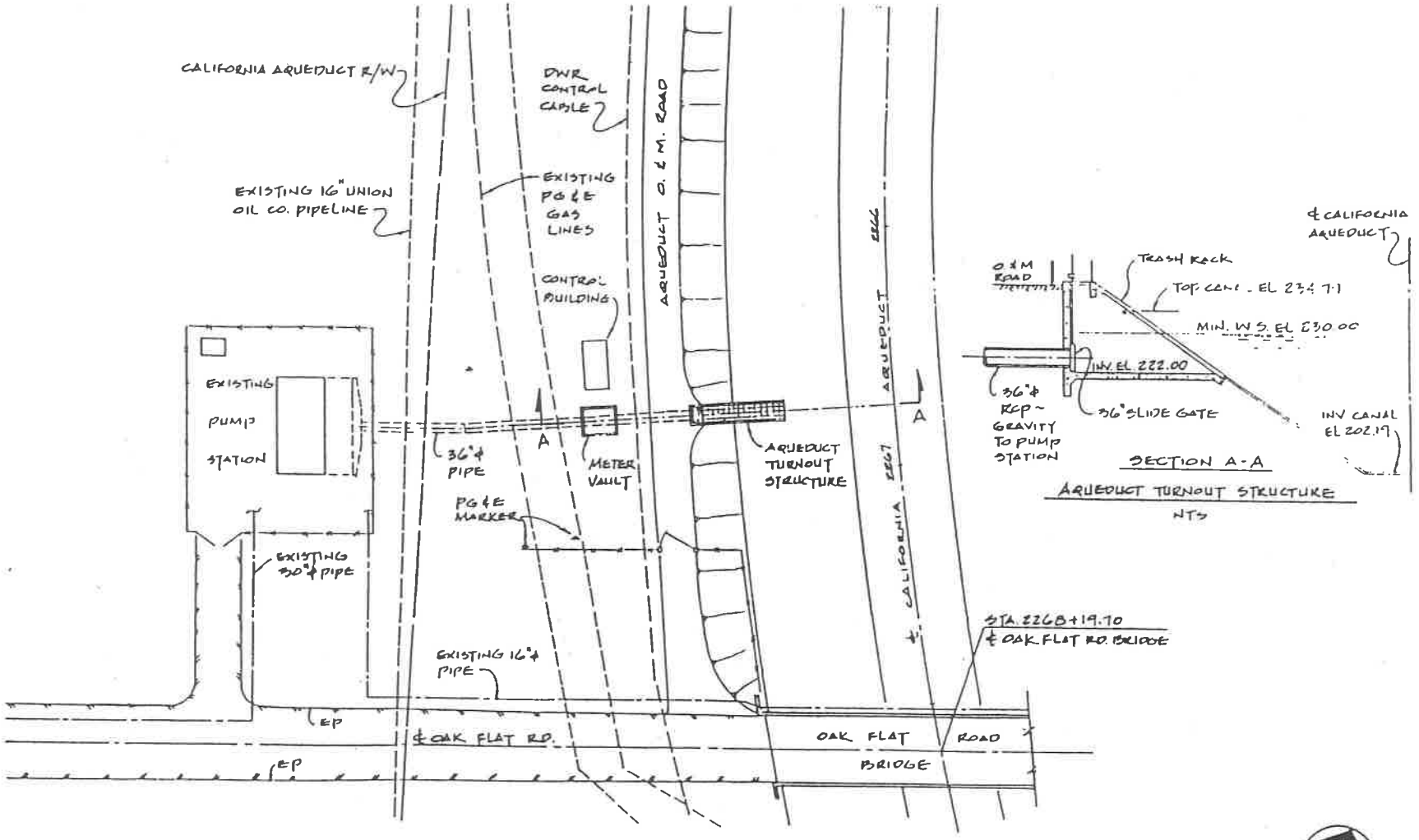

Source: Bookman-Edmonston Engineering

No Scale

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Diablo Grande Water Plan SEIR

Conceptual Plan for Diablo Grande California Aqueduct Pumping Plant

Figure 14

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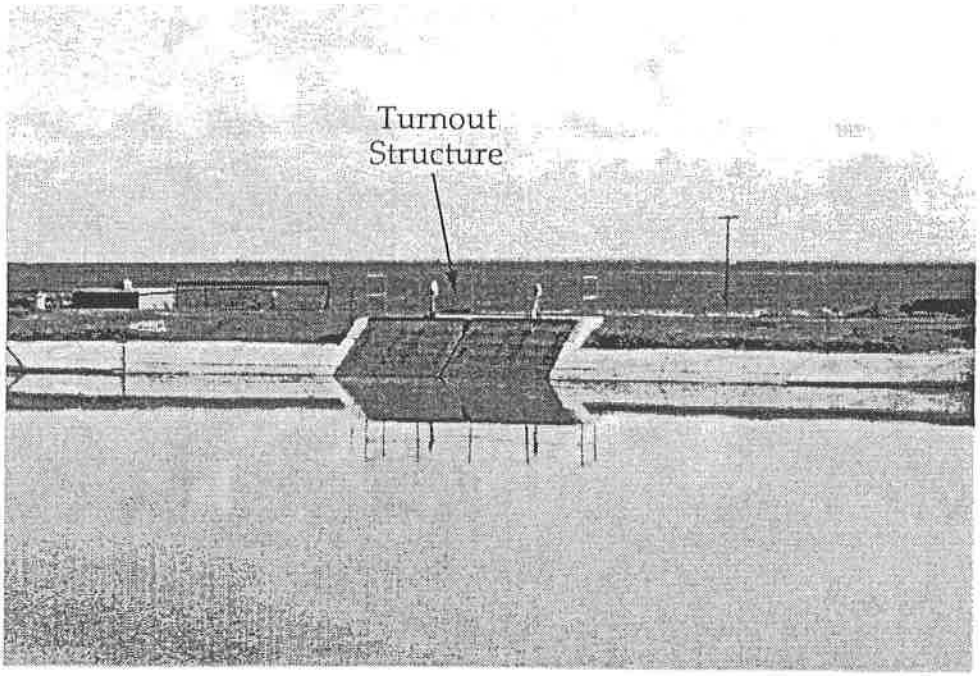
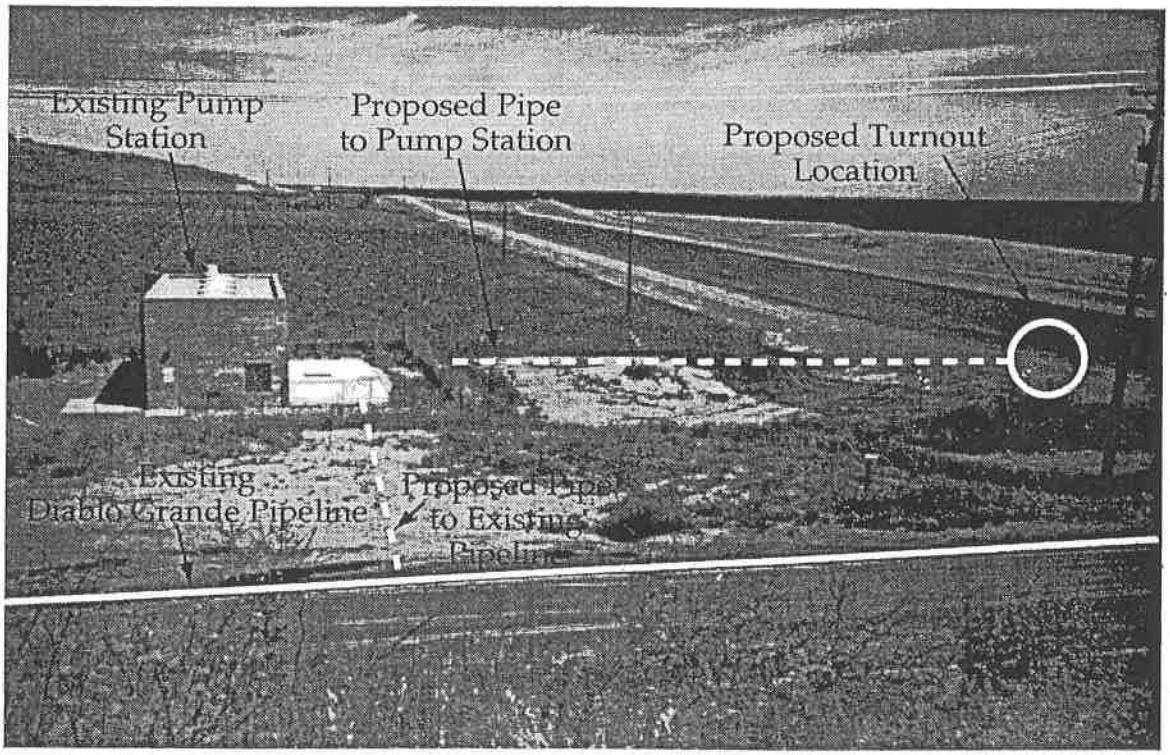


Example Aqueduct Turnout Structure



Existing Pump Station and California Aqueduct

Source: Bookman Edmonston Engineering

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Diablo Grande Water Plan SEIR

California Aqueduct Turnout Facilities

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2.0 Environmental Setting, Impacts and Mitigation Measures

The discussion of environmental setting, impacts and mitigation measures for each of the Water Plan Options is presented in this section. For clarity, each option is addressed in a separate sub-section.

Within each sub-section, the following components are discussed:

- Water supply;
- Water conveyance;
- Consistency with applicable plans, policies and ordinances;
- Cumulative impacts; and
- Growth-Inducing impacts.

2.1 Marshall-Davis Well Site (Option 1)

As described in Section 1, this option has been approved, constructed and is currently under operation. Under the existing approvals, up to 1,200 AF per year of groundwater from the Marshall-Davis Well Site may be transported to and used on the Diablo Grande site for non-residential uses until the year 2001.

This environmental analysis includes evaluation of impacts that would result from two changes to the existing agreement:

- Continuation of the use of the same amount of water from the Marshall-Davis Well Site as a permanent water source for Diablo Grande.
- Removal of the limitation on the use of this water to non-residential uses.

Areas of potential impact relating to these two changes include effects on groundwater resources, agricultural uses and water quality.

Water Supply (Hydrology)

The Diablo Grande EIR included a report titled *Reconnaissance Evaluation of Ground Water Resources Available to the City of Patterson* (the "Patterson Study"). This report

was prepared in 1991 by Bookman-Edmonston Engineering and is included in Appendix F. This report provides the primary basis for the following discussion.

Environmental Setting

The Central Valley is a topographic and structural basin that has been filled with a sequence of marine and continental sedimentary deposits. The general vicinity of Patterson contains a substantial thickness of both marine and continental sediments. Fresh water resources are limited to the upper portions of the continental sediments in sands and silts containing lenses of poorly sorted coarse sands and gravels.

Available data indicates the deposits underlying the City of Patterson are westerly of the geologic trough of the Central Valley. Several clay or silty clay "tongues" extend out of these deposits, the most extensive of which is termed the "Corcoran" clay or "E-clay." This layer is about 150 feet below sea level.

In the Patterson vicinity, there is an unconfined to semi-confined ground water body which receives substantial replenishment from canals carrying water diverted from the San Joaquin River. This has resulted in a groundwater mound beneath Highway 33, extending from Orestimba Creek to approximately the City of Patterson. Field measurements indicate groundwater movement beneath Patterson from the Coast Range towards the San Joaquin River.

Hydrographs of wells in the vicinity of Patterson (taken from 1959 to 1987) indicate relatively stable water level conditions. Based on evaluation of the construction characteristics of the wells serving the City of Patterson, it appears that these are composite wells (drawing water from both confined and unconfined aquifers).

Project Analysis

The Patterson Report includes a hydrologic balance evaluating the potential growth of Patterson from its 1991 population of 9,000 to its planned population of 21,000 by the year 2010. The City anticipates growth into adjoining lands contained within the Patterson Water District (PWD), West Stanislaus Irrigation District (WSID) and Del Puerto Water District (DPWD).

The PWD delivers about 45,000 AF per year through a combination of San Joaquin River diversions and a contractual surface water supply from the Central Valley Project (Delta-Mendota Canal). The WSID lies west of Patterson and delivers water supplies for irrigated agriculture. The District's water supplies include diversions from the San Joaquin River, a contractual surface water supply from the Central Valley Project (CVP), and four deep wells. The DPWD receives a contractual surface water supply (12,060 AF per year) from the CVP.

These districts are largely developed to irrigation, with about 1,500 people within the PWD and 3,500 within the WSID (as of 1991). These districts deliver substantial quantities of surface water and rely on groundwater to a limited degree.

Potential recharge from applied water within the districts was estimated assuming 25 percent of applied water would percolate to the groundwater. This assumption equates to a groundwater recharge of 35,000 AF per year. Current groundwater extractions include about 1,600 AF per year from the City of Patterson, about 700 AF per year estimated for domestic use within the two districts (based on a population of 5,000) and about 13,000 AF per year pumped from the West Stanislaus Irrigation District Wells (assuming 2,000 gpm per well with the wells operated at a 50 percent load factor). This results in a total estimated groundwater demand for this area of about 15,000 AF per year. The comparison between groundwater recharge and demand indicates that return flows from irrigation exceed groundwater demands by about 20,000 AF per year. Even as irrigated lands are converted to urban use, the balance of potential groundwater recharge to groundwater extraction remains positive.

The Patterson Study concludes that recharge could support the projected 20-year growth for the City and an additional 15-20,000 AF per year of groundwater withdrawal without creating a groundwater imbalance. The results are supported by the measured stable water levels in the vicinity of Patterson. The report did not consider underflow into or out of the area, but the substantial return flows indicate that sufficient groundwater recharge is available within the area to support additional extractions.

The Patterson Study contains a qualification that, while the overall hydrologic balance for the area appears to be favorable, the substantial direct recharge in the area largely contributes to the unconfined aquifer system and available data are not sufficient to fully describe the relationship between the unconfined and confined aquifers.

The Diablo Grande EIR concluded that it is not anticipated that there would be any increase in the pumping heads (decrease in groundwater levels) on neighboring wells. However, the EIR recommended measures to be followed should such impacts occur. The EIR included a mitigation measure requiring establishment of monitoring wells to determine the effects of the pumping on the Marshall-Davis Well Site would affect neighboring properties (included in Appendix F). The mitigation measure specifies that if groundwater levels at wells near the well sites decline by 10 percent or greater, and that decline can be reasonably correlated with increased pumping from the Marshall-Davis wells, the project is required to allocate their Salado Creek Water District water to the impacted neighboring owners.

Further, immediately upon drawdown occurring, Diablo Grande is required to fund the County's retention of a hydrologic engineer to calculate the amount of surface water required annually to replace lost groundwater supplies and, if that quantity exceeds 275 AF per year, the availability of additional replacement water is required to be demonstrated to the County's satisfaction. But in no event may the Western Hills Water District (WHWD) pump groundwater in excess of 1,200 AF, and such pumping is required to be carried out subject to California law. (Diablo Grande Specific Plan EIR Mitigation Monitoring Plan, p. F-3)

The required monitoring plan has been established and has been in operation since pumping of the Marshall-Davis well by Diablo Grande began in June 1996. The data obtained to date is included in Appendix F. Monthly data generated by the monitoring program has found that none of the five existing neighboring wells have reported declines of ten percent or greater. While this program has been in existence for a relatively short time, it provides support for the findings of the Patterson Report.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will substantially degrade or deplete groundwater resources or interfere substantially with groundwater recharge (CEQA Guidelines, Appendix G).

Impact. This option would result in the continued extraction of up to 1,200 AF per year of groundwater from the Marshall-Davis Well Site and conveyance of that water to Diablo Grande beyond the year 2001. The environmental impact to the aquifer underlying the Marshall-Davis Well Site and surrounding area is less than significant based on the findings of the Patterson Report, monitoring data obtained to date and considering that in the absence of Diablo Grande, groundwater extracted from the Farms would likely be used for agricultural uses, with only a portion returning to groundwater. However, continued pumping does have the potential to affect water levels in wells on adjacent properties, especially should irrigation in the Patterson vicinity decline substantially or a long-term drought occur. Therefore, this impact is considered to be potentially significant. However, implementation of the following mitigation measure will reduce the impacts associated with continued and permanent use of the Marshall & Davis Farm well as a water source for Diablo Grande will be reduced to a level of insignificance.

Mitigation Measure

1. Should groundwater extraction from the Marshall-Davis Well Site wells continue beyond the year 2001 as a water source for Diablo Grande, the Monitoring Plan for Operation of the Marshall-Davis Well by the Western Hills Water District shall continue to be carried out. The requirements of this Plan are set forth in Appendix F.

Impact. City of Patterson water data indicate the City's wells have met all EPA and Department of Health Services standards to date (as of 1991) (Patterson Report). However, available data indicates that some of the groundwater in the area exceeds secondary drinking water standards for total dissolved solids, chloride, and sulfate. Water supplies delivered to Diablo Grande intended for domestic use will be treated pursuant to mitigation measures included in the Diablo Grande EIR. No additional mitigation is warranted.

Impact. The State Department of Water Resources has expressed concern regarding potential subsidence in the vicinity of groundwater pumping at the Marshall-Davis

Well Site and resulting impacts to the nearby California Aqueduct. The Aqueduct is about two miles from the Marshall-Davis Well Site at the closest point. Groundwater pumping at the Farm is limited to 1,200 acre-feet per year. The combination of distance and the relatively small amount of water extracted will not result in a potential impact to the aqueduct (Paul Selsky, pers. com., December 10, 1997).

Water Conveyance

Water conveyance infrastructure related to this option and associated impacts were evaluated in the Diablo Grande EIR. No additional construction beyond that evaluated in the Diablo Grande EIR would be required to continue pumping on a permanent basis as proposed by this option. Furthermore, this infrastructure has been constructed and is currently in operation. Further discussion of this conveyance system in this SEIR would not be appropriate. However, if the reader is interested in greater details of the conveyance system, refer to the Diablo Grande Specific Plan EIR (LSA 1992).

Consistency with Applicable Plans, Policies and Ordinances

Stanislaus County General Plan

Conservation/Open Space Element

Policy Seven. New development that does not derive domestic water from pre-existing domestic and public water supply systems shall be required to have a documented water supply that does not adversely impact Stanislaus County water resources.

Implementation Measure 1. Proposals for development to be served by new water supply systems shall be referred to appropriate water districts, irrigation districts, community service districts, the State Water Resources Board, and any other appropriate agencies for review and comment.

Project Consistency. The Notice of Preparation for the proposed project was distributed to the State Water Resources Board, the Western Hills Water District, Turlock Irrigation District, Patterson Water District, and New Del Puerto Water District. This option is **consistent** with this measure.

Implementation Measure 2. Review all development requests to ensure that sufficient evidence has been provided to document the existence of a water supply sufficient to meet the needs of the project without adversely impacting the quantity and quality of existing local water resources.

Project Consistency. This SEIR serves to provide evidence and documentation of water supply for the Diablo Grande project. Option 1 will result in a less than

significant impact on existing local water resources with implementation of the recommended mitigation measures. This option is **consistent** with this measure.

Groundwater Management Plan

The Marshall-Davis Well Site is located in the Del Puerto Water District. This district, as well as the Patterson Water District and the West Stanislaus Irrigation Districts, do not currently have a management plan (William Harrison, pers. com., August 21, 1997).

Cumulative Impacts

As discussed above, the City of Patterson General Plan projects a buildout population of 21,000. There are no identified reasonably anticipated future projects in the vicinity of Patterson that would rely on groundwater. Continuation of extraction and conveyance of groundwater from the Marshall-Davis wells would contribute incrementally to impacts on groundwater resources associated with buildout of Patterson. Based on the conclusions of the Patterson Study that groundwater supplies will be adequate to meet increases in water demands in the City of Patterson to the planned population, the cumulative impacts of this option on groundwater resources are considered to be less than significant.

Growth Inducing Impacts

There are no identified growth inducing impacts associated with continuing the existing extraction of water from the Marshall-Davis Well Site other than providing for construction of a portion of the Diablo Grande project: the purpose of this option.

2.2 On-Site Groundwater (Option 2-1)

Under this option, water from nine existing wells within the Diablo Grande Phase 1 area would be used to provide a portion of the potable water demand of the Phase 1 land uses. Potential areas of impact relating to water supply from the nine existing wells include hydrology and biotic resources.

Water Supply (Hydrology)

The following discussion is based on the Hydrogeologic Evaluation of the Northern Portion of Diablo Grande ("Hydrologic Evaluation") prepared by Geoconsultants, Inc. dated January 1997 and an Addendum to that report dated June 6, 1997. These reports are included in Appendix C.

Environmental Setting

Topography within Diablo Grande ranges from about 800 feet, where Salado Creek exits the property in the northeast corner, to a high of 2,678 feet on Copper Mountain along the western property boundary. The primary drainage of Salado Creek flows from the southwest to the northeast across the study area.

Groundwater beneath Diablo Grande occurs within the shallow sand and gravel alluvium of Salado Creek and weathered and un-weathered sandstone bedrock materials. The project area does not overlie any recognized groundwater basin, and lies entirely west of the Tertiary and Quaternary deposits which constitute the major aquifers of the San Joaquin Groundwater Basin to the east (Diablo Grande Draft EIR, p. IV-74). The maximum radius of influence of the wells is 1.5 miles. There are no existing off-site groundwater extraction wells within 1.5 miles of the Phase 1 wells. Depth to groundwater within the bedrock materials ranges from 10 to 225 feet, while in the alluvium the depth to groundwater varies generally from 10 to 15 feet.

Availability of groundwater is determined by the amount of rainfall and stream flow recharge on a long-term basis. Recharge to wells at Diablo Grande occurs from two principle sources: direct percolation of rainfall and runoff from surrounding hills.

Groundwater within the alluvium is recharged by three sources: direct penetration of rainfall, recharge from runoff in Salado Creek and return irrigation flow from the two on-site golf courses.

The area of alluvium that would be recharged by direct penetration of rainfall is about 300 acres. Based on an average annual rainfall of 12 inches of which 0.3 inches becomes runoff and an 80 percent loss to evapotranspiration and near-surface retained moisture, about 2.34 inches per year becomes deep penetration. This is equivalent to about 58 AF which is available as direct recharge to the alluvium on an annual basis. In addition, recharge from runoff in Salado Creek is estimated to contribute an additional 71 AF during the winter months on a long-term average. Thus the total natural recharge is estimated to be 129 AF per year.

There are two golf courses within the Phase 1 area. One is currently in operation and the other is under construction and is anticipated to open by the end of 1997. The golf courses on Diablo Grande use about 1,000 AF of water during the roughly 6-month primary irrigation season of May through October. Roughly 20 percent of this amount (200 AF) is available as recharge to the alluvial aquifer. The total recharge to the alluvium is estimated to be 329 AF per year.

The storage capacity of the alluvium is estimated to be about 300 AF. This is based on the 300 acre surface area, an average saturated thickness of 10 feet and an estimated specific yield of 10 percent. This figure indicates a rough approximation of the absolute limit of groundwater available if no recharge were to occur.

The bedrock aquifer encompasses about 8,200 acres. Based on an average rainfall of 12 inches of which 0.5 inches becomes runoff and an 80 percent loss to

evapotranspiration and near-surface retained moisture, about 1,574 AF per year becomes deep penetration.

The total groundwater recharge to the northern portion of Diablo Grande is estimated to be 1,811 AF per year on a long-term basis. Extended periods of either heavy rainfall or drought may alter these annual averages.

Project Analysis

To avoid aquifer overdraft, the hydrogeological study includes estimates of the maximum amount of groundwater that can be safely extracted from each of the two aquifer systems.

Alluvial Aquifer. A prudent estimate of the groundwater available for future development within the alluvial aquifer is the lesser of either two-thirds of the average annual natural recharge of 129 AF per year (i.e., 86 AF), or one-third of the natural storage capacity of 300 AF per year (i.e., 100 AF). Therefore, the prudent estimate of groundwater availability is 86 AF per year. In addition, the projected recharge from the off-site golf course water supply is 200 AF per year (20 percent of 1,000 AF) and the projected recharge from the remaining golf course irrigation return to be obtained from on-site wells is 16 AF. To be conservative, the amount of water available from the 16 AF has been decreased by two-thirds (11 AF) to account for potential on-site aquifer impacts. Therefore, the total available groundwater from the alluvial aquifer amounts to 297 AF per year (86 AF + 200 AF + 11 AF), or about 184 gallons per minute [gpm].

The project proposes to extract up to 173 AF of water per year from the Frog Pond Replacement well. This is less than the amount of return irrigation flow resulting from golf course irrigation (216 AF) and is within the safe yield of the alluvial aquifer.

Bedrock Aquifer. In light of the minimal number of wells within the bedrock aquifer, an estimate of storage capacity has not been attempted. In this case, the annual available groundwater should not exceed two-thirds of the annual recharge, or 1,207 AF (748 gpm).

Proposed Extraction. An extensive groundwater exploration program has been undertaken within the northern portion of Diablo Grande. Of the wells drilled, a total of nine are proposed to supply water to Phase 1, two wells drawing from the alluvial aquifer and the balance drawing from the bedrock aquifer. Details of these wells are presented in Table 3. The alluvial wells range in depth from 20 to 50 feet while the bedrock wells range in depth from 500 to 800 feet. The locations of these wells are illustrated on Figure 4.

Aquifer testing was performed on the wells using 24-hour sustained yield tests. Based on this testing, estimates were prepared as to the maximum yield over both a 24-hour and a long-term period based on the capacities of each well and the overall hydrologic balance of the aquifers. The long-term "safe" yield of the wells was also

calculated. These calculations are presented in Table 3. This represents the maximum amount of water that may be produced that will ensure continued well production and will not result on long-term overdraft of the aquifer. Either factor may limit the safe yield.

TABLE 3
Estimated Well Yields

Well	Total Depth (Feet)	24-hour "safe" yield (gpm)	Long-term "safe" yield (gpm)	Long-term "safe" yield (AF/year)
Alluvial Wells				
Frog Pond Replacement	35	188	120*	173
Squirrel	25	19	13	21
Bedrock Wells				
14th Tee	320	9	4	6
Hennings	750	18	9	15
Power Line	670	95	47	76
Windy	550	5	2	3
YF-6	700	146	73	118
YF-8	500	10	5	8
YF-12**	505	55	27	44
TOTAL		**545**	**287**	**464**

* Long-term "safe" yield limited by 120 gpm of recharge to alluvial basin on an annualized basis.

** Available drawdown limited to 100 feet due to a discharge barrier encountered at 106 feet in depth.

Source: Geoconsultants, Inc.

Based on the investigation, the theoretical long-term safe yield of the nine wells is 464 AF per year or 287 gpm. The portion of water capable of being produced from the bedrock aquifer is 14 percent of the available supply. However, as stated in Section 1 in the Project Area Groundwater analyses, ultimate available project area groundwater will be dictated by actual groundwater pumping and State of California Department of Health Services standards.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will substantially degrade or deplete groundwater resources (CEQA Guidelines Appendix G).

Impact. The groundwater sources within the Phase 1 area of Diablo Grande are isolated and are not depended upon by any off-site users. Extraction of water up to the long-term safe yield limits proposed under this option and identified in the hydrogeologic evaluation from the nine wells within the Phase 1 area will not result in any long-term depletion of groundwater resources and therefore would not result in a significant adverse impact with respect to groundwater resources. In essence, the groundwater extracted from the Salado Creek alluvium will constitute a portion of the added runoff to the alluvium resulting from the Diablo Grande golf course irrigation. No mitigation is necessary.

Impact. The State Department of Water Resources has expressed concern regarding potential subsidence in the vicinity of groundwater pumping at the on-site wells and resulting impacts to the California Aqueduct. The Aqueduct is over six miles from the on-site wells at the closest point. Considering that the area of influence of the wells is no more than two miles, no impacts to the California Aqueduct are expected. No mitigation is necessary.

Water Supply (Biotic Resources)

This section is based on the biotic resources report prepared by Zander Associates for this SEIR in December 1997. For a description of the On-Site Groundwater supply (Option 2-1), refer to Section 1 of this SEIR. The following section analyzes impacts to biological resources resulting from pumping of alluvial wells only. The remaining wells are deep aquifer wells and have been determined not to have impacts to surface or near-surface hydrology that could affect plant or wildlife species.

Environmental Setting

The proposed on-site water supply would be provided by two existing wells located adjacent to Salado Creek in the eastern section of the Diablo Grande Phase-1 project site. The two wells, designated as Squirrel (Sq) well and Frog Pond Replacement (FPR) well, are located within an alluvial zone that extends for approximately 3.5 miles along the northwesterly bank of the creek. The alluvial material consists primarily of unconsolidated sands, gravels and silts (Geoconsultants January 1997).

The Sq well is located in the southwesterly, upstream section of the alluvial zone (elevation ~ 1080 feet). The well site is located in a relatively flat, disturbed area above the northwesterly bank of the Salado Creek. Vegetation around the well site consists of non-native annual grasses and ruderal (weedy) species, including wild oats, soft chess, red brome, filaree, mallow, and shepherd's purse. The creek in the vicinity of the Sq well is confined to a shallow channel approximately 5 - 10 feet

wide. The edges and banks of the creek support some hydrophytic (moisture-tolerant) plant species, including rushes, sedges, and rabbitsfoot grass. The southeasterly bank of the creek rises to a relatively flat area consisting primarily of non-native annual grassland, with a few large blue oaks growing at the base of the adjacent hill slopes to the southeast. During the site reconnaissance on April 29, 1997, water levels in the creek were relatively low, flow was sluggish, with some ponding and some dry areas, and much of the water surface was covered with algal matting.

The FPR well is located adjacent to the westerly bank of Salado Creek (elevation ~ 800 feet), approximately 2.5 miles downstream from the Sq well. The well site is located in a disturbed area above the creek bank, which supports annual grasses and ruderal species as described above. The section of the creek adjacent to the FPR well is wider and more densely vegetated than the section near the Sq well. The creek flows from a large culvert upstream of the FPR well site into an area supporting a healthy stand of wetland/riparian vegetation, including rushes, sedges, cattails, bulrushes, and arroyo willow. This section opens into a pond and wetland area known as the "Frog Pond". The pond contains a mixture of open water and emergent vegetation, dominated by cattail marsh in the shallow areas and arroyo willow along the westerly bank of the pond. Outflow from the pond into the downstream creek channel is controlled by a concrete check dam, and much of the outflow is diverted through culverts into a lower, unvegetated stock pond. The level of the outflow culverts effectively determines the water level in the Frog Pond, provided water inputs from upstream sources are sufficient to balance losses to evapotranspiration, percolation, and outflow.

A comprehensive discussion of habitat types on the overall project site has been provided in a previous document (LSA Associates 1992). For the purposes of this report, discussion will be limited to the wetland and riparian habitats of Salado Creek that could potentially be affected by the proposed on-site water supply project.

Biotic Habitat - Wetland/Riparian. Wetland and riparian habitats support productive biological communities, and are important to many species of plants and animals. Stream wetlands and ponds with emergent vegetation provide habitat for a variety of aquatic invertebrates, fish and amphibians, such as the California newt, Pacific tree frog, and western toad. Perennial ponds and streams also provide habitat for aquatic reptiles such as the common garter snake and western pond turtle. Birds such as the northern harrier and red-winged blackbird use emergent wetland vegetation and surrounding areas for foraging and nesting.

Riparian woodland habitats typically occur in moist, alluvial soils along stream corridors. These habitats are characterized by dense stands of willow or other moisture-tolerant tree species, with an understory of shrubs or forbs. The tree canopy and understory provide cover, foraging habitat and breeding sites for a variety of wildlife species, including amphibians such as the Pacific tree frog, and birds such as Wilson's warbler, common bushtit, and blue-gray gnatcatcher.

Riparian vegetation also benefits stream habitats by reducing erosion from stream banks, and providing shade to maintain cooler water and air temperatures.

Sensitive Species. A discussion of special-status species in the vicinity of the project site was included in the EIR for the Diablo Grande Specific Plan (LSA Associates 1992). Based on results of previous surveys conducted in the project area (LSA Associates 1992, 1994), two sensitive species[1] have been identified, the southwestern pond turtle (Clemmys marmorata pallida) and western spadefoot toad (Scaphiopus hammondi), that could potentially be affected by the proposed on-site water supply project. These species are discussed below.

Southwestern Pond Turtle. The southwestern pond turtle is a federal species of concern, and a state-listed species of special concern. The southwestern pond turtle is one of two subspecies of the western pond turtle (Clemmys marmorata). It occurs in aquatic habitats throughout the coastal hills and valleys of California, from San Francisco south to Baja California. Southwestern pond turtles require aquatic habitats with permanent or nearly permanent water, including ponds, streams, and perennial pools along intermittent creeks. Protected basking sites, such as partially submerged rocks, logs, or open mud banks, are a necessary component of their habitat. Pond turtles are normally active during the day, and can be active year-round in warm climates. In colder climates, pond turtles become dormant during winter, retreating into the mud at pond bottoms. Their breeding season ranges from late winter to mid-summer, depending on local conditions. The eggs are deposited in nests that are typically constructed in sandy stream banks, and females may travel up to several hundred feet overland to find suitable nesting sites. The eggs develop slowly and hatchlings require several years to reach maturity.

Surveys conducted in the spring of 1993 confirmed the presence of at least two southwestern pond turtles in the Frog Pond (LSA Associates 1994). This is the only reported occurrence of this species in the vicinity of the project site.

Western Spadefoot Toad. The western spadefoot toad is a federal species of concern, and a state-listed species of special concern. This species occurs throughout the Central Valley and adjacent foothills of the Coast Ranges and Sierra Nevada. Spadefoot toads spend most of the year in underground burrows that provide a refuge from heat and desiccation. The burrows are typically located in upland areas with open grassland vegetation. Adults become active on the surface with the onset of rains in the fall, and migrate to shallow, seasonal ponds for breeding. Suitable breeding habitat includes ephemeral pools and ponded areas in creeks that are subject to seasonal desiccation. The breeding season extends from late winter to the

[1] Sensitive species are those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) under the federal Endangered Species Act; those considered "species of concern" by the USFWS; those listed or proposed for listing as rare, threatened, or endangered by the California Department of Fish and Game (CDFG) under the California Endangered Species Act; and those designated as "Species of Special Concern" by the CDFG.

end of March. Females lay the eggs in small clusters in the pools. The eggs normally hatch within two weeks and the larvae develop rapidly in the pools during spring. During this time, the larvae are highly vulnerable to predation, and may compete with other amphibian larvae for food or space. The larvae transform to juvenile toads in late spring and subsequently disperse to upland estivation sites.

Surveys conducted in spring 1993 identified both juvenile toads and toad larvae in several pooled areas along Salado Creek in the Phase 1 project area. Two of these areas are located within approximately one-half mile of the Sq well, and two other sites are located within approximately one-quarter mile of the FPR well (LSA Associates 1994).

Project Analysis

The proposed on-site water supply project would involve increasing water extraction from the Sq and FPR wells in the Salado Creek alluvium to provide a total of 194 AF of water per year. Extraction rates would average approximately 13 gallons per minute (gpm) from the Sq well (21 AF per year) and 107 gpm from the FPR well (173 AF per year). These values are based on estimates of the hydrological "long-term safe yield" from these wells (Geoconsultants January 1997).

This proposed project will not involve construction of any new wells. Therefore, no direct impacts to biological resources are expected as a result of construction or modification of on-site wells. The project will involve increasing extraction from an alluvial aquifer, which may be hydrologically connected with the riparian system of Salado Creek, including the Frog Pond. This increase in extraction could cause localized decline of the water table, which could adversely effect the Frog Pond and other riparian habitats of Salado Creek within the zone of influence of these wells.

Squirrel Well. The area in the immediate vicinity of the Sq well consists primarily of disturbed and ruderal habitat with little biological resource value. The section of Salado Creek adjacent to the Sq well is a small, intermittent stream that appears to dry out seasonally in normal years. This stretch of the creek supports limited wetland/riparian habitat in the form of some low-growing hydrophytic plant species, but does not support riparian woodland or extensive emergent wetland vegetation. Increased extraction of water from the Sq well could potentially accelerate desiccation of the creek bed, particularly at the end of the rainy season or in dry years. Intermittently-ponded areas of Salado Creek upstream and downstream from the Sq well are known to provide breeding habitat for the western spadefoot toad. If the proposed increase in water extraction were to result in more rapid desiccation of these pools, this could adversely affect the breeding success of this species in these areas. However, the proposed extraction rates from this well are relatively low, and the known locations of spadefoot breeding pools appear to be outside the radius of influence of the Sq well. Furthermore, a Habitat Management Plan has been developed for this species in the Phase 1 area (Sycamore Environmental Consultants 1995). Implementation of this plan will create new

ephemeral pools on golf courses near known upland habitats of the spadefoot toad, to provide additional breeding habitat for this species.

Frog Pond Replacement Well. The proposed pumping rate of 107 gpm constitutes a substantial increase in water extraction from the FPR well and associated alluvial aquifer. Although this value is based the calculated "long-term safe yield" for the aquifer, this calculation does not consider localized effects within the radius of influence of the well. The potential extent of drawdown of the aquifer within the zone of influence of this well, and resulting effects on biological resources, can not be accurately predicted without direct test data from the well at the proposed higher extraction rates. However, considering the close proximity of the FPR well to the Frog Pond (within 100 feet), and the relatively high extraction rate proposed for this well, it is reasonable to assume that part or all of the Frog Pond and adjacent wetland area would lie within the zone of influence of the well. Localized drawdown of the water table in this zone could affect water levels in of the Frog Pond, both by increasing the gradient for water loss through the substrate and by reducing possible groundwater accretion to Salado Creek from the alluvial aquifer.

The Frog Pond is known to provide habitat for the southwestern pond turtle. A Habitat Management Plan has been developed to protect and enhance existing habitat for this species in the Frog Pond (Sycamore Associates 1995). However, this Plan does not prescribe measures to maintain pond water levels in the event of increased rates of water loss or reductions in water input to the pond. Since pond turtles require permanent or nearly-permanent water in their habitat, prolonged desiccation of the Frog Pond would be expected to adversely affect this species. Therefore, the potential for indirect or cumulative impacts to this species resulting from the project must be considered.

Salado Creek in the vicinity of the FPR well also provides breeding habitat for the western spadefoot toad. The proposed increase in water extraction could result in accelerated desiccation of ephemeral breeding pools, which could affect the breeding success of this species in this area. However, implementation of the Habitat Management Plan as described above for the Squirrel Well will provide additional breeding habitat, which should compensate for potential impacts of this project on the spadefoot toad.

Future development of the Phase 1 area is expected to provide additional water inputs to Salado Creek, in the form of increased surface runoff from residential areas, and/or increased recharge of the alluvial aquifer from irrigation drainage from adjacent golf courses. This latter component has been estimated to equal approximately 216 AF per year (Geoconsultants June 1997). These inputs could partially offset the effects of increased water extraction from the on-site wells. However, the balance of these potential influences can not be predicted with any degree of certainty. Therefore, the possibility of indirect or cumulative impacts to biological resources resulting from the project can not be dismissed.

As stated previously in section 1, the on-site groundwater well "FPR" has been determined to only produce 50 gpm (40 AF per year). This is a significantly lower

capacity than the 107 AF per year originally estimated for this well. Therefore, the potential impacts identified above would be expected to be reduced.

Impacts and Mitigation Measures

Standard of Significance. For the purposes of this analysis, impacts on biological resources resulting from the proposed on-site water supply project would be considered significant if they would:

- substantially affect a rare or endangered species of animal or plant or the habitat of any such species;
- interfere substantially with the movement of resident or migratory fish or wildlife species;
- substantially diminish or degrade habitats of native fish, wildlife or plants;
- conflict with local, state, or federal policies relating to biological resources.

The judgment regarding whether an effect on a sensitive species is substantial was made taking into account both the magnitude of the impact and the rarity and sensitivity of the species or habitat in question.

Impact. Extraction of approximately 13 gpm from the Sq well could cause localized drawdown of the alluvial aquifer, which could affect water levels in Salado Creek and associated riparian habitat in the vicinity of the Sq well, and potentially affect breeding habitat for the western spadefoot toad. This impact is considered to be less than significant.

Because the proposed extraction rates from this well are relatively low, and the known locations of western spadefoot toad breeding pools appear to be outside the radius of influence of the Sq well, increased pumping from this well is not expected to substantially affect the spadefoot toad. Furthermore, a Habitat Management Plan (HMP) has been developed for this species in the Phase 1 area. Implementation of the HMP will provide additional breeding habitat for the spadefoot toad on the project site near known upland habitats of this species. No additional mitigation is warranted.

Impact. Groundwater extraction from the FPR well could cause localized drawdown of the alluvial aquifer in the vicinity of the FPR well, which could affect water levels in the Frog Pond and associated wetland/riparian area of Salado Creek, and potentially affect habitats for the southwestern pond turtle and western spadefoot toad. This impact is considered to be potentially significant.

The Frog Pond is known to provide habitat for the southwestern pond turtle, and Salado Creek in the vicinity of the FPR well is known to provide breeding habitat for the western spadefoot toad. A Habitat Management Plan (HMP) has been developed to protect and enhance existing habitat for these species on the Phase 1

project site. Implementation of the HMP will provide additional breeding habitat for the spadefoot toad on the project site, and is expected to offset any potential impacts to this species resulting from pumping of the FPR well. However, the HMP does not contain measures to prevent desiccation of the Frog Pond, which could potentially result from the project, and could adversely affect the southwestern pond turtle.

Implementation of the following mitigation measure, in combination with the HMP, will reduce this impact to a less than significant level.

Mitigation Measure

2. Prior to the proposed increase in water extraction from the FPR well, a regular monitoring program for the Frog Pond shall be established by the WHWD, in conjunction with the Stanislaus County Environmental Coordinator. A depth gauge will be placed at a representative location in the pond to be determined in collaboration with the environmental coordinator. Water levels shall be monitored by a qualified technician monthly from November 1 to April 30, and biweekly from May 1 to October 31, and the data evaluated by the environmental coordinator to insure compliance with reasonable standards for pond depth and rate of drawdown, given seasonal variations in water availability and requirements for the pond turtle.

   The following standards shall be adopted for maintenance of the Frog Pond:

   a. The water level in the Frog Pond shall be maintained at the existing high level, established by the elevation of the outflow culverts, during the period from November 1 to July 31.

   b. The Frog Pond shall not be dry (i.e., without standing water) for more than one month per year. A dry period of up to one month shall be allowed only between August 1 and October 31.

   In the event that water levels in the pond fall below the prescribed level during the period from November 1 to July 31, or water levels decline at an excessive rate (> 6 inches per month) during any one month period, the Diablo Grande environmental monitor in conjunction with the environmental coordinator will conduct a directed review to assess the reasons for such decline and develop remedial measures as necessary to insure continued viability of habitat for pond turtles. In the event that the Frog Pond is dry for a period of more than one month during the period from August 1 to October 31, WHWD in collaboration with the environmental coordinator shall implement compensatory measures to restore water to the Frog Pond. These measures could include reducing extraction from the FPR well and/or diverting water to the Frog Pond from other suitable sources. Additionally, in order to maintain water quality in the Frog Pond, untreated surface runoff from roads or developed areas shall not be introduced into the Frog Pond.

Note: The Frog Pond has been observed to dry out for as long as 3 months during drought years from 1990 to 1993. However, the presence of pond turtles in the Frog Pond was not established before 1993, and the pond has contained water year-round from 1994 to 1996. Pond turtles require aquatic habitats for foraging, and can probably tolerate seasonal dry periods, but specific information is lacking on the duration of drought that this species can tolerate. The period of one month was estimated, based on general knowledge of the biology of this species.

Water Supply (Health Hazards)

Environmental Setting

Water quality testing was conducted for the nine wells in April 1995 by Far West Laboratories, Inc. and in February 1996 by A&L Western Agricultural Laboratories. The results of these tests are summarized below. The water quality reports are available at the WHWD offices.

Project Analysis

The testing determined that none of the wells, with the exception of the YF-6 well, met State Health Standards for coliform bacteria. In addition, the 14th Tee well was found to contain high concentrations of salts (1,498 parts per million of sodium and 1,434 parts per million of bicarbonate).

Impacts and Mitigation Measures

Impact. Use of the water from these wells for domestic purposes without treatment could result in creation of a health hazard. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measure

3. Prior to any domestic, commercial, or other non-irrigation use of the water generated from this option, the water from each well to be used for such purposes shall be treated as necessary to meet all applicable health standards. The WHWD shall be responsible for ensuring compliance with this measure.

The water will be treated to meet state and local requirements. Environmental effects relating to the filtration plant were evaluated in the certified Diablo Grande EIR (see section IV, p. 173). Installation of any treatment system other than that described above may require additional environmental review.

Water Conveyance

The water system to deliver the water to Phase 1 land uses (water lines and water treatment system) was included in the Phase 1 Preliminary Development Plan and was evaluated in the Diablo Grande EIR (Section IV-F). Conveyance pipelines are predominantly located in proposed roadways. Mitigation pertaining to this system is included in the Mitigation Monitoring and Reporting Program. To date, development of water conveyance infrastructure has not been completed. This option does not involve any construction not already evaluated in the Diablo Grande EIR. No additional environmental analysis of the water conveyance system is necessary.

Consistency with Applicable Plans, Policies and Ordinances

Diablo Grande Specific Plan

The project site for this option is located within the area addressed by the Diablo Grande Specific Plan which has been found consistent with the Stanislaus County General Plan. The Specific Plan designations for Village 1 - Oak Flat consist of Low Density Residential, Medium Density Residential, Medium-High Density Residential and Commercial. The Preliminary Development Plan for Village 1 (Specific Plan section 7.01.1) contains zoning designations implementing the general plan land use designations described above. The proposed project involves provision of a water delivery system that would provide domestic water to support development within the land use designations identified above. The project will not conflict with the general plan or anticipated zoning designations.

Groundwater Management Plan

The WHWD does not currently have a groundwater management plan. However, the WHWD is subject to water use restrictions.

Cumulative Impacts

There are no other existing or proposed projects that are known to draw from the alluvial or bedrock materials within the Phase 1 area or within the area of influence of the wells included in this option. Therefore, this option will not contribute to any cumulative effects.

Growth Inducing Impacts

No growth inducing impacts have been identified associated with this option. Implementation of this option will facilitate construction of a portion of Diablo Grande Phase 1: the objective of the option.

2.3 Patterson Algal Turf Scrubber (Option 3-1)

As described in Section 1, the environmental effects of this option were evaluated at a project-specific level in the Patterson Algal Turf Scrubber Water Reclamation Project Expanded Initial Study. The City of Patterson adopted a negative declaration for this project in June 1996. This option would provide 1,000 to 3,000 acre-feet of water per year. The Initial Study for this option is included in Appendix D of this document and is incorporated herein for reference so that the potential impacts and mitigations associated with this option are integral to section 2 of this SEIR. It is not the intention to re-evaluate the impacts of this project. No additional environmental analysis is required for this option. Following are potentially significant impacts and mitigations pertinent to this option as described in the mitigated in the initial study. Note: whereas mitigations 1, 2, 3, 5, and 8 are relevant to Diversion Element Alternative 1 of the Patterson Algal Turf Scrubber, mitigations 4, 6 and 7 are specific to Diversion Element Alternative 2.

Air Quality

Impact - Violate any air quality standard or contribute to an existing or projected air quality violation?

Potentially Significant Unless Mitigation Incorporated. Construction of the ATS facility, diversion structure and laying of the new pipeline will involve some grading. The total amount of grading is expected to be between two and four acres. Grading typically results in generation of fugitive particulate matter emissions. The effects of construction activities would increase dustfall and locally elevate levels of fine particulate matter downwind of construction activity. Construction dust has the potential to create a nuisance at nearby properties. While the amount of grading proposed is relatively small, this impact is considered to be potentially significant.

Operation of the ATS facility, diversion element and conveyance element will not involve operation of any combustion engines and will not result in any pollutant emissions. No vehicle trips will be generated by the project apart from periodic trips for maintenance.

Mitigation

1. Dust and other air pollutant emissions related to construction shall be reduced by:

   a. Retarding engine timing on diesel-powered equipment to reduce nitrogen oxide emissions. Maintaining existing gasoline-powered equipment in tune per manufacturer's instructions.

   b. Sufficiently watering all excavated or graded material.

c. Ceasing all clearing, grading, earth-moving, or excavation activities when wind speeds exceed 20 miles per hour.

d. Sufficiently watering or securely covering all material transported off-site.

e. Minimizing the area disturbed by clearing, grading, earth-moving, or excavation operations.

f. Seeding and watering all inactive portions of the construction site until cover is grown.

g. Planting, paving, or returning portions of the site upon which work is complete to their natural state.

h. Limiting vehicle speed to 15 miles per hour in unpaved areas.

i. Treating all internal roadways and the equipment storage areas with chemical suppressant.

j. Sweeping adjacent streets and roadways as needed to remove accumulated silt and soil.

Implementation of this mitigation will reduce air quality impacts associated with construction activities to a level of insignificance.

Biological Resources - Treatment/Discharge Element

Impact - Locally-designated natural communities?

Potentially Significant Unless Mitigation Incorporated. The existing treatment plant outfall is located on a sandy bank in an area substantially devoid of riparian vegetation. The new outfall locations under consideration occur in areas of higher vegetation, yet not in areas where the destruction of substantial riparian habitat cannot be avoided. It does not appear that any riparian woodlands, native grasslands or other locally sensitive natural communities will be removed or otherwise affected by construction and operation of the ATS facility and associated discharge facilities. However, considering that riparian habitat has been designated as critical primary habitat and exists in the vicinity of the proposed improvements, engineering drawings should be developed in consultation with a qualified biologist to ensure that impacts of this element of the project on riparian habitat will be avoided or minimized.

Mitigation

2. The final engineering drawings or construction plans depicting the precise location and design of the newly constructed outfall or the

refurbished treatment plant outfall from the existing ditch to the San Joaquin River shall be developed in consultation with a qualified biologist to ensure that the improvements are sensitively placed to avoid or minimize disturbance to riparian habitat. The City Planning Director shall review and approve the drawings or plans prior to submission of any application for a streambed alteration permit or, if one is not required, any permit allowing construction of the improvements.

3. The pipeline route and any outfall structure shall be designed to avoid loss of trees to the extent feasible. In the event that any trees must be removed, they shall be replaced with trees of the same species at a ratio of three to one. In this event, the applicant shall retain a qualified botanist to prepare a tree replacement plan detailing the size, planting methods and planting location of the replacement trees. This plan shall be subject to the review and approval of the City Planning Director.

Implementation of this mitigation measure will reduce impacts associated with the treatment and discharge element to a level of insignificance.

Biological Resources - Diversion Element

Impact - Locally-designated natural communities?

Alternative 2. Potentially Significant Unless Mitigation Incorporated. The diversion facility will occupy less than 400 square feet. Construction of the new diversion facility is not expected to result in removal or disturbance of substantial amount of riparian habitat. However, depending on the exact location and design of the facility, some riparian habitat disturbance may result. Considering that riparian habitat has been designated as critical primary habitat and exists in the vicinity of the proposed improvements, engineering drawings should be developed in consultation with a qualified biologist to ensure that impacts of this element of the project on riparian habitat will be avoided or minimized.

4. The final engineering drawings or construction plans depicting the precise location and design of the new diversion facility shall be developed in consultation with a qualified biologist to ensure that the improvements are sensitively placed to avoid or minimize disturbance to riparian habitat. The City Planning Director shall review and approve the drawings or plans prior submission of any application for a streambed alteration permit.

Implementation of this mitigation will reduce impacts associated with the new diversion facility to a level of insignificance.

Biological Resources - Diversion Element

Locally-designated natural communities?

Potentially Significant Unless Mitigation Incorporated. No riparian woodlands, native grasslands or other locally sensitive natural communities will be removed or otherwise affected by construction of the new diversion station, or the new pipelines along county rights-of-way. The potential new pipeline routes across agricultural fields would follow property/fence lines, farm roads, crop boundaries or other distinguishable landmarks to the extent feasible. Site-specific alignment determinations should be made in the field to assure that no areas of natural habitat are disturbed by this alternative.

Mitigation

5. The final engineering drawings or construction plans depicting the precise route of the new water pipeline shall be developed in consultation with a qualified biologist to ensure that the improvements are sensitively placed to avoid or minimize disturbance to natural habitat. The City Planning Director shall review and approve the drawings or plans prior to issuance of any city or county approvals allowing construction of the pipeline.

Implementation of this mitigation will reduce impacts associated with the conveyance facilities to a level of insignificance.

Noise

Increases in existing noise levels?

Potentially Significant Unless Mitigation Incorporated. The proposed project will result in temporary construction noises. Construction noise is considered less-than-significant because of its short duration and because it is similar in nature and duration as the existing ambient noise caused by agricultural and treatment plant equipment. There are no sensitive noise receptors in the immediate vicinity of the project site.

The only element of the project that will create noise during operation is the existing pumps located at the PWD diversion facility or the new diversion pumps.

Currently the PWD operates their pumps approximately 14 hours per day during the spring and summer months. These electric pumps create a continuing noise of less than 60 decibels during operation. No sensitive noise receptors are located in the vicinity of this facility. The proposed project would result in the operation of these pumps for up to 15 additional minutes per day, year round. This impact is insignificant.

Alternatively, a new diversion facility would be constructed in the vicinity of the existing treatment plant diversion facility. It is anticipated this facility would include substantially smaller pumps than those at the PWD diversion facility. There are no dwelling units in the vicinity of the proposed location of this facility. However, construction of this facility would result in creation of a new noise source that may adversely affect wildlife in the area. This is considered a potentially significant impact.

Mitigation

6. If Diversion Element Alternative 2 is selected, prior to initiating construction, the applicant shall demonstrate to the Planning Director that noise levels from the facility will not exceed 60 decibels at the nearest residence.

Implementation of this mitigation will reduce noise impacts associated with the new diversion facility to a level of insignificance.

Aesthetics

Have a demonstrable negative aesthetic effect?

Potentially Significant Unless Mitigation Incorporated. If Diversion Element Alternative 2 was selected, a new diversion facility would be constructed adjacent to the San Joaquin River in the vicinity of the existing outfall. This facility would be relatively small in size, however it would be visible by those using the River in the vicinity and could be considered a negative aesthetic feature, especially considering the relative lack of manmade structures in the area. This impact is considered to be potentially significant.

Mitigation

The following mitigation measure is applicable should Diversion Element Alternative 2 be selected.

7. The new diversion facility shall be designed and constructed in the least obtrusive manner possible. The construction plans for the new diversion facility shall be reviewed and approved by the City Planning Director prior to approval any permit allowing construction of the facility.

Implementation of this mitigation will reduce aesthetic impacts associated with the new diversion facility to a level of insignificance.

Cultural Resources

The project is not anticipated to result in any significant adverse impacts to cultural resources. However, the following measure should be followed due to the possibility that such resources may be present.

Mitigation

8. All employees, contractors, and subcontractors for the project shall be informed, in writing, of the possibility that paleontological or archaeological resources may be uncovered during project activities. If any such materials are uncovered during project activities, work in the area or any area reasonably suspected to overlie adjacent remains shall be stopped until professional cultural resources evaluation and/or data recovery excavation can be planned and implemented. Appropriate measures to protect finds from accidents, looting, and vandalism shall be immediately implemented.

   After they have been professionally recorded in their place of discovery, paleontological or archaeological resources shall be transferred to an appropriate regional repository for preservation, research, and/or use in interpretive exhibits.

   If human remains are discovered, the Stanislaus County Coroner shall be notified immediately. The Coroner has two working days to examine the remains and 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are Native American. The most likely descendants have 24 hours to recommend proper treatment or disposition of the remains, following the NAHC guidelines.

2.4 Shallow County Groundwater (Option 4)

The project description for this option is included in Section 1 of this SEIR. The following sections address the environmental impacts pertaining to water supply extraction and conveyance. The source of information for the following hydrologic analysis is the Brown and Caldwell report dated January 1998. This report is included herein in the following discussion.

Water Supply (Hydrology)

Environmental Setting

The area where groundwater is withdrawn from the TID for this option is the area of the TID depicted in Figures 6 and 7. More specific information on well sites is

included in the Shallow County Groundwater (Option 4) discussion in Section 1 of this SEIR.

This section describes the groundwater and surface water characteristics based on a groundwater model study. As presented in Section 1, the project area is defined as the area where the two proposed well fields would be located.

Description of the Groundwater Basin. The project area is within the Turlock Groundwater Basin. The Turlock Groundwater Basin is bounded on the north by the Tuolumne River, on the west by the San Joaquin River, on the south by the Merced River, and on the east by the Sierra Nevada foothills. Inflows into the basin include recharge from the rivers, surface water diverted from both the Tuolumne and Merced rivers and applied as irrigation water, precipitation, groundwater inflows from the foothill formations (to a small extent) and treated municipal effluent discharged into percolation ponds or used for irrigation. Outflows from the basin include agricultural, industrial, and municipal groundwater pumping, private domestic groundwater pumping for individual households, drainage pumping to regulate groundwater levels, evapotranspiration, and groundwater accretions to the rivers. Table 4 presents the approximate annual quantities of groundwater pumping during the period 1989 to 1996.

TABLE 4

Existing Groundwater Use (Acre-feet Per Year)

Use	Average	Historical range (i.e., 1989-1996)
Drainage pumping	54,875	36,000 - 86,700
TID rented wells	43,588	9,400 - 83,400
Private irrigation wells	148,975	117,400 - 184,300
Delhi Improvement District Wells	638	400 - 1,100
Eastside Private Wells	186,000	186,000
Municipal wells	33,926	31,040-37,590
Total	**468,002**	**436,350 - 509,550[1]**

[1] The minimum and maximum values do not occur in the same years

Note: Does not include private domestic well and industrial well pumping

Source: Brown and Caldwell

Surface water supplies an average of fifty-three percent of the total irrigation water applied within the basin, the majority of which originated from the Tuolumne River. A significant part of applied irrigation water percolates past the root zone to become groundwater recharge. Therefore, a majority of water in the basin groundwater system originated from the Tuolumne River.

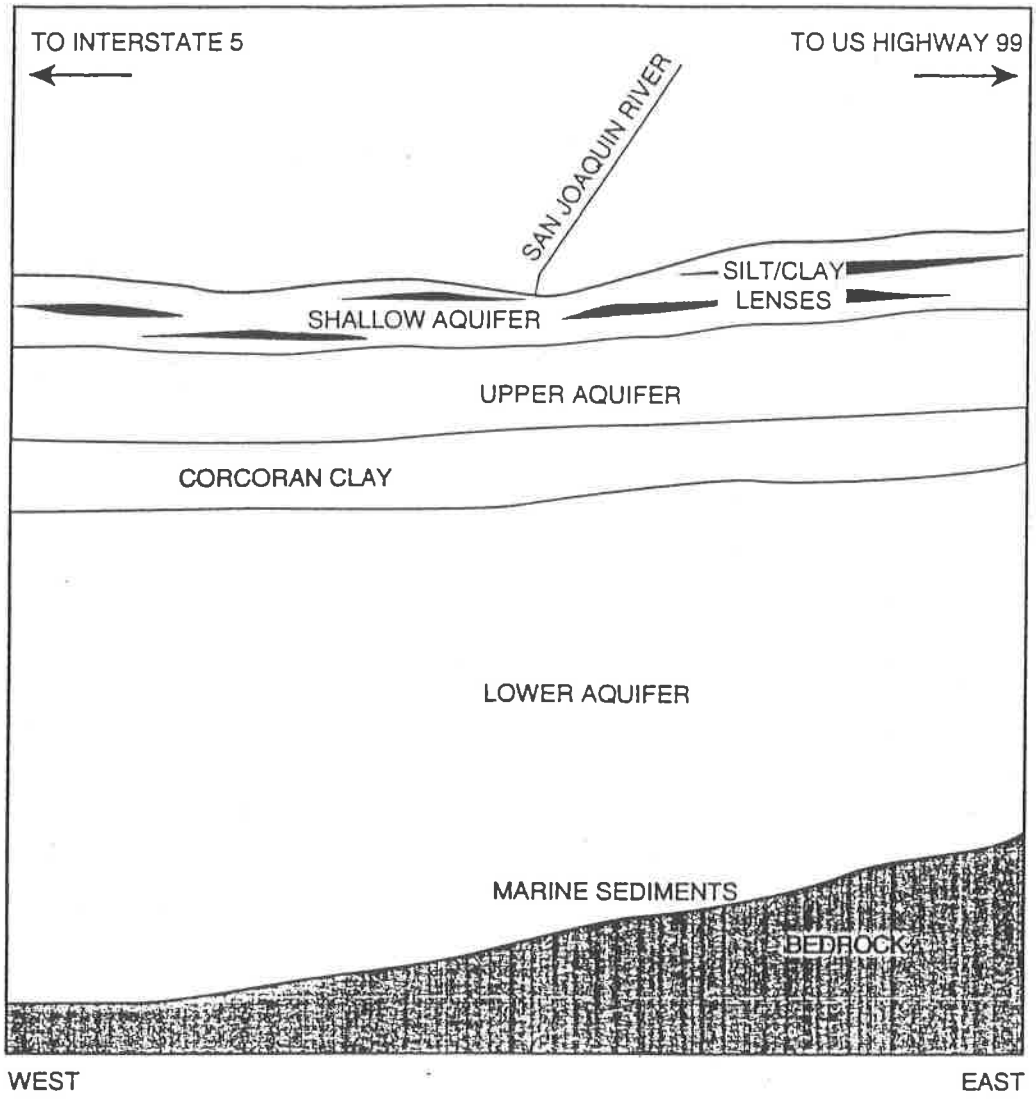
Depths to groundwater within the basin vary. Water levels in the eastern areas are in a significant state of decline. Water levels in the western areas of the basin are high to the point of requiring pumping in certain areas to keep the groundwater from encroaching into the root zone of agricultural crops. The general accretions to and depletions from the groundwater basin have resulted in a localized overdraft of between 70,000 to 85,000 acre-feet (AF) per year. The localized overdraft is occurring mainly in the eastern areas of the basin which lack a surface water supply.

Groundwater Basin Geology and Aquifers. The project area is located in the northeastern corner of the San Joaquin Valley near the center of the Central Valley geomorphic province, in the southern portion of Stanislaus County. The Central Valley is a northwest-trending structural trough that is filled with marine and continental sediments. Topography of the project area is flat with an average elevation of 60 feet above mean sea level (msl). There are three primary geologic units in the project area that control the movement of the upper groundwater: the Corcoran Clay Member of the Tulare Formation, Sierran sand, and flood-basin deposits.

The most significant controlling factor in the groundwater flow system under the project area is the Corcoran Clay layer. The Corcoran Clay acts as a divide between the upper unconfined water-bearing zone and the lower confined water-bearing zone . The Corcoran Clay, also known as the E-clay, is a low-permeable unit of lacustrine origin. It is comprised of silt and silty clay with a signature blue color. The top of the Corcoran Clay in the project area is approximately 200 feet below ground surface (bgs) and is approximately 40 feet thick.

Overlying the Corcoran Clay is the highly permeable Sierran sand. This typically 150-foot-thick unit is derived from the Sierra Nevada to the east and is comprised of medium to coarse sand. The surficial flood-basin deposits are composed of interbedded sand, silt, and clay with variable permeablilities and range in thickness from 10 to 50 feet. The finer-grained lenses that occur within the Sierran sand in the project area are thought to control shallow groundwater flow.

There are three aquifers beneath the project area. The upper unconfined to semi-confined water-bearing zone consists of two aquifers, the shallow and the upper, and the lower aquifer under the Corcoran Clay. All three aquifers are beneath the project area. Several private and improvement district wells penetrate the Corcoran Clay within the region. The three aquifers are described below and are depicted schematically on Figure 16. A more detailed description of the regional hydrologic system is described in the groundwater modeling analysis below.



Source: Brown & Caldwell

No Scale

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Diablo Grande Water Plan SEIR

Schematic of Aquifer System

Figure 16

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The *shallow aquifer* generally coincides with the occurrence of flood-basin deposits adjacent to the San Joaquin River. This aquifer is approximately 50 feet thick beneath the study area. Flood-basin deposits consist of interbedded sand, silt, and clay lenses with a much lower permeability than the sands of the upper aquifer. The shallow aquifer is the water table aquifer in the project area.

The *upper aquifer* is approximately 150 feet thick beneath the study area. The upper aquifer consists of highly permeable sands derived from the Sierra Nevada to the east. Regionally, the upper aquifer is the water table aquifer; however, closer to the San Joaquin River, this aquifer becomes semi-confined beneath the flood-basin deposits. The upper aquifer is the main source of water to existing wells in the project area. The bottom of the upper aquifer is the top of the Corcoran Clay. The Corcoran Clay, as previously discussed, acts as a confining layer between the upper and lower aquifers.

The *lower aquifer* is comprised of unconsolidated gravel, sand, silt, clay, and consolidated sandstones and shales. The lower aquifer is not typically used as a water supply source in the project area because of its higher salinity levels. The proposed project wells are not planned to penetrate the Corcoran Clay into the lower aquifer.

The groundwater basin is underlain by marine sedimentary rock. The marine rocks resulted from marine sediments which were deposited when the area contained a shallow sea. These marine rocks leak saline water into the overlying groundwater basin.

Groundwater Quality. The water quality of the Turlock Groundwater Basin generally varies from poor to good. The shallow and upper aquifer does have some occurrence of contamination related to agricultural land use. Specifically dibromochloropropane (DBCP) and nitrate have been detected in some wells. The lower aquifer is generally protected by the Corcoran Clay and has better water quality. The lower depths of the lower aquifer is characterized by highly saline water. A small amount of saline groundwater flows upward from deeply buried marine rocks beneath the groundwater basin. Deeper wells, especially near the San Joaquin River, are more likely to encounter saline water. The depth to higher salinity water is shallower near the San Joaquin River.

All of the municipal water systems which lie over the basin mostly use groundwater from the lower aquifer as their sole source of supply. Generally, the municipal water systems within the basin are able to directly use the groundwater supply with no treatment, except for disinfection. However, some municipal wells have required treatment, mainly for DBCP. Other wells have been removed from service, primarily because of higher nitrate levels.

There is more information about the water quality of the portion of the Turlock Groundwater Basin along the Highway 99 corridor, as there are numerous existing wells in this area. A review of the groundwater quality in the vicinity of the project area for this report is based on analytical results of six drainage wells near the project area, as summarized in Table 5.

TABLE 5

Analytical Results of Groundwater Samples from TID Drainage Wells

			TID Wells (Original Configuration)					TID Wells (New Configuration)		
Constituent	Units	Drinking water standard	Well 43	Well 60	Well 66	Well 77	Average	Well 53	Well 61	Average
Sodium	mg/l	NS[1]	131	98	234	159	155.50	159	259	209
Calcium	mg/l	NS	100	69	80	56	76.25	110	136	123
Magnesium	mg/l	NS	38	45	16	12	27.75	26	19	22.5
Bicarbonate	mg/l	NS	366	381	366	336	362.25	381	168	274.5
Chloride	mg/l	250[2]	218	80	310	165	193.25	245	594	420
Conductivity	mmhos/m	NS	1.28	0.87	1.59	1.07	1.20	1.25	1.93	1.6
TDS	g/l	500[2]	972	793	1,103	797	916.25	1,001	1,221	1,111
pH		6.5-8.5[2]	7.30	7.50	7.40	7.50	7.43	7.50	7.70	7.6
Phosphorous	mg/l	NS	0.25	0.20	0.38	0.37	0.30	0.33	0.20	0.27
Potassium	mg/l	NS	4.40	3.40	5.60	4.40	4.45	2.80	4.5	3.65
Nitrate	mg/l	45	72	73	40	32	54.25	55	6	30.5
Sulfate	mg/l	250[2]	42	43	51	32	42.00	31	34	32.5
Boron	mg/l	NS	0.45	0.41	0.46	0.40	0.43	0.46	0.54	0.5
Hardness	mg/l	NS	406	357	265	189	304.25	382	418	400
Arsenic	µg/L	50	5.30	9	9	8.20	7.88	3.10	4.10	3.60
DBCP/EDB	µg/L[3]	0.2	ND	ND	ND	ND	ND	ND	ND	ND

1 No standard.

2 Secondary standard, set for aesthetic, not health reasons.

3 Micrograms per liter

4 Not Detectable

Source: Turlock Irrigation District

As shown in Table 5, total dissolved solids (TDS) levels of these wells were in the 800 to 1,200 mg/l range. The secondary drinking water standard is 500 mg/l, but higher levels are allowed in certain cases. Secondary standards are set for aesthetic and consumer acceptance reasons, and not for health reasons. Chloride levels exceeded the secondary standard in two of the six wells. Nitrate levels in half of the wells exceed the primary drinking water standard, which is not unusual in Save for agricultural areas. Arsenic levels were well under the current drinking water standards. However, the standard for arsenic is currently under review, and may be reduced in the future.

A water quality review of small water systems within the TID service area was conducted in 1989 by Brown and Caldwell. Small water systems are defined as systems serving 5 to 200 connections. A small water system near the intersection of Bradbury Road and Central Avenue reported DBCP over the drinking water standard. However, water quality tests on water from drainage wells located near the project area did not show signs of DBCP contamination.

A review of the California Department of Food and Agriculture pesticide database was conducted for well test results from the 1975 to 1988 period. No record of pesticide test results was found for the project area.

In summary, for use as a drinking water supply, the water quality of the shallow and upper aquifer has several constituents of concern. Nitrate and likely, DBCP levels may exceed the primary drinking water standard. TDS would exceed the secondary drinking water standard.

Turlock Irrigation District Drainage Pumping. High groundwater levels occur in the western portion of the area served by TID including the project area. The groundwater levels rose shortly after the turn of the century when farmed acreage and applied irrigation increased dramatically. Only shallow rooted crops, as opposed to deep rooted crops such as orchards, can be economically grown in the study area due to the historically high water table.

Surface application of irrigation water over much of the San Joaquin Valley, both on the east and west sides of the San Joaquin River, has helped raise the groundwater table to within as high as one foot bgs in certain areas. The high water table adversely affects the farmability of these areas.

Drainage wells were installed by the TID as early as 1925 to manage the groundwater table. Strategically located drainage wells are systematically pumped when measured water levels reach approximately six feet bgs or higher. Drainage pumping is carried out by the TID in an effort to lower the high water table. Without drainage pumping, the area would be unsuitable for most agricultural uses. Drainage water pumped during the irrigation season is discharged into TID's canal system where it becomes available for irrigation. Unused water is ultimately discharged to the San Joaquin River via the TID system of canals and drains.

The TID monitors groundwater levels seasonally using a network of shallow monitoring wells located at section corners. As an example of groundwater levels, Figures 17 and 18 depict the groundwater levels in the vicinity of the project area. As depicted on the figures, groundwater in the project area was five to 11 feet bgs during December 1994 and four to six feet bgs in July 1995. Historical groundwater data for the 1980 to 1995 period shows that groundwater levels have varied from zero to 14 feet bgs in the project area. Groundwater tends to be closer to the surface during the summer months, and deeper during the winter months. December and July generally represent the level of groundwater at its minimum and maximum elevations, respectively. Likewise, groundwater levels generally tend to be higher during "wet" years and lower during "dry" years. Even with these seasonal and annual variations, drainage pumping is normally needed to reduce the potential for adverse impacts to crops due to high groundwater levels.

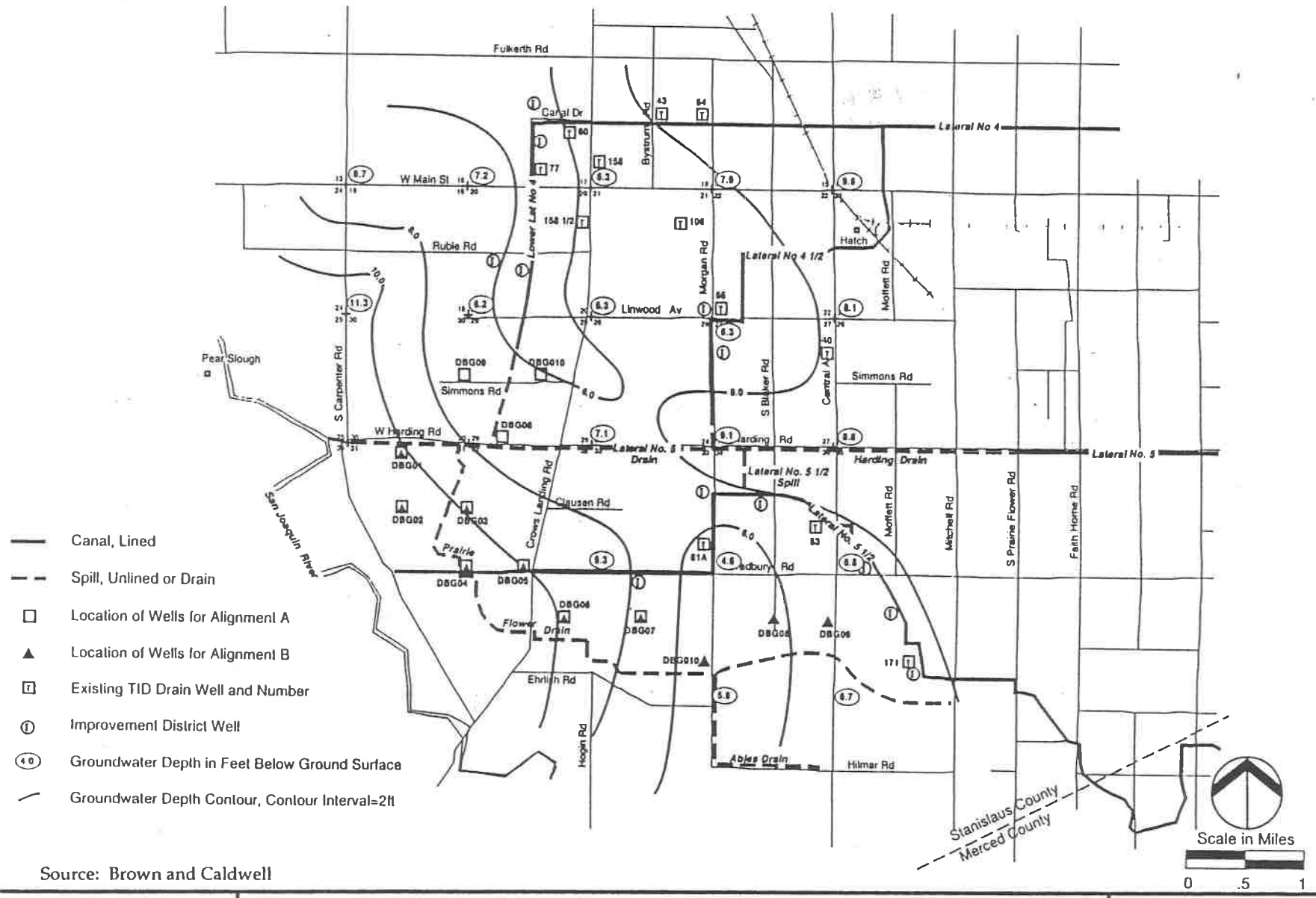
The shallowest groundwater occurs in the area around the intersection of Bradbury and Morgan roads. Groundwater in this area is typically three to four feet bgs during the summer (July) and five to six feet bgs during the winter months (December). The deeper groundwater is on the western side of the well fields near the intersection of Harding and Carpenter roads. In this area groundwater typically varies from eight to 14 feet bgs.

Improvement District Wells. Landowners within the TID are authorized by law to form improvement districts to acquire, construct, operate, and maintain wells and other irrigation ad drainage facilities for the benefit of their lands. The Board of Directors of the TID are the trustees of all TID improvement districts. Improvement district wells act as irrigation supply wells on an "as needed basis" for the land owners within each improvement district.

Improvement districts wells are occasionally rented by TID upon approval of the improvement district land owners to supplement surface water deliveries. This water is pumped into the canal system for deliveries to irrigators downstream. No improvement district wells are proposed for use for the Diablo Grande supply project. However, due to their proximity to the proposed well field, certain improvement district wells are potentially impacted by the project. Figure 19 depicts the locations of existing wells in the project area.

Private Irrigation Wells. There are also privately owned and operated irrigation supply wells located within the project area. These wells are owned and operated by individual farmers for use on their land. Privately owned wells are occasionally rented by the TID to supplement surface water deliveries. No private wells are proposed for use for the Diablo Grande supply project. However, due to their proximity to the proposed well field, certain private irrigation wells are potentially impacted by the project.

Private Domestic Wells. There are several private residences located within and near the project area which are supplied drinking water from domestic wells. These domestic wells are privately owned and operated. The locations and characteristics of each private domestic well are not know.



Source: Brown and Caldwell

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Shallow Aquifer Depth to Groundwater December 1994

Figure 17

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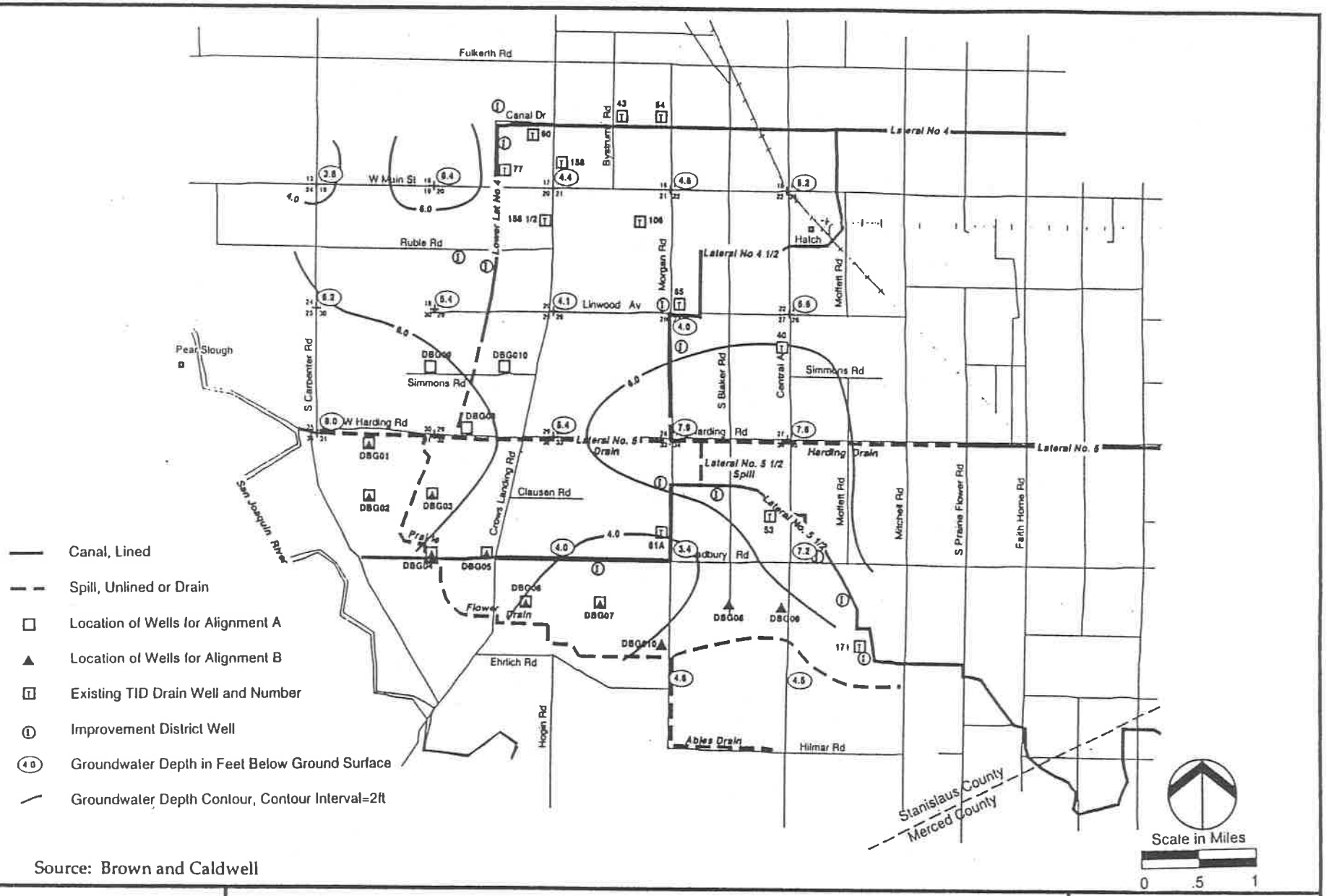

Source: Brown and Caldwell

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Shallow Aquifer Depth to Groundwater July 1995

Figure 18

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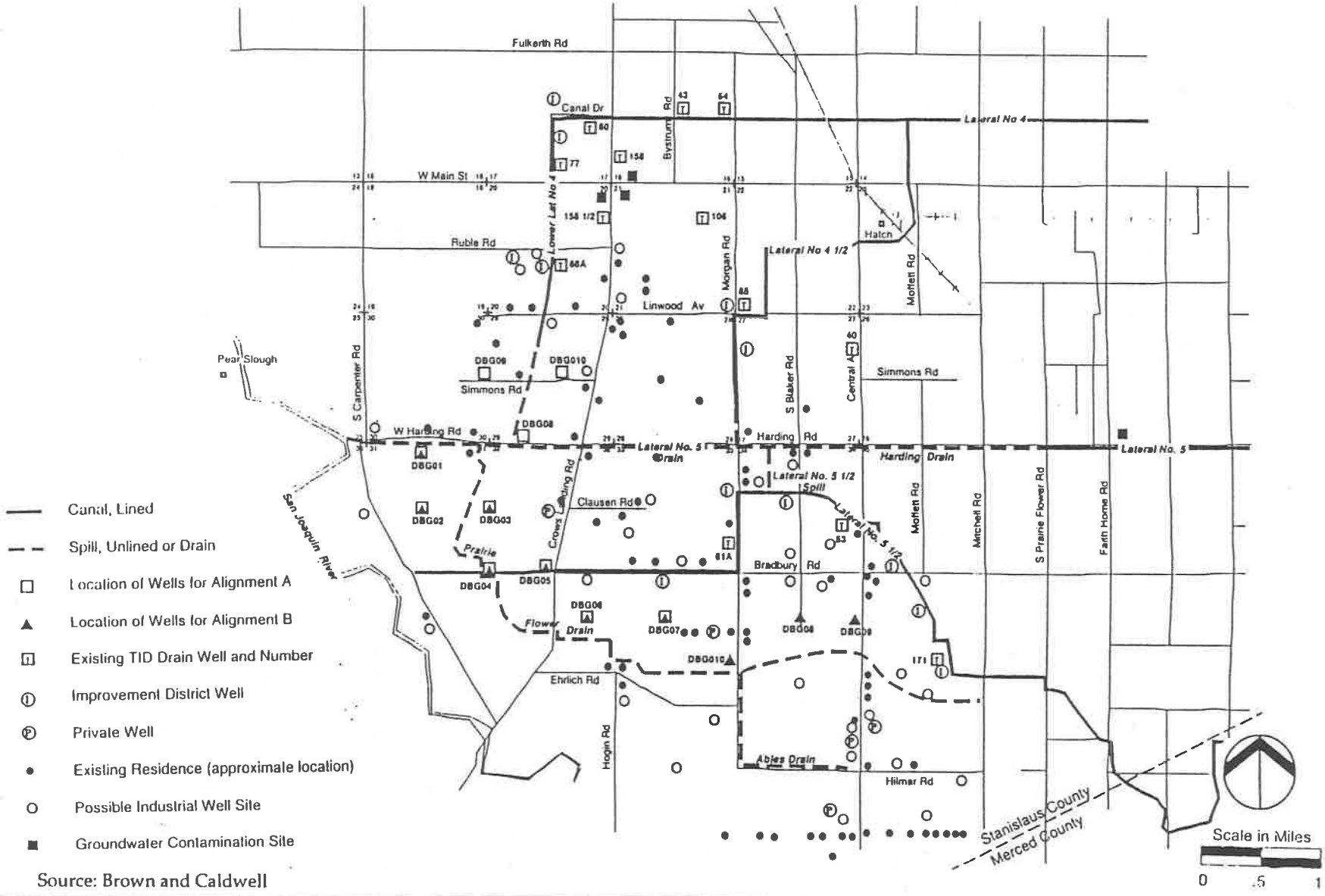

Source: Brown and Caldwell

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Existing and Proposed Wells

Figure 19

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A field survey conducted by the TID identified the approximate location of private residences within the area which likely are supplied by individual private wells. Figure 19 depicts the locations of these identified private residences. Due to their proximity to the proposed well fields, certain wells are potentially impacted by the project.

Industrial Wells. In the general project area, there are dairies and chicken ranches that use groundwater in their operations. The approximate location of these facilities are shown in Figure 19. In addition, there is a tallow plant located in the project area near the intersection of Harding Drain and Carpenter Road. Though not known for certain, the plant most likely uses groundwater in its operations. The locations and characteristics of each industrial well is not known. Figure 19 also depicts the approximate location of industries within the project area that could potentially use groundwater. No industrial wells are proposed for use for the Diablo Grande project. However, due to their proximity to the proposed well field, certain industrial wells are potentially impacted by the project.

Surface Water Characteristics. The regional surface water system includes the Tuolumne River to the north, the San Joaquin River to the west, and the Merced River to the south. The Merced and Tuolumne rivers flow into the San Joaquin River from the east. Figure 6 indicates the location of these rivers. Intermittent and perennial streams flow into the Tuolumne and Merced rivers primarily in the upper reaches of their respective watersheds. Surface water flow in the project area is limited to irrigation canals and ditches.

The surface water available to growers within TID is based on the runoff each year coupled with the District's share of carry-over storage from Don Pedro Reservoir. The District supplements its surface water supply with groundwater to satisfy crop water requirements, the extent of which varies from year to year depending on the availability of surface water. The TID pumps groundwater directly into the canals from both TID owned drainage wells and rented wells for distribution to users within its irrigation service area.

The water delivery system is made up of a network of canals, pipelines, and ditches, which include TID owned and operated facilities, as well as private and improvement district facilities. The primary canal system, owned and operated by the TID, is comprised of mainly lined canals, also known as laterals, and unlined drains. In some cases, portions of these canals have been piped to allow for urban development. Water then flows from the TID laterals into private or improvement district pipelines or ditches and is conveyed to the land where it is used for irrigation. At the end of the canal system, water that was unable to be used for irrigation is spilled from the canal either directly into the river, or into unlined drains which convey the water to the river. In addition, there are lift pumps located along these drains which return portions of the water in the drain back to the land to be used for irrigation.

Several lined irrigation canals transverse the project area including Lower Lateral 4 and Lateral 41/2, the Harding Drain, and 51/2. In addition, the Harding Drain and Prairie Flower Drain are located in the project area. Figures 8 and 9 indicate the location of these TID facilities.

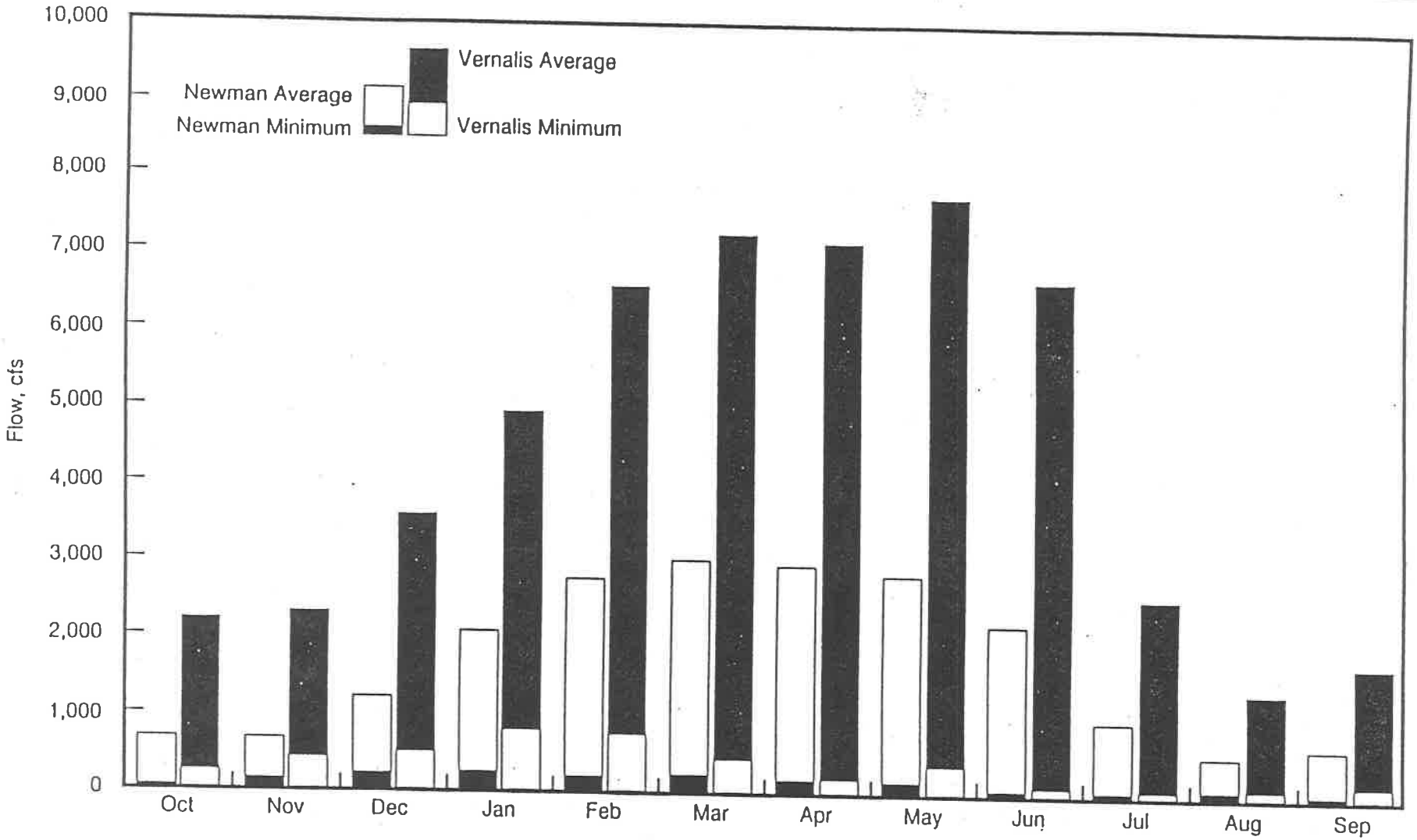
Both Harding Drain and the Prairie Flower Drain run through the project area and ultimately discharge to the San Joaquin River. The principal sources of water flowing into these drains are: operational spills from the TID canals (which includes surface water, drainage water pumped from TID drainage pumps, and groundwater pumped from rented wells), treated effluent from the City of Turlock (Harding Drain only), storm water flows from the cities and Sand Creek area (during the rainy season - the Harding Drain only) and tail water from local farms. In addition, if the water table is higher than the water level in the drain, there are groundwater accretions into the drain.

Conversely, if the water table is below the water level in the drain, water seeps out of the drain to provide groundwater recharge. Lastly, there are several private and TID owned lift pumps that return portions of the water in the drain back to the lands to be used for irrigation.

San Joaquin River. The San Joaquin River flows in the vicinity of the project area can be characterized by the nearest upstream and downstream USGS gaging stations with long term flow records. The upstream USGS gaging station is near Newman (Station #11274000) and measures inflow from the entire upstream San Joaquin River basin including inflow from the upper San Joaquin and Merced rivers. No major tributaries influence the flow of the San Joaquin River between the study area and this gaging station. The mean flow for the 1912 to 1996 period of record for the Newman gaging station is 2,020 cfs or 1.46 million acre feet per year. The downstream gaging station is near Vernalis (Station #11303500) which measures inflow from the upper San Joaquin, Merced, Tuolumne, and Stanislaus rivers.

The San Joaquin River flow is characterized by large seasonal variations, as well as year to year variations. The flow in the San Joaquin River is strongly influenced by the operation of various reservoirs which are located upstream on the San Joaquin River and every major tributary. The highest flows occur during the winter and spring months. The winter months are the area's rainy season, with snowmelt runoff from the Sierra Nevada range causing the early summer high flows. Annual variations in flows are caused by the historical pattern of occasionally wet versus dry years. Figure 20 depicts the average and minimum monthly river flows for the two gaging stations.

The Tuolumne, Merced, and San Joaquin rivers are connected hydrologically to the groundwater basin. The San Joaquin River generally gains flow due to groundwater accretion. The estimated net gain to San Joaquin River flow is approximately 20 cfs between the Merced River and the Tuolumne River. The net gain is estimated to vary from three cfs during the winter (January to March) to spring (April to June) seasons to 27 cfs during the summer (July to September) to fall (October to December) seasons.



Note: Newman Station 11274000. Monthly mean water years 1944-1995.
Vernalis Station 11303500. Monthly mean water years 1924-1995.

Source: Brown & Caldwell

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Average and Minimum Monthly Flow in the San Joaquin River

Figure 20

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Discharges from the TID drains adds flow to the San Joaquin River. These discharges include operational spills, treated effluent from the City of Turlock (via Harding Drain only), tail water from local farms, storm water flows from the cities and the Sand Creek area (during the rainy season only), and groundwater seepage.

Federal Energy Regulatory Commission (FERC). The lower Tuolumne River is regulated by the Don Pedro Project, located upstream of the town of La Grange. The Don Pedro Project supplies irrigation and municipal water and provides hydroelectric, flood control, recreation, and fish benefits. The project is owned 68.46 percent by TID and 31.54 percent by the Modesto Irrigation District (collectively referred to as Districts). TID is the project manager. The two Districts have a combined annual water demand which ranges between 900,000 acre-feet and 1,100,000 acre-feet for irrigation and municipal and industrial purposes with the higher diversions occurring during the drier water years. Water and reservoir storage are allocated between the Districts based on the 68.46 percent/31.54 percent split. The reservoir has a gross storage capacity of 2,030,000 acre-feet and a net usable storage capacity of 1,721,000 acre-feet with the balance consisting of 309,000 acre-feet of dead storage (FERC 1996).

The Don Pedro Project was licensed by the Federal Power Commission, predecessor to the Federal Emergency Regulatory Commission (FERC), in 1964, the license was accepted by the Districts in 1966, and commercial operation began in 1971. Article 37 of the project's license set forth the minimum instream flows for fish purposes and also provided for a limited license reopener after the first twenty years of project operation to reconsider the minimum instream flow requirements. Article 39 of the project's license required the Districts, in cooperation with the California Department of Fish and Game and the Secretary of the Interior, to "make necessary studies aimed at assuring continuation and maintenance of the fishery of the Tuolumne River in the most economical and feasible manner." The fishery of concern is San Joaquin fall-run Chinook salmon.

In December 1992, the FERC instituted its proceeding under Article 37 by reopening the license for the limited purpose of reassessing the required minimum fish instream flows. To resolve the many issues involved, FERC initiated its first ever mediation process.

The mediation successfully resulted in a settlement agreement among all of the participants. The settlement agreement provided for significantly higher minimum flows to protect salmon in the lower Tuolumne River, monitoring of fish resources under the new instream flow regime, and implementation of other fish habitat and adaptive management changes.

The agreement was submitted to the United States Fish and Wildlife Service (USFWS) for consultation under Section 7 of the Endangered Species Act and the USFWS issues a Biological Opinion finding that the proposed minimum flows would have no adverse impact on threatened and endangered species or their habitat. On July 31, 1996, the FERC issued an order approving the higher negotiated

minimum instream flow requirements and the additional fish monitoring requirements. The FERC approval of the new requirements also triggered implementation of additional mitigation requirements under the settlement agreement. The Districts began implementing the new fish flows on August 1, 1996.

Minimum instream flow requirements under the original Article 37 have varied between 40,123 acre-feet (Water Year 1988-1989) and 123,210 acre-feet per water year; the instream flow requirement was suspended for Water Year 1976-1977, the driest water year of record. The new FERC flows will vary from 94,000 acre-feet to 300,923 acre-feet per year. Refer to Table 6.

Water year classifications will be determined using the San Joaquin Basin Index and the California Department of Water Resources (DWR) April 1 San Joaquin Valley unimpaired runoff forecast, both of which are published each year in DWR Bulletin 120-3, *Water Conditions in California, Report 3*. The new fish flow water year will start on April 15, instead of October 1, of each year.

The FERC flows are minimum instream flows, so the actual flows, especially in the 50 percent wetter water years, can be significantly greater. A good comparison of the increase in flows under the settlement agreement is between the actual flows in the Tuolumne River at La Grange during June, July, August, and September during the 50 percent driest years since 1971 (the year New Don Pedro became operational) with the new FERC flows for those four months. Table 7 shows the additional water which would have been provided under the settlement agreement had the settlement agreement been in effect for the years shown. The additional water during these dry years varies from 11,473 acre-feet to 38,473 acre-feet for the four-month period. TID will be providing 68.46 percent of the additional water.

These increased flows can be anticipated to be experienced all the way to the mouth of the Tuolumne River. Unlike many rivers, the Tuolumne River is a gaining river because of return surface water flows and groundwater accretions (HCI 1998).

Project Analysis

Groundwater Modeling. To determine the potential impact of supplying TID drainage water for use by Diablo Grande, a three-dimensional groundwater flow model was used to evaluate the impacts of the two alternative well alignments on groundwater levels, groundwater salinity, and groundwater accretion to the San Joaquin River. The hydrological impacts of each well alignment were compared to a simulation of future groundwater levels and river flows without the project.

The model projects groundwater levels and river flows for each year of the project, from the estimated initial phase-in in 1998 until six years past the anticipated project buildout (the year 2028). The model is explained below.

TABLE 6

FERC Flow Schedule

Schedule Occurance	Days	Critical below 6.4%	Median Critical 8.0%	Intermed-iate C-D 6.2%	Median Dry 10.8%	Intermed-iate D-BN 9.1%	Median Below Normal 10.3%	Intermed-iate BN-AN 15.5%	Median Above Normal 5.1%	Intermed-iate AN-W 15.4%	Median Wet/Max-imum 13.3%
October 1-October 15	1-15	100 cfs 2,975 ac-ft	100 cfs 2,975 ac-ft	150 cfs 4,463 ac-ft	150 cfs 4,463 ac-ft	180 cfs 5,355 ac-ft	200 cfs 5,950 ac-ft	300 cfs 8,926 ac-ft	300 cfs 8,926 ac-ft	300 cfs 8,926 ac-ft	300 cfs 8,926 ac-ft
Attraction Pulse Flow		none	none	none	none	1,676 ac-ft	1,736 ac-ft	5,950 ac-ft	5,950 ac-ft	5,950 ac-ft	5,950 ac-ft
October 16-May 31	228	150 cfs 67,835 ac-ft	150 cfs 67,835 ac-ft	150 cfs 67, 835 ac-ft	150 cfs 67,835 ac-ft	180 cfs 81,402 ac-ft	175 cfs 79,140 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135, 669 ac-ft
Outmigration Pulse Flow		11,091 ac-ft	20,091 ac-ft	32,619 ac-ft	37,060 ac-ft	35, 920 ac-ft	60,027 ac-ft	89,882 ac-ft	89, 885 ac-ft	89,882 ac-ft	89,882 ac-ft
June 1-Sept. 30	1-22	50 cfs 12,099 ac-ft	50 cfs 12,099 ac-ft	50 cfs 12,099 ac-ft	75 cfs 18,149 ac-ft	75 cfs 18, 149 ac-ft	75 cfs 18,149 ac-ft	250 cfs 60, 496 ac-ft	250 cfs 60,496 ac-ft	250 cfs 60, 496 ac-ft	250 cfs 60,496 ac-ft
Volume (ac-ft)	365	94,000	103,000	117,016	127,507	142,502	165,002	300,923	300, 923	300, 923	300,923

C = Critical; D = Dry; BN = Below Normal; AN = Above Normal; W = Wet

Source: Turlock Irrigation District

TABLE 7

Difference Between New Tuolumne River Minimum Flow Requirements and Modeled Actual Flows

Year	Months June - Sept.						
	June	July	August	September	Total	602020 Index	Classification
1977	2,827	2,921	2,921	2,827	11,497	838,770	Critical Water Year and Below
1988	2,821	2,915	2,915	2,821	11,473	1,476,178	Critical Water Year and Below
1990	2,831	2,924	2,924	2,831	11,511	1,514,587	Median Critical Water Year
1992	2,964	3,059	3,059	2,964	12,046	1,557,439	Median Critical Water Year
1976	2,956	3,050	3,050	2,956	12,012	1,588,133	Median Critical Water Year
1987	3,641	3,734	3,734	3,641	14,752	1,861,362	Median Critical Water Year
1991	3,894	3,988	3,988	3,694	15, 765	1,955,459	Median Critical Water Year
1989	3,910	4,004	4,004	3,910	15,830	1,963,675	Median Critical Water Year
1994	3,031	3,124	3,124	3,031	12,312	2,035,560	Intermediate C-D Water Year
1972	3,492	3,585	3,585	3,492	14,154	2,158,968	Intermediate C-D Water Year
1985	4,305	4,446	4,446	4,305	17,505	2,403,226	Intermediate D-BN
1981	4,548	4,691	4,691	4,548	18,479	2,442,155	Intermediate D-BN
1971	9,547	9,690	9,690	9,547	38,473	2,885,824	Median Below Normal

Note: The reason the table is not listed in chronological order is because it is based on dry to wet years as measured in acre-feet per year.

Source: EMC Planning Group Inc.

The groundwater model study area includes an area larger than the immediate vicinity of the project wells in order to include all of the likely hydrological impacts. The geographic boundaries of the study area--extending to the Tuolumne River on the north, the San Joaquin River on the west, the Merced River on the south, and the Sierra Nevada foothills on the east–include the entire local groundwater system, as well as the hydraulic interactions between the groundwater system.

The model accounts for pumping by all significant groundwater users, groundwater recharge based on the agricultural uses of surface water and agricultural uses of groundwater, the consumption of irrigation water and precipitation, the hydraulic characteristics of the aquifers and aquitards, and the current knowledge of the hydraulic characteristics of the boundaries of the groundwater system. The proposed groundwater pumping for the Diablo Grande project is based on the gradual increase of annual pumping starting in 1998, with the full 11,000 acre-feet per year being reached in 2022. The model also includes assumptions for TID canal deliveries and Tuolumne, Merced, and San Joaquin river flows. The following list presents the various input elements which were used to develop the model.

- TID drainage well pumping
- TID rented well pumping
- TID private pumping
- Delhi Improvement District pumping
- Eastside pumping
- Municipal pumping
- TID and Merced Irrigation District canal deliveries
- Crop distribution
- Precipitation
- Pan evaporation
- Irrigated acreage
- River flows
- Diablo Grande pumping
- Permeability, specific storage, and specific yield

Two climate scenarios (Scenario A and Scenario B) for the 1997 to 2028 period were modeled for each of the two well field alignments. The two climate scenarios simulate the two most recent droughts experienced in California: the 1976-77 and 1987-92 droughts. The 1976-77 drought represents the drought of record with the

largest single-year water supply deficit. The 1987-92 drought is the drought of record for the Tuolumne River basin with the largest multi-year cumulative water supply deficit. These droughts were simulated by using the historical rainfall data represented by these droughts, as well as the data corresponding to the preceding and subsequent years. In the model, the year 2025 corresponds with the last year of the two assumed drought scenarios. The year 2028 corresponds to drought recovery. For example, in Scenario A, rainfall data for 1977 are used for 2025, and rainfall data for 1980 (a year of above average rainfall) are used for 2028. The droughts are assumed to occur after full buildout, in order to identify the potential worst case impacts. Additionally, the two scenarios also include minor droughts in the middle of the study period.

The two scenarios were designed to determine what would happen if history repeated itself for those two scenarios. The reason that the droughts were established near the end of the scenarios was because the proposed project would be at full build out and would be using maximum water supplies. Therefore, the scenarios evaluated the worst case scenario.

The groundwater model was calibrated to historical groundwater levels for the 1952 to 1996 period. For this study, the groundwater model is used to predict relative project impacts. Each well field alignment and climate scenario is compared to the baseline condition with no project. For the shallow aquifer, the prediction error is about +2 feet for a water level change of 10 feet. For the upper aquifer, the prediction error is about +5 feet for a water level change of 20 feet.

Groundwater Modeling Results. The impacts of the two proposed well alignments were evaluated using the groundwater model for the two defined scenarios. Scenario A represents the 1976 to 1977 drought superimposed near the end of the 1997 to 2028 study period. Scenario B represents the 1987 to 1992 drought superimposed near the end of the 1997 to 2028 study period. The model accounts for TID reducing historical groundwater pumping in conjunction with the increased pumping associated with the proposed project.

Reduction in Drainage Pumping by the TID. Integral to Diablo Grande's groundwater pumping will be a reduction in the drainage pumping needed to lower the groundwater table, as a result of the positive impact project pumping will have on groundwater levels. The groundwater pumping model was used to quantify the maximum amount drainage pumping could be decreased while still providing groundwater levels at least six feet below ground surface. It is anticipated that during the initial years of the project, when project related groundwater pumping is relatively low, drainage pumping reduction would be less than indicated by the model. It is anticipated that reduced drainage pumping would not occur until monitoring by the TID indicates the need to do so. The maximum annual reduction in drainage pumping ranges up to 4,850 acre-feet per year.

Impacts to San Joaquin River Flows. The groundwater model was used to simulate the flows in the San Joaquin River both with and without the project. The difference in flows is defined as the impact of the project. The flows were modeled on a

quarterly, or seasonal basis. For example, for modeling purposes, winter refers to January through March, spring refers to April through June, etc.

Figure 21 depicts the impact as a percent of river flow for each of the two well alignments and two climate scenarios.

Based on the groundwater modeling of the quarterly river flows, for well Alignment A, Scenario A, river flows in the San Joaquin River, between the Merced and Tuolumne rivers, would be reduced in the range from 5.8 to 9.8 cfs during the last six years of the study period (2023 to 2028). This would represent a flow reduction impact of 0.15 to 1.99 percent. Under Scenario B, groundwater accretions would be reduced from 6.2 to 10.4 cfs, which would represent an impact of 0.09 to 5.74 percent.

For well Alignment B, Scenario A, groundwater accretion would be reduced from 4.8 to 7.2 cfs, which would represent an impact of 0.12 to 1.41 percent. Under Scenario B, groundwater accretion would also be reduced by 4.9 to 7.9 cfs, which would represent an impact of 0.07 to 4.18 percent.

In summary, the maximum impact on accretion to the San Joaquin River flows relative to both well alignments and both climate scenarios would be in the 4.8 to 10.4 cfs range, with distinct variations seasonally and annually. The greatest impacts in terms of percent of river flow would be during the summer and fall months for a three month period of time, during the fall of one year. As can be seen in Figure 21, the extended drought (Alignment A, climate Scenario B) would result in the greatest flow impact in terms of percent of San Joaquin River flow (up to 5.74 percent). Well Alignment A would have greater proportional flow impact than well Alignment B. This is likely because well Alignment B would have several wells located a farther distance from the San Joaquin River.

Impacts to Prairie Flower Drain. The groundwater model was used to account for the interaction of drain flow with the groundwater system and for the relationship between drain flow and depth. The depth in the Prairie Flower Drain was computed for a location approximately one-third of a mile south (upstream) of the crossing with the crossing with the Lateral 5½ spill. The model did not account for the tail water flows from local farms or the potential interaction with spills from Lateral 5½. These additional flows may result in decreased impacts to the water levels in the drain.

The model results indicates that for well Alignment A, for both climate scenarios, water levels would be slightly reduced in this drain, but the drain would still contain flow.

For well Alignment B with climate Scenario A, the modeling shows that the drain would have no flow attributable to groundwater for the last seven years of the study period. For climate Scenario B, there would be intermittent drying of this drain. Depending on the quantity and timing of surface water inflows (e.g., local tailwater runoff from irrigated fields and inflow from adjoining drainage channels), the

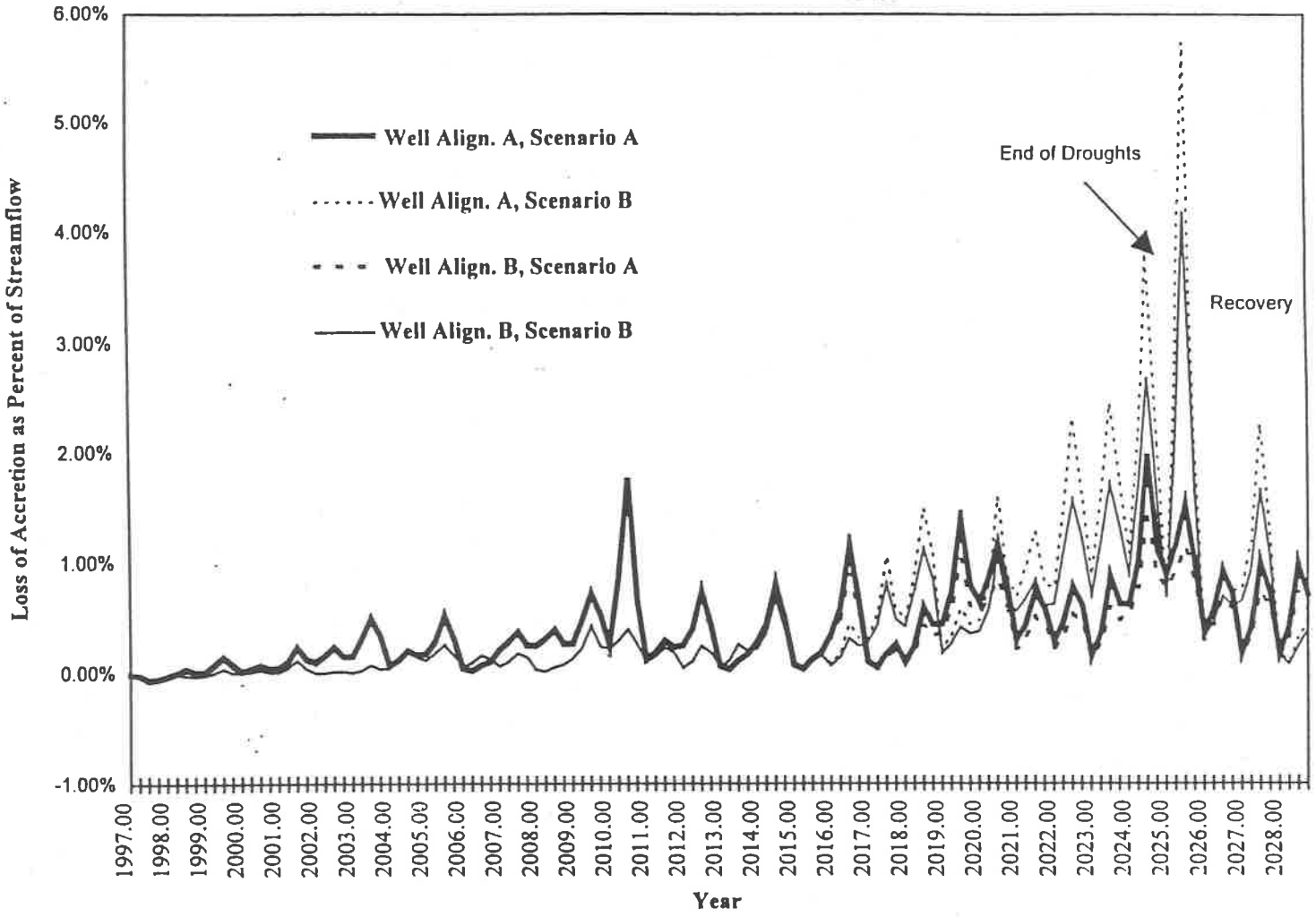
reduction of groundwater accretion during a prolonged drought could either have no substantial effect, or could result in intermittent or seasonal desiccation, in this section of the Prairie Flower Drain.

Impacts on Groundwater Levels. The model was used to simulate groundwater levels both with and without the project. The change in groundwater levels that would result from the project is defined as the groundwater level impact. Groundwater level impacts were defined for both the upper aquifer and the shallow aquifer, and were found to increase with time with project buildout. The groundwater level impacts would be largest after the assumed droughts, which is also after the time when water supply for Diablo Grande reaches its maximum rate of 11,000 acre-feet per year.

The modeling results show that the groundwater impacts for the two well alignments and two climate scenarios would be approximately similar. Table 8 presents the groundwater impacts at the end of the study period. The primary difference between the two well alignments is that well Alignment B results in a cone of depression which is spread over a larger area. Groundwater level impacts for each of the two well alignments and climate scenarios, for both the shallow and upper aquifers are depicted on Figures 22 to 29. These figures depict the projected change in groundwater levels resulting from the proposed project. The impacts to groundwater levels would not be instantaneous, but would increase gradually over time as the project reaches full buildout. After a drought period, it can be expected that some recovery of groundwater levels would occur. Figures 30 and 31 depict the groundwater levels for well Alignments A and B with climate scenario B applied in both alignments, as well as the no project groundwater level for the study period, whereupon the TID continues its historical drainage pumping.

The proposed project would reduce groundwater levels in the vicinity of the well field. Groundwater levels are anticipated to drop an additional 18 to 19 feet at the center of the well field, and by up to approximately 2 feet two miles from the center of the well field during and following an extended drought. As indicated in the table, depending on which well alignment and drought scenario, the area of impact with groundwater levels greater than four feet range from 4,600 acres to 7,000 acres. The impact would be gradual overtime as the project reaches buildout. This decline in groundwater levels could reduce the capacity of existing domestic, industrial and irrigation wells.

The proposed project would result in an increased drop in water levels for both the shallow and upper aquifers. The impact on the shallow aquifer would be beneficial because it would improve irrigation drainage in the area. Since most wells in the area use the upper aquifer as the source of supply, reducing impacts to the upper aquifer would be the focus of mitigation measures.



Source: Brown and Caldwell

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Loss of Acretion as Percent of Streamflow Above Tuolumne River

Figure 21

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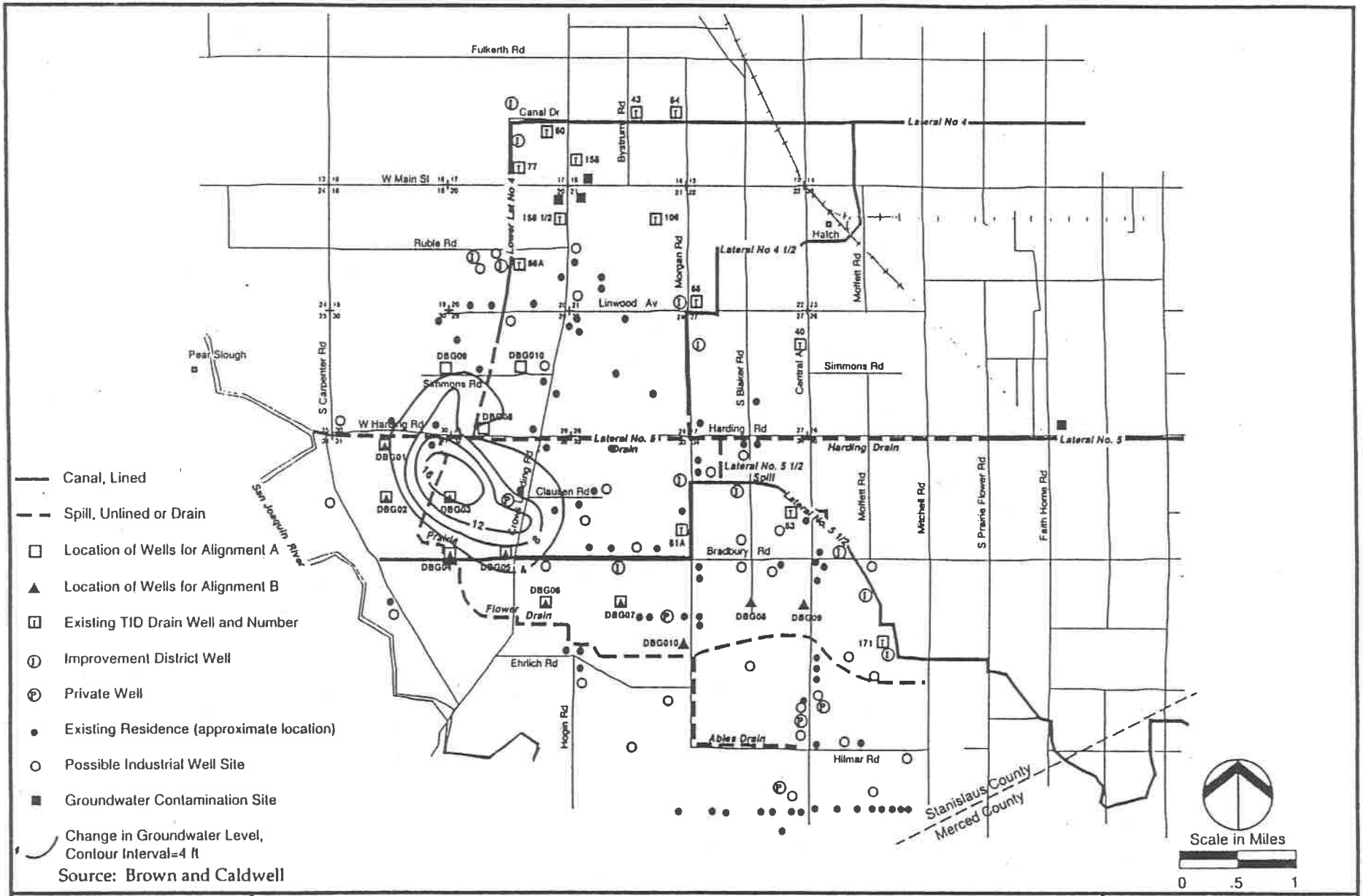

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Estimated Changes in Groundwater Levels in Shallow Aquifer Well Alignment A. Climate Scenario A. Summer 2028

Figure 22

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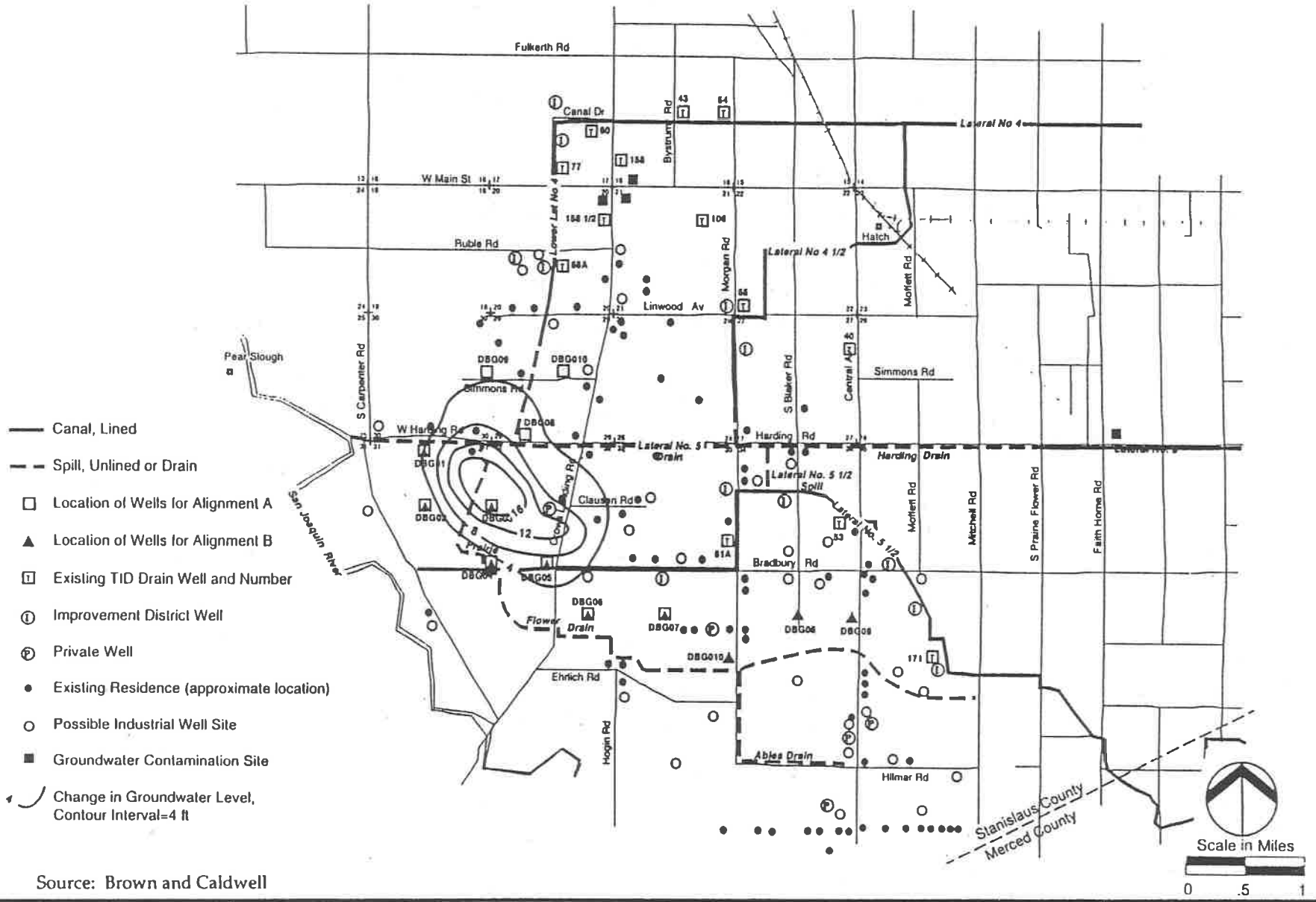

Source: Brown and Caldwell

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Estimated Changes in Groundwater Levels in Upper Aquifer Well Alignment A. Climate Scenario A. Summer 2028

Figure 23

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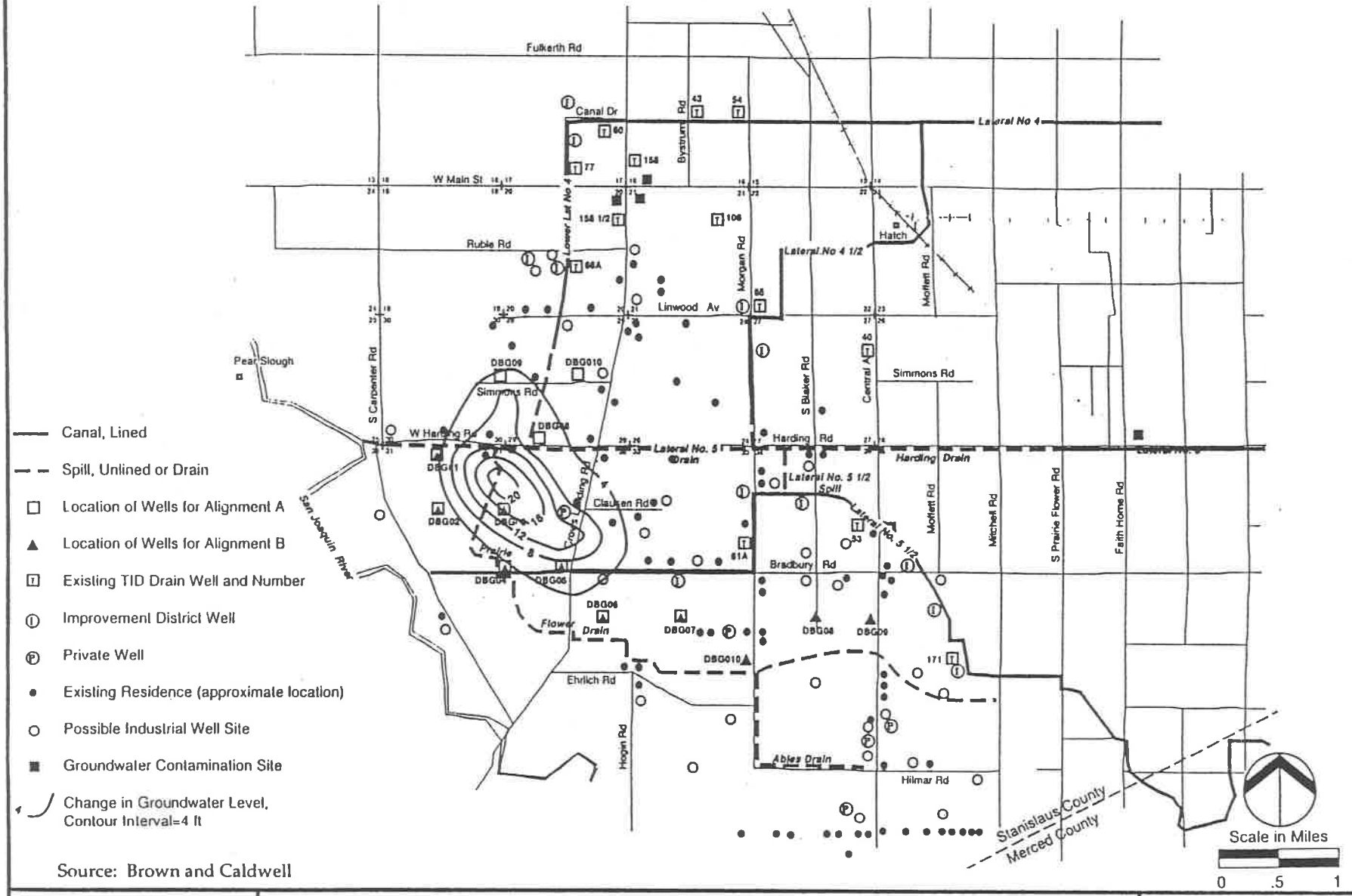

Source: Brown and Caldwell

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Estimated Changes in Groundwater Levels in Shallow Aquifer Well Alignment A. Climate Scenario B. Summer 2028

Figure 24

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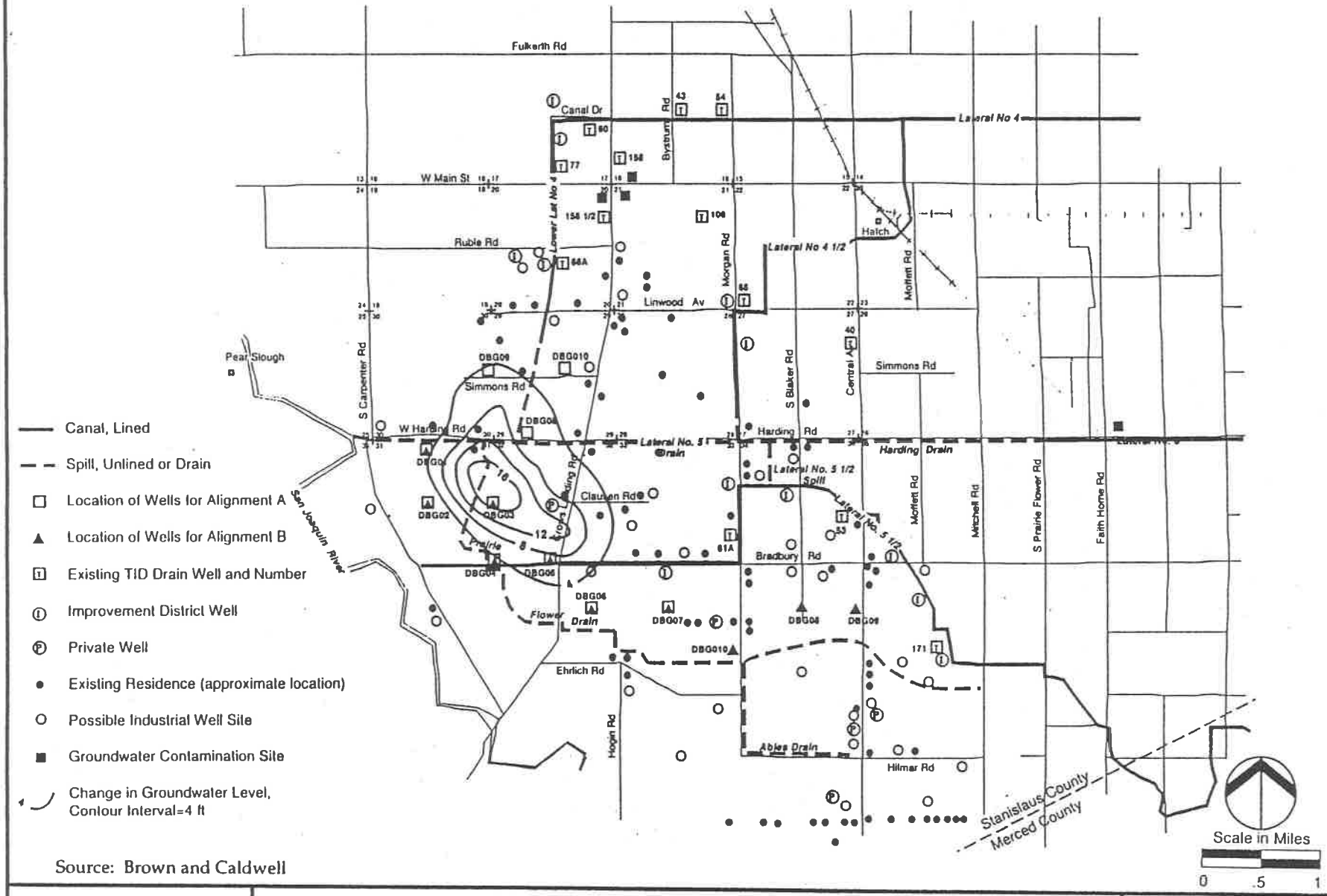

Source: Brown and Caldwell

EMC Planning Group Inc.
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Diablo Grande Water Plan SEIR
Estimated Changes in Groundwater Levels in Upper Aquifer Well Alignment A. Climate Scenario B. Summer 2028

Figure 25

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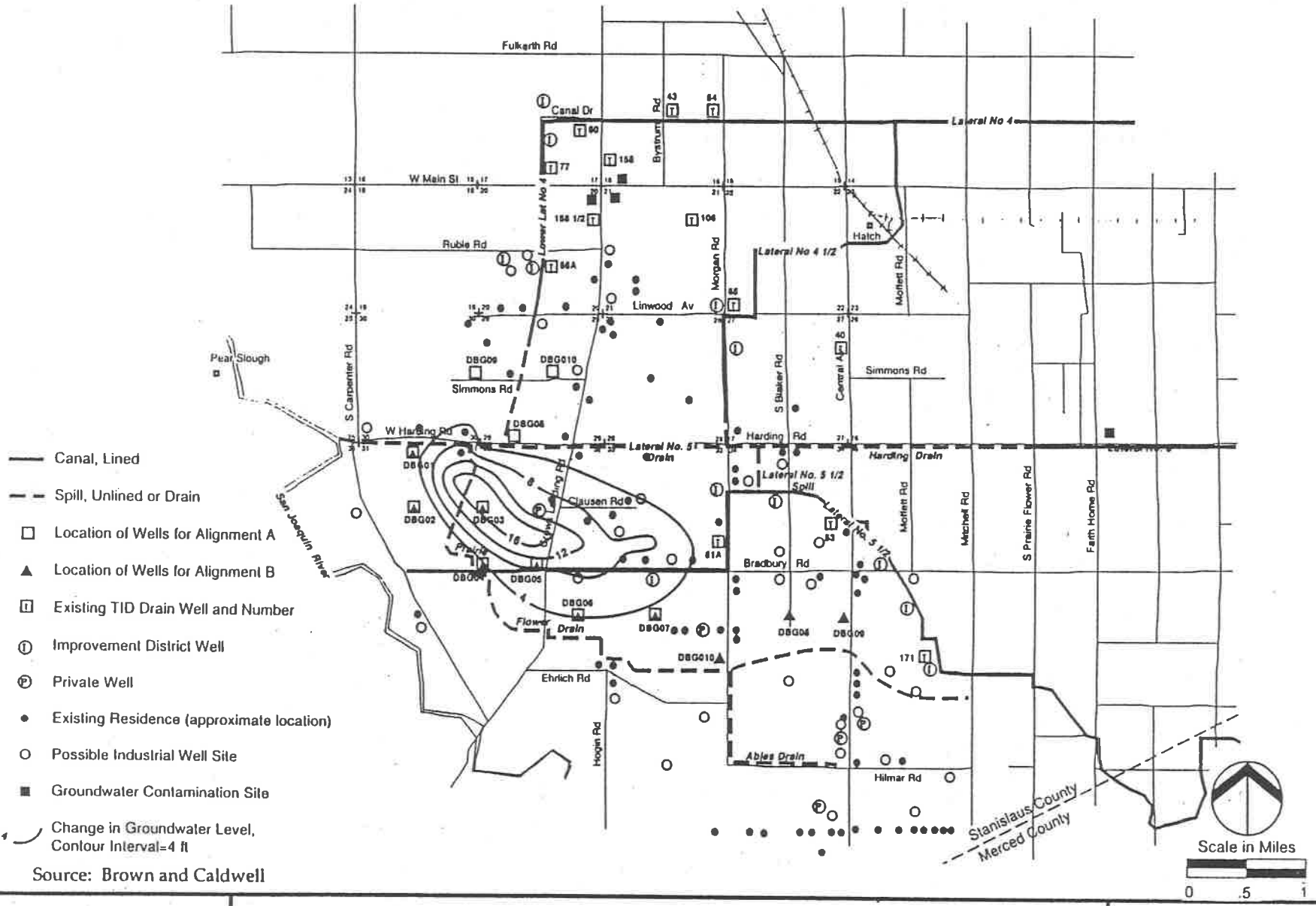

EMC Planning Group Inc.
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Diablo Grande Water Plan SEIR

Estimated Changes in Groundwater Levels in Shallow Aquifer Well Alignment B. Climate Scenario A. Summer 2028

Figure 26

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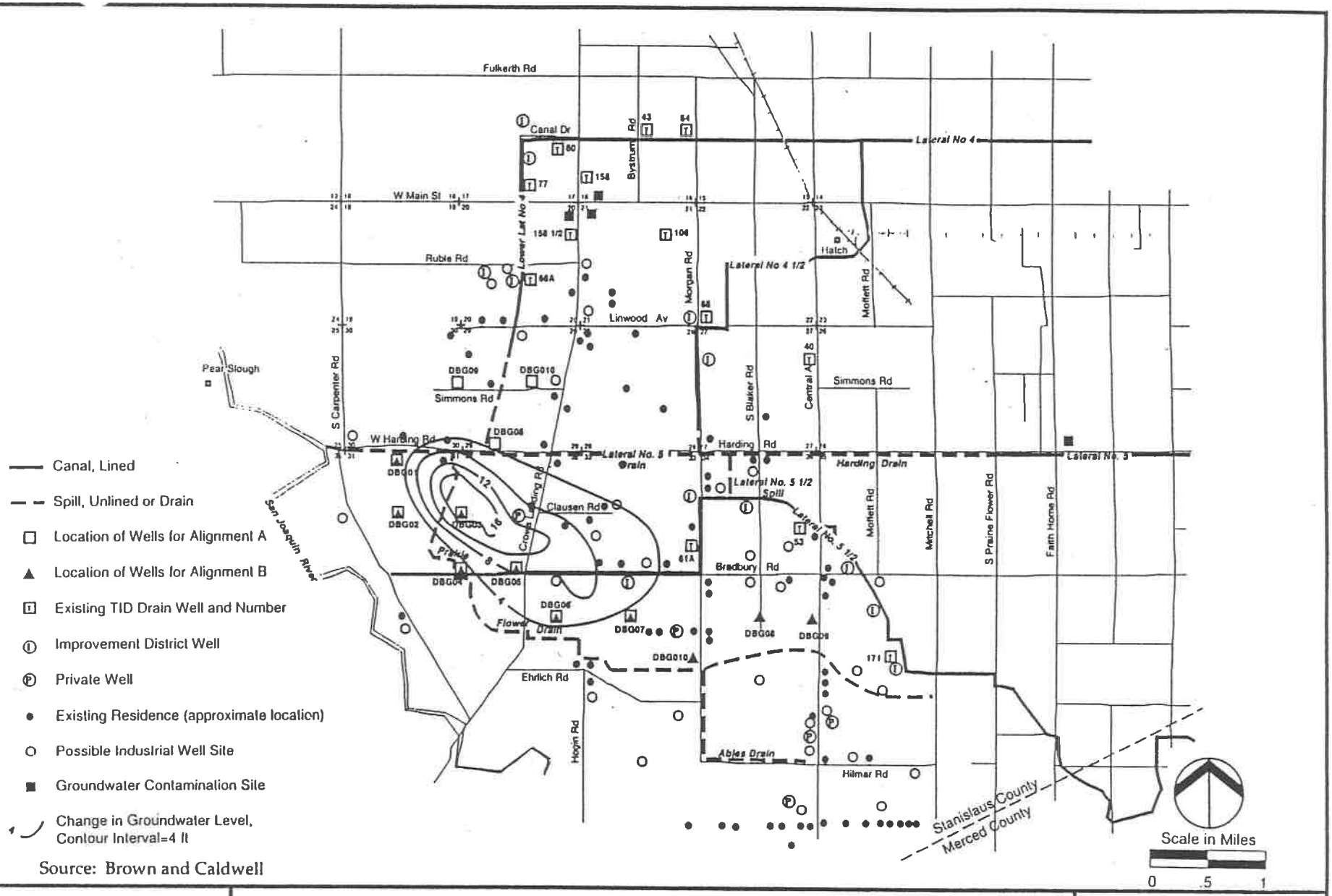

Source: Brown and Caldwell

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Diablo Grande Water Plan SEIR

Estimated Changes in Groundwater Levels in Shallow Aquifer Well Alignment B. Climate Scenario B. Summer 2028

Figure 28

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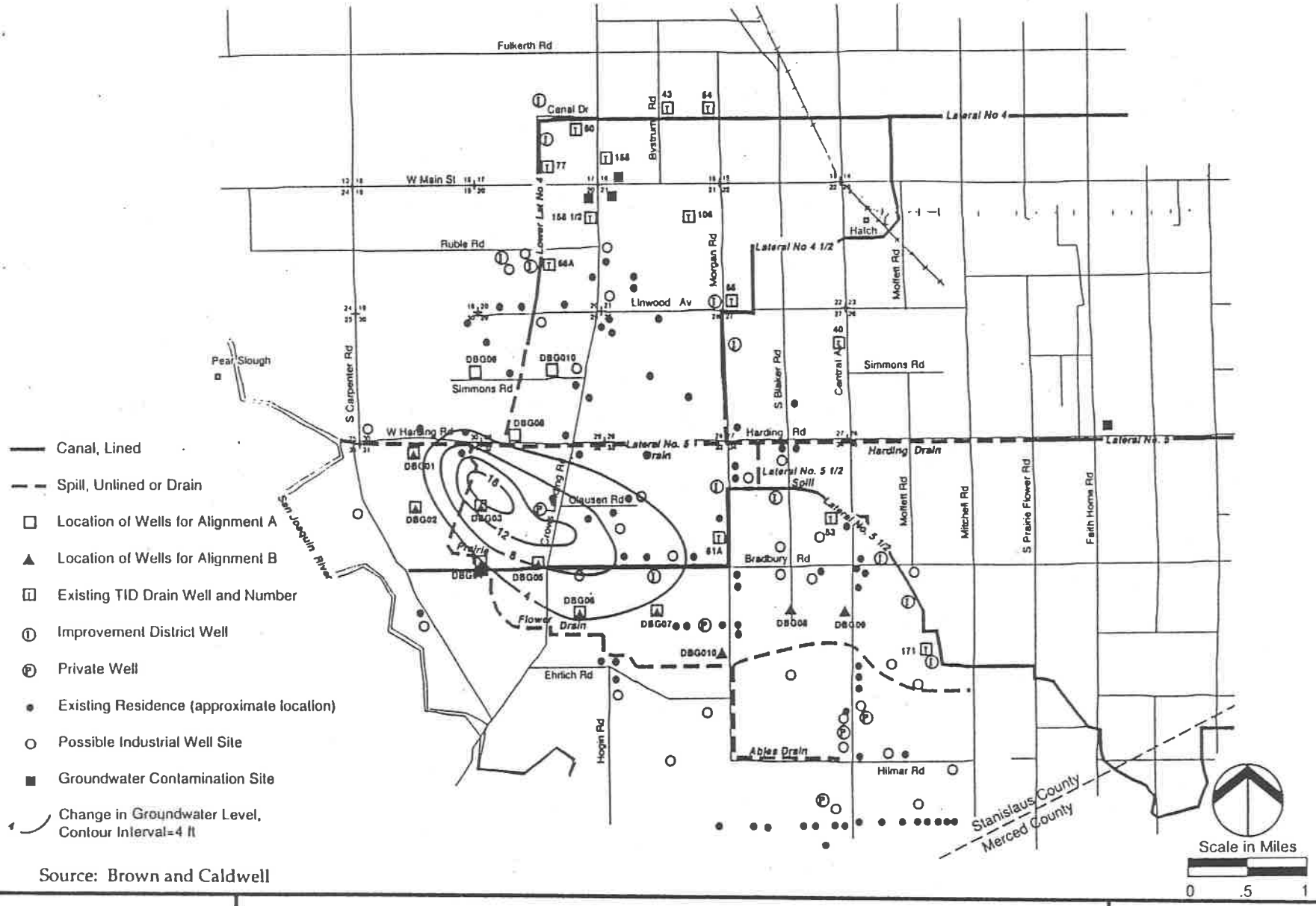

Source: Brown and Caldwell

EMC Planning Group Inc.
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Diablo Grande Water Plan SEIR
Estimated Changes in Groundwater Levels in Upper Aquifer Well Alignment B. Climate Scenario A. Summer 2028

Figure 27

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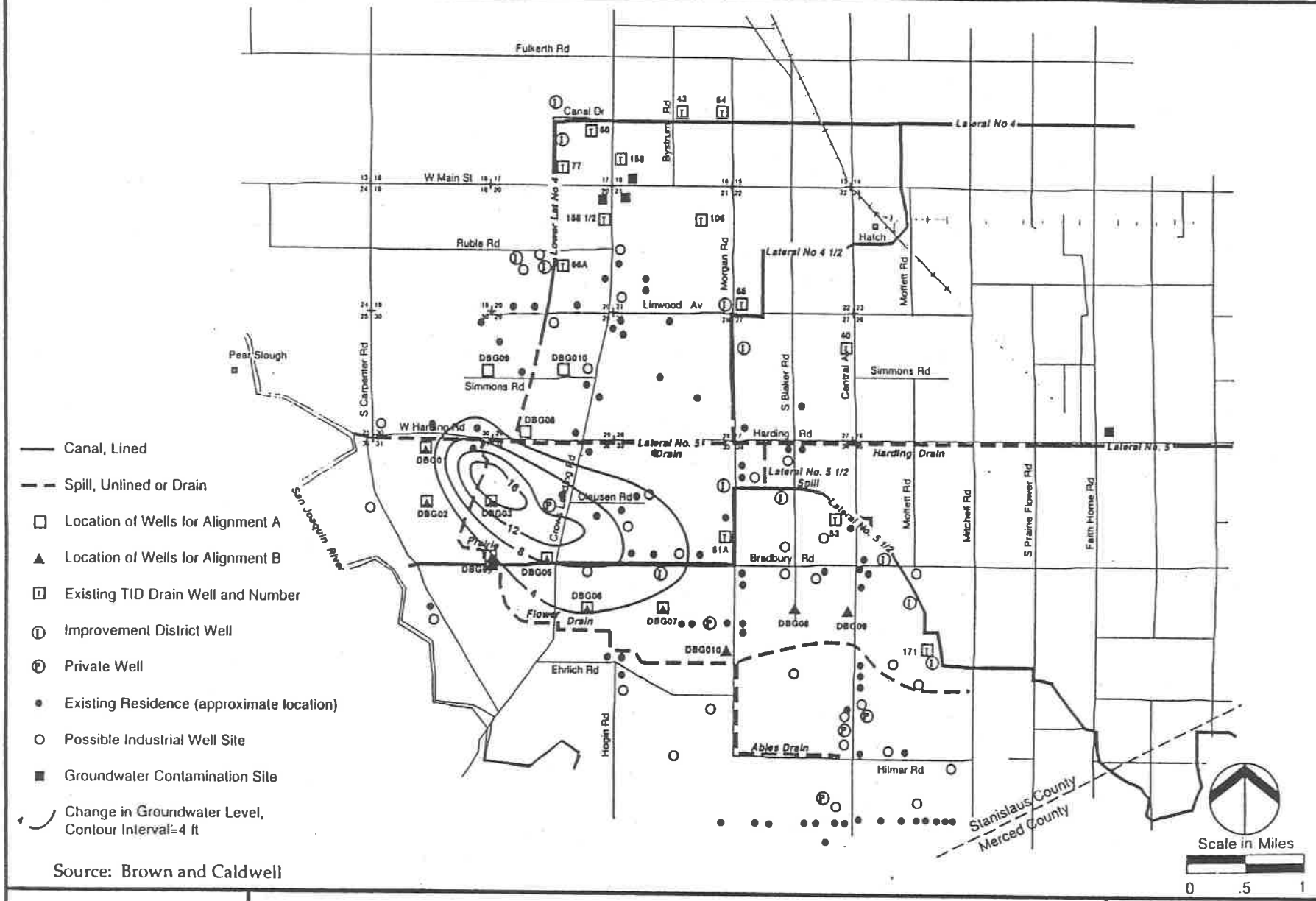

Source: Brown and Caldwell

EMC Planning Group Inc.
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Diablo Grande Water Plan SEIR
Estimated Changes in Groundwater Levels in Upper Aquifer Well Alignment B. Climate Scenario B. Summer 2028

Figure 29

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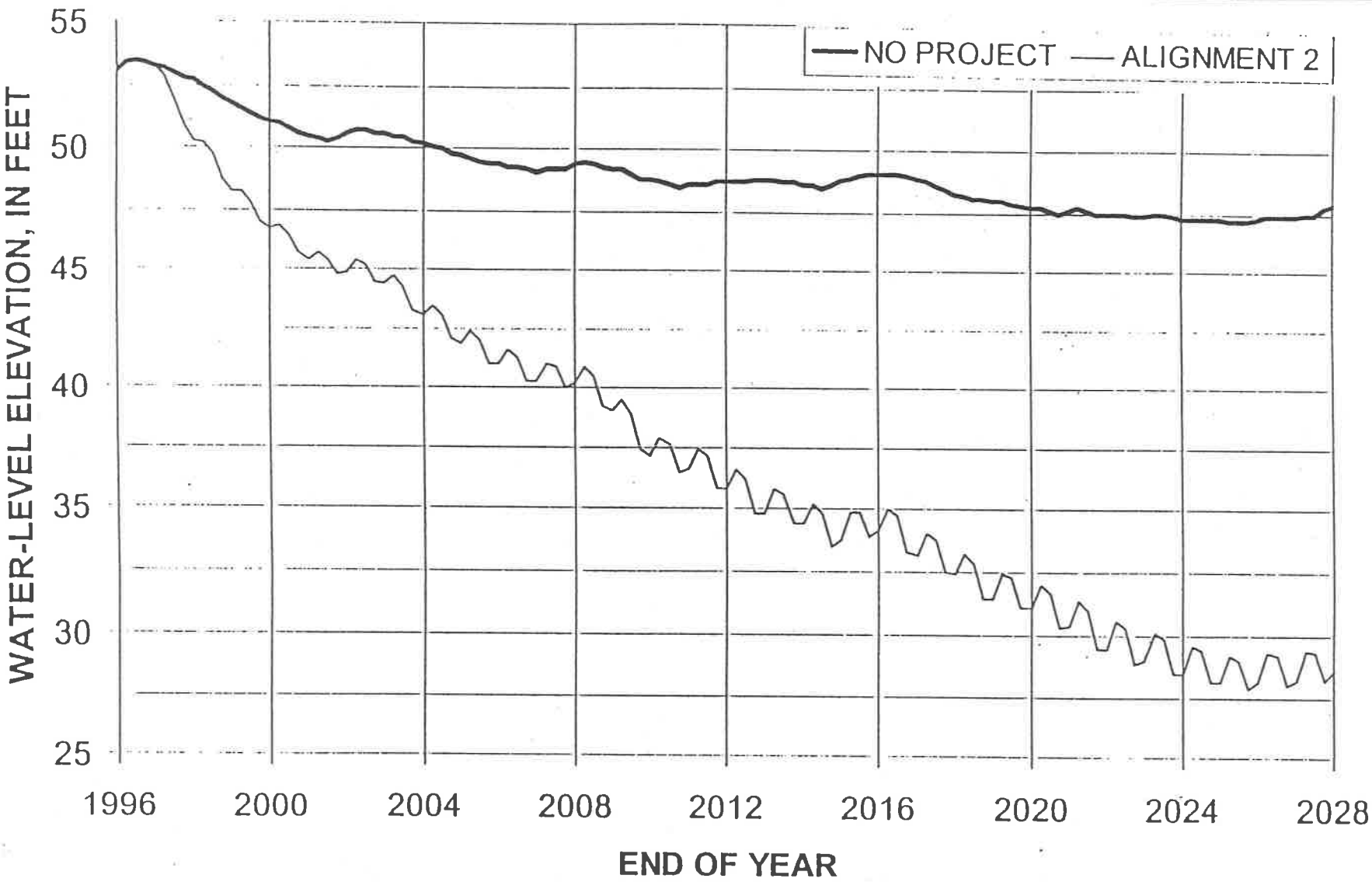

Source: Hydrologic Consultants, Inc.

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Diablo Grande Water Plan SEIR

Water Level at Center of Well Field
Alignment A, Scenario B

Figure 30

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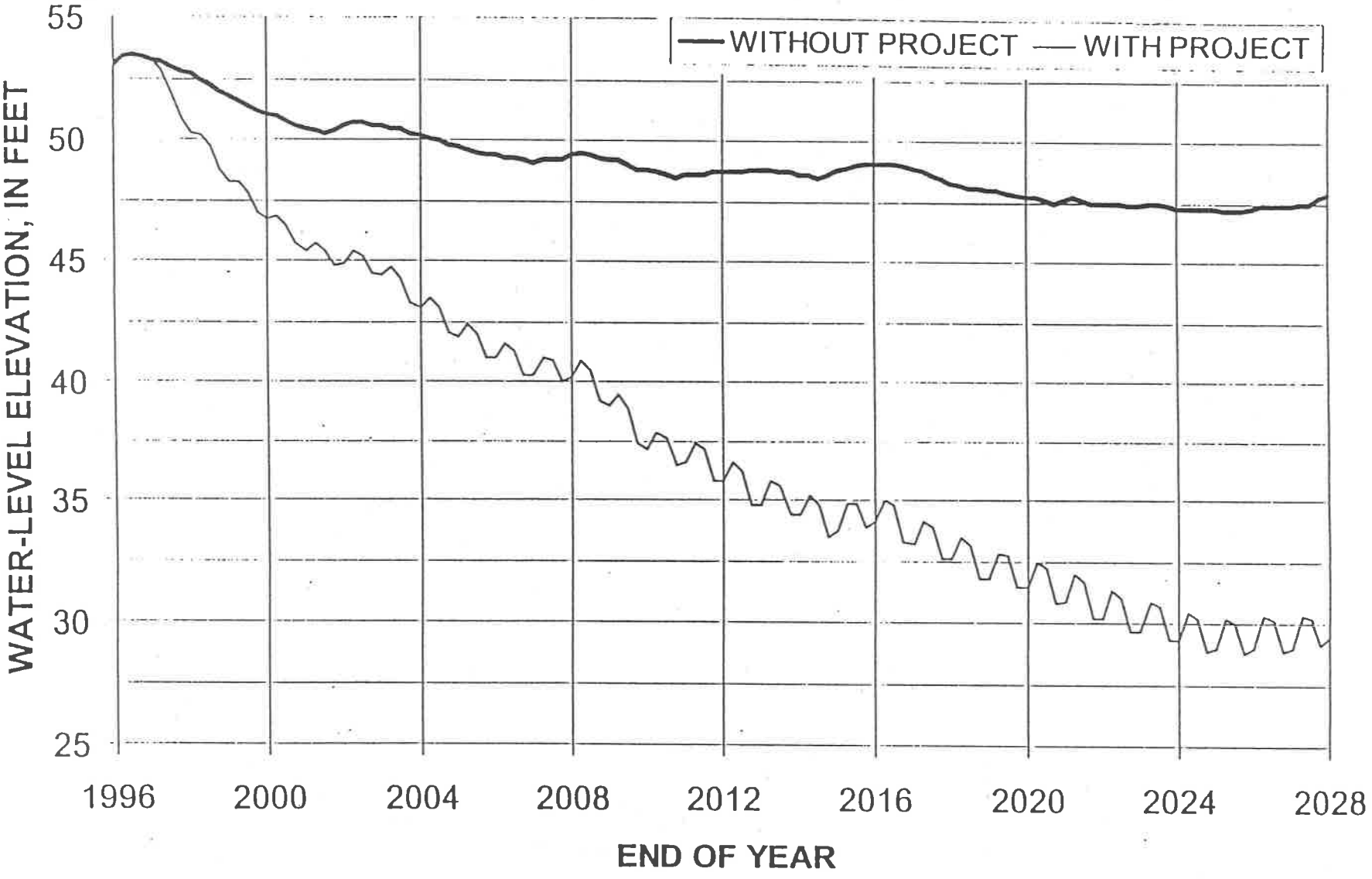

Source: Hydrologic Consultants, Inc.

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Diablo Grande Water Plan SEIR

Water Level at Center of Well Field
Alignment B, Scenario B

Figure
31

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TABLE 8

Groundwater Level Impacts

	Groundwater Level Decline [1] (feet)			Area Impacted Greater Than Two Feet [1], (acres)	
	At Well Field		2 miles from well field		
	Upper Aquifer	Shallow Aquifer	Upper Aquifer	Upper Aquifer	Shallow Aquifer
Well Alignment A					
Climate Scenario A	19	19	1.8	4,600	4,600
Climate Scenario B	19	19	2.1	4,600	4,600
Well Alignment B					
Climate Scenario A	18	18	0.4	7,000	6,800
Climate Scenario B	18	18	1.0	7,000	6,800

[1] At year 2028

Source: Brown and Caldwell

Impacts to Groundwater Quality. The impact of the groundwater pumping on the quality of the lower aquifer would be primarily reflected in salinity levels. The marine sedimentary rocks generate an upward migration of saline water into the aquifer. The reduction in groundwater levels would result in an increase of approximately three percent to the dissolved solids load to the lower aquifer.

Assuming that this would eventually result in a three percent increase in TDS levels in the upper aquifer, TDS levels might increase from an average of 981 mg/l to 1,010 mg/l. This increase would not be considered significant because the existing TDS levels are in the 800 to 1,200 mg/l range, thus making a potential three percent increase in this context indiscernible. Therefore, there would be no significant impact to the salinity levels within the shallow and upper aquifer where the proposed project would take water.

The impact the proposed project would have on other constituents found in the groundwater is not precisely known. It is possible that the increased groundwater drawdown caused by the pumping could draw in nearby pockets of DBCP and/or nitrate. The end result would be that any contaminant migrating to the well fields

would eventually be pumped out, thereby improving quality, other than the slight TDS increase mentioned above.

California Aqueduct. The State Department of Water Resources has expressed concern regarding potential subsidence of the area in the vicinity of the proposed groundwater and resulting impacts to the California Aqueduct.

The Aqueduct is over ten miles from the on-site wells at the closest point, across the San Joaquin River. In light of the geographical separation of the wells and Aqueduct, no impacts to the California Aqueduct are expected. No mitigation is warranted.

Contaminated Wells Remediation Sites. The Stanislaus County Department of Environmental Resources (DER) has indicated that there are four well sites currently undergoing contamination remediation, which could be potentially affected by the Diablo Grande groundwater wells. Three of the remediation well sites are located at or near the intersection of West Main Street and Crows Landing Road. Another site is located at or near the intersection of Faith Home Road and Harding Road. Based on Figures 22 through 29, the modeled groundwater level contours associated with the Diablo Grande groundwater pumping would not impact the area containing the three remediation well sites on West Main Street or the one remediation well site on Faith Home Road. Therefore, no significant impacts are anticipated.

Impacts and Mitigation Measures

Standard of Significance. For purposes of this analysis, impacts are considered to be significant if they would do the following:

- Substantially degrade water quality whereby water quality would not meet state standards;
- Substantially degrade or deplete groundwater resources;
- Interfere substantially with groundwater recharge;
- Convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land; or
- Substantially degrade or deplete surface water resources.

Review of Significance of Impact. This section presents a review of the project impacts in comparison to the standards of significance.

Deplete Groundwater Resources. To reduce the groundwater quantity by 11,000 acre-feet per year is not considered significant in comparison to the estimated average of 496,000 acre-feet per year of groundwater pumping from the Turlock groundwater basin between 1997 and 2028. However, the increased drawdown caused by the proposed drainage pumping may adversely impact some domestic, industrial and

private irrigation wells. However, the lowering of groundwater levels will benefit agricultural production by preventing or reducing saturation of the plant's root zone.

Interfere with Groundwater Recharge. The proposed project would not result in any change to the current recharge of the groundwater basin. The importation of surface water for irrigation, and the resulting recharge, would not change.

Deplete Surface Water Resources. The proposed project would result in some reduction of flow in the San Joaquin River between the Merced and Tuolumne rivers, amounting up to 5.74 percent of the river's flow for one three month period (July - September, 2025), during a dry or critically dry year. Well Alignment B would have a marginally smaller impact (4.18 percent).

The impacts to flow below the confluence of the San Joaquin River with the Tuolumne River (downstream of the TID) would be much smaller given the higher river flows in the San Joaquin River below the Tuolumne River, and given that flows will now be increased (especially in the drier water years) because of the higher minimum FERC flows on the Tuolumne River, and the resulting smaller proportional impact. Furthermore, increased releases of water to the lower Merced River are currently being negotiated with the MID under the Vernalis Adaptive Management Plan (VAMP) to improve conditions for fall-run Chinook salmon. This water release would further increase water flow within the San Joaquin River below the Merced River. Down river water users would not have to reduce their diversions as a result of the project (Brown and Caldwell 1998). The impact of the proposed project on San Joaquin River flows is not considered significant. However, the impact is considered to be significant as it relates to Chinook salmon. This is discussed in the section below titled *Water Supply (Biotic Resources).*

Impact. The proposed project would reduce groundwater levels in the vicinity of the well fields. Groundwater levels are anticipated to drop approximately 18 to 19 feet at the center of the well field, and by up to 2 feet two miles from the center of the well field. This would result in a positive impact in the shallow aquifer where root zones need to be above the groundwater level. However, a negative secondary impact is projected due to reduced capacity of existing domestic and irrigation wells. This is considered to be a potential significant impact. However, implementation of the following mitigations will reduce the impact to a less-than-significant level.

Mitigation Measures

Historical groundwater pumping has been ongoing in the TID in order to lower the groundwater level in some areas to allow agricultural operations. Groundwater pumping by the Diablo Grande project would reduce the need for this historical groundwater pumping by the TID. The proposed project would benefit agricultural operations in this context. However, there is a potential secondary impact associated with the project's proposed groundwater pumping relative to existing wells. A declining groundwater level may result in reductions to groundwater

pumping in existing area wells (not project wells or TID wells). To reduce this potential impact, the following mitigation is submitted.

4. A mitigation program shall be established to protect existing wells within a two mile radius of the center of the well field. The elements of this mitigation program are as follows:

   a. Well Inventory. Prior to operation of project wells, a well inventory of all wells within two miles of the center of the well field shall be conducted to develop baseline data on the pre-project status of the groundwater levels, as well as the condition and characteristics of individual wells. The county shall cooperate by providing any relevant groundwater data and well information it has to the TID. General threshold criteria are defined below in section "c".

   b. Well Monitoring Plan. Prior to operation of project wells, a groundwater monitoring plan shall be developed. Existing wells, the new project wells, and any new monitoring wells that are deemed necessary, within two miles of the center of the well field, shall be monitored as set forth in the monitoring plan. The Well Monitoring Plan reports shall be evaluated to determine impacts based upon thresholds defined in the Well Monitoring Plan.

   c. Define Thresholds. Thresholds of significance are as follows:

      1. The groundwater level drops below an existing operational well's bowl level and said drop is due to the proposed project's groundwater pumping, not natural conditions.

      2. The groundwater level drops such that the capacity of the existing well's pump is significantly reduced and said drop is due to the proposed project's groundwater pumping, and not natural conditions.

   d. Groundwater Modeling. An element of the Well Monitoring Plan is groundwater modeling, calculations, or other scientific method that will determine if an impact to a well or wells is occurring and determine if the impact is the result of the proposed groundwater pumping from the well field. If impacts are the result of the proposed project's groundwater pumping, then certain mitigation measures would be triggered to offset those impacts. For example, the plan will include who shall pay for the cost to lower the pump bowls, or replace the well as necessary on existing wells projected by the model to be significantly adversely impacted by project pumping. As an alternative, pumping could be reduced in some wells, while increasing pumping in another project well. Modeling would be done per the requirements of the Well Monitoring Plan.

Water Supply (Biotic Resources)

This section is based on the biotic resources report prepared by Zander Associates for this SEIR in December 1997. For a description of the Shallow County Groundwater water supply (Option 4), refer to Section 1 of this SEIR.

The proposed water supply project consists of two components: 1) pumping of water from shallow groundwater drainage wells located east of the San Joaquin River and operated by the Turlock Irrigation District (TID), and 2) delivery of this water via a new pipeline that would cross under the San Joaquin River and connect with existing Diablo Grande water conveyance facilities west of the river. The two components and their associated project sites will be discussed separately under the headings "water supply" and "conveyance pipeline" in the following sections of this report. The term "overall project" will be used when referring to both components of the project together.

Environmental Setting

Project Site. The proposed well sites would be located east of the San Joaquin River in Stanislaus County, in the vicinity of Crows Landing Road, West Harding Road and Bradbury Road. Two alternative alignments of ten wells are proposed, which are subsequently referred to as Alignment A and Alignment B. The two alignments are similar, except that Alignment B is centered about 1.5 mile southeast of Alignment A. Refer to Figures 8 and 9 for location of the proposed well alignments and pipelines.

The area in the vicinity of the project wells consists predominantly of large-parcel agricultural fields and dairy farms. These fields currently support production of shallow root crops, including alfalfa, corn, and sod. The project area is transected by several lined canals and unlined irrigation drainage channels, including TID's Lower Lateral 4, Lateral 5^1/2, Lateral 5 Drain (also known as the Harding Drain) and the Prairie Flower Drain. These channels receive water from Tuolumne River diversions, TID drainage wells and other sources, including groundwater accretion into the unlined drainage channels. The banks of the unlined channels support hydrophytic (moisture-tolerant) plants such as willow, cattail, and water hyacinth.

Surface Water Resources. The San Joaquin River and two of its main tributaries, the Merced River and Tuolumne River, comprise the major surface water resources of the project area. Flow in this section of the San Joaquin River, which is located between the confluences of the Merced and Tuolumne Rivers with the San Joaquin River, is affected by numerous water inputs and diversions. The construction of Friant Dam and the Friant-Kern Canal by the U.S. Bureau of Reclamation in the 1940s resulted in the export to the south and out of the San Joaquin River Basin of most of the unimpaired flow of the Upper San Joaquin River except in wetter water years. The upper mainstem of the river below Friant Dam receives much of its water from the Delta-Mendota canal, which discharges relatively low-quality, turbid water into the river. The Merced River provides a vital input of cooler, higher quality water to the San Joaquin River system. Smaller inputs to the San Joaquin River are

provided by TID drainage laterals between the Merced and Tuolumne Rivers. The San Joaquin River also receives groundwater inflow from a shallow, unconfined aquifer in this area. (Brown and Caldwell 1998).

San Joaquin River. Flow in the San Joaquin River in the vicinity of the project wells is characterized by large seasonal and year to year variations. Monthly mean flow measured near Newman (USGS Gaging Station 1127400), approximately 7 miles south of the project site and downstream from the confluence of the Merced River with the San Joaquin River, averages approximately 175,000 acre-feet (AF/month) in March and 30,000 AF/month in August (averages for 1944-1994 water years). However, flow variations between wet and critically dry water years in any given month can be extreme. In a critically dry year, monthly mean flow in this section has been recorded as low as 2,000 AF/month during the driest months (average for September-October 1977) (Brown and Caldwell 1998).

Tuolumne River. Flow in the lower Tuolumne River is regulated by the Don Pedro Project, located upstream of the town of La Grange. The project is owned 68.46 percent by TID and 31.54 percent by the Modesto Irrigation District (Roger Masuda, General Counsel, TID. Memo to Robert Nees, TID, November 10, 1997.). The Don Pedro Project was licensed by the Federal Power Commission, predecessor to the Federal Energy Regulatory Commission (FERC). In December 1992, the FERC reopened the license for the limited purpose of reassessing the required minimum instream flows for maintenance of the fall-run Chinook salmon fishery of the Tuolumne River. As a result of the mediation process initiated by the FERC, a settlement agreement was reached that provided for substantially higher minimum flows to protect salmon in the lower Tuolumne River. The higher negotiated minimum flow requirements were approved through an order issued by the FERC on July 31, 1996, and were implemented beginning August 1, 1996. The new FERC flows will vary from 94,000 AF per year to 300,923 AF per year, depending on the water year classification determined by the California Department of Water Resources (DWR). These new minimum flows represent approximately a 2.3 to 2.4-fold increase over the previous minimum required instream flows. These increased flows can be anticipated to be experienced all the way to the mouth of the Tuolumne River, because the lower Tuolumne River is a gaining river due to surface water returns and groundwater accretions (HCI 1998).

Merced River. Flow in the lower Merced River is regulated by releases from the New Exchequer Dam, operated by the Merced Irrigation District (MID). The river is also regulated by the McSwain Dam (an afterbay of the New Exchequer Dam), and the Merced Falls and Crocker-Huffman diversion dams further downstream. Minimum stream flows for fishery maintenance in the lower Merced River are mandated by the FERC license for the New Exchequer Project, and Davis-Grunsky Contract No. D-GG417 between the DWR and MID (CALFED 1997). Minimum flows required by FERC range from 25 to 100 cfs (1,500-6,000 ac ft/mo) in normal years and 15-75 cfs (900-4,500 ac ft/mo) in dry years. The Davis-Grunsky contract requires minimum continuous flows of 180-220 cfs (10,800-13,200 ac ft/mo) from November through March (Ted Selb, MID. Transmittal to and telephone conversation with Daniel

Clemens, Zander Associates. November 13, 1997.). Increased releases of water to the lower Merced River are currently being negotiated with MID under the Vernalis Adaptive Management Plan (VAMP) to improve conditions for fall-run Chinook salmon (ibid.). The proposed increased flows would be provided by MID during April-May and October. Although the Merced River generally loses stream flow to the groundwater system in winter and spring (HCI 1998), and experiences additional losses through downstream diversions, a substantial portion of the proposed increased flows could be expected to be experienced at the mouth of the Merced River, as well as downstream in the San Joaquin River in the project area.

Biotic Habitat-Cultivated Lands. Cultivated croplands comprise the major habitat type for the water supply (as well as the conveyance pipeline) project area. Although croplands and orchards generally do not support significant natural plant communities, they can provide habitat for a variety of birds, rodents and rabbits, which in turn provide a prey base for raptors and other predators. Irrigated orchards can also provide water and shade for migratory birds and other wildlife in the vicinity.

Biotic Habitat-Riverine. The San Joaquin River in the project area is a highly modified river system, with a large percentage of its source water diverted for agriculture and urban uses. Despite these constraints, the river provides habitat for a variety of fish species (Saiki 1984), and serves as an essential migratory corridor for anadromous fish that spawn in upstream tributaries, including the Tuolumne and Merced Rivers (USFWS 1995). Flow from the San Joaquin River also provides an important water influx to the Sacramento-San Joaquin Delta, which supports a diverse assemblage of fish and wildlife species.

Sensitive Species. The potential for sensitive species to occur on or in the vicinity of the overall project site was assessed by reviewing the CDFG Natural Diversity Data Base (CNDDB, Crows Landing and Hatch quadrangles) and the USFWS list of sensitive species for Stanislaus County (4/28/97). These data were evaluated in relation to habitat characteristics of the project site, as assessed during reconnaissance surveys performed by Zander Associates on April 29 and October 17, 1997.

Plants. The CNDDB (1997) lists four sensitive plant species that have been identified in the vicinity of the overall project site (Table 9). Three of these species, alkali milk-vetch (*Astragalus tener* var. *tener*), heartscale (*Atriplex cordulata*), and brittlescale (*Atriplex depressa*), are restricted to alkali sink or alkali scrub habitats, which do not occur in the project area. Therefore, these species are not expected to occur on the overall project site. One species, Delta button-celery (*Eryngium racemosum*), is documented to have occurred in an area east of Carpenter Road, in the vicinity of the proposed conveyance pipeline and well alignments. This species is discussed below.

- *Delta Button-celery.* Delta button-celery is a state-listed endangered species and a federal species of concern. This species is an annual herb in the carrot family, and is characterized by decumbent (low-growing) stems, lanceolate

leaves and white to pale-purplish flowers. Delta button-celery typically occurs in seasonally flooded clay depressions in riparian scrub habitats.

TABLE 9

Sensitive Plant Species Previously Identified in the Vicinity of the Proposed Project

Species	Listing Status (Fed./State/CNPS)	Habitat
Astragalus tener var. *tener* (Alkali milk-vetch)	--/--/1B	alkali playa, vernal pools in valley and foothill grasslands
Atriplex cordulata (Heartscale)	SC/--/1B	chenopod scrub, alkali flats in valley and foothill grasslands
Atriplex depressa (Brittlescale)	--/--/1B	chenopod scrub, alkali flats in valley and foothill grasslands
Eryngium racemosa (Delta button-celery)	SC/E/1B	riparian scrub, seasonally inundated floodplain in hard clay depressions

Legend: E = endangered; SC = USFWS "Species of Concern"; 1B = CNPS List 1B

Source: Zander Associates

Some areas of the San Joaquin River floodplain with hard clay soils could potentially support this species. However, Delta button-celery is not expected to occur on the cultivated fields or disturbed roadside areas comprising the majority of the overall project site. The area that previously supported this species in the vicinity of the proposed well fields has been leveled and converted to agricultural production. Moreover, the floodplain in the area of the proposed conveyance pipeline consists primarily of sandy alluvium, which would not provide a suitable substrate for this species. Therefore, this species is not expected to occur on the overall project site.

Animals. For the water supply component of the project, this report considers three sensitive fish species, Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley steelhead (*Oncorhynchus mykiss*), and Sacramento splittail (*Pogonichthys macrolepidotus*), that could potentially be affected by possible reductions in San Joaquin River flow resulting from the proposed project. These species are considered because of their federal or state status as sensitive species and/or because they are currently targeted for restoration efforts by the resource agencies (USFWS 1995). In addition, the CNDDB (1997) lists three sensitive animal species, Swainson's hawk (*Buteo swainsoni*), tricolored blackbird (*Agelaius tricolor*) and San Joaquin kit fox (*Vulpes macrotis mutica*), that have been observed or could potentially occur in the vicinity of the overall project site. A discussion of these species follows below.

- *Chinook Salmon.* The Chinook salmon is an anadromous salmonid fish, living most of its life in the ocean and returning to spawn in freshwater streams in California and the Pacific Northwest. Four races of Chinook salmon have been identified in the Sacramento-San Joaquin River system, based on variations in life history and timing of adult upstream migration. These include fall-run, late fall-run, winter-run and spring-run. The winter-run Chinook salmon is a federally- and state-listed endangered species; the spring-run race is a state species of special concern.

  The San Joaquin River system currently supports only fall-run Chinook salmon, which spawn in the three major tributaries, the Stanislaus, Tuolumne and Merced Rivers. Adult salmon migrate up the San Joaquin River in response to seasonal increases in stream flow, and spawn from October through December (USFWS 1995). The adults die after spawning, and the eggs hatch and larvae develop during winter months. The juveniles (smolts) then emigrate downstream to the ocean from March through May (USFWS 1995). High stream temperatures in late April and May can be a significant stress factor for emigrating smolts in the lower Merced and San Joaquin Rivers.

  Populations of Chinook salmon in the San Joaquin River system have declined substantially since the 1940s, but small, fluctuating populations have persisted below major dams on the three major tributaries. The spawning population (escapement) in the Merced River has been estimated to average about 4,000 fish between 1967 and 1991, but annual numbers are highly variable, ranging from approximately 25,000 in 1984 to zero in 1989-1991 (U.S. Bureau of Reclamation 1986, Mills and Fisher 1993, in USFWS 1995). Variation in annual spawning population appears to be closely correlated with flows in the main stem of the river during the juvenile migration period one and two years prior to the spawning run (Carl Mesick, independent consultant. Telephone conversation with Daniel Clemens, Zander Associates, July 8, 1997.). Low flows and high water temperatures can adversely affect salmon by inhibiting migration to spawning areas as well as directly causing mortality of eggs, larvae or juveniles.

- *Central Valley Steelhead.* The Central Valley steelhead is a federally proposed endangered fish species. Steelhead are anadromous salmonid fish that migrate to sea as juveniles and return to freshwater streams to spawn as adults. Upstream migration of Central Valley steelhead typically occurs in winter and spring, and spawning takes place in late spring and early summer. Juveniles remain in fresh water for one year or longer, and emigrate to sea in winter or spring.

  Most of the existing populations of Central Valley steelhead occur in the Sacramento River and its major tributaries. The San Joaquin River system historically supported annual steelhead runs, but these runs have declined to remnant levels; no runs are known to exist in either the Merced or Tuolumne

Rivers. Factors contributing to the decline of steelhead in the San Joaquin River are similar to those affecting the Chinook salmon.

- *Sacramento Splittail.* Sacramento splittail is a fish in the cyprinid family, and is a federally proposed threatened species and a state species of special concern. The distribution of this species is limited to the Delta and the main stems and lower tributaries of the Sacramento and San Joaquin Rivers. Adults migrate upstream from the Delta and spawn in the San Joaquin River from January to early May. Juveniles migrate out to the Delta in summer as flow decreases and water temperature increases, although some individuals may remain year-round in the river or its major tributaries.

  Splittail have been identified by capture studies in the San Joaquin River in the vicinity of the project site, between the Merced and Tuolumne Rivers (Saiki 1984). This species is relatively rare in the San Joaquin River, but its population has been observed to increase markedly in recent high-flow years (Randy Baxter, CDFG. Telephone conversation with Daniel Clemens, Zander Associates, June 3, 1997).

- *Swainson's Hawk.* Swainson's hawk is a state-listed threatened species. This species is a large, broad-winged hawk that inhabits open country. Adults range in color from light to dark or reddish brown. Swainson's hawks prey on small mammals, birds and insects. This hawk migrates from wintering grounds in South America to breeding grounds in western North America, including the Central Valley. The species nests in trees, typically in riparian areas adjacent to open agricultural fields or pastures that provide primary foraging habitat. The population of Swainson's hawk has declined substantially due to losses of riparian nesting habitat and suitable foraging habitat.

  Swainson's hawks have been observed nesting near the proposed pipeline alignment, in trees along the San Joaquin River and adjacent sloughs. The closest recorded nesting site is within approximately one mile of the proposed alignment west of the river. The riparian woodland in the floodplain adjacent to the west staging area and the trees bordering the slough west of the river could both provide potential nesting habitat for this species.

- *Tricolored Blackbird.* The tricolored blackbird is a federally-listed species of concern, and a state-listed species of special concern. Adult males are distinguished by their shiny black plumage and bright red and white wing patches. Tricolored blackbirds are highly gregarious, and breed in large communal nesting colonies that can contain as many as 20,000 nests. The preferred nesting habitat of this species is freshwater wetland with tall, dense emergent vegetation such as cattails or tules.

  Tricolored blackbirds have been previously observed in the vicinity of the overall project site, however there are no areas of extensive marsh vegetation in the project area that could potentially support nesting colonies of this

species. Therefore, this species is not expected to occur on the overall project site.

- *San Joaquin Kit Fox.* The San Joaquin kit fox is a federally-listed endangered species, and a state-listed threatened species. Kit foxes are small, tan to grayish-colored foxes with large ears. This species occurs in arid grasslands and other open habitats in valleys and surrounding low foothills. Kit foxes use underground dens for shelter and breeding. The young are born in late winter, and remain with their parents until early summer, when they can disperse up to several miles from their parents' home range. This species was once widely distributed in the San Joaquin Valley, but has been displaced from much of its original range due to loss of habitat to agricultural and urban development.

  The closest documented occurrence of this species in relation to the project site is approximately 20 miles northwest of the proposed western pipeline section. The cultivated lands comprising the majority of the site are not expected to provide suitable denning or breeding habitat for the kit fox. However, because this species is relatively wide-ranging, and preys on small mammals that are typically found in agricultural fields, the possibility exists that San Joaquin kit foxes could move through or forage in some areas of the overall project site.

Project Analysis

The Diablo Grande project has a four-phase development plan to be implemented over approximately 25 years. At full build-out, approximately 11,000 acre-feet of water per year (AF per year) would be delivered from the project wells to Diablo Grande. The majority of the annual pumping would occur during the months of May through September.

Pumping of the project wells would lower the water table in the vicinity of the well field, and would reduce groundwater accretion to the San Joaquin River. These declines would begin the first year of pumping of the first three project wells, and would increase progressively with development of the project (HCI 1998). Pumping of the project wells would also reduce the need for continued drainage pumping by TID. The expected reductions in current drainage pumping would partially offset the impacts of the project on groundwater levels and accretion. This factor is included in the modeling of project impacts discussed below.

Based on hydrological modeling of the project, groundwater levels at maximum project build-out following a prolonged drought would decline by up to 20 feet under the well field (HCI 1998). This decline would result in a reduction or elimination of groundwater accretion to unlined drainage channels in the vicinity of the well field, including the Prairie Flower Drain. Accretion of groundwater, in combination with surface water inflows, contributes to the maintenance of hydric conditions in the naturalized section of the Prairie Flower Drain between Crows Landing Road and Lateral 5 1/2. Depending on the quantity and timing of surface

water inflows (e.g., local tailwater runoff from irrigated fields and inflow from adjoining drainage channels), the reduction of groundwater accretion during a prolonged drought could either have no substantial effect, or could result in intermittent or seasonal desiccation, in this section of the Prairie Flower Drain. If the drain channel remains dry for a prolonged period (i.e., several months or longer), this could adversely affect hydrophytic vegetation and associated wildlife habitat in this section.

According to the hydrological model, pumping of the project wells at maximum build-out during a prolonged drought would reduce net groundwater accretion to the San Joaquin River by up to 6,500 AF per year for Alignment A, or 5,300 AF per year for Alignment B. These reductions of inflow would amount to less than 0.5 percent of the mean annual San Joaquin River flow in the vicinity of the project wells. During a prolonged drought, average summer stream flow in the project vicinity could be reduced by up to 5.7 percent for Alignment A, or 4.2 percent for Alignment B. The percent reductions in flow would be less in late fall, winter and spring, both because of higher river flows and reduced rates of pumping during these seasons. However during early fall, the percent reductions in flow in a critical drought year could equal or exceed those experienced in summer.

Reductions in San Joaquin River flow resulting from the project could potentially affect sensitive fish species in the vicinity of the project area, most notably the Merced River run of the San Joaquin fall-run Chinook salmon. The San Joaquin River supports the upstream migration of adult salmon to spawning grounds in the fall (October-December), and downstream migration of juveniles in spring (March-May). Spawning success of Chinook salmon tends to be low during or following dry years, and local salmon populations could be under considerable stress during prolonged droughts. Therefore, it is possible that any reduction in San Joaquin River flow in Dry or Critical years, specifically during the fall or spring migration periods, could adversely affect the Chinook salmon. However, in assessing the potential effects on migrating salmon of reduced groundwater accretion, water quality variables such as temperature, turbidity, and dissolved solid load must also be considered. Agricultural drainage water entering the river from shallow groundwater could constitute a relatively low quality water source for fish because of high levels of nitrates and other compounds. Therefore, inflow of this water may be less beneficial to instream fish populations than inflows of higher quality water from the Merced River and other sources.

With the new Tuolumne River fish flows implemented through the FERC agreement, any reduction in groundwater accretion to the San Joaquin River in the project area will not be experienced below the confluence of the Tuolumne River. Similarly, if increased releases to the lower Merced River are implemented under VAMP for October and April-May, this could offset potentially adverse effects of the project on fall-run Chinook salmon in the reach of the San Joaquin River below the confluence of the Merced River.

The project is not expected to affect Central Valley steelhead, because no runs of this species are known to occur in either the Merced or Tuolumne Rivers. Similarly, Sacramento splittail are not known to spawn in the affected reach of the San Joaquin River (i.e., upstream of the confluence with the Tuolumne River) during low flow years when project impacts would be greatest (i.e., during Critical, Dry, or Below Normal water years). During Above Normal or Wet years, when Sacramento splittail could potentially spawn in this reach, the reductions in stream flow resulting from the project would be small in relation to total river flow. Consequently, the project is not expected to substantially affect Sacramento splittail.

Impacts and Mitigation Measures

Standard of Significance. For the purposes of this analysis, impacts on biological resources resulting from the proposed shallow groundwater supply project would be considered significant if they would:

- substantially affect a rare or endangered species of animal or plant or the habitat of any such species;
- interfere substantially with the movement of resident or migratory fish or wildlife species;
- substantially diminish or degrade habitats of native fish, wildlife or plants;
- conflict with local, state, or federal policies relating to biological resources.

The judgment regarding whether an effect on a sensitive species is substantial was made taking into account both the magnitude of the impact and the rarity and sensitivity of the species or habitat in question.

Impact. Construction of the project wells and associated pipeline along well Alignments A or B could affect plant communities or wildlife habitats in the vicinity of the well fields. This impact is not considered to be significant.

The areas in the immediate vicinity of the well sites consist of large-parcel agricultural fields and dairy farming operations. These areas do not support intact natural plant communities, nor are they known to provide habitat for any sensitive wildlife species. Some animals commonly found in these croplands could be temporarily displaced by construction activities, but these effects would be short-term and reversible by restoring the project site to pre-construction conditions following completion of the project. No mitigation is required.

Impact. Extraction of up to 11,000 AF per year from the project wells would lower the groundwater level in the local zone of influence of these wells, which could affect plant communities or wildlife habitats in the vicinity of these wells, including those associated with the Prairie Flower Drain. This is considered to be a potential significant impact.

The agricultural fields in the vicinity of the well sites do not support intact natural vegetation communities or sensitive wildlife habitats. Therefore, reduction of the groundwater level would not substantially affect biological resources and would likely improve agricultural productivity of these fields. Lowering of the water table could also reduce or eliminate groundwater influx into unlined drainage channels in the vicinity of the well field. The majority of these are artificial drainage channels and provide little biological resource value. However, an approximately 3,600 linear foot section of the Prairie Flower Drain located west of Crows Landing Road and south of Lateral 5 1/2 appears to follow pre-existing topographic contours and has more naturalized wetland-type features. Perennially moist conditions are maintained in this channel partly by accretion from the shallow aquifer. The resulting moisture and hydrophytic vegetation in this section provide a zone of relatively high habitat value for wildlife.

According to the hydrological model, pumping of the project wells would lower the water level in this section of Prairie Flower Drain, which could cause this channel to become dry intermittently or continuously for up to several years during and following a prolonged drought, depending on the location of the well alignment and the intensity and duration of drought (see Section 2, Hydrology). If this section of the channel remains dry for a prolonged period (i.e., several months or longer), hydrophytic vegetation and associated wildlife habitat in this section could be adversely affected. However, the model assumes no inflow of surface water. Surface inflows from local tailwater runoff, adjoining drainage channels, and precipitation runoff could prevent drying of the channel or reduce the duration of the dry period. Therefore, the severity of this impact and its potential effect on biological resources would depend on the quantity and timing of surface water inflows, as well as pumping rate, climatic conditions, and location of the well field. Under a worst-case scenario and considering the expected inflows of surface water, the Prairie Flower Drain could potentially dry out seasonally for up to several months during drought years at full project build-out.

Implementation of the following mitigation will reduce this impact to a less-than-significant level.

Mitigation Measure

5. Following the onset of pumping of the project wells, a quarterly monitoring program for the Prairie Flower Drain between Crows Landing Road and Lateral 5 1/2 shall be implemented. The presence of water or saturated soils in this section of the drain shall be assessed visually and the water level estimated and recorded. If the channel is found to be dry (i.e., no water or saturated soils present in the channel) in two or more consecutive quarterly monitoring surveys, measures shall be implemented to restore sufficient water to this section of the channel to re-establish saturated soil conditions and support hydrophytic vegetation. Such measures could include allowing supplemental backflow into the drain channel from Lateral 5 1/2, or diverting agricultural drainage runoff from adjacent fields to the affected section of the drain.

Impact. Extraction of up to 11,000 AF per year from the project wells would reduce inflow of groundwater to the San Joaquin River, which could contribute to cumulative effects on fall-run Chinook salmon (Merced River run) that migrate through this section of the river. This is considered to be a potential significant impact.

Groundwater accretion to the San Joaquin River in the project area represents a relatively minor component in the context of the various regulated and uncontrolled water inputs that affect this stretch of the river, the most important of which is inflow from the Merced River. According to the hydrological model, groundwater inflow to the river during a prolonged drought at full project build-out would be reduced by up to 5,300 to 6,500 AF per year, depending on well alignment. These reductions of flow would amount to less than 0.5 percent of the mean annual San Joaquin River flow in this section of the river. Therefore, potential impacts to fall-run Chinook salmon in years with near average or higher than average flow (i.e., Below Normal, Above Normal or Wet water years) are not expected to be significant. However, during a prolonged drought, average summer flow in the river could be reduced by up to 4.2 percent or 5.7 percent, depending on the well alignment. Reductions in San Joaquin River flow in low flow years (i.e., Dry or Critical water years) could affect adult salmon during the fall upstream migration (October-December) or juveniles during the spring emigration period (March-May). The impact on river flow resulting from the project is expected to be relatively minor during late fall and early spring because of lower pumping rates and higher stream flows during those periods. However, during early fall (October-November) and mid-spring (April-May), any reduction in San Joaquin River flow resulting from the project in Dry or Critical water years could potentially have an adverse effect on the fall-run Chinook salmon.

Implementation of the following mitigation will reduce this impact to a less-than-significant level.

Mitigation Measure

6. Mitigation measures shall be implemented during water years classified as Dry or Critical by the DWR for the San Joaquin River basin, as indicated in DWR Bulletin 120. Bulletin 120-3 (April 1) shall be referred to annually, starting on the first year of pumping of the project wells. If Dry or Critical conditions are forecast for that water year, the following measures shall be implemented:

    a. An adaptive management program shall be implemented to offset the project impacts to San Joaquin River flow, as predicted by the hydrological model, for a 30-day period between April 1 and May 15, and a 30-day period between October 1 and November 15. The primary component of this management program will consist of release of an appropriate amount of water into the San Joaquin River on a continuous basis during the mitigation period in the affected reach of the river, to offset project impacts as projected by the

hydrological model. Options available to implement this discharge of water to the San Joaquin River could include:

1) Release of surface water. If during the mitigation period, TID or some other water district in the project vicinity has water available which could be released into the river, this water may be purchased and released in the affected area of the river to supplement the river and meet the mitigation requirement.

2) Increase in project groundwater pumping. This option would provide additional water to be discharged to the river in the required amount, plus an amount to offset the additional loss of accretion to the river that could result from this measure. This option generally would be implemented when groundwater levels in the area of the well field remain high.

3) Reduction in project groundwater pumping. Under this option, the groundwater pumping would be reduced in an amount to permit increased accretion based on the required discharge amounts. This option generally would be implemented when groundwater levels in the area of the well field are low.

4) Release of groundwater from other areas of the TID. The TID has groundwater drainage wells in many other areas of the District. If, during the required mitigation period, the groundwater level in the well field area is low, but the groundwater remains substantially high in other areas of the TID, then TID could increase pumping in those areas to supply the appropriate amount of discharge to the river.

5) These options may be used individually or in combination to ensure that the river is supplemented as set forth in this mitigation measure.

If reduced project pumping, or increased project or drainage pumping is to be included as a component of this mitigation measure, a hydrological analysis would be required prior to implementation of this measure to assess how much the proposed reduction or increase would affect project impacts to the river during the mitigation period; the quantity of supplemental water purchased and discharged to the river would then be adjusted accordingly. The timing of this mitigation shall be coordinated with scheduled Merced River pulse flow releases under the pending VAMP agreement, to support migration of salmon through the affected reach of the river. Mitigation requirements shall be phased to match the phased increases in project pumping and offset resultant impacts to the river. For example, at 25 percent project build-out, the estimated loss in accretion would average approximately 2 cfs during a drought year, and the mitigation

requirement would total approximately 240 AF for the 60-day mitigation period. At full project build-out, the estimated loss in accretion would average approximately 8 cfs during a drought year, and the mitigation requirement would total approximately 950 AF for the 60-day period. If scheduled Merced River pulse flow releases are implemented for a period of less than 30 days in either spring or fall, the mitigation period and quantity shall be reduced accordingly.

b. This mitigation program shall be reviewed each year that it is implemented to assess its feasibility. Pursuant to this review, specific alternatives may be recommended, in consultation with the CDFG, USFWS and/or regional water resource agencies, which may be implemented in lieu of measure (a) above, to mitigate potential cumulative impacts of the project on fisheries resources of the San Joaquin River. Such alternatives could include contributing funds to local or regionally-based programs for riparian and instream habitat restoration and management of chinook salmon populations in the San Joaquin River basin.

Water Conveyance (Biotic Resources)

A description of the conveyance pipeline system is included in the Shallow County Groundwater discussion in Section 1 of this SEIR.

Environmental Setting

Project Site. The proposed Diablo Grande pipeline would cover approximately 5.5 lineal miles, from the starting point east of the San Joaquin River adjacent to the Lateral 5 Drain to the end point west of the river at the existing Diablo Grande water conveyance facilities adjacent to Marshall Road. The pipeline alignment would traverse agricultural fields and parallel existing roadways along most of the alignment. The under-channel crossing would cover approximately 1,500 lineal feet, through a directionally-bored tunnel under the San Joaquin River between the staging areas located on the east and west sides of the river. The San Joaquin River in the area of the proposed crossing is confined within a flood plain approximately one-half mile wide between the east- and west-side levees. The west staging area would be located in this floodplain inside the west-side levee, along a prominent hairpin bend of the river. The floodplain in this area is composed primarily of sandy alluvium, and includes a zone of riparian woodland vegetation adjacent of the river channel.

The cultivated field and riverine habitats in the project area are discussed above in the section Water Supply (Biotic Resources). The riparian woodland community is discussed below.

Biotic Habitat-Riparian Woodland. The San Joaquin River and associated floodplain provide water and fertile soils that support a productive riparian

woodland community. Dominant tree species of these riparian woodlands include valley oak, Fremont cottonwood , California sycamore, and willow. Riparian woodlands provide high value habitat for wildlife. The tree canopy and understory provide cover, foraging resources, and breeding sites for a variety of birds, amphibians, and mammals. Riparian vegetation also benefits instream habitats by reducing erosion from stream banks, and providing shade to maintain cooler water and air temperatures.

Sensitive Species. A discussion of sensitive species in the project area is included in the section Water Supply (Biotic Resources), presented earlier.

Plants. The CNDDB (1997) lists four sensitive plant species that have been identified in the vicinity of the overall project site. These species are listed in Table 9 above, and discussed in the section Water Supply (Biotic Resources), presented earlier.

Animals. The CNDDB (1997) lists three sensitive animal species, Swainson's hawk, tricolored blackbird, and San Joaquin kit fox, that are known to occur or could potentially occur in the vicinity of the conveyance pipeline project. A discussion of these species is included in the section Water Supply (Biotic Resources), presented earlier.

Project Analysis

The Diablo Grande pipeline would be buried in a trench approximately 7.5 feet deep and 20 feet wide at the surface for most of the proposed alignment, both east and west of the San Joaquin River. For the segment inside the levees, the trench excavation would be enlarged to approximately 25 feet deep and either 25 feet wide for shored excavation, or 100 feet wide for unshored excavation, depending on substrate properties (Janet Atkinson, memo to Joseph Karnes, May 9, 1997). Following installation of the pipeline, trenches would be filled and the project impact areas restored to pre-construction conditions.

For most of the alignment outside of the levees, trench excavation and pipeline installation activities would be expected to cause only minor and temporary disturbance in a narrow zone incorporating the trench and equipment access areas. Potential impacts could be greater for the pipeline segment and staging area inside the levee west of the river. In this area, the trench excavation would be substantially larger, and construction activities could affect adjacent riparian habitats of the San Joaquin River. In addition, the pipeline crossing of the slough west of the river could potentially affect biological resources in the slough, or riparian habitat in the crossing area. Open-trench installation procedures would be used to cross the slough, which could result in discharges of sediment into the waterway. Construction activities in the vicinity of the slough could also result in disturbance of nesting raptors, including the state-listed Swainson's hawk.

The under-channel segment of the pipeline would cross the San Joaquin River via a 1500-foot long, directionally-drilled tunnel bored approximately 30-40 ft below the river bed. Horizontal directional drilling (HDD) methods have been successfully

employed for a wide range of pipeline applications, including recent crossings of both the San Joaquin and Sacramento Rivers (Cherrington et al. 1993). These precedents indicate that the HDD method, if properly implemented, would not adversely affect the river channel or surrounding lands.

Impacts and Mitigation Measures

Standard of Significance. For the purposes of this analysis, impacts on biological resources resulting from the proposed shallow groundwater supply project would be considered significant if they would:

- substantially affect a rare or endangered species of animal or plant or the habitat of any such species;
- interfere substantially with the movement of resident or migratory fish or wildlife species;
- substantially diminish or degrade habitats of native fish, wildlife or plants;
- conflict with local, state, or federal policies relating to biological resources.

The judgment regarding whether an effect on a sensitive species is substantial was made taking into account both the magnitude of the impact and the rarity and sensitivity of the species or habitat in question.

Impact. Trench excavation and pipeline installation activities in the sections of the pipeline outside of the San Joaquin River floodplain could affect plant communities or wildlife habitats in the vicinity of the pipeline alignment. This impact is not considered to be significant.

For most of the proposed alignment outside of the San Joaquin River floodplain, the pipeline operations would be limited to a narrow zone in agricultural fields and disturbed roadside areas. With the exception of the slough west of the river (considered under a separate impact below) these areas do not support significant natural vegetation communities or sensitive wildlife habitats. Some wildlife species may forage in or move through areas of the proposed alignment. Individual animals could potentially be displaced by the project, but these effects would be temporary and reversible. No mitigation is required.

Impact. Pipeline installation operations in the east staging area would disrupt and compact soils in this area, which could affect plant communities or wildlife habitats in the vicinity of this staging area. This impact is not considered to be significant.

The staging and drilling activities would be expected to cause substantial disruption and compaction of the soil in the staging area, and possible displacement of wildlife in the immediate vicinity. These activities would be confined to a relatively small area in an agricultural field which does not support natural vegetation or sensitive wildlife habitats. Therefore, no significant impacts to biological resources are

expected. In addition, approximately 600 cubic yards of excavation spoils would be placed onto adjacent agricultural fields. Following installation of the pipeline, these fields may be re-leveled to accommodate the excess soil. This volume of material would constitute a relatively negligible quantity in relation to the area of the surrounding agricultural fields. Therefore, placement of this excess soil would not be expected to have any adverse affect on biological resources. No mitigation is required.

Impact. Directional drilling and pipeline installation under the San Joaquin River could affect the river channel and associated riparian vegetation and habitats. This impact is not considered to be significant.

The drilling operation would place the pipeline 30-40 ft under the river bed, and would thereby avoid the river channel and root zones of riparian plants. Previous applications of the directional drilling procedure indicate that this method can be implemented without significant disturbance of the river channel or associated riparian habitats. No mitigation is required.

Impact. Pipeline installation operations inside the levee on the west side of the San Joaquin River could affect riparian habitats or sensitive wildlife in this area, including Swainson's hawk or other raptors. This is considered to be a potential significant impact.

The west staging area and adjoining section of the pipeline inside the western levee would be situated in a floodplain that supports riparian vegetation and associated wildlife habitats, including potential nesting sites for Swainson's hawk and other raptors. Pipeline installation activities would result in soil compaction, removal of vegetation and general disturbance of this area, and could potentially displace nesting raptors or other wildlife during the construction period. Section 3.503.5 of the California Fish and Game Code protects all birds-of-prey, their eggs, and active nests from destruction. In addition, Swainson's hawk is protected as a state-listed threatened species. Therefore, removal of any trees containing active raptor nests, or activities resulting in the abandonment of an active Swainson's hawk nest, would be considered a significant impact.

Implementation of the following mitigation measures will reduce this impact to a less-than-significant level.

Mitigation Measures

7. Prior to construction, a qualified biologist shall survey the project site and surrounding areas in the floodplain to determine the extent of the riparian vegetation zone, and identify any other sensitive plant communities or habitats (e.g., wetlands) that may occur in this area. Based on this survey, the construction area shall be located at least 100 feet from the edge of the riparian vegetation zone. The limits of the construction zone shall be clearly marked with flags or temporary fencing, and construction activities shall be contained within this zone. If loss of sensitive plants or habitats can not be

avoided, a habitat restoration plan shall be developed and approved by the Environmental Coordinator in consultation with the CDFG, and implement restoration activities following completion of construction.

8. Prior to construction, both prior to (February-March) and during (March-September) the breeding season, a qualified biologist shall conduct surveys to identify potential raptor nests in all suitable nest trees within one-half mile of the west staging area. If an unoccupied nest that could potentially be used by Swainson's hawk is identified in the vicinity of the construction site prior to the breeding season, a cover shall be placed on the nest to prevent nest establishment at that site, and shall remain in place until completion of construction activities. Authorization from the CDFG shall be obtained prior to implementing nest covering activities. All nest covers installed shall be removed following construction. If an active raptor nest is found during the breeding season, its location shall be marked and a site-specific buffer zone established by the biologist. For raptor species other than Swainson's hawk, construction activities shall be avoided within this buffer zone while the nest is occupied by adults and/or nestlings. For Swainson's hawk, construction activities shall be avoided within one-half mile of an active nest site between March 1 and September 15 (or August 15 if authorization is obtained from CDFG). If construction can not be avoided during the period when an active raptor nest is present, the biologist shall monitor the nest site(s) during construction. If a Swainson's hawk nest is abandoned during construction, or any active raptor nest is removed as a result of the project, the WHWD shall contribute funds for recovery and controlled release of nestlings, as specified in the current CDFG mitigation guidelines/management conditions for Swainson's hawk.

Impact. Installation of the pipeline crossing of the slough west of the San Joaquin River could temporarily affect water quality and aquatic resources in the slough. This is considered to be a potentially significant impact.

Construction of the pipeline crossing would likely involve temporary dewatering of a section of the slough to excavate the trench and install the pipeline, and could result in sediment discharges and temporary increases in water turbidity in the vicinity of the installation. Dewatering or increases in water turbidity could potentially impact aquatic life in the affected area of the slough. These activities would likely be subject to U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the Clean Water Act, and may thus require authorization from the Corps (possibly under a nationwide permit number 12). These activities could also require a streambed alteration agreement with the CDFG (under Section 1600 et seq. of the California Fish and Game Code).

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure

9. Following project approval and prior to construction, the WHWD shall consult with the Corps and CDFG to determine the extent of jurisdiction of these agencies and obtain any necessary authorizations. Best management practices and methods acceptable to the Corps and/or CDFG shall be employed to minimize potential impacts of construction within the slough. A qualified environmental technician shall be present during construction to monitor sediment discharges, and recommend appropriate measures as needed and these measures shall be implemented, to minimize potential impacts on water quality in the slough.

Impact. Installation of the pipeline crossing of the slough west of the San Joaquin River could affect riparian vegetation including valley oaks adjacent to the slough, and could result in abandonment or removal of Swainson's hawk or other raptor nests in these areas. This is considered to be a potentially significant impact.

The riparian vegetation bordering this slough provides habitat value for a variety of wildlife, and the mature valley oaks bordering the slough could potentially provide nesting sites for raptors. Active raptor nests are protected under Section 3.503.5 of the California Fish and Game Code, and Swainson's hawk is further protected as a state-listed threatened species. Therefore, removal of trees containing active raptor nests, or activities resulting in the abandonment of an active Swainson's hawk nest, would be considered significant impacts.

Mitigation Measures

10. Refer to mitigation measure 7.

11. The pipeline alignment shall be placed so as to minimize disruption of riparian vegetation and avoid removal of mature valley oaks or other potential nesting trees along the slough. If removal of such trees can not be feasibly avoided, WHWD shall replant an equal number of trees of the same species as those removed on the site. If riparian vegetation is removed, the affected areas shall be restored by replanting appropriate native riparian species following completion of the pipeline crossing.

Water Conveyance (Agricultural Resources)

Environmental Setting

Land Uses in the vicinity of the proposed pipeline route consist primarily of agricultural, grazing and rural residential uses. The pipelines will run along the shoulder of paved and dirt roadways and across agricultural fields in some areas. The pipeline will be installed in a trench up to 7.5 feet deep and up to 20 feet wide in areas of agricultural operations. The trench would be refilled and restored to its former condition after pipeline installation.

In addition, the staging areas for the River crossing are located in areas used for agricultural operations. The western staging area, which will occupy a total of about 2.6 acres, is located within the levy in an areas that was inundated by the floods of last winter. Review of historical air photos indicates this area has been used for agricultural production in the past. This area is not currently under production.

The eastern staging area, which will occupy about 0.9 acres, is located outside the eastern levy. This area is currently under cultivation with row crops.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land. (CEQA Guidelines, Appendix G).

Impact. The conveyance pipeline will require installation of about 32,000 linear feet of pipeline in trenches along the edge of agricultural fields and across agricultural fields. This will cause a temporary disruption of agricultural activities and could lead to long term adverse effects on agricultural productivity should site restoration not be properly conducted. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Impact. The staging areas for the River Crossing will temporarily remove a total of about 3.5 acres of agricultural land from production during installation of the pipeline under the River. This will cause a temporary disruption of agricultural activities, soil compaction and could lead to long term adverse effects on agricultural productivity should site restoration not be properly conducted. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measures

12. Prior to issuance of a grading permit for pipeline installation, the application shall submit an agricultural restoration plan identifying the exact pipeline route in relation to adjacent land uses and the specific measures that will be taken to restore disturbed agricultural lands to their pre-project condition. This plan should include such measures as stockpiling strippings and measures necessary to enhance soil structure for compacted areas. The plan shall be reviewed and approved by the County Environmental Coordinator prior to initiation of trenching activities.

Implementation of this mitigation measure will reduce project impacts associated with agricultural resources to a level of insignificance.

Water Conveyance (Air Quality)

Environmental Setting

The Diablo Grande Specific Plan EIR addresses the regulatory environment and existing air quality conditions impacting the region. This discussion is incorporated herein by reference.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will violate any air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations (CEQA Guidelines, Appendix G).

Impact. The use of construction vehicles and trenching activities will temporarily increase local PM_{10} emissions during the installation of the water pipeline.

Pipeline installation activities typically involve three elements: trenching, backfilling and materials delivery. Each element includes different activities and different construction vehicles. Trenching activities are expected to include one backhoe vehicle. During backfilling, it is expected that one front loader would be used to push soils into the trench around the pipeline. Materials delivery typically includes dump trucks for transporting back fill materials and possibly removal of some soils from the pipeline site, and flatbed trucks to deliver pipeline materials to the project site.

PM_{10} emissions associated with trenching are difficult to ascertain because the work surface area consists of a three-sided ditch. Exposure to wind is minimal in this situation. However, soil is scooped out and placed along side the trench. In the case of pipeline installation along roadway shoulders, the exposed berm generally remains during the day, with backfilling taking place at the end of the day. For pipelines sections located in agricultural fields, it would be expected that immediate backfilling would not be a critical issue, unless interruption of agricultural operations must be minimized and backfill operations must be conducted continuously and on the "heels" of the trenching and pipe laying activities.

Depending on wind conditions, pipeline installation could result in increased local PM_{10} levels. As such increases are not expected to be dramatically different from those typically associated with agricultural activities and there are no identified sensitive receptors in the immediate vicinity of the proposed pipeline route, this impact is considered to be insignificant. However, the consultant recommends that dust minimization measures be used during project construction such as watering of construction areas, covering of haul trucks and covering inactive storage piles. Mitigation is not warranted.

Water Conveyance (Archaeological Resources)

Environmental Setting

The San Joaquin Valley contains known and unknown archaeological sites.

Project Analysis

Approximate location of future water conveyance pipeline is depicted in Figures 8 and 9. This SEIR did not evaluate if there were archaeological resources within a particular water conveyance pipeline right-of-way.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group; or paleontological site except as a part of a scientific study (CEQA Guidelines, Appendix G).

Impact. The potential exists for disruption of archaeological sites during the pipeline construction phase. This is considered to be a potentially significant impact. Implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measure

13. Prior to digging trenches for water conveyance pipelines, the applicant shall be responsible for conducting a site reconnaissance of the pipeline location and a literature search through the relevant California Information Center.

14. If a resource is found prior to or during construction, the applicant will be required to implement the conditions contained in Appendix K of CEQA. Appendix K outlines actions that must be implemented in the event resources are found.

Consistency with Applicable Plans, Policies and Ordinances

Stanislaus County General Plan

Land Use Element

Policy 7. Riparian habitat along rivers and natural waterways of Stanislaus County shall to the extent possible be protected.

Implementation Measure 1. All requests for development which require discretionary approval and include lands adjacent to or within riparian habitat shall include measures for protecting that habitat.

Project Consistency. With the mitigations incorporated herein, the proposed project is considered consistent.

Policy 14. Uses shall not be permitted to intrude into or be located adjacent to an agricultural area if they are detrimental to continued agricultural usage of the surrounding area.

Implementation Measure 1. All development proposals that require discretionary action shall be carefully reviewed to ensure that approval will not adversely affect an existing agricultural area.

Project Consistency. Well digging and pipeline construction could temporarily disrupt agricultural operations. But because the disruption is temporary, the project is considered to be consistent.

Conservation/Open Space Element

Policy 2. Assure compatibility between natural areas and development.

Implementation Measure 2. Review all development requests to ensure that sensitive areas (e.g. riparian habitats, vernal pools, rare plants) are left undisturbed or that mitigation measures acceptable to appropriate state and federal agencies are included in the project.

Project Consistency. With the mitigations incorporated herein, the proposed project is considered consistent.

Policy 7. New development that does not derive domestic water from pre-existing domestic and public water supply systems shall be required to have a documented water supply that does not adversely impact Stanislaus County water resources.

Implementation Measure 1. Proposals for development to be served by new water supply systems shall be referred to appropriate water districts, irrigation districts, community service districts, the State Water Resources Control Board and any other appropriate agencies for review and comment.

Project Consistency. Based on the above impacts analysis and mitigations, the proposed project is considered to be consistent.

Implementation Measure 2. Review all development requests to ensure that sufficient evidence has been provided to document the existence of a water supply sufficient to meet the needs of the project without adversely impacting the quality and quantity of existing local water resources.

Project Consistency. Based on the analysis contained in this SEIR, there are long-term water resources available that would meet the needs of the project without adversely impacting the quality and quantity of existing local water resources.

Policy 30. Habitats of rare and endangered fish and wildlife species shall be protected.

Implementation Measure 1. The County shall use the CEQA process to ensure that development does not occur that would be detrimental to fish, plant life, or wildlife species.

Project Consistency. Based on the analysis contained in this SEIR, there are long-term water resources available that would meet the needs of the project without adversely impacting fish, plant life, or wildlife species.

Turlock Irrigation District Groundwater Management Plan

The goal of the groundwater management plan is to implement sound groundwater management practices, in order to maintain the available groundwater resources to meet the beneficial uses and needs of the Turlock Groundwater Basin. The groundwater management plan includes sound principles of groundwater optimization which include, but are not limited to, the following:

- Protection and planned maintenance of groundwater quality;
- Protection and beneficial use of recharge areas; and
- Monitoring of basin parameters for the primary purpose of maintaining groundwater quantities and eliminating conditions of long-term overdraft.

Project Consistency. The extraction of 11,000 acre-feet per year of drainage water from the Turlock Groundwater Basin is not considered to be significant in comparison to the 496,000 acre-feet per year of groundwater currently pumped from the Turlock Groundwater Basin (Brown and Caldwell, 1997). Furthermore, the groundwater model results indicate that the dissolved solids load to the aquifer would increase by approximately three percent. Assuming that this would eventually result in a three percent increase in TDS levels in the upper aquifer, TDS levels might increase an average of 981 mg/l to 1,010 mg/l. This increase would not be significant. Therefore, the use of TID groundwater is not considered to be inconsistent with the goals of the Turlock Groundwater Basin Groundwater Management Plan.

Cumulative Impacts

This option would result in extraction and transfer of up to 11,000 ~~12,000~~ AF of groundwater from a well field located on the east side of the San Joaquin River about eight miles east of the City of Patterson. The TID has extracted groundwater

from this area since the 1920's to lower the groundwater table and thereby increase agricultural productivity as well as to supply irrigation water to farmers in the vicinity. In addition, a portion of the drainage water is discharged to the San Joaquin River. Project implementation will result in lower groundwater levels and would therefore reduce the need for drainage pumping to lower groundwater levels.

The primary cumulative effects relate to the hydrology of the San Joaquin River. The project would result in reductions in flows to the San Joaquin River by a relatively small amount, even during the prescribed drought scenarios. As described in the previous sections, the proposal does not have the potential to contribute to long-term adverse reduction in groundwater of any groundwater basins.

Other existing water supply projects draw water from the San Joaquin River. For example, the Patterson Water District (PWD) diverts water from the River upstream near the City of Patterson. During the years 1992 to 1995, the PWD diverted an average of 26,500 AF from the River during its March to September irrigation season or an average diversion rate of 6.3 cubic feet per second (for 210 days or 3,786 AF per month).

Growth Inducing Impacts

This option would directly facilitate development of Diablo Grande: the stated project objective. The option will not free up any additional water supplies or provide infrastructure that could be used for other development. The option would likely increase the productivity of agricultural practices in the immediate vicinity of the new drainage wells through reductions in groundwater elevations, thereby fostering economic growth to some extent.

2.5 Berrenda Mesa Water District (Option 5)

The project description of this option is set forth in Section 1. The following sections address environmental impacts relating to this option.

The Monterey Agreement Program EIR ("Monterey Agreement EIR") evaluated the environmental impacts that would be associated with transfer by sale of 130,000 AF of water entitlement from agricultural contractors to urban contractors and non-SWP contractors. The proposed project would result in transfer of up to 8,000 AF of the available 130,000 AF of water entitlement. The "system-wide" impacts of this transfer on surface water and groundwater resources were evaluated in the certified Monterey Agreement EIR, which is incorporated herein by reference. This SEIR assumes that the transfer of water entitlement will be part of the 130,000 AF obligation of KCWA addressed in the Monterey Agreement.

No further evaluation in this SEIR is necessary to address water supply impacts. For reference, the following provides a brief summary of how impacts of the water sale

were evaluated in the Monterey Agreement EIR concerning surface water, groundwater and agricultural resources.

Water Supply (Surface Water)

Environmental Setting

Surface water is supplied to the BMWD by the SWP via the California Aqueduct, which roughly parallels Interstate 5. Primary facilities of the SWP include the following:

- Oroville Dam and Reservoir on the Feather River (a primary water supply source);
- San Luis Reservoir near Los Banos;
- Terminal reservoirs at Del Valle in the north and Castaic and Perris in the south;
- Banks pumping plant in the Sacramento-San Joaquin Delta near Tracy (a water diversion point);
- North Bay Aqueduct (the means of water transport to the northern San Francisco Bay area);
- South Bay Aqueduct (the means of water transport to the southern San Francisco Bay Area); and
- California Aqueduct with its various branches and pipelines (the means of water transport to Central and Southern California).

In the early 1960's, DWR entered into a series of substantially similar water supply contracts with various urban and agricultural water suppliers, or "contractors". Each contractor received a right to service for an annual quantity of water entitlement and capacity for delivery of that entitlement in return for payments intended to cover capital, operation and maintenance costs.

SWP water is conveyed to the BMWD from SWP facilities located north of the Delta. The water is pumped at the Banks Pumping Plant through the California Aqueduct and the BMWD takes water from both the California Aqueduct and the Coastal Aqueduct. The Banks pumping Plant operations are generally limited during February through June to protect Delta fishery resources. In addition, the capacity of the Delta pumping facilities is less than the summer water demand of the SWP. The SWP water is pumped from the Delta during fall and winter months at a rate that exceeds direct demands at that time. The amount of water that exceeds demands is stored in San Luis Reservoir. Therefore, water operations that are affected by BMWD water use include the Banks Pumping Plant, California Aqueduct, San Luis Reservoir, and Coastal Aqueduct.

Project Analysis

Permanent sales of entitlement from agricultural contractors to non-SWP water users would be subject to existing Delta regulatory constraints and would require action by the State Water Resources Control Board to deliver SWP water outside the service area designated in the SWP water permit rights.

The transfer of water from the BMWD to the WHWD for use at Diablo Grande would have little, if any effect, on the total water diverted out of the Delta or the average Sacramento-San Joaquin drainage area runoff of 30 million AF. Rather, water that is presently delivered through the California Aqueduct to the BMWD would be diverted earlier near Patterson and delivered to the WHWD. The cumulative total of SWP water delivery would remain the same.

The pattern of diversion, relative to current BMWD water use, would be only incrementally altered. During the summer months, some BMWD water is diverted to the San Luis Reservoir. In the winter months this water is diverted from the San Luis Reservoir. In this scenario, water for WHWD would be diverted more uniformly throughout the year (Herb Greydanus, pers. com., December 24, 1997).

Impacts and Mitigation Measures

Standard of Significance. For the purposes of this analysis, a project will normally have a significant effect on the environment if it will substantially degrade or deplete surface water and/or groundwater resources or interfere substantially with surface and/or groundwater recharge.

Impact. Implementation of the proposed project would not cause any significant adverse impacts with regard to surface water resources. No mitigation is warranted.

Water Supply (Groundwater)

Environmental Setting

Limited groundwater supplies within the District is saline and drainage is generally eastward through an underground Tulare Lake Basin, which is hydraulically closed. District lands have not given evidence of drainage problems and the shallow groundwater levels found in other locations on the west side of the San Joaquin Valley. The BMWD is considered to be a "non-ground water Member Unit" by the KCWA (BMWD, 1988).

Project Analysis

There will be little or no impact on groundwater resources as a result of the sale of BMWD entitlement to WHWD. It is unlikely that groundwater would be pumped from other groundwater basins to non-overlying lands to replace the sold water because the supply is limited and of poor quality (Herb Greydanus, pers. com.,

December 24, 1997). Groundwater is limited in BMWD and is not of sufficient quality or quantity to use for irrigation.

Under the proposed option, members of KCWA would have the opportunity of the first right of refusal, therefore, they would have the opportunity to purchase this water.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will substantially degrade or deplete groundwater resources or interfere substantially with groundwater recharge (CEQA Guidelines, Appendix G).

Impact. It is not anticipated that the proposed sale of up to 8,000 AF of BMWD water entitlement will cause significant adverse impacts to groundwater resources. No mitigation is warranted.

Water Supply (State Water Project Facilities)

Environmental Setting

The SWP is operated in a coordinated manner with the U.S. Bureau of Reclamation's Central Valley Project (CVP) to meet Delta water quality and fishery resources requirements. Due to Delta operations physical and environmental requirements, the CVP and SWP coordinate operations.

Water supplied to BMWD is pumped at the Banks Pumping Plant into Bethany Reservoir and flows into the California Aqueduct. The water can be diverted into San Luis Reservoir for storage or diverted into the California Aqueduct through the Dos Amigos Pumping Plant. Water for BMWD can be diverted into the Coastal Branch Aqueduct and pumped through Las Perillas and Badger Hill pumping plants to the BMWD turnouts. Water can also be diverted from the California Aqueduct directly and conveyed to the BMWD at a location north of the community of Lost Hills.

Historically, if BMWD has not needed to use all of the available SWP water, the water was available for purchase and use by KCWA or other KCWA member agencies.

The quantity of water in the SWP facilities at any time is based on water deliveries to users and to storage facilities located south of the Delta. Therefore, if delivery patterns are modified, new flow patterns must consider the impacts to both direct deliveries and storage operations. These considerations have become more important because operations of the Banks Pumping Plant have been modified in recent years due to environmental regulations. The Banks Pumping Plant must be operated in accordance with the 1994 Bay/Delta Agreement which was signed in December 1994, a 1993 Biological Opinion issued by the National Marine Fisheries

Service to protect Winter Run Chinook Salmon, and a 1995 Biological opinion issued by the U.S. Fish and Wildlife Service to protect Delta smelt. The agreement and the biological opinions primarily reduce Delta Pumping plant operations in February through June. Due to the more restrictive operations constraints, any changes in water deliveries or storage patterns must be evaluated for all SWP facilities.

Project Analysis

According to the project description, the acquisition of water entitlement by the WHWD from the BMWD would include assumption of the obligations and conditions of KCWA/BMWD to the DWR for SWP water. These obligations would include operation conditions.

Impacts and Mitigation Measures

Standard of Significance. For the purposes of this analysis, significant impacts to SWP contractors would occur if use of contracted capacity of SWP facilities would be reduced.

Impact. The proposed project would not result in any substantial changes to SWP operations over the existing setting. Water previously delivered to the BMWD through the California Aqueduct would be diverted farther to the north near the City of Patterson at the Diablo Grande main supply line crossing of the Aqueduct. This would increase the capacity downstream of the new diversion within the California Aqueduct over current conditions. Since the current operation conditions would continue to be applied, the project would not result in any significant adverse impacts relating to SWP facilities. No mitigation is warranted.

Water Supply (Agricultural Resources)

Environmental Setting

Of the total irrigated cropland acreage of just over 3.2 million acres in the Tulare Lake Hydrologic Region as a whole in 1990, 61 percent supports cultivation of field crops (grain, cotton, sugar beet, alfalfa, pasture and tomatoes), 23 percent supports orchards and vineyards and the balance supports other crops.

Project Analysis

The Monterey Agreement EIR included an analysis of the impacts to agricultural production that would result from transferring 130,000 AF of entitlement from agricultural contractors in the Tulare Lake Hydrologic Region to urban uses. The BMWD is located within the Tulare Lake Hydrologic Region.

The BMWD has projected that in the next five to 10 years (start date 1995), the irrigated acreage of BMWD will be reduced to between 15,000 and 20,000 acres as

older, less productive almond trees and vineyards are removed each year. The land will continue to be cultivated as non-irrigated agriculture. The irrigation demand will be reduced to about 60,000 AF per year as compared to a water entitlement of 155,100 AF. It is not feasible for BMWD to replace the transferred water entitlement with local surface water or groundwater, because no such local supplies exist (Montgomery Watson, 1995).

Under the assumption that all cropland reduction attributable to the reduction of water deliveries (i.e., 130,000 ac. ft.) would occur to field crops, a total of 41,640 acres would be removed from production . The total acreage currently under cultivation in the Tulare Lake Hydrologic Region where the water would be taken from, is 3.2 million acres (Science Applications International Corporation 1995). Therefore, the loss of 41,640 acres represents slightly less than 1.5 percent of the total acreage.

This reduction of field crop acreage represents a worst-case scenario as land has already gone out of production in some districts. This worst case scenario assumes that there has been no implementation of alternative irrigation methods, cropping patterns, or change to less water-intensive crops on acreage cultivated. The Monterey Agreement EIR concluded that such potential reductions in cropland are not considered significant impact on the agriculture of the region.

This worst-case scenario may overstate the case and may exaggerate the potential cropland reductions for three reasons:

- some or potentially all of the cropland that could be idled likely already has been because the urban priority for SWP water has rendered agricultural water supplies to these lands unreliable and irrigation has been sporadic or abandoned;
- some of these lands have been marginally productive even when SWP water has been available so they have not been irrigated for many years; and
- the cost of SWP water has rendered some or all of these lands uneconomical for farming, so they have been left fallow.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land (CEQA Guidelines, Appendix G).

Impact. The transfer of 130,000 AF of entitlement water from agricultural contractors to urban uses may result in a significant loss to agricultural production. Based on the above discussion, this is not determined to be a significant impact. No mitigation is warranted.

Water Supply (Groundwater Banking)

Environmental Setting

The Semitropic Water Storage District (SWSD) is located in Kern County east of the BMWD. The SWSD is a member agency of KCWA and has contracted with KCWA for an annual entitlement of firm and surplus water. Annual deliveries range from 180,000 AF in 1987 to 6,000 AF in 1991. The SWSD obtains water directly from the California Aqueduct through two turnouts. SWSD has constructed a Groundwater Banking System that includes conveyance facilities to transport water to and from the California Aqueduct; expanded distribution facilities; and expanded facilities to recharge and recover groundwater. The maximum amount of accumulated banked water will be 1,000,000 AF. The estimated withdrawal rate is 90,000 AF per year. Withdrawals from storage can be provided either by SWSD using the groundwater and allowing the groundwater storage contractor to divert an equal portion of the SWSD entitlement from the SWP; or conveyance of the extracted water to the California Aqueduct for delivery to SWP water entitlement holders with diversions from California Aqueduct downstream of SWSD.

The Groundwater Bank is designed to allow for other users to store and withdraw water. The other users may be "Banking Partners" with first priority for use, or lower priority Banking Partners. The final agreements for a new user are dependent upon agreements among DWR, SWSD, KCWA, and the Banking Partners for use of the California Aqueduct for conveyance of the water to be stored and the recovered water, and change in Point of Delivery at the turnout. Costs for Groundwater Banking have been determined on put-and-take costs based on amount of stored water, repayment of construction costs, operation and maintenance costs, cycling incentive charges, capacity rights, and power costs.

Project Analysis

As described in the project description for this option in Section 1, banking of a portion of the BMWD entitlement may be used to provide for drought year deficiencies and surplus water in the early years of Diablo Grande development could also be banked. Use of the Groundwater Bank for this purpose would be conducted pursuant to agreements as described above.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will substantially degrade or deplete groundwater resources or interfere substantially with groundwater recharge (CEQA Guidelines, Appendix G).

Impacts. The SWSD Groundwater Bank could be used in accordance with the existing operation criteria to store a portion of the transferred water entitlement on a long-term basis to maximize the useability of the BMWD water. The use of the Groundwater Bank to the degree contemplated (up to a maximum of 8,000 feet of

deposit or withdrawal per year) is within the design and operations parameters of the Groundwater Bank and would not impact other users. Therefore, no adverse impacts would occur.

As described above, during times when the historical water flows through the Delta associated with the transferred water entitlement exceed the Diablo Grande demands, water may be deposited in the SWSD Groundwater Bank via the California Aqueduct. When the historical flows through the Delta associated with the transferred water entitlement are less than the Diablo Grande demands, water diverted through the Delta for SWSD would be diverted to Diablo Grande and water previously stored in the SWSD Groundwater Bank would be used by SWSD. This operation would not change Delta flow patterns and would not increase flows in the California Aqueduct and San Luis Reservoir as compared to conditions described under the environmental setting. No mitigation is warranted.

Water Conveyance (Archaeological Resources)

Environmental Setting

The San Joaquin Valley contains known and unknown archaeological sites.

Project Analysis

As described in the project description in Section 1, the only construction required for this option is a turnout from the California Aqueduct just north of Oak Flat Road and installation of a 30-inch water pipeline connecting to the existing Diablo Grande water pipeline in Oak Flat Road. This construction would take place within and adjacent to existing California Aqueduct facilities and within the areas between the existing pump station and Oak Flat Road. Refer to Figure 14. This SEIR did not evaluate if there were archaeological resources within a particular water conveyance pipeline right-of-way.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group; or paleontological site except as a part of a scientific study (CEQA Guidelines, Appendix G).

Impact. There is the potential for disruption of archaeological sites during the pipeline construction phase. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measure

15. Refer to mitigation 13 and 14.

Water Conveyance (Biotic Resources)

As described in the project description in Section 1, the only construction required for this option is a turnout from the California Aqueduct just north of Oak Flat Road and installation of a 30-inch water pipeline connecting to the existing Diablo Grande water pipeline in Oak Flat Road. This construction would take place within and adjacent to existing California Aqueduct facilities and within the areas between the existing pump station and Oak Flat Road, which is flat and devoid of vegetation (see Figure 14 and 15). Construction and operation of these facilities are not anticipated to result in any significant adverse impacts.

Consistency with Applicable Plans, Policies and Ordinances

Review of the Kern County General Plan and Stanislaus County General Plan indicates there are no applicable plans or policies relating to this alternative.

Berrenda Mesa Water District

The Berrenda Water District is a non-groundwater district. Its only source of water is surface water from the State Water Project. Therefore, this district does not have a groundwater management plan. However, it does have a conservation plan applicable to its constituency within the district. No policies or goals of this conservation plan are relevant to the Diablo Grande project (Ronald Lampson, pers. com., August 25, 1997).

Cumulative Impacts

Cumulative impacts associated with the transfer of water entitlements must consider the impacts of other water transfers that would occur in the Kern County area and throughout the Central Valley. Initially, most of the other transfers may occur under the Monterey Agreement, as addressed in the Final EIR for the Monterey Agreement. That EIR noted that similar projects that provide a long-term or permanent transfer of water entitlements or water rights may occur but have not been identified at this time.

The Monterey Agreement EIR found that transfer of up to 130,000 AF of water entitlements from the KCWA would have negligible impacts on most environmental elements on a statewide basis. However, the EIR did note that indeterminate impacts may occur to biological, cultural and recreation resources and to health and safety concerns on a statewide basis. The EIR also indicated that adverse, but not significant impacts may occur to land use and socio-economic concerns on a statewide basis and within the KCWA/Tulare Lake region. This determination was

reached because the amount of land that would become non-irrigated would represent about one percent of the total irrigated cropland in the Tulare Lake region.

Other water transfers are expected to occur in the future. For example, water users located in the watersheds of the upper Sacramento, Feather, Yuba, Bear, Merced, and Stanislaus Rivers have participated and/or are considering participation in short-term water transfers of one- to five-year periods for water supplies and/or fish and wildlife uses. However, projects and locations have not been identified at this time. The extent of these other transfer programs will depend on the length of the contract period.

Future water transfers may involve permanent transfer of water entitlements such as that proposed by this option, or the transfers may involve year-to-year agreements during periods of water restrictions. If future SWP water entitlement transfers do not change the pattern of Delta diversions, SWP operations should not be impacted. Prior to any potential future water transfer, an application to the DWR would be required for a "change in place of use". At that time, the DWR would determine if this SEIR is adequate, or if additional environmental analysis would be required.

Overall, implementation of water transfer programs will be part of the water demand that has been identified by the State Department of Water Resources as being unmet by current water supplies. The DWR identified 2.9 to 4.9 million AF of projected water demand that would not be met by existing water facilities, conservation, and reclamation if all water entitlements and water rights continued to be delivered to existing users. Water transfers can be used in the future to reduce the currently unmet future demand. Therefore, water transfers may be beneficial from a cumulative statewide perspective, depending largely upon one's own perspective. Regardless, each transfer proposal must be evaluated individually to determine direct or indirect impacts at a project-specific level. This would be for the DWR to determine as part of a "change in place of use" review.

Growth Inducing Impacts

This option would directly facilitate development of Diablo Grande: the stated project objective. This option could provide up to three-quarters of the water demand of the entire Diablo Grande project. If a cut back of 50 percent were included, this option, in conjunction with on-site water, and reclaimed water discussed in the original EIR, could supply all of the water needed for the Phase 1 of the Preliminary Development Plan (PDP) and possibly a portion of the supply for Phase 2. No water would be made available for other uses. The infrastructure constructed as part of this option would not be available for other uses. On this basis, the project is not considered to be growth inducing.

2.6 Bravo Management Company, Inc. (Option 8)

Water Supply (Groundwater)

Environmental Setting

The groundwater basin underlying the Buena Vista Water Storage District (BVWSD) is approximately 120 square miles in area and is part of a basin which contains millions of acre-feet of water (Herb Greydanus, pers. com., December 24, 1997). The BVWSD has an annual water supply demand of approximately 170,000 acre-feet. Depending on hydrology, approximately 70 percent of the BVWSD water demands are met from the use of surface water originating from the SWP (14,000 AF) and the Kern River (110,000 AF) with the balance coming from groundwater. Because of annual variations in hydrology, the balance between groundwater pumping and groundwater recharge varies from year to year (Harry Starkey, Bookman-Edmonston Engineering. Transmittal to Herb Greydanus, Bookman-Edmonston Engineering, December 18, 1997).

Project Analysis

Under previous agreements, the Buena Vista Water Storage District (BVWSD) has banked 20,000 acre-feet of water for BMC in the groundwater basin of Kern County. The BVWSD, through the Kern County Water Agency (KCWA), will deliver up to 1,000 acre-feet per year of its State Water Project (SWP) water to a new Oak Flat turnout on the California Aqueduct to accommodate Diablo Grande (i.e., Western Hills Water District). The water will be delivered for a period of up to twenty consecutive years at a rate of about 1,000 acre-feet per year. In the same year that the BVWSD makes a delivery of SWP water to Diablo Grande, a like amount of BMC previously banked groundwater will be pumped from the groundwater basin by BVWSD.

Based on changes in groundwater storage and groundwater levels for pumping groundwater in the BVWSD, an estimate of the annual reduction in groundwater levels associated with 1,000 acre-feet of groundwater pumping is between .125 feet to .25 feet (ibid.). However, this exchange would not necessarily result in a reduction of groundwater levels because of the previously stated variations in the annual amounts of groundwater recharge each year in the BVWSD. However, an estimate of the cumulative impact over the 20 year period of exchange would be between 2.5 and 5 feet (ibid.). This reduction in groundwater levels then becomes a water storage opportunity for someone else.

The use of 1,000 acre-feet per year over a 20 year period from an area that contains millions of acre-feet of groundwater is considered inconsequential and insignificant.

Impacts and Mitigation Measures

Standard of Significance. For the purposes of this analysis, a project will normally have a significant effect on the environment if it will substantially degrade or deplete surface water and/or groundwater resources or interfere substantially with surface and/or groundwater recharge.

Impact. Implementation of the proposed project would not cause any significant adverse impacts with regard to surface water resources. No mitigation is warranted.

Based on the total amount of water supplied by the BVWSD (170,000 AF per year), the use of 1,000 acre-feet per year for 20 years is not considered to have a significant on total groundwater supplies.

Water Conveyance (Biotic Resources)

The only construction required for this option is a turnout from the California Aqueduct just north of Oak Flat Road and installation of a 30-inch water pipeline connecting to the existing Diablo Grande water pipeline in Oak Flat Road. This construction would take place within and adjacent to existing California Aqueduct facilities and within the areas between the existing pump station and Oak Flat Road, which is flat and devoid of vegetation (see Figure 14 and 15). Construction and operation of these facilities are not anticipated to result in any significant adverse impacts.

Water Conveyance (Archaeological Resources)

Environmental Setting

The San Joaquin Valley contains known and unknown archaeological sites.

Project Analysis

As described in the project description in Section 1, the only construction required for this option is a turnout from the California Aqueduct just north of Oak Flat Road and installation of a 30-inch water pipeline connecting to the existing Diablo Grande water pipeline in Oak Flat Road. This construction would take place within and adjacent to existing California Aqueduct facilities and within the areas between the existing pump station and Oak Flat Road. Refer to Figure 14. This SEIR did not evaluate if there were archaeological resources within a particular water conveyance pipeline right-of-way.

Impacts and Mitigation Measures

Standard of Significance. A project will normally have a significant effect on the environment if it will disrupt or adversely affect a prehistoric or historic

archaeological site or a property of historic or cultural significance to a community or ethnic or social group; or paleontological site except as a part of a scientific study (CEQA Guidelines, Appendix G).

Impact. There is the potential for disruption of archaeological sites during the pipeline construction phase. This is considered to be a potentially significant impact. However, implementation of the following mitigation will reduce the impact to a less than significant level.

Mitigation Measure

16. Refer to mitigation 13 and 14.

Consistency with Applicable Plans, Policies and Ordinances

Review of the Kern County General Plan (1994) indicates there are no relevant policies to this alternative.

Cumulative Impacts

The Bravo Management Company water is water which is specifically owned and is stored in an existing groundwater storage area. This water is currently available for transfer to an urban use and may be transferred either to the Diablo Grande project or some other project. As this water is of a limited supply and it is not available in larger amounts, the impact associated with this supply source is limited to the actual usage of 1,000 acre feet per year for 20 years. There are no known cumulative effects related to this supply.

Growth Inducing Impacts

This option would directly facilitate development of Diablo Grande: the stated project objective. No water would be made available for other uses. The infrastructure constructed as part of this option would not be available for other uses. On this basis, the project is not considered to be growth inducing.

3.0 Related Environmental Issues

3.1 Unavoidable Significant Adverse Environmental Impacts

An unavoidable significant adverse environmental impact is a significant adverse impact which cannot be reduced to an insignificant level through the implementation of mitigation measures. In the case there were an unavoidable impact, a statement of overriding consideration would be required. Based on the analysis in Section 2, there are no unavoidable significant environmental impacts associated with the proposed project.

3.2 Alternatives

CEQA requires a discussion of feasible alternatives to the proposed project that could reduce or eliminate any significant adverse environmental impacts associated with the proposed project (CEQA guidelines section 15126(d)). The discussion of alternatives must focus on those alternatives capable of eliminating any significant adverse environmental impacts or reducing them to a level of insignificance, even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly (CEQA Guidelines section 15126 (d)(3)).

This section addresses alternatives that were discussed in the Notice of Preparation for the Diablo Grande Water Master Plan SEIR other than those for which project-specific analysis is provided in Section 2. The level of detail provided with respect to these potential alternative sources of permanent water supply for the Diablo Grande project is sufficient to support program level analysis. On this basis, these potential sources are addressed as project alternatives. Each of the Alternatives discussed herein are based on existing information. The degree of specificity of each Alternative discussion corresponds with the information provided and available. Should the applicant decide to pursue any of these alternatives, additional environmental review would be necessary. Four alternatives are addressed in this section, including the "no-project" alternative:

- Ceres Algal Turf Scrubber (Option 3-2)
- Modesto Algal Turf Scrubber (Option 3-3)
- No Project Alternative

Each of the alternatives discussions are organized as follows:

- Project Description
- Water Supply Impacts
- Water Conveyance Impacts
- Construction Impacts
- Consistency with Applicable Plans, Policies and Ordinances

Within each of the impact discussion sections, issues determined to be relevant to the particular impact category are identified and discussed.

Two alternatives addressed in the Water Plan have been determined by the project applicants to be infeasible; the Mercy Springs Water District Option (Water Plan Option 6) and the Oakwood Lake Water District Option (Water Plan Option 7). On this basis, these alternatives are not addressed in this SEIR.

Algal Turf Scrubber - City of Ceres (Water Plan Option 3-2)

Project Description

This alternative involves construction of an Algal Turf Scrubber (ATS) at the City of Ceres Wastewater Treatment Plant, infrastructure to discharge treated effluent to the San Joaquin River, extraction of an equal amount of water from the River and conveyance of the water to the existing Diablo Grande water pipeline. The ATS facility would operate the same way as the ATS for the City of Patterson described in the initial study contained in Appendix D. Please refer to that discussion for a full description of the ATS operation.

The Ceres wastewater treatment plant is located on a 200-acre site in the southern part of Ceres at 4200 Morgan Road. The treatment plant includes approximately 125 acres used for treatment disposal. Existing facilities include aerated lagoons and ponds used for evaporation and percolation. The lagoons will be replaced by an activated sludge facility in the near future (Bill Riddle, pers. com., April 15, 1997).

The City of Ceres presently generates up to 2,000 acre-feet per year of secondary effluent which is used for irrigation (Bookman-Edmonston Engineering 1997). This effluent could be treated with the ATS process and discharged to the San Joaquin River. An equivalent amount of water would be diverted from the River and conveyed to the existing Diablo Grande pipeline near the Marshall-Davis Well Site. With a discharge permit from the Central Valley Regional Water Quality Control Board (CVRWQCB), the Western Hills Water District (WHWD) could recover all of the new water from the San Joaquin River minus channel losses, if any. Under the Water Code section applicable to the exchange (section 1485), the discharge and diversion rates would have to match to some extent.

New construction would include an ATS facility at the Ceres Wastewater Treatment Plant, a pumping plant and 12-mile long pipeline from the Treatment Plant to the San Joaquin River and its associated outfall facility, a diversion facility on the River and a 4.8-mile pipeline to WHWD's existing pipeline in Marshall Road. The discharge pipeline would likely be installed in Central Avenue south of the treatment plant to Harding Avenue approximately 9 miles south of the City of Ceres. At this juncture, the pipe would be directed west to cross Crows Landing Road and then traverse across agricultural land to the San Joaquin River. As an alternative, the pipeline could be directed south in Crows Landing Road to the San Joaquin River.

The diversion pipeline to carry water from the San Joaquin River to the existing Diablo Grande water conveyance infrastructure would be located along the same route as the water conveyance pipeline proposed and analyzed in Section 2.4, Shallow County Groundwater. Figure 3 illustrates the location of the treatment plant.

The diversion facility would include pumps likely housed in a masonry structure with approximate dimensions of 20 feet by 20 feet. Possible designs of the facility are illustrated on Figure 4 of the Patterson ATS Initial Study (Appendix D).

Approvals required to deliver ATS reclaimed water to Diablo Grande include:

- Approval of City of Ceres;
- WHWD approval of purchase;
- CVRWQCB approval of discharge to the San Joaquin River;
- SWRCB approval of water rights diversion permit;
- Affirmation of supply by County of Stanislaus;
- Approval of water treatment plant by Department of Health Services;
- Section 404 permit for discharge to River;
- Encroachment Permit for construction of diversion facility in floodplain; and
- NPDES Discharge Permit (RWQCB).

Water Supply Impacts

Hydrology. The Turlock Irrigation District (TID) annually receives approximately 200 to 250 acre feet of treated effluent per year from the City of Ceres for use as boiler feed water in the Almond Power Plant. The TID is entitled to take up to the first 400 acre feet of the highest quality treated effluent available from the City of

Ceres wastewater facilities. The amount of treated effluent available to Diablo Grande would likely be limited by the TID entitlement.

The project would result in water that is currently applied to agricultural lands in the vicinity of the treatment plant being conveyed to Diablo Grande. It is likely that a portion of the water applied to the agricultural lands reaches the groundwater table. As a result of elimination of the water supply for the irrigation of these agricultural lands, it is possible that an alternative irrigation source would be used, possibly groundwater. The project would therefore likely result in a net reduction in the amount of groundwater in the vicinity. This is a potentially significant impact. However, it could also be a benefit if groundwater were pumped near the San Joaquin, because it would lower the groundwater table and provide improved agricultural use of the land.

A water balance should be prepared as part of project-specific environmental review to quantify the hydrological effects of this alternative if it is pursued.

Water Conveyance Impacts

Air Quality. Monitoring of the pilot ATS plant in the City of Patterson included monitoring for creation of objectionable odors. Over the monitoring period, no objectionable odors were noticed (Report of Waste Discharge, Section 3). The consultant conducted a site visit on February 19, 1996 of the Patterson pilot ATS facility and noticed no objectionable odors at that time. The effluent input into the ATS is secondary treated effluent and is discharged as tertiary treated effluent. Therefore, it would be expected that any odor emitted from the ATS facility would be less than that which already exists. Furthermore, the City is currently using its effluent treated to a secondary level for irrigation purposes, which to date has not raised odor issues.

Construction Impacts

Environmental impacts relating to construction would occur associated with the following elements of the project: construction of the ATS at the City of Ceres Wastewater Treatment Plant; construction along the route selected for the 12-mile discharge pipeline; construction of the outfall; construction of the diversion facility and construction of the 4.8-mile diversion pipeline. These elements are discussed in the context of environmental issues that are considered to be potentially relevant.

Air Quality. As it pertains to construction impacts, refer to the *Water Conveyance (Air Quality)* discussion on air quality impacts in section 2.4 of this SEIR.

Biotic Resources. Wastewater Treatment Plant: The ATS facility would be installed within the existing treatment plant. It is not anticipated that this element of the project would affect any biotic resources.

Conveyance Pipelines. Installation of pipelines within road rights-of-way would not be expected to result in significant biotic impacts as these areas are generally devoid of vegetation. However, pipeline routes should be surveyed as part of project-specific environmental review. Installation of pipelines across agricultural fields would result in temporary disturbance to agricultural operations and could affect biotic resources depending upon the route selected. Site-specific surveys would be required to identify impacts associated with the conveyance pipelines to determine the level of impact.

Discharge Pipeline Outfall and Diversion Facility. Construction of the outfall and diversion facilities would likely result in minor bank disturbance and removal of a small amount of riparian habitat. Within this habitat may be plant and/or animal species that are threatened and/or endangered or classified as species of special concern by the State of California. Installation of these facilities would require a Streambed Alteration Permit from the California Department of Fish and Game (CDFG) and/or an Army Corps of Engineers Section 404 Permit. Compliance with these requirements would ensure that biotic impacts are less than significant.

There are areas in the County of Stanislaus which are considered "sensitive" (i.e., likely to have archaeological or historic cultural resources). These sensitive areas are often located near natural watercourses, springs or ponds, and on elevated ground. Many archaeological sites in the Central Valley have been buried by silt and might not be evident by inspection of the surface of the ground. The channel of natural watercourses change (meander) over the years and springs dry up, therefore, archaeological sites may be found in areas that are distant from present sources of water (Stanislaus County 1987).

Only an estimated 8 percent of the county has been surveyed for evidence of archaeological or historical cultural resources. Based on the most current information on the archaeological resources of the county (i.e., the Stanislaus County's General Plan Support Document, June 1987), there are 230 recorded cultural resource sites in the county: 206 are archaeological sites and 24 are historical sites. These records of known archaeological and historical sites are filed with the Office of Historic Preservation, Central California Information Center, California State University, Stanislaus, Turlock, California. The exact locations are kept confidential to protect these valuable resources.

Water conveyance pipelines would be placed about three to four feet below the ground surface along road rights-of-way and across agricultural fields. No deep grading would be required. These areas have been subject to previous disturbance. The outfall and diversion facilities would be constructed adjacent to the San Joaquin River and would involve minor bank disturbance. Implementation of the measures described in CEQA Guidelines Appendix K would provide adequate guidance in the event cultural resources are discovered during construction activities.

Consistency with Applicable Plans, Policies and Ordinances

City of Ceres General Plan

Policy 4.D.4.: The City will investigate options for the reuse of treated wastewater.

Project Consistency. Use of the city's wastewater by the Diablo Grande project would support this policy.

County of Stanislaus General Plan

Conservation/Open Space Element

> Policy 7. New development that does not derive domestic water from pre-existing domestic and public water supply systems shall be required to have a documented water supply that does not adversely impact Stanislaus County water resources.

Implementation Measures

1. Proposals for development to be served by new water supply systems shall be referred to appropriate water districts, irrigation districts, community service districts, the State Water Resources Board, and any other appropriate agencies for review and comment.

Project Consistency. The Notice of Preparation for the proposed project was distributed to the State Water Resources Board, the Western Hills Water District, Turlock Irrigation District, Patterson Water District, and New Del Puerto Water District. This alternative is consistent with this measure.

2. Review all development requests to ensure that sufficient evidence has been provided to document the existence of a water supply sufficient to meet the needs of the project without adversely impacting the quantity and quality of existing local water resources.

Project Consistency. This SEIR serves to provide evidence and documentation of water supply for the Diablo Grande project. As discussed above, this alternative would likely result in a net reduction in local groundwater resources through export of water to Diablo Grande. However, without benefit of a groundwater model it cannot be determined if this particular alternative would or would not be consistent with this implementation measure.

> Policy 30. Habitats of rare and endangered fish and wildlife species shall be protected. Information on rare and endangered species and habitats is constantly being updated.

Implementation Measures

1. The County shall use the CEQA process to ensure that development does not occur that would be detrimental to fish, plant life, or wildlife species.

Project Consistency. Because of the hydrologic relationships between groundwater and surface water, to determine consistency of this alternative with this implementation measure, a groundwater model would be needed.

Algal Turf Scrubber - City of Modesto (Option 3-3)

Project Description

The Algal Turf Scrubber (ATS) in the City of Modesto would operate the same way as the ATS for the City of Patterson described previously in this EIR. Refer to Appendix D for a full description of the ATS operation.

The City of Modesto presently generates approximately 25,000 acre-feet of treated effluent per year (Jim Lake, pers. com., April 18, 1997). The city treats its effluent at its Las Palmas Avenue treatment plant. This plant consists of a 1,000 acre treatment facility and an adjacent 3,500 acre ranch located near the San Joaquin River. The ranch is used for irrigating pasture with treated effluent.

Approximately 1,000 acres plus 100 acres of the ranch property contain oxidation ponds, recirculation channels and storage ponds. According to the City Public Works Department, Modesto currently reclaims and beneficially reuses up to 100 percent of its treated wastewater each year on the ranch. However, in 1995, the Plant discharged about 17,192 AF to the San Joaquin River and applied about 7,368 AF to the ranch for irrigating pasture.

Depending on the amount and timing of precipitation, the amount of treated effluent going to the river will fluctuate. For example, in wet years treated effluent discharged to the river will be higher than in dry years when irrigating the city owned pasture requires more water (ibid.). In the fiscal year 1996-1997, 15,350 AF was discharged to the San Joaquin River and 9,210 AF were applied to pasture. The location of the Modesto Treatment Plant is indicated on Figure 3.

Under this alternative, up to 12,000 AF of treated effluent would be conveyed to the ATS and discharged into the San Joaquin River and an equal amount of water would be diverted from the River for conveyance to Diablo Grande. New construction would include the ATS facility, facilities to convey and discharge the new water to the San Joaquin River and a diversion facility and pipeline from the River to WHWD's existing pipeline in Marshall Road. The total length of the pipelines would be about 7.7 miles. Under the Water Code section applicable to the exchange (section 1485), the discharge and diversion rates would be required to match to some extent.

Alternatively, arrangements could be made with the Patterson Water District (PWD) to convey the new water to the vicinity of State Highway 33 for use of wastewater from the City of Patterson. The amount of mixing of the reclaimed water with flow in the San Joaquin River would be a factor in the expanded use of new water from an ATS facility.

Approvals required to deliver ATS reclaimed water to Diablo Grande include:

- Approval of City of Modesto
- WHWD approval of purchase
- CVRWQCB approval of discharge to the San Joaquin River
- SWRCB approval of water rights diversion permit
- Affirmation of supply by County of Stanislaus
- Approval of water treatment plant by Department of Health Services
- Section 404 permit for discharge to River
- Encroachment Permit for construction of diversion facility in floodplain
- NPDES Discharge Permit (RWQCB)

Water Supply Impacts

Hydrology. The project would result in water that is currently applied to agricultural lands in the vicinity of the treatment plant and deposited in the San Joaquin River being conveyed to Diablo Grande. It is likely that a portion of the water applied to the agricultural lands reaches the groundwater table. As a result of elimination of the water supply for the irrigation of these agricultural lands, it is possible that an alternative irrigation source would be used, possibly groundwater. The project would therefore likely result in a net reduction in the amount of groundwater in the vicinity. This is a potentially significant impact. A water balance should be prepared as part of project-specific environmental review to qualify the hydrological effects of this alternative if the applicant pursues this alternative.

Water Conveyance Impacts

Air Quality. As it pertains to construction impacts, refer to the *Water Conveyance (Air Quality)* discussion on air quality impacts in section 2.4 of this SEIR.

Construction Impacts

Environmental impacts relating to construction would occur associated with the following elements of the project: construction of the ATS at the City of Modesto Wastewater Treatment Plant; construction along the route selected for the discharge pipeline; construction of the outfall; construction of the diversion station; and construction of the diversion pipeline. These elements are discussed in the context of environmental issues that are considered to be potentially relevant.

Biotic Resources. Refer to the biotic resources discussion for the City of Ceres Algal Turf Scrubber alternative, above.

Archaeological Resources. Refer to the archaeological resources discussion for the City of Ceres Algal Turf Scrubber alternative.

Air Quality. As it pertains to construction impacts, refer to the *Water Conveyance (Air Quality)* discussion on air quality impacts in section 2.4 of this SEIR.

Consistency with Applicable Plans, Policies and Ordinances

City of Modesto Urban Area General Plan.

Wastewater Policy 2f: The city will encourage the regional beneficial reuse of reclaimed water. The city is committed to development of a full reclamation program in the long term.

Project Consistency. The proposed use of the city's wastewater by the Diablo Grande project supports this policy. Effluent from the treatment plant that is currently applied as pasture irrigation or discharged to the San Joaquin River would be treated to a greater level and used for domestic purposes through discharge into the River and extraction of an equivalent amount of River water for conveyance to Diablo Grande.

Stanislaus General Plan

The policies evaluated in Section 3.3.1 are pertinent to this alternative because distribution lines would traverse County of Stanislaus jurisdiction. Refer to the Stanislaus General Plan consistency analysis contained in Section 3.3.1. The same analysis would apply to this alternative.

No-Project Alternative

CEQA guidelines section 15126(d)(2) requires that the specific alternative of "no project" be evaluated. The "no project" alternative shall discuss the existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved. The "project" analyzed in this SEIR is the provision of a long-term water supply for the Diablo Grande project. Without a long-term water supply, the Diablo Grande project will be limited to an on-site

water source only, plus temporary provision of 1,200 acre-feet from the Marshall-Davis Well Site. After the year 2000, when the 1,200 acre-feet from the Marshall-Davis Well Site water source terminates, the Diablo Grande project would be limited to its on-site water resources only. This "no project alternative" scenario considers "what would be reasonably expected to occur in the foreseeable future" to be a scenario where Diablo Grande is limited to on-site water sources only. However, it is possible that beyond the foreseeable future the proposed project would expand incrementally as new off-site water sources are found.

Because of the lesser amount of water available from on-site sources (estimated to be 464 acre-feet per year maximum and most likely significantly less, based on the discussion of on-site groundwater in Section 1), this alternative would result in significantly fewer impacts relative to all environmental issues. However, it is fair to assume that over time, the property owners could obtain off-site long-term water supplies, whereupon impacts discussed in the 1992 and this SEIR would occur, and, consequently, be mitigated.

Environmentally Superior Alternative

CEQA Guideline section 15126(d) requires identification of the environmentally superior project alternative. Based on the information contained in this EIR, the environmentally superior alternative can either be the Shallow County Groundwater option, because it will provide the greatest amount of water for the proposed project, thus meet project objectives without significant adverse environmental impacts; or, any combination of the other options, which, when combined, could fulfill the project objectives without project specific or cumulative significant adverse environmental impacts. Table 2 provides a comparison of the options.

Though the Ceres and Modesto ATS options listed in Table 10 contain the note "cannot determine" in the context of biotic resources, the lack of specific biological analysis associated with their respective conveyance pipelines should not be construed to mean that any potential future impacts associated with these two ATS options would not be mitigated to a level of insignificance. It should be understood that conveyance pipelines will, in large part, be installed in agricultural lands and existing roadways, thereby avoiding significant impacts. Any potential impacts to plant or animal species are expected to be identified and fully mitigated. Therefore, in light of this information, all options could be construed to be equally environmentally superior.

3.3 Cumulative Impacts

The discussion of cumulative impacts is prepared in compliance with CEQA Guidelines Section 15130. For the purposes of this SEIR, the cumulative impacts should be discussed first, to analyze the possible inter-relation between the options set forth in this SEIR and second, to discuss where other reasonably foreseeable future projects may create additional significant cumulative impacts related to water. These two discussions should be set forth separately in this document as provided below.

TABLE 10

Comparison of Options

Option	Hydrology[2]	Biotic Resources	Agricultural Resources	Air Quality
Marshall-Davis[1]	less than significant	less than significant	less than significant	less than significant
On-Site Groundwater[1]	less than significant	less than significant	less than significant	less than significant
Patterson ATS	less than significant	less than significant	less than significant	less than significant
Shallow County Groundwater	less than significant	less than significant	less than significant	less than significant
Berrenda Mesa	less than significant	less than significant	less than significant	less than significant
Bravo Management Company	less than significant	less than significant	less than significant	less than significant
Ceres ATS	less than significant	cannot determine[3]	less than significant	less than significant
Modesto ATS	less than significant	cannot determine[3]	less than significant	less than significant

1 This option's impacts were discussed in the 1992 EIR prepared for the Diablo Grande project. Therefore, impacts relative to this discussion relate to those impacts associated with extension of the contract between Diablo Grande and Marshall-Davis Farms, whereby Diablo Grande continues to use approximately 1,200 acre-feet of groundwater per year beyond the year 2000.

2 "Less than significant" designation indicates the impact would be reduced to a less than significant level after implementation of recommended mitigation measures.

3 Though the impacts associated with these two alternatives have been discussed in section 3 of the SEIR, the level of environmental analysis is not at a level of detail to allow a determination that specific impacts relating to biotic resources would be significant or insignificant. As stated in the SEIR (para. 2, page 3-5), any future pipeline routes shall be required to be surveyed as part of project specific environmental review. The lack of specific biological analysis associated with these alternative's respective conveyance pipelines should not be construed to mean that any potential future impacts associated with these two alternative options would not be mitigated to a level of insignificance. Any potential impacts to plant or animal species shall be identified as part of any future pipeline construction final environmental evaluation, and will be fully mitigated. Conveyance pipelines will, in large part, be installed in agricultural lands and existing roadways, thereby avoiding potentially significant impacts. In light of this information, all options could be construed to be equally environmentally superior.

Note: The water conveyance impacts associated with each long-term water option is included in the biotic resources, agricultural resources and air quality columns in the above table.

Source: EMC Planning Group Inc.

Cumulative Impacts Between the Water Options

Cumulative impacts relating to each of the water options are discussed in Section 2 of this SEIR. If two or more of the water options are combined, there may be cumulative impacts above those impacts associated with each option. Based on the possibility that the sum of impacts associated with a combined water option is greater than the impacts for each water option individually, it is necessary to assess such cumulative impacts.

The potential for cumulative impacts depends on proximity of the options chosen. To provide a theoretical "worst case scenario", this section analyzes the cumulative impacts assuming the two options in closest proximity to one another were selected: the Shallow County Groundwater option (11,000 AF) and the Patterson Algal Turf Scrubber option (1,000 to 3,000 AF). The Patterson Algal Turf Scrubber option is approximately 8 miles from the proposed shallow county groundwater well fields.

Shallow County Groundwater (Option 4) and the Patterson ATS (Option 3-1): The only potential cumulative environmental impacts determined to have potential significance relate to groundwater hydrology.

The analysis contained in Section 2 (Table 8) indicates that at two miles away from the well field for alignments A or B, the groundwater level decline is approximately 2 1/2 feet during a period of prolonged drought (Alignment A, Scenario B, which is the worst case scenario). Figures 22 through 29 contained in this SEIR indicate the area of groundwater decline is localized and because the known drop of groundwater levels two miles from the center of the well filed is only up to two feet, interconnection to wells eight miles to the west is highly unlikely (Paul Selsky, pers. com., January 6, 1998). Therefore, because of the groundwater level decline characteristics and proximity of the project wells to the City of Patterson wells, it is concluded that there is no hydrological connection between the two which would result in potential significant cumulative impacts.

Cumulative Impacts Related to Other Reasonably Anticipated Future Projects

The purpose of this discussion is to determine whether or not there may be significant cumulative environmental effects in relation to other projects proponents who are also attempting to acquire water for their developments, which may have cumulative impacts when taken into consideration with this project.

In the way of background, the Marshall-Davis Well Site water currently has a term which will terminate in the year 2001. It is possible that this water use may be extended, although that extension of use is not currently being required. The analysis of the use of the Marshall-Davis water included the expected growth of the City of Patterson. The Bookman-Edmonston Report prepared on this groundwater basin shows that the growth of the City of Patterson and the use of the Marshall-Davis water together can occur without a significant environmental impacts. At this

time there are no additional expansions proposed in this area which would further use this groundwater and therefore there are no foreseeable additional cumulative environmental effects.

With respect to onsite groundwater, there are no reasonably foreseeable projects beyond Diablo Grande which would use water beneath the Diablo Grande site. This water is limited in nature (no more than 464 acre-feet per year and most likely significantly less) and the radius of influence of this water use is only up to two miles. Any projects outside of the perimeter of the Diablo Grande project, even if using groundwater, would have no influence on this onsite groundwater as set forth in this environmental document. As such, even if such a project were to be developed, although none are reasonably foreseeable, there would be no impacts which would be cumulative in nature.

With respect to the Patterson ATS water, this water has a limited supply and is currently under contract with the WHWD. As such, this water is unable to be expanded to supply other projects. There are no known reasonably foreseeable projects which are attempting to acquire either this water or to use water immediately surrounding the Patterson Wastewater Treatment Plant which would in some way create a cumulative impact related to this supply.

With respect to the Shallow County groundwater option, this option is specifically proposed to supply an amount of water to the Diablo Grande project at a maximum of 11,000 acre feet per year. The impacts associated with this option have been defined and mitigation measures are set forth. While this supply could possibly be expanded and other districts could move forward with a similar type of a program, at this time there are no known projects which would attempt to either expand this use or to move forward with a similar type of option. As such, we find that it is too speculative to evaluate the possibility of other projects moving forward with similar types of supplies as permitted in CEQA Guidelines Section 15145 (regarding speculation).

With respect to the Berrenda Mesa Water District, a certified environmental document, the Monterey Principles EIR (Science Application International Corporation 1995) has been prepared and certified and is incorporated herein by reference (see Appendix E of this SEIR for excerpts of the Monterey Principals EIR), which sets forth an amount of water which may be exported from the Kern County Water Agency (130,000 acre-feet per year). As such, the Berrenda Mesa water is a limited supply which has been reviewed on a cumulative basis. This water source may be transferred to Diablo Grande, or other projects in the state. The cumulative impacts of these transfers on the Kern County Water Agency and its respective water basin was evaluated in the Monterey Principals EIR.

The Bravo Management Company is water which is owned and is stored (i.e., groundwater banking) in an existing groundwater storage area. This water is currently available for transfer to an urban use and may be transferred either to the Diablo Grande project or some other project in the state. As this water is of a limited supply, and it is not available in larger amounts, the impact associated with this

supply is limited to the use of 1,000 acre feet per year for 20 years. There are no additional cumulative effects related to this supply.

Overall, while there are other development projects throughout the State of California which are in the water market, these projects are looking at many different water supplies, a majority of which are not known to the preparers of this EIR. Furthermore, it is possible that some of these projects are looking at some of the water options discussed in this EIR.

For the purpose of this EIR, and as set forth in CEQA Guidelines Section 15145, it is too speculative to attempt to analyze all the reasonably foreseeable development projects in the state which could either attempt to acquire one of the water options, or may be considering other supplies of unknown origin, and then attempt to determine whether they are inter-related and somehow the cause of significant cumulative impacts. As such, there cannot be further cumulative impact analysis with respect to other development projects and other water sources which are currently not specifically defined or are unknown to the preparer of this EIR.

4.0 Literature Cited, Persons Contacted and Report Preparers

Note: All of the referenced documents may be reviewed at the following locations:

1. **County of Stanislaus**
   Dept. of Planning & Community Development
   1100 H Street, 2nd Floor
   Modesto, CA 95354
   (408) 525-6330
   Contact: Kirk Ford

2. **County of Stanislaus Public Libraries**
   Modesto Public Library
   1500 I Street
   Modesto, CA 95354
   (209) 558-7800

   Newman Public Library
   1305 Kern Street
   Newman, CA 95360
   (209) 862-2010

   Patterson Public Library
   46 North Salado
   Patterson, CA 95363
   (209) 892-6473

   Turlock Public Library
   550 Minaret
   Turlock, CA 95380
   (209) 664-8100

3. **Kern County Public Library**
   701 Truxton Avenue
   Bakersfield, CA 93301

4. **Water and Irrigation Districts**

   Western Hills Water District
   801 10th Street
   Fifth Floor, Suite 1
   Modesto, CA 95354
   (209) 521-9521

Turlock Irrigation District
333 East Canal Drive
Turlock, CA 95381-0949
(209) 883-8428

Berenda Mesa Water District
2100 F Street, Suite 100
Bakersfield, CA 93301

Kern County Water Agency
P.O. Box 58
Bakersfield, CA 93302

Copies of the EIR may be purchased from Kinko's at:
2225 Plaza Parkway
Modesto, CA 95354
(209) 577-2679

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4.2 Persons Contacted

Baxter, Randy	California Department of Fish and Game
Caouette, Norman T.	Mojave Water Agency
Clayton, Christopher	Science Applications International
Fryer, Wilton	Turlock Irrigation District
Greydanus, Herb	Bookman-Edmonston Engineering, Inc.
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Appendix A

Diablo Grande Water Master Plan

WATER RESOURCES PLAN FOR DIABLO GRANDE

PREPARED FOR

WESTERN HILLS WATER DISTRICT
MODESTO, CALIFORNIA

PREPARED BY

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TABLE OF CONTENTS

WATER RESOURCES PLAN FOR DIABLO GRANDE

Section		Page
1	INTRODUCTION	1-1
2	OVERVIEW OF WATER RESOURCES AND TRANSFERS IN THE STATE OF CALIFORNIA	2-1
	WHWD PIPELINE	2-2
	CALIFORNIA AQUEDUCT	2-2
	DELTA-MENDOTA CANAL	2-3
3	SPECIFIC ALTERNATIVE LONG-TERM WATER SOURCES	3-1
	MARSHALL-DAVIS FARMS (No. 1)	3-1
	PROJECT AREA GROUNDWATER (Nos. 2-1 and 2-2)	3-2
	ALGAL TURF SCRUBBER (Nos. 3-1, 3-2, and 3-3)	3-3
	SHALLOW COUNTY GROUNDWATER (No. 4)	3-6
	BERRENDA MESA WATER DISTRICT (No. 5)	3-7
	MERCY SPRINGS WATER DISTRICT (No. 6)	3-8
	OAKWOOD LAKE WATER DISTRICT (No. 7)	3-10
	BRAVO MANAGEMENT COMPANY, INC. (BMC) (No. 8)	3-10
4	CONCLUSIONS	4-1
APPENDIX A	DRAFT CRITERIA FOR EVALUATING WATER TRANSFER THROUGH FACILITIES OF THE STATE WATER PROJECT	

Figure (Following Text)

1 Locations of Alternative Sources for Western Hills Water District (Diablo Grande)
2 Existing Water Supply Facilities for Diablo Grande
3 Location of Conveyance Facilities, City of Patterson ATS Facility
4 Location of Conveyance Facilities, City of Ceres ATS Facility
5 Location of Conveyance Facilities, City of Modesto ATS Facility
6 General Locations of Shallow Groundwater, Stanislaus County
7 Locations of Alternative Water Sources in Kern County

SECTION 1 INTRODUCTION

Diablo Grande is a planned destination resort and residential community located in southwestern Stanislaus County, seven miles west of Interstate 5. Diablo Grande will feature scenic open spaces, a wilderness conservation area, six golf courses, swim and tennis facilities, a hotel and executive conference center, a winery, vineyards, research campus, municipal facilities, town center, shops and offices, and three primary dwelling types totaling 5,000 units in five villages clustered on 29,500 acres.

Diablo Grande is covered by a Specific Plan adopted by the Stanislaus County Board of Supervisors on October 23, 1993. The first village, or phase, is covered by a Preliminary Development Plan (PDP) which provides for the construction of approximately 2,000 residential units, two golf courses, the hotel conference center, winery, town center, and other appurtenant facilities. Prior to their adoption, the remaining phases of Diablo Grande also must be covered by PDPs, which will be subject to environmental review in compliance with the California Environmental Quality Act (CEQA).

Prior to the adoption of the Diablo Grande Specific Plan and PDP for Phase I, an Environmental Impact Report (EIR) was certified by the Stanislaus County Board of Supervisors, which identified and discussed impacts associated with the PDP for Phase I at the "regulatory" level and at the "policy" level for the balance of the Specific Plan. The water analysis in the EIR was tiered. There was a detailed analysis of the supply for the first five years from the Marshall & Davis well site and a general discussion of possible long-term sources with a more specific discussion to be tiered in later environmental documentation.

The long-term water supply was identified as having a potentially significant environmental impact. A mitigation measure was included in the Mitigation Monitoring and Reporting Plan (MMRP) to mitigate this impact. The measure stated, "...residential development shall not be permitted unless the applicant can show to the County's satisfaction that adequate real water supplies have been made available, and that environmental impacts of those sources have been studied and mitigated per CEQA requirements."

After the approval of the Diablo Grande Specific Plan and certification of the EIR, a writ of mandate was filed challenging the adequacy of the Diablo Grande EIR on a number of grounds, including the handling of the discussion of long-term water sources. The certified Diablo Grande EIR was upheld by the Superior Court. The decision of the Superior Court was appealed to the Fifth District Appellate Court, which held the Diablo Grande EIR was sufficient in all respects with the exception of the discussion of long-term water sources.

This Water Resources Plan contains a general overview of sources and transfer prospects and a more detailed discussion of several long-term water supply sources for the Diablo Grande project. This Water Resources Plan and its associated Supplemental Environmental Impact Report are intended to comply with the Fifth District Appellate Court's

determination that potential sources of long-term water for the Diablo Grande project must be set forth and analyzed in compliance with CEQA, and provides completed environmental documentation for the identified long-term water supply alternatives for Diablo Grande.

Diablo Grande took the first step to implementing its water resource supply plan by forming Western Hills Water District (WHWD), a California Water District, with the approval of the County Board of Supervisors and the Local Agency Formation Commission of Stanislaus County in 1992. WHWD is authorized by law to acquire all necessary water resources, construct and maintain all necessary treatment and delivery facilities, and assess property owners for those services.

SECTION 2 OVERVIEW OF WATER RESOURCES AND TRANSFERS IN THE STATE OF CALIFORNIA

Water is a fungible commodity in the State of California. Encouraged by state and federal legislation accommodating transfers and motivated by a desire to make wise use of existing water resources and generate needed resources to operate, maintain, and rehabilitate existing facilities to serve their constituents', water districts, and irrigation districts throughout the State of California have developed inventories of their water supplies, identified available surpluses and undertaken sale and transfer of supplies to other districts and municipalities. Recent water transfer experience and sales offers show that several hundred thousand acre-feet (annual supply) of water are available for purchase in the State of California. Use of water transfers is encouraged by legislation and the Governor.

There is a fast-moving, rapidly expanding water marketplace complete with brokers, planners, engineers, and lawyers specializing in the negotiation, design, and implementation of water transfers. Transactions often include intricate transfer links involving several districts to make delivery at the buyer's destination.

The sources of water available in the marketplace include surface water, groundwater, and recycled water supplies, some of which is under seller's water rights and some for which a seller has a contract to purchase water from a purveyor such as a public district.

Diablo Grande presently has a variety of water source options available to it. Additional sources will arise as potential sellers become more aware of the opportunities. Completion and implementation of plans to "fix" the Bay-Delta in the next few years will further facilitate transfers. Several current alternative sources are described in the following section.

Nine of 11 alternative sources are shown on Figure 1, *Locations of Alternative Sources for Western Hills Water District (Diablo Grande)*. The other two sources described in this report are in Kern County, as shown on Figure 7. Location numbers on Figures 1 and 7 are keyed to descriptions in Section 3. Note that one alternative, Project Area Groundwater, has two potential supply sources, i.e., 2-1 and 2-2, and another alternative, Algal Turf Scrubbing, has three potential supply sources, i.e., 3-1, 3-2, and 3-3.

The existing network of local, state, and federal storage and conveyance facilities, coupled with natural channels, makes it possible to deliver water, directly or by exchange, throughout most of the Central Valley, the San Francisco Bay area, and Southern California.

There are three primary means of conveyance by which water might be delivered to the recently completed pipeline serving Diablo Grande near Oak Flat Road and Interstate 5: 1) new pipeline; 2) the California Aqueduct; and 3) the Delta-Mendota Canal (D-MC).

WHWD PIPELINE

WHWD has constructed a waterline from a well on Marshall-Davis Farms to Diablo Grande. This pipeline, as shown in Figure 2, *Existing Water Supply Facilities for Diablo Grande*, generally follows existing roads and crosses the Delta-Mendota Canal along Ward Road and the California Aqueduct along Oak Flat Road. It then generally follows the existing Oak Flat Road and Diablo Grande Parkway to Diablo Grande. The line is 30 inches in diameter from the California Aqueduct to Diablo Grande, which will accommodate buildout of Phase I and Phase II, and 16 inches in diameter from its eastern beginning in Marshall Road to the California Aqueduct.

Surface water and groundwater supplies can be delivered to Diablo Grande using a wide variety of water transfer networks implementing inter-district trades and wheeling arrangements with the U.S. Bureau of Reclamation (USBR) (D-MC) or the State Department of Water Resources (DWR) (California Aqueduct). The San Joaquin River and other rivers, streams, and tributaries are also available under law to wheel water.

CALIFORNIA AQUEDUCT

The California Aqueduct is the main conveyance facility of the California State Water Project (SWP). It begins in the Sacramento-San Joaquin Delta, where water is pumped at the Banks Pumping Plant from Clifton Court Forebay, and continues along the west side of the San Joaquin Valley and into Southern California (see Figure 1). The California Aqueduct is operated by DWR on behalf of 29 public contracting entities that have priority use for water deliveries. DWR must operate the Banks Pumping Plant within constraints of the San Francisco Bay-Delta Water Quality Control Plan and biological opinions developed pursuant to the Endangered Species Act.

State law provides that at least 70 percent of the capacity not required to satisfy water contractor needs must be made available for use by non-contractors. DWR has prepared a statement of conditions for such wheeling service. A draft form letter response, prepared by DWR to a requestor setting forth the conditions, is included in Appendix A. Principal aspects of these conditions for service to WHWD include:

- Availability of unused capacity.
- Transfer water must be under a valid water right or contract entitlement.
- No injury to other vested water right holders.

- Must have approval of both DWR and USBR for operation under the SWP/CVP Coordinated Operation Agreement.
- Water must be "new" water, e.g., not otherwise available to another user.
- Must not cause injury to fish, wildlife, or other natural environment.
- If groundwater substitution for surface water is proposed, there must be a comprehensive groundwater basin study.
- For water transferred across the Delta, there must be a contribution toward meeting Delta water quality plans.

DELTA-MENDOTA CANAL

The D-MC, as shown on Figure 1, begins at the Tracy Pumping Plant and extends southward along the western edge of the San Joaquin Valley to the Mendota Pool on the San Joaquin River where it delivers water to districts with early water rights to replace water diverted from the river at Millerton Lake into the Friant-Kern and Madera Canals. The D-MC is a feature of the federal Central Valley Project (CVP) and is operated by the USBR, which has contracts to serve project water to districts along the west side of the San Joaquin Valley. The D-MC is also used to fill the federal share of San Luis Reservoir and is generally fully utilized throughout the year with little, if any, unused capacity. If capacity is available for non-contractors, there are provisions for special wheeling charges under the federal Warren Act. Use of CVP water for transfers to a non-CVP user must also meet conditions of the 1992 Central Valley Project Improvement Act (CVPIA). Principal aspects of conditions applicable to wheeling water in the D-MC and/or transfer of CVP water include:

- Payment of costs assigned under the Warren Act.
- Payment of environmental restoration fees under the CVPIA.
- No injury to other water users.
- Individuals within a water district served by the CVP can transfer their allocation of water.
- No substitution of groundwater for transfer of a surface water entitlement if groundwater would be overdrafted.

- Concurrence of the water district served by the CVP if the aggregate quantity of all transfers from the district is 20 percent or more of the contract amount.

- The area in which transferred water is used must be in or added to the place of use under the CVP water rights.

SECTION 3 SPECIFIC ALTERNATIVE LONG-TERM WATER SOURCES

MARSHALL-DAVIS FARMS (No. 1)

Marshall-Davis Farms, Inc., a California Corporation, which is an affiliated company of the Diablo Grande developers, owns land on the valley floor at the intersection of Marshall and Davis Roads in western Stanislaus County, two miles south of the city of Patterson. (See Figure 2.) The property overlies only a small portion of the regional groundwater basin. With appropriate approvals, groundwater could be obtained from adjacent lands without significant adverse effects.

As described in the Diablo Grande EIR, up to 1,200 acre-feet of groundwater could be pumped each year from the Marshall-Davis Farms property and pumped to the Diablo Grande site. The EIR further states that there would be no significant impacts on the groundwater basin associated with the use of this water. This determination was based upon a groundwater study performed for the City of Patterson by Bookman-Edmonston Engineering, Inc. in 1991, which concluded that up to about 20,000 acre-feet of water per year could be taken from this aquifer with no significant impact to water supplies of the area. The quality of the water is fully suitable for potable purposes with appropriate minimum filtration and disinfection.

With respect to the water from Marshall-Davis Farms, it is recognized that Diablo Grande previously agreed to a condition in the MMRP restricting the use of this water supply for a five-year period, at the end of which this supply would be limited to emergency use, and further agreed that any impact on neighboring properties, caused by a drawdown of over ten percent in their wells, would be mitigated by Diablo Grande.

Mitigation could include deepening of affected neighboring wells, lowering pump bowls, providing surface water supplies available to Marshall-Davis Farms to affected neighbors, or payment of extra pumping costs to the affected party. In addition, a Groundwater Monitoring Plan has been established for the Marshall-Davis property to determine when and if these mitigation measures should be implemented. This Groundwater Monitoring Plan has been prepared by Bookman-Edmonston Engineering, Inc., and approved by the Stanislaus County Department of Environmental Resources. The Marshall-Davis water is currently being used at Diablo Grande to irrigate the Ranch Golf Course. Groundwater monitoring is underway, and no detrimental impacts have been detected. It is expected that further data will show that long-term pumping from Marshall-Davis Farms and adjacent lands will not negatively impact the groundwater resources of the area.

This Marshall-Davis water may only be used for non-residential uses, including construction, irrigation of golf courses, the hotel/conference center, the winery, the maintenance center, and the water and sewage treatment plants. The Marshall-Davis water may not be used for supply to any residence at the site. On the basis of the foregoing, Diablo Grande currently has from the Marshall-Davis well site a 1,200 acre-foot per year supply for the years 1996 through 2000.

There are no additional approvals required for the use of the Marshall-Davis well supply under the terms discussed above.

PROJECT AREA GROUNDWATER (Nos. 2-1 and 2-2)

Richard C. Slade prepared a groundwater study (1989) for the entire 29,500-acre Diablo Grande project area. In this report, Slade determined that there could be up to 725 acre-feet of water per year available from the 4,600 acres in and around the Phase I PDP (No. 2-1 on Figure 1). The quantity is very dependent upon rainfall, however, because there is limited groundwater storage. The entire Diablo Grande project will need approximately 12,000 acre-feet of water at full buildout and approximately 5,000 acre-feet of water for the Phase I PDP. Because the 725 acre-feet of possible onsite groundwater beneath the Phase I PDP would not be a dependable and adequate supply to serve the project, the EIR did not evaluate this groundwater as a potential water source. Instead the EIR, while recognizing the existence of this groundwater report, stated that there was not an adequate supply of water onsite to serve the Diablo Grande project.

Since the approval of the Diablo Grande project, Diablo Grande has conducted extensive exploration activity in the Phase I area as well as on a property acquired by Diablo Grande at the northwest corner of the Diablo Grande project (No. 2-2 on Figure 1). Several test wells have been constructed and pumped to determine their possible yields, if they were to be used to supply long-term water to the project.

Based on this exploration activity and related engineering and soils analyses performed by GeoConsultants, Inc., groundwater is available onsite and in the immediate vicinity in sufficient volumes to provide up to 20 percent (about 2,500 acre-feet per year) of Diablo Grande's total water supply. The radii of influence of the wells used to provide this water are small enough that impacts to neighboring property owners associated with the use of this supply should not occur. Diablo Grande will continue to explore its onsite supply.

Approvals required to use onsite groundwater at Diablo Grande include:

- WHWD approval of construction and acceptance of necessary facilities, including wells, pumps, and pipelines.

- Approval of the quality of water by the Department of Health Services.

- Affirmation of supply by County of Stanislaus.

ALGAL TURF SCRUBBER (Nos. 3-1, 3-2, and 3-3)

Aquatic BioEnchancement Systems, Inc. (ABES), a Texas corporation and an affiliated company of Diablo Grande Limited Partnership, owns several patented water reclamation technologies created by Dr. Walter Adey of the Smithsonian Institute. These technologies are collectively used in a process known as the Algal Turf Scrubber (ATS). The ATS process consists of running effluent (including secondarily treated sanitary wastewater) over a sloping runway at low flows and shallow depths to create an environment in which algae will grow and thrive on the constituents in the water. The algae are periodically harvested. Once these constituents are removed from the water, the water at the end of the ATS runway will be of a quality which will allow its discharge into natural and man-made water courses for blending with other supplies.

Thus, ATS creates from water which is currently lost through percolation, evaporation, or by crops for disposal, a fungible commodity, i.e., water, which may be traded to others, or discharged into and diverted from natural water courses and then delivered to Diablo Grande.

In 1992, ABES entered into an agreement with the City of Patterson to construct an ATS pilot facility at the City of Patterson Wastewater Treatment Plant. The location (No. 3-1) is shown on Figure 1. This facility has been in operation for over three years. During 1993 and 1994, the ATS process was thoroughly tested by the laboratories of the University of California, Berkeley, and determined it is possible to treat water to a level that would make its discharge into the San Joaquin River acceptable. In essence, the testing shows that the ATS process works. Recently, ABES has entered into an agreement with the City of Patterson to construct the full ATS plant at the Patterson Wastewater Treatment Plant. This new ATS facility will permit the treatment of all effluent from the City of Patterson at the ATS facility and discharge of this water into the San Joaquin River. The city currently treats about 1,000 acre-feet of wastewater per year.

As part of the agreement between the City of Patterson and ABES, ABES was required to obtain all necessary permits to construct the ATS facility at the Patterson Wastewater Treatment Plant. The City of Patterson has a National Pollutant Discharge Elimination System (NPDES) permit to discharge its effluent to the San Joaquin River, although the current Patterson Wastewater Treatment Plant has been unable to clean the water to a level that would permit such discharge to the San Joaquin River consistent with the requirements of the Waste Discharge Permit.

An environmental review was required on the construction of the ATS facility at the Patterson Wastewater Treatment Plant. The City of Patterson prepared an initial study on the construction. This initial study also discussed the discharge of the ATS treated water

into the San Joaquin River. Two alternative points of diversion were evaluated which would allow rediversion for Diablo Grande through existing facilities of the Patterson Water District (PWD). One alternative would be at the intake to the PWD canal, and the other alternative would be farther upstream of the intake near the Las Palmas Avenue bridge to achieve greater mixing with water in the river. Adequate mixing is a safety consideration in securing a permit from the Department of Health Safety for potable use and a concern of the PWD in using some reclaimed water for crop irrigation. In the preferred alternative, water would be conveyed by pipeline to a point near the existing Las Palmas Avenue bridge about 1,200 feet upstream of the PWD intake.

Based upon comments received on the initial study, a mitigated negative declaration was prepared and adopted by the City of Patterson for the Patterson project consisting of (1) the treatment of secondary treated effluent from the Patterson Wastewater Treatment Plant by the ATS system, (2) the construction of conveyance facilities and discharge facilities which would discharge this water into the San Joaquin River, (3) diversion of this water at the PWD main canal intake, and (4) the conveyance of this water from the PWD main canal near State Highway 33 to the existing Diablo Grande pipeline. Alternatively, a separate new pumped diversion on the San Joaquin River was evaluated. Preliminary alignments of conveyance facilities are shown on Figure 3, *Location of Conveyance Facilities, City of Patterson ATS Facility*. The pipeline from the ATS facility to the San Joaquin River would be about 1-mile long and the pipeline from the PWD main canal to the present WHWD pipeline from the Marshall-Davis Farms would be about 1.6 miles long.

As the City of Patterson grows, the amount of effluent through the ATS facility will increase. Up to 3,000 acre-feet per year may ultimately be treated at the Patterson ATS facility, discharged to the San Joaquin River, and diverted through the PWD facilities to Diablo Grande.

ABES took this adopted mitigated negative declaration to the Central Valley Regional Water Quality Control Board (CVRWQCB) with a request for a new NPDES permit and waste discharge requirements related to the discharge of the ATS treated water into the San Joaquin River. The regional board has issued a permit, and ABES is authorized to proceed with not only the construction of the ATS facility, but the discharge of this new water into the San Joaquin River upon compliance with certain water quality standards.

On this basis, approximately 1,000 acre-feet of water per year will be available from the City of Patterson to the Diablo Grande project, in perpetuity, with an increase to 3,000 acre-feet per year as the City of Patterson grows.

The City of Ceres (No. 3-2) presently generates up to 2,000 acre-feet per year of treated effluent which is used for irrigation. This effluent could be treated with the ATS process and the new water conveyed to the San Joaquin River for rediversion to Diablo Grande. With a discharge permit from the CVRWQCB and a water rights diversion permit from the

State Water Resources Control Board (SWRCB), WHWD could recover all of the new water from the San Joaquin River minus channel losses, if any.

New construction would include an ATS facility at the Ceres Wastewater Treatment Plant, a pumping plant and 12-mile long pipeline from the Ceres Wastewater Treatment Plant to the San Joaquin River, a diversion facility on the river and a 4.8-mile pipeline to WHWD's existing pipeline in Marshall Road (see Figure 4, *Location of Conveyance Facilities, City of Ceres ATS Facility*). Alternatively, arrangements could be made with PWD to convey the water in its main canal to the vicinity of State Highway 33, as shown on Figure 3 for use of wastewater from the City of Patterson.

The City of Modesto (No.3-3) presently generates over 25,000 acre-feet of treated effluent which is used for irrigation on city-owned farmland near the San Joaquin River near Las Palmas Avenue. This effluent could be treated by ATS and discharged into the San Joaquin River for ultimate delivery to Diablo Grande. The supply would be sufficient for the full needs of Diablo Grande. New construction would include an ATS facility, facilities to convey and discharge the new water to the San Joaquin River, and a diversion facility and pipeline from the river to WHWD's existing pipeline in Marshall Road. The total length of the pipelines would be about 7.7 miles as shown on Figure 5, *Location of Conveyance Facilities, City of Modesto ATS Facility*.

Alternatively, arrangements could be made with PWD to convey the new water to the vicinity of State Highway 33, as shown on Figure 3 for use of wastewater from the City of Patterson. The amount of mixing of the reclaimed water with flow in the San Joaquin River would be a factor in the expanded use of new water from an ATS facility.

Approvals required to deliver ATS reclaimed water to Diablo Grande include:

- Approval of source cities, i.e., Patterson, Ceres, and Modesto.
- WHWD approval of purchase.
- CVRWQCB approval of discharge to the San Joaquin River for Ceres and Modesto.
- SWRCB approval of a water rights diversion permit.
- Affirmation of supply by County of Stanislaus.
- Approval of water treatment plant by Department of Health Services.

SHALLOW COUNTY GROUNDWATER (No. 4)

Due to the importation and application of surface water on a vast majority of the farmland lying both east and west of the San Joaquin River in Stanislaus County, the groundwater levels in areas of the county adjacent to the San Joaquin River have been raised, thereby affecting the farmability of these lands. On the east side of the San Joaquin River, through the application of surface water by the Modesto and Turlock Irrigation Districts, the groundwater has been raised to as high as one foot below the ground surface in certain areas. This high groundwater has affected the utility of these farmlands and created situations where the ability to farm some properties is non-existent, unless drainage works are installed. This water mainly comes from surface water from the Don Pedro Reservoir, which is then distributed through main canals to the Modesto and Turlock Irrigation Districts and applied to the farms in these districts.

On the west side of the San Joaquin River, surface water is taken from the Delta-Mendota Canal and the San Joaquin River by numerous irrigation and water districts, including Del Puerto and Patterson Water Districts and the Central California Irrigation District. These districts apply that water to a majority of the farmland on the west side of the San Joaquin River. Similar to the east side of the San Joaquin River, this application of surface water has created a situation where the groundwater has been raised to levels which affect the farmability of parcels on the west side of, and in particular near, the San Joaquin River.

Because high groundwater is a detriment to the farmability of lands near the San Joaquin River, WHWD proposes to evaluate the extraction of this groundwater and its transportation to the Diablo Grande site to provide domestic water for the Diablo Grande project. This extraction and exportation of water will serve two purposes. First, the extraction of the groundwater will assist in reducing the groundwater levels, thereby enhancing the farmability of certain lands. Secondly, the water will transported to the Diablo Grande site where it can supply domestic water to the Diablo Grande project. Based upon preliminary review, the amount of groundwater available for exportation to Diablo Grande from these areas would provide the needs for the Diablo Grande project many times over. Figure 6 depicts the general areas in the county where high groundwater exits and where the possible extraction of this water could occur. It should be noted that additional groundwater pumping in areas adjacent to the very shallow areas will be beneficial to the shallow areas.

WHWD will evaluate the extraction and exportation of this groundwater to the Diablo Grande project. As part of any groundwater extraction program, there will be associated pipelines to transport the water to the Diablo Grande project. Most likely any pipelines will move the water to the intersection of Marshall and Davis Roads where pipelines currently exist. If groundwater is extracted from the east side of the San Joaquin River, it will be necessary for a river crossing, which would likely be in a tunnel under the main channel. It would also be possible that pipelines would traverse open agricultural fields or be placed

in county roadways. Pipeline facilities for water extracted from the west side of the San Joaquin River would be similar, although it would not be necessary to cross the San Joaquin River.

Approvals required to deliver this groundwater to WHWD would include:

- Approval of the sale and construction of wells, pumps, and pipelines by the affected irrigation and/or water district.
- WHWD approval of sale and construction of pumps and pipelines.
- County of Stanislaus affirmation of long-term supply.
- Approval of a water treatment plant and quality of water by the Department of Health Services.

BERRENDA MESA WATER DISTRICT (No. 5)

Berrenda Mesa Water District (BMWD) is a California water district located in northwestern Kern County, largely north of State Highway 46 and on both sides of State Highway 33 (see Figure No. 7). All lands are west of and higher than the California Aqueduct.

BMWD is a member unit of the Kern County Water Agency (KCWA), which has a contract with DWR for over 1 million acre-feet annually from the SWP. BMWD has a contract with KCWA for approximately 155,000 acre-feet of which it is attempting to sell approximately 75,000 acre-feet. In 1995, KCWA and DWR agreed in the Monterey Principles that KCWA would transfer up to 130,000 acre-feet of its agricultural water entitlement to non-SWP contractors, subject to the right of first refusal by other member units of KCWA and other SWP contractors. (The EIR for the Monterey Principles was challenged in court and in the fall of 1996, the court agreed the process was flawed, but the EIR was adequate.) Sale of BMWD's entitlement is within the KCWA sale commitment.

Acquisition of water by WHWD from BMWD would require assumption of the obligations and conditions of KCWA/BMWD to the DWR for SWP water. The obligations would include financial obligations to assure repayment of SWP bonds and operating costs and operation conditions. WHWD would probably not become a contractor for SWP water with the DWR because it does not now have sufficient taxable assets to meet bond requirements.

If WHWD acquires some of BMWD's contract entitlement, the water could be delivered to the Diablo Grande main supply line at its crossing of the California Aqueduct. (Except for a turnout, no new facilities would be needed.) At this time, the DWR cannot provide all of its delivery commitments to all contractors in many years because of lack of storage and restraints on pumping from the Sacramento-San Joaquin Delta for the California Aqueduct.

There would be significant shortages in many years. DWR currently can supply an average of only about 50 percent of the current demand. To provide for the full needs of Diablo Grande it would be necessary to (1) have an entitlement twice or more than the demands, (2) store a portion of the BMWD supply in wet years for use in dry years, or (3) have alternative backup supplies. Extra wet year water could be stored in Kern County and exchanged in dry years for KCWA SWP entitlement water, which would otherwise be delivered through the California Aqueduct.

WHWD would need to secure approval of the DWR to construct a turnout from the California Aqueduct. Such approval would be a condition in the water purchase agreement between WHWD and DWR-KCWA-BMWD.

The DWR would need to apply to the SWRCB to add Diablo Grande to its place of use in its water rights for the SWP.

Approvals required to deliver BMWD's state water entitlement supply to WHWD include:

- BMWD approval of sale.
- KCWA approval of sale and water transfer and a new turnout from the California Aqueduct.
- The DWR would need to approve the transfer because it manages the SWP.
- WHWD approval of purchase and construction of needed facilities.
- County of Stanislaus affirmation of long-term supply.
- Approval of water treatment plant by Department of Health Services.
- Approval by SWRCB of change in place of use.

MERCY SPRINGS WATER DISTRICT (No. 6)

Mercy Springs Water District (MSWD) is a California water district located in northwestern Fresno County consisting of about 3,390 acres (see Figure 1). MSWD has an annual allocation of 13,300 acre-feet of CVP water from the D-MC by contract with the USBR. MSWD lands have drainage limitations and drain water is quite saline. Landowners have offered to sell their water contract entitlements with or without the land.

WHWD could purchase all or a portion of the water and/or land in MSWD. USBR administrative procedures provide for transfer of the MSWD contract to WHWD. MSWD contract provides for use of the water for municipal and industrial (M&I) purposes as well

as for irrigation. There are, however, different dry year shortage provisions in CVP contracts for M&I and irrigation water. M&I water supplies are not subject to as great reductions as for irrigation water. Therefore, the USBR would reduce the maximum MSWD contract entitlement of 13,300 acre-feet to a lesser amount, if the contract is assigned to WHWD for M&I purposes. The amount of the reduction would be based on generally maintaining the same degree of shortage impact on other CVP contractors by providing the same quantity of water for M&I use as for irrigation use in water-short years. A new maximum contract amount for M&I purposes would be established, if a formal request is made to USBR. It is assumed that the M&I amount would be at least 60 percent of the irrigation amount or about 8,000 acre-feet.

Water from a reassigned MSWD contract could be diverted from the Delta-Mendota Canal at the crossing of the Diablo Grande pipeline from Marshall-Davis Farms. It would be necessary to install an additional pipeline between the Delta-Mendota Canal and the 30-inch pipeline that begins at the California Aqueduct, because this pipeline section is only 16 inches in diameter. It would also be necessary to construct a new turnout from the Delta-Mendota Canal.

The USBR would need to apply to the SWRCB for a change in place of use for its CVP water rights permit(s) because Diablo Grande is outside of its presently authorized place of use.

If WHWD acquired the land in MSWD, some of it could be farmed until the demand in Diablo Grande would require the water. Alternatively, the unneeded water could be banked in one of several groundwater banking sites in Kern County for use by exchange in dry years. Extra water could also be resold back to the CVP for other uses or to other buyers. It would be necessary that WHWD manage the vegetation and use of any land fallowed in MSWD. Some of the land might provide significant wildlife benefits with limited amounts of applied water.

Approvals required to deliver MSWD CVP water entitlements to WHWD include:

- MSWD approval of sale.
- USBR approval of transfer of water contract and a new turnout from the Delta-Mendota Canal.
- WHWD approval of purchase and construction of conveyance facilities.
- County of Stanislaus affirmation of long-term supply.
- Approval of water treatment plant by Department of Health Services.

- Approval by SWRCB of change in place of use.

OAKWOOD LAKE WATER DISTRICT (No. 7)

Oakwood Lake Water District (OLWD) is a California water district located in southwestern San Joaquin County as shown on Figure 1. OLWD provides groundwater to its primary property owner in the district, the Manteca Water Slides, a public water recreation park (Park).

The Park currently pumps an average of 6,000 acre-feet per year of water into the San Joaquin River. The SWRCB has concurred in findings of studies of the OLWD that most of the water is groundwater and, therefore, is not under SWRCB jurisdiction. The SWRCB has agreed that 95 percent of the water discharged to the San Joaquin River can be classified as groundwater. The balance is classified as underflow from the river.

The discharged groundwater could be sold to WHWD and transported to Diablo Grande by pumping at the Banks Pumping Plant and wheeling the water in the California Aqueduct to a new turnout at the Oak Flat Road. Because the water is pumped into the San Joaquin River within the Delta, DWR would not normally assess any channel losses. Because the discharge is into the southern Delta, a carriage water assessment for water quality in the Delta would not be made as for a transfer from north of the Delta. The water supply could be produced throughout the year, but wheeling in the California Aqueduct would be limited by other priority uses and pumping restrictions because of endangered fish in the Delta. Seasonal regulation in San Luis Reservoir could be provided by DWR. With regulation, up to 5,700 acre-feet could be supplied to WHWD.

Approvals required to deliver OLWD water to Diablo Grande include:

- OLWD approval of sale of water.
- WHWD approval of purchase water and wheeling agreements.
- DWR approval of agreement to wheel water in the California Aqueduct and a new turnout.
- County of Stanislaus affirmation of long-term water supply.

BRAVO MANAGEMENT COMPANY, INC. (BMC) (No. 8)

BMC is a private company with land and water rights in Kern County. BMC lands include developments adjacent to the Kern River east of the City of Bakersfield. Water rights on the Kern River date back to 1888 and have been adjudicated. Kern River water is managed by a watermaster.

BMC has offered to sell 2,000 acre-feet per year for use by Diablo Grande. The sale/exchange would involve KCWA. BMC would provide water to Improvement District #4 (ID-4), a member unit of KCWA which incudes and supplies water to the City of Bakersfield, and KCWA would release a portion of its SWP entitlement water destined to ID-4 to WHWD in the California Aqueduct at Oak Flat Road. BMC would provide water to ID-4 from a portion of its supply already banked in groundwater storage available to ID-4 and by pumping groundwater from a basin east of the City of Bakersfield in which BMC has a 99 percent interest.

Approvals required to deliver BMC water to WHWD include:

- Agreement by WHWD to purchase water.
- Agreement by BMC to sell water.
- Agreement by ID-4 to exchange water.
- Agreement by DWR to wheel water in the California Aqueduct and to provide a new turnout.
- Agreement by DWR and the SWRCB that a change in place of use for SWP water is not required because it is equivalent to groundwater.
- If DWR and/or SWRCB do not agree that the water delivered to WHWD is equivalent to groundwater, DWR would need to petition SWRCB for a change in place of use.

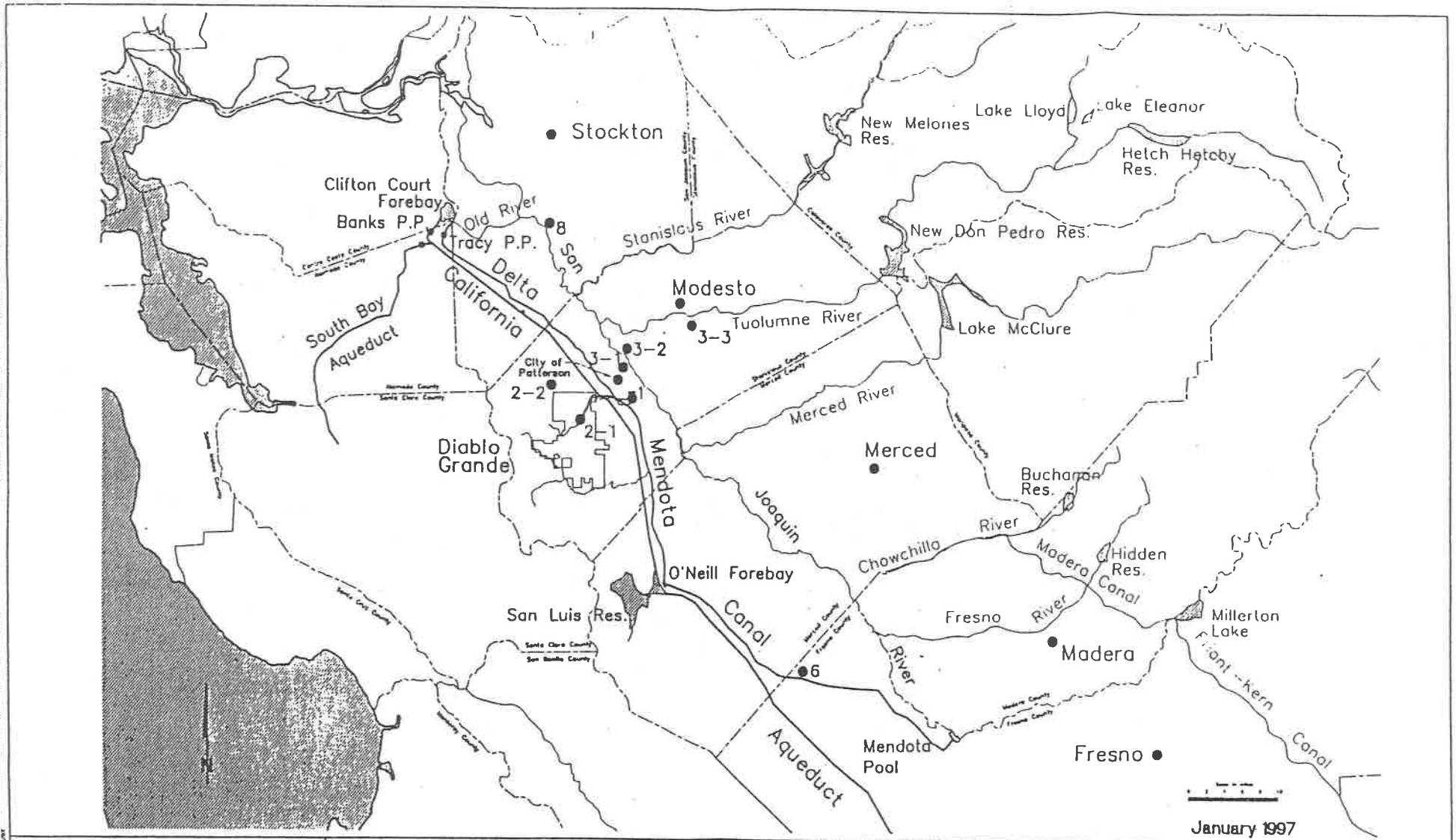
SECTION 4 CONCLUSIONS

Based upon the foregoing, the numerous long-term water supply options available for the Diablo Grande project are summarized in the following tabulation. Some of these long-term water supply options may only provide a portion of the water needed for the Diablo Grande project, while other sources are able to provide the entire amount of water needed to supply the project.

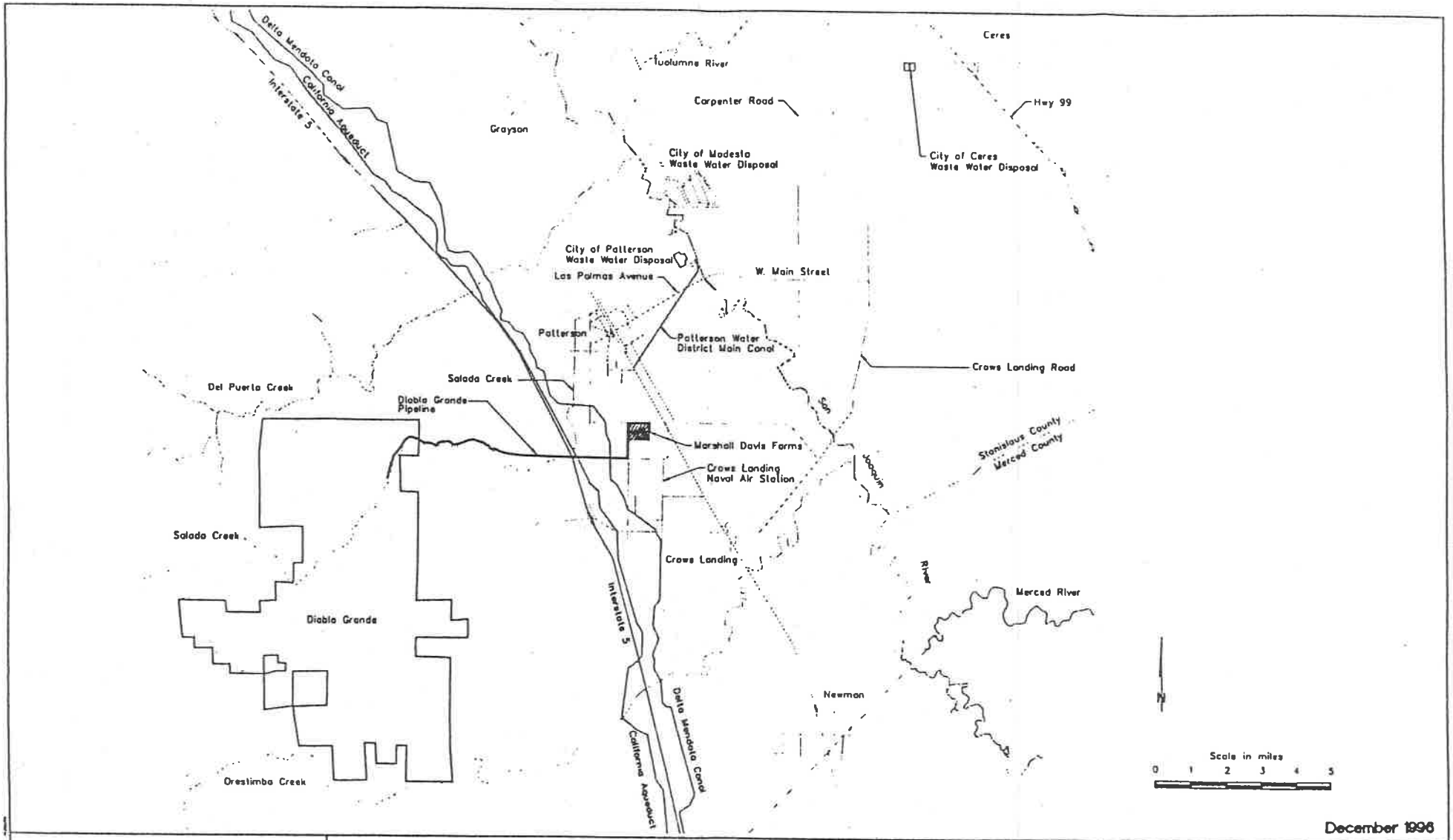
ALTERNATIVE POTENTIAL WATER SOURCES FOR DIABLO GRANDE		
Source	**Type**	**Annual Amount (acre-feet)**
1. Marshall Davis Farms	Groundwater	1,200
2-1 & 2-2. Project Area Groundwater	Groundwater	2,500
3. Algal Turf Scrubber		
3-1. City of Patterson	Wastewater	3,000
3-2. City of Ceres	Wastewater	2,000
3-3. City of Modesto	Wastewater	25,000
4. Shallow County Groundwater	Groundwater	12,000
5. Berrenda Mesa Water District	Surface Water	12,000
6. Mercy Springs Water District	Surface Water	8,000
7. Oakwood Lake Water District	Groundwater	5,700
8. Bravo Management Company, Inc.	Groundwater	2,000

The development of Phase I of Diablo Grande is expected to take approximately 15 years, and the development of the entire project is expected to occur over an approximately 25- to 30-year period. On this basis, the supply of water to the Diablo Grande site will need to be phased on an incremental basis. Because Diablo Grande's needs for water at the site are phased, it is expected that the water will be supplied to the site on a phased basis. Diablo Grande expects to purchase water as needed from one or a number of the sources contained in this Water Resources Plan. It is also likely that during the life of the project other feasibly economical sources will come to the attention of Diablo Grande as viable long-term water sources. It is reasonable to expect that with on-going CALFED efforts the restrictions on pumping from the Delta because of water quality and endangered fish will be significantly reduced or lifted and that a number of transfer opportunities will develop in the Sacramento Valley.

It is intended that a program level environmental document will be prepared on this Water Resources Plan which will evaluate the impacts associated with each stated water supply and would offer appropriate mitigation measures to mitigate any impacts identified with each source. To the extent that Diablo Grande selects a water source contained in this Water Resources Plan, the mitigation measures established in the environmental document will be applied as part of the provision of this water to the project. If another water source, which is not contained in this Water Resources Plan or the associated environmental document, is ultimately determined to be a feasible water source and is planned to be transported to the site, additional environmental review will be required on this water source.



Bookman-Edmonston Engineering, Inc.	Locations of Alternative Water Sources For Western Hills Water District (Diablo Grande)	FIGURE 1



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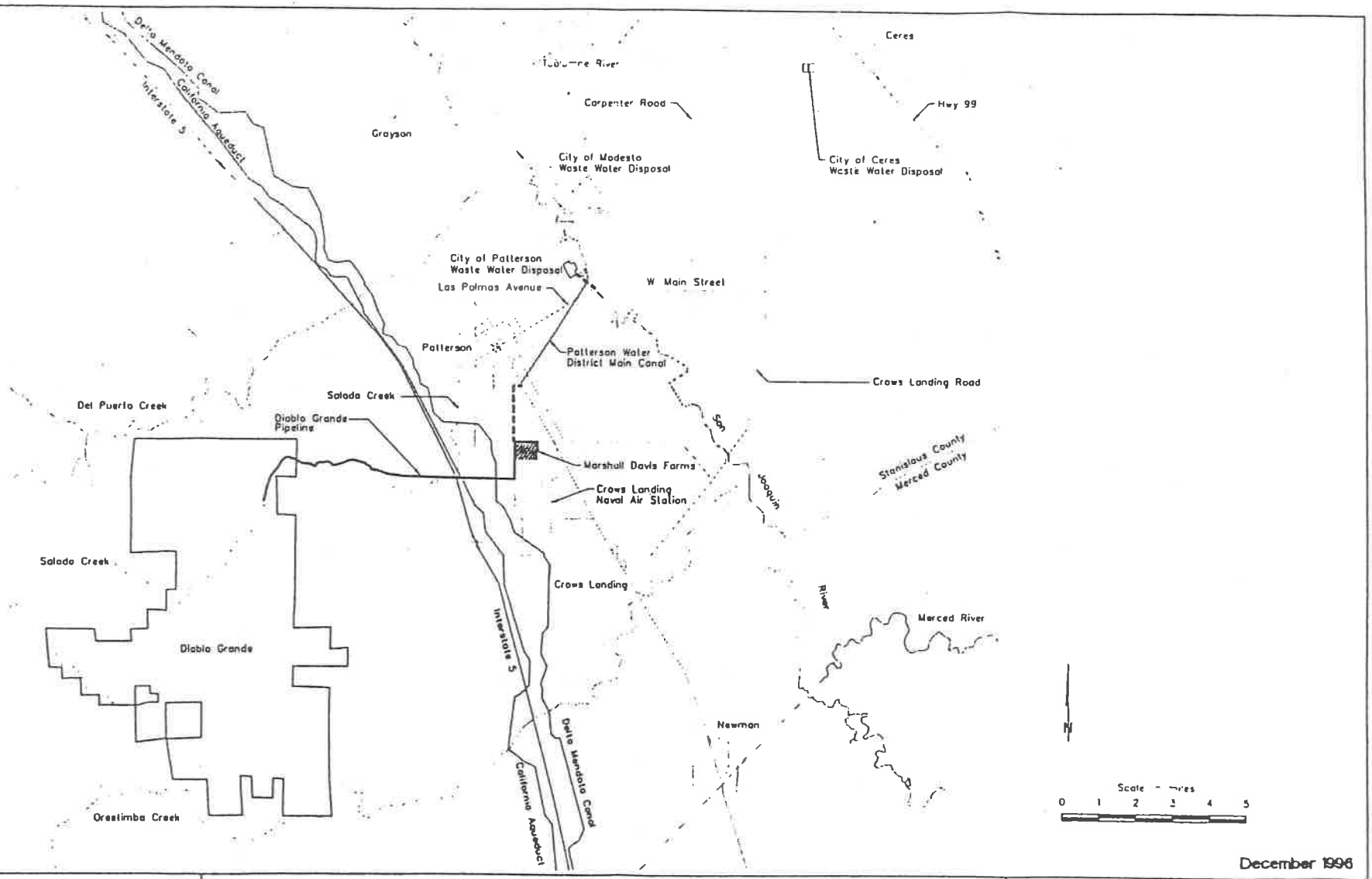
Bookman-Edmonston Engineering, Inc.	Existing Water Supply Facilities For Diablo Grande	Figure 2



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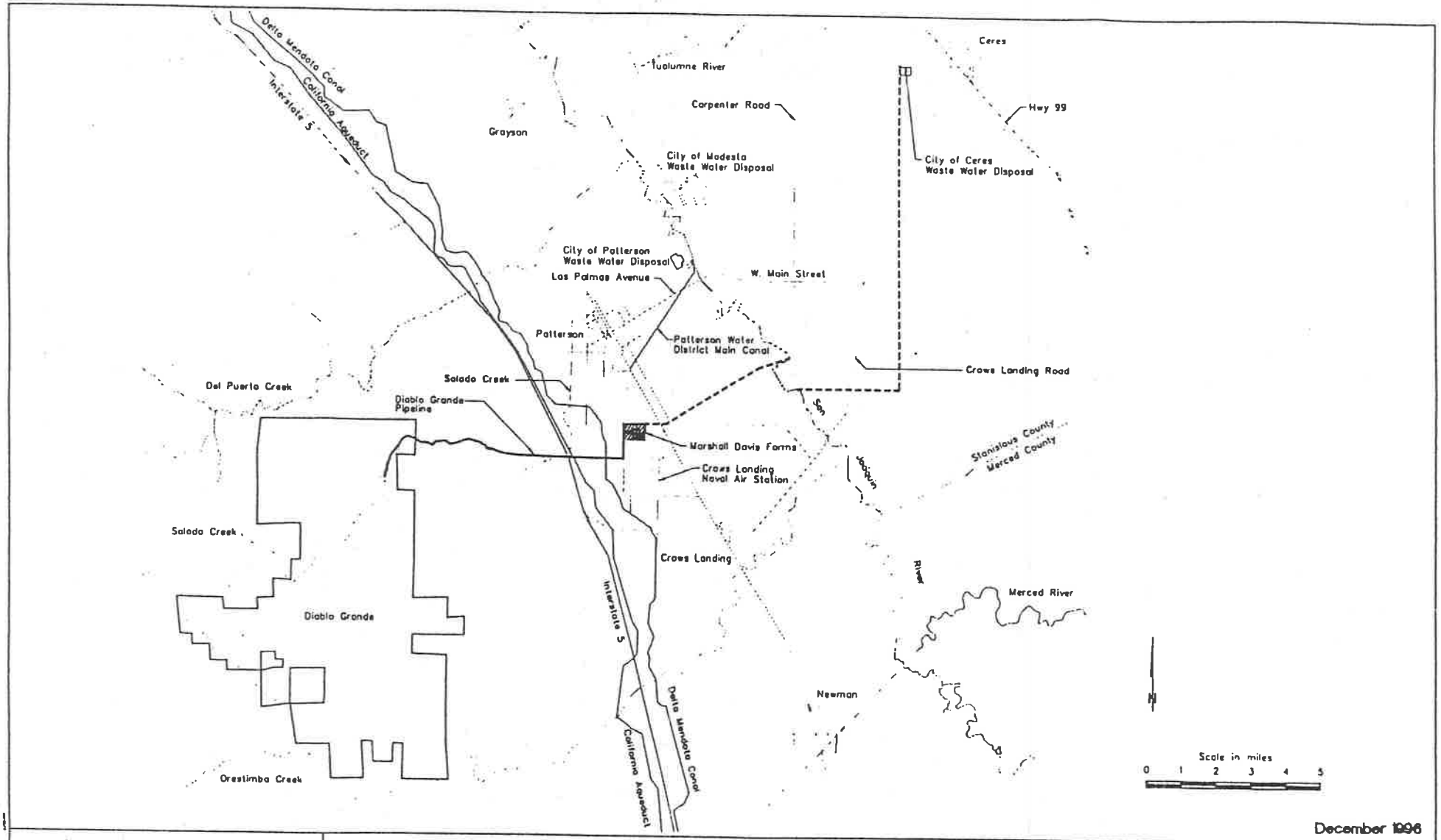
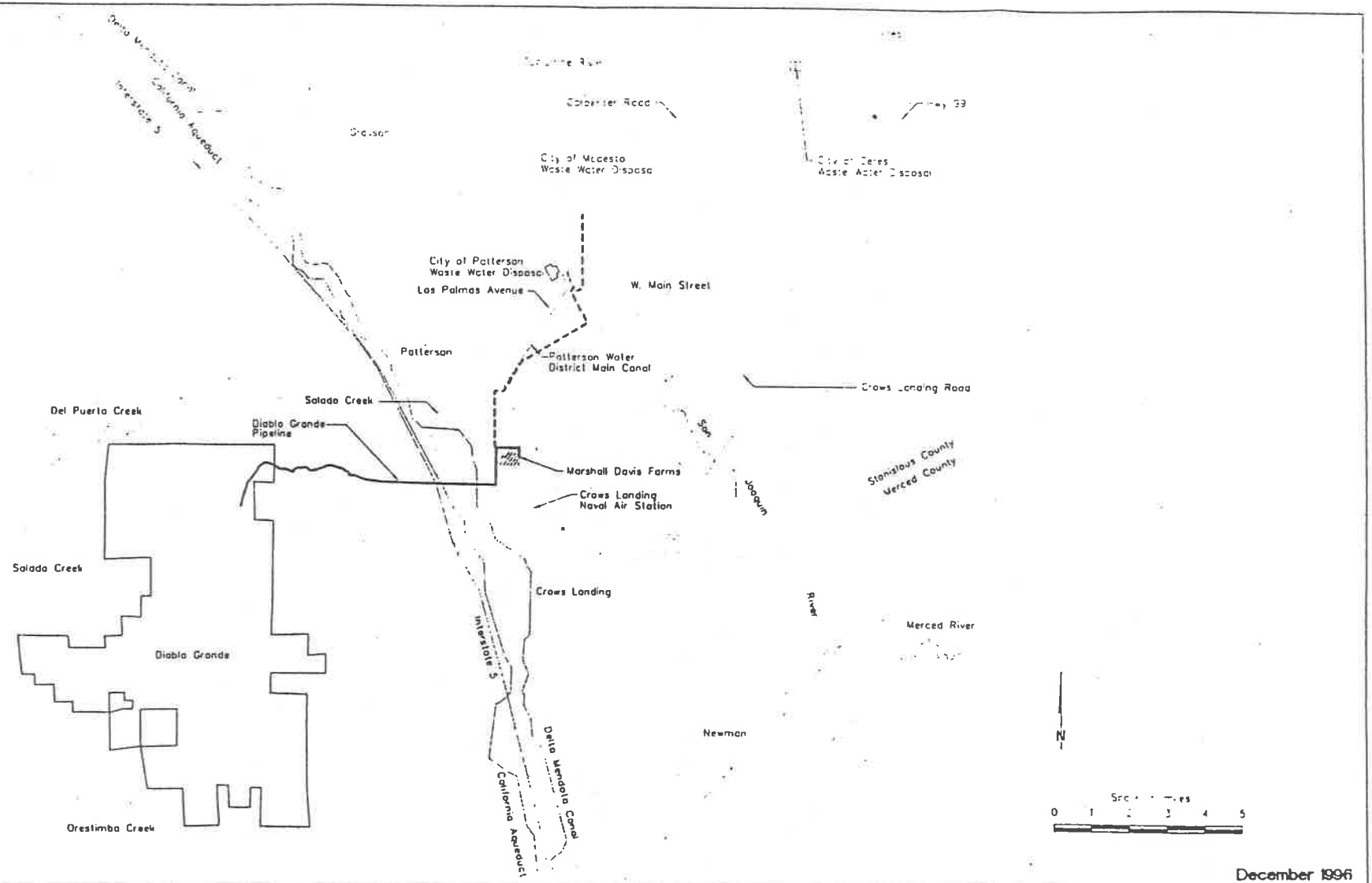
Bookman-Edmonston Engineering, Inc.	Location of Conveyance Facilities City of Patterson ATS Facility Western Hills Water District	Figure 3



Bookman-Edmonston Engineering, Inc.	Location of Conveyance Facilities City of Ceres ATS Facility Western Hills Water District	Figure 4



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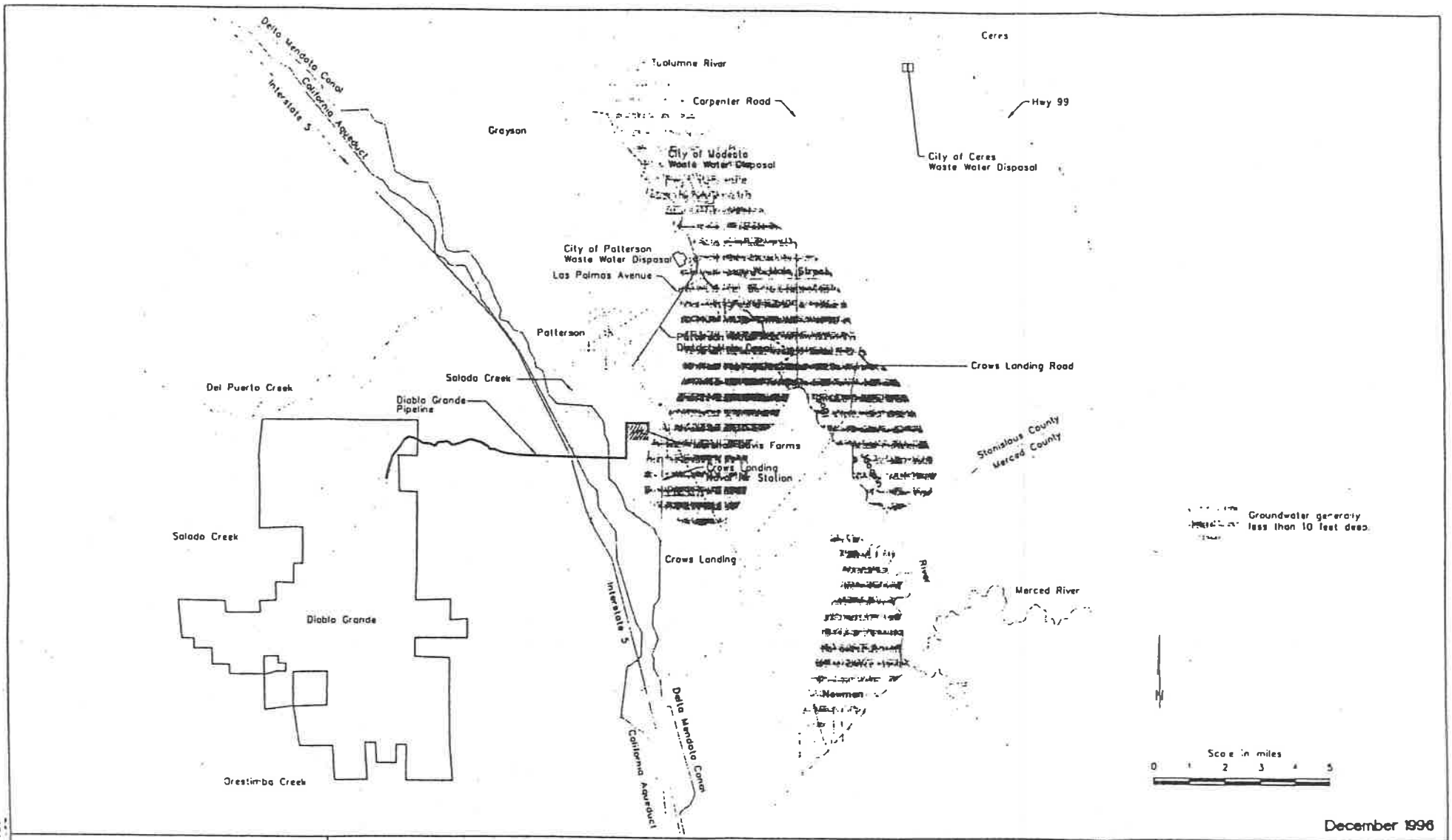
Bookman-Edmonston Engineering, Inc.	Location of Conveyance Facilities City of Modesto ATS Facility Western Hills Water District	Figure 5



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Bookman-Edmonston Engineering, Inc.	General Locations of Shallow Groundwater, Stanislaus County	Figure 6