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4.2 AGRICULTURE

This section discusses loss of important agricultural lands, disqualification of lands under Williamson Act contracts, reduction of agricultural soil productivity due to erosion, and the build-up of trace elements or salinity in agricultural soils. To provide a context for these analyses, the setting section provides information on classification of farmlands, data on existing agriculture in the project area, and a summary of policies regarding agricultural resources, including Williamson Act contracts and local general plan policies. Irrigation in the Sebastopol area could be part of either a West County or South County alternative, and is included in the evaluations of both alternatives.

IMPACTS EVALUATED IN OTHER SECTIONS

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

- **Soil Erosion.** Erosion from construction activities is discussed in Section 4.3, Geology, Soils, and Seismicity. Sedimentation in waterways is evaluated in Section 4.6, Surface Water Quality. On-site erosion from agricultural practices is evaluated in this section on Agriculture.
- **Increased Agricultural Productivity.** Provision of reclaimed water for agricultural irrigation would provide economic value to agriculture by allowing production of higher value agricultural products. The potential impact on the local agricultural economy from the availability of reclaimed water is discussed in Section 4.18, Socio-economics.
- **Water Quality Impacts of Bay Flats Irrigation.** Water quality concerns associated with irrigation of the Bay Flats are addressed in Section 4.5, Groundwater Section and in 4.6, Surface Water Quality.

AFFECTED ENVIRONMENT (SETTING)

As noted in the Land Use Section (4.1), vast areas of Sonoma and Marin counties are farm or grazing lands. That section discusses generalized locations of crop and grazing areas.

Important Farmland Series Maps

The California Department of Conservation has modified the U.S. Department of Agriculture Soil Conservation Service maps to show farmland and urban areas in California. These *Important Farmland Series Maps for Sonoma County* classify the farmlands of the state as (California Department of Land Conservation, Office of Land Conservation, Farmland Mapping & Monitoring Program 1992):

- **Prime Farmland.** This category of land has the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods. Prime Farmland must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date. Maps are updated every two years.
- **Farmland of Statewide Importance.** Although similar to Prime Farmland, this category of land has minor shortcomings, such as greater slopes or less ability to hold and store moisture. This land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date.
- **Unique Farmland.** This land has lesser quality soils and is used for the production of specific high economic value crops at some time during the two update cycles prior to the mapping date. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to current farming methods. Unique farmland is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones. Examples of crops on unique farmland include oranges, olives, avocados, rice, grapes, and cut flowers.
- **Farmland of Local Importance.** This land is of importance to the local agricultural economy, determined by each county's board of supervisors and local advisory committees. Examples could include dairies, dryland farming, aquaculture and uncultivated areas with soils qualifying for Prime Farmland and Farmland of Statewide Importance. Farmland of Local Importance does not include publicly owned lands for which there is an adopted policy preventing agricultural use.

Throughout this section these categories of farmlands: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, are referred to collectively as status farmlands.

Williamson Act Lands

Another classification of agricultural lands of concern is Williamson Act contract lands as defined in the California Land Conservation Act of 1965. The law was enacted to protect agriculture and open space land and to adjust imbalanced tax practices. Williamson Act contracts also known as agricultural preserves, offer tax incentives for agricultural land preservation by ensuring that land will be assessed for its agricultural productivity rather than its highest and best uses.

In order to cancel a Williamson Act contract, a landowner must file a notice of nonrenewal. Beginning at the next contract anniversary date, the contract winds down over its remaining (usually nine-year) term. During this time the taxes on the contract

lands gradually return to their pre-contract levels. After nonrenewal has been filed, a landowner may petition to the city/county in which jurisdiction the land is located for early cancellation of the contract. The council/board of that jurisdiction may grant tentative approval for cancellation only if it makes one of the following findings:

- That the cancellation is consistent with the purposes of the Williamson Act; or
- That cancellation is in the public interest (Government Code Section 51282(a)).

In order to find that cancellation is consistent with the purposes of the Williamson Act, the council/board must find the following:

- That a notice of nonrenewal has been filed.
- That cancellation would not likely result in the removal of adjacent lands from agricultural use.
- That cancellation would result in an alternative use which is consistent with provisions of the applicable General Plan.
- That discontinuous patterns of urban development would not result from cancellation.
- That there is no proximate noncontracted land which is both available and suitable for the proposed use, or that development of contracted land would provide more contiguous patterns of urban development.

In order to find that cancellation is in the public interest, the council/board must find:

- That public concerns substantially outweigh Williamson Act objectives;
- That there is no proximate noncontracted land which is both available and suitable for the proposed use, or that development of contracted land would provide more contiguous patterns of urban development.

Senate Bill 1534 (approved by the Governor and filed with the Secretary of State in 1994) amended Williamson Act provisions pertaining to acquisition of contracted land for public improvements. Article 6 of the Williamson Act (Government Code Sections 51290-51295) provides that a public entity may acquire land within an agricultural preserve for a public improvement through eminent domain or in lieu of eminent domain, and that this action terminates the contract. Specific provisions contained in Senate Bill 1534 define procedures which the agency must follow in notifying the Director of the Department of Conservation, conditions under which a public improvement may not be located within a preserve, and public improvements which are exempt from these conditions. These provisions are summarized below:

Notification Provisions. At the time a public agency is considering locating a public improvement within an agricultural preserve, notice must be sent to the Director of the Department of Conservation and the local governing body responsible for administration of the contract. The notification must include the total number of Williamson Act acres to be acquired and whether or not they include Prime Farmland; the purpose of the acquisition and why the parcel was selected; the location; characteristics of adjacent land; location maps; copies of the contract; and explanation of findings (see explanation below).

Findings. A public agency shall not locate a public improvement within an agricultural preserve unless the following findings are made:

- The location is not based primarily on a consideration of the lower cost of acquiring land in an agricultural preserve; and
- If the land is Prime Farmland covered under a contract pursuant to Article 6 for any public improvement, that there is no other land within or outside the preserve on which it is reasonably feasible to locate the public improvement.

Agricultural Crop Summary

Table 4.2-1 presents approximate bearing acreage and cash value of the most important crops in Sonoma County for 1994. The table indicates the dominance of the wine industry; however, little viticulture occurs in the potentially affected West and South County areas. The sections of Marin County that could be affected by the proposed project are mostly grazing areas.

Table 4.2-1

Sonoma County Agricultural Summary

| Crop | Acreage | Cash Value |
|---|---------|----------------|
| Grapes | 33,800 | \$ 152,280,700 |
| Apples | 5,250 | 8,131,500 |
| Other Fruits and Nuts | 1,250 | 9,312,000 |
| Vegetables | 1,000 | 15,491,500 |
| Livestock and Poultry | NA | 37,519,200 |
| Livestock and Poultry Products (including milk) | NA | 84,937,500 |
| Silage | 258,000 | 10,600,200 |

Source: Office of Agricultural Commissioner Sonoma County, Agricultural Crop Report, Sonoma County 1994

Currently, most of the West and South County study areas are not intensively cultivated. Farmed acreage is predominantly hay and grazing pasture for cattle and dairy operations. Intensive agricultural development is constrained by the lack of a developed, dependable, and inexpensive water supply.

Agriculture Goals, Objectives, and Policies

Table 4.2-2 identifies goals, objectives, and policies which provide guidance for future agricultural resources. The table also indicates which criteria in the Agriculture Section are responsive to each set of policies. Because there are no Project facilities in the General Plan areas of Cotati, Rohnert Park or Sebastopol (except for a segment of pipeline in Sebastopol), agricultural policies of these cities are not discussed.

Table 4.2-2

General Plan Goals, Objectives and Policies - Agriculture

| Adopted Plan Document | Document Section | Document Numeric Reference | Policy | Relevant Evaluation Criteria ¹ |
|----------------------------|-------------------------------------|---|--|---|
| Sonoma County General Plan | Agricultural Resources Element | Goal AR-3 Objective AR-3.2 Policy AR-3a | Maintain agricultural land in parcel sizes that are suitable for agricultural purposes | 2 |
| Sonoma County General Plan | Agricultural Resources Element | Objective AR-8.1 Policy AR-8c | Continue Participation in the Williamson Act | 2 |
| Sonoma County General Plan | Agricultural Resources Element | Objective AR-8.2 Policy AR-8f | Encourage participation in programs for reuse of treated wastewater which are beneficial for agriculture | 1,3,4 |
| Marin Countywide Plan | Agriculture Element | Policy A-1.1 Policy A-1.3 | Maintain agricultural land in parcel sizes that are suitable for agricultural purposes | 2 |
| Marin Countywide Plan | Agriculture Element | Program A-1.3a | Continue Participation in the Williamson Act | 2 |
| Santa Rosa General Plan | Open Space and Conservation Element | Goal OSC-8 Objective OSC-8a | Support conservation and preservation of prime agricultural land and commercial agriculture outside the Urban Boundary | 1,2,3,4 |

Table 4.2-2

General Plan Goals, Objectives and Policies - Agriculture

| Adopted Plan Document | Document Section | Document Numeric Reference | Policy | Relevant Evaluation Criteria ¹ |
|-----------------------|---|--------------------------------------|--|---|
| Petaluma General Plan | Open Space, Conservation and Energy Element | Goal 4 Objective (g) Policy 14 | Preserve and protect agricultural use on land surrounding the city and reduce pressure for urbanization of agricultural land | 1,2,3,4 |

Source: Harland Bartholomew and Associates, Inc., 1996

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

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

CEQA Appendix G states that a project will have a significant impact on the environment if it will, "Convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land."

Potential agricultural impacts may occur if the Project were to result in:

- Loss of farmland with a status defined by the State Department of Conservation; or
- Reduced productivity of the soil, caused by soil erosion or chemical toxicity.

The criteria of significance for loss of farmland and reduced soil productivity are presented in Table 4.2-3.

Reduction of Soil Productivity

Two potential causes of reduced soil productivity have been evaluated, erosion and trace element loading (chemical toxicity), and therefore two sets of evaluation criteria have been developed. Using the U.S. Department of Agriculture's soil erosion prediction model, the Universal Soil Loss Equation (USLE), soil types have been rated according to their soil loss tolerance, or "T" value. The T value expressed as annual tons per acre of allowable soil loss. The annual soil loss due to the Project exceeds the T Value for that soil, erosion impacts are considered significant.

The *Trace Element Loading Analysis for the South and West County Reclamation Alternatives* (Questa Engineering Corporation 1995c) presents 32 constituents analyzed for in reclaimed water from the Laguna Plant and compares them with EPA and California standards. References are:

- EPA. 1993. *Standards for the Use or Disposal of Sewage Sludge* (Title 40 of the Code of Federal Regulations [CFR], Part 503), published in the Federal Register (58 FR 9248 to 9404) on February 19.
- Pettygrove Asano. 1984. *Irrigation with Reclaimed Municipal Wastewater, A Guidance Manual* (Chapter 12, Nitrogen and Phosphate; and Chapter 13, Metals).

Table 4.2-3

Evaluation Criteria with Point of Significance - Agriculture

| Evaluation Criteria | As Measured by | Point of Significance | Justification |
|--|--|---|---|
| 1. Will the Project cause loss of farmland? | Acres of status ¹ farmland lost | Greater than 0 acres | CEQA and State of California Department of Conservation |
| 2. Will the Project cause Williamson Act contracts to be canceled? | Number of remainder parcels under Williamson Act contract which are less than 10 acres of status ¹ farmland or 40 acres of non-status farmland due to purchase of land for the Project. | Greater than 0 remainder parcels smaller than contract criteria | California Land Conservation Act of 1965 |
| 3. Will the Project reduce agricultural soil productivity due to erosion of topsoil? | Annual tons per acre (T values) | Universal Soil Loss Equation-predicted annual soil loss exceeds the T value | USDA Universal Soil Loss Equation |
| 4. Will the Project reduce agricultural soil productivity due to build-up of trace elements or salinity? | a. Suitability of reclaimed water for irrigation (pH units, mg/l, or mmhos/cm) | Exceedence of FAO Guidelines | United Nations Food and Agricultural Organization (FAO) Irrigation Water Guidelines |
| | b. Metals loading (kilograms/hectare) in soils from application of reclaimed water and fertilizer/manure | Exceedence of state guidelines or federal rules | State Water Resources Control Board Report #84-1 (Pettygrove G.S. and Asano, T. 1996); EPA 503 Rules for applications of sludge |

Source: Parsons Engineering Science, Inc. 1996

Notes:

1. For the purposes of this document, status farmland includes the following categories defined by the California Department of Conservation: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance.

METHODOLOGY

This impact analysis is based on a review of relevant literature and technical reports prepared for the impact evaluation for this project. Overlays of farmland categories (mapped at a scale of 1:24,000) supplied by the Department of Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program were used to evaluate acres of Prime Farmland impacted by the construction of reservoirs and pump stations. The technical reports listed in the References section provide additional details on methodology.

The *Evaluation of Soil Erosion Impacts of the West and South County Reclamation Alternatives* (Questa Engineering Corporation 1996) evaluates the impacts of changes in agricultural land use and practices which may be caused by the availability of reclaimed water. Soil erosion due to the Project was estimated using the U.S. Department of Agriculture's soil erosion prediction model, the Universal Soil Loss Equation (USLE) and compared to the T value of that soil. The T value is the soil loss tolerance as developed by the USDA Natural Resources Conservation Service.

The *Trace Element Loading Analysis for the South and West County Reclamation Alternatives* (Questa Engineering Corporation 1995c) presents 12 constituents analyzed in Santa Rosa reclaimed water comparing them with EPA and California standards.

Build-up of trace elements was calculated based on average levels of these constituents in existing reclaimed water. Analysis of impacts was based on the assumption that the Irrigation Management Plan Guidelines set forth in Chapter 2 (Measures 2.2.1 through 2.2.5) would be implemented. These measures are included in the Project description and establish performance criteria for agricultural irrigation. The provisions of those guidelines are summarized below.

Irrigation Management Measures

Measures 2.2.1 through 2.2.7 identify procedures and practices that have been adopted as part of the Project by the City. These measures provide the basis for the Irrigation Conservation and Management Program and establish the irrigation system planning, and the design principles and guidelines, that are required for incorporating individual farms and ranches into expansion of the agricultural irrigation system. These measures implement the Irrigation Management Guidelines. Each parcel brought into the reclamation program would be subject to a site-specific Irrigation Conservation and Management Program (ICMP). The requirements of the individual ICMP are described in more detail in Section 2.2.

ENVIRONMENTAL CONSEQUENCES (IMPACTS) AND MITIGATION MEASURES

No Action Alternative

Impact: 2.1.1-4. Will the No Action Alternative impact agriculture based on evaluation criteria 1 through 4?

Analysis: *No Impact; Alternative 1.*

The No Action Alternative will not cause the loss of any agricultural land or reduce agricultural soil productivity.

Mitigation: No mitigation is needed.

Headworks Expansion Component

Impact: 2.2.1-4. Will the headworks expansion component impact agriculture based on evaluation criteria 1 through 4?

Analysis: *No Impact; All Alternatives.*

Expansion of the Laguna Plant headworks will take place entirely within an existing building and will, therefore, not cause the loss of any agricultural land or reduce agricultural soil productivity.

Alternative 1 does not have headworks expansion component.

Mitigation: No mitigation is needed.

Urban Irrigation Component

Impact: 2.3.1-4. Will the urban irrigation component impact agriculture based on evaluation criteria 1 through 4?

Analysis: *No Impact; All Alternatives.*

Urban irrigation is applied to urban properties only, such as golf courses, landscaping, and school grounds. This component, therefore, will not cause the loss of any agricultural land or reduce agricultural soil productivity.

Alternatives 1, 4, and 5 do not have a urban irrigation component.

Mitigation: No mitigation is needed.

Pipeline Component

Impact : 2.4.1. Will the pipeline component cause loss of farmland?

Analysis: *No Impact; All Alternatives.*

Pipelines follow public rights-of-way or private roads. However, for the Tolay, Sears Point, Huntley, Two Rock, and Bloomfield reservoirs it will be necessary to disrupt agricultural land to construct the pipeline connections to storage reservoirs. This will be a temporary disruption, and will result in no loss of farmland. Measure 2.2.9, Retain Stripped Topsoil, incorporated into the Project, requires that, following construction, the soil layers over the pipelines will be replaced as they were before pipeline installation occurred. The amount of land temporarily disrupted will be less than one acre. There will be no permanent loss of prime agricultural soils.

Alternatives 1 and 5B do not have a pipeline component.

Mitigation: No additional mitigation is needed.

Impact: 2.4.2-4. Will the pipeline component impact agriculture based on evaluation criteria 2, 3 and 4?

Analysis: *No Impact; All Alternatives.*

Because there is no permanent loss of agricultural soils, Williamson Act contracts will not be affected.

Operation of pipelines will not affect agricultural soil production. Measure 2.2.9, Retain Stripped Topsoil, is incorporated into the Project Description and would serve to maintain agricultural productivity of the soil for areas affected by pipeline construction.

Pipelines will not introduce any trace element into the soil.

Rupture of pipelines could erode agricultural soil, but will do so infrequently and in a localized manner so that it will not be a problem for long-term agricultural production.

Alternatives 1 and 5B do not have a pipelines component.

Mitigation: No mitigation is needed.

Storage Reservoir Component

Table 4.2-5

Agricultural Impacts by Component - Storage Reservoirs

| Evaluation Criteria | Point of Significance | Impact | Type of Impact ¹ | Level of Significance ² |
|--|---|--------|-----------------------------|------------------------------------|
| 2.5.1. Will the storage reservoir component cause loss of farmland? | Greater than 0 acres of status ³ farmland removed | | | |
| • Tolay Extended | | 456 | P | ● |
| • Adobe Road | | 28 | P | ● |
| • Tolay Confined | | 108 | P | ● |
| • Two Rock | | 114 | P | ● |
| • All other reservoirs | | 0 | P | == |
| 2.5.2. Will the storage reservoir component cause Williamson Act contracts to be canceled? | Greater than 0 remainder parcels smaller than contract criteria | | | |
| • Bloomfield | | 1 | P | ● |
| • Huntley | | 1 | P | ● |
| • All other reservoirs | | 0 | P | == |
| 2.5.3. Will the storage reservoir component reduce agricultural soil productivity due to erosion of topsoil? | USLE predicted annual soil loss exceeds the T value | None | O&M | == |
| 2.5.4. Will the storage reservoir component reduce agricultural soil productivity due to build-up of trace elements? | a. Exceedence of FAO Guidelines. | None | O&M | == |
| | b. Exceedence of state guidelines or federal rules | None | O&M | == |

Source: Parsons Engineering Science, Inc., 1996

Notes: 1. Type of Impact:
O&M Operation and Maintenance
P Permanent

2. Level of Significance:
● Significant impact before and after mitigation
○ Less than significant impact; no mitigation proposed
== No impact

3. Status Farmland is Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance as defined by the California Department of Conservation.

Impact: 2.5.1. Will the storage reservoir component cause loss of farmland?

Analysis: *Significant; Alternatives 2A, 2B, 2C, 3A.*

The Tolay Extended, Adobe Road, Tolay Confined, and Two Rock reservoirs will cause the loss of substantial amounts of agricultural land. Table 4.2-6 summarizes status farmland impacts by reservoir location.

No Impact; Alternatives 2D, 3B, 3C, 3D, 3E, 4, and 5.

Although the Lakeville Hillside, Sears Point, Bloomfield, Carroll Road, Valley Ford, and Huntley reservoirs would displace grazing land, none will cause the loss of Prime Farmland, Farmland of Statewide or Local Importance, or Unique Farmland.

Table 4.2-6

Loss of Farmland by Reservoir¹
(acres)

| Reservoir | Grazing Land | Unique Farmland | Farmland of Local Importance | Total Construction Impact Area |
|--------------------|--------------|-----------------|------------------------------|--------------------------------|
| Tolay Extended | 158 | 418 | 38 | 1,065 |
| Adobe Road | 147 | 0 | 28 | 350 |
| Tolay Confined | 76 | 108 | 0 | 605 |
| Lakeville Hillside | 152 | 0 | 0 | 230 |
| Sears Point | 274 | 0 | 0 | 465 |
| Two Rock | 115 | 0 | 114 | 350 |
| Bloomfield | 195 | 0 | 0 | 340 |
| Carroll Road | 241 | 0 | 0 | 315 |
| Valley Ford | 230 | 0 | 0 | 375 |
| Huntley | 184 | 0 | 0 | 305 |

Source: California Department of Land Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program, 1992. Parsons Engineering Science, Inc. 1996

Notes:

¹No Prime Farmland or Farmland of Statewide Importance would be impacted by reservoirs.

One of the long-term consequences of implementing alternatives with storage reservoirs will be to enhance the viability of agricultural production in the counties of Sonoma and Marin. As the Socio-economic Section states, the reclamation alternatives will have a positive net economic return due to a projected increase in agricultural production

value, made possible by the creation of a reliable source of irrigation water. By making water available, the reclamation alternatives could increase production of existing operations and convert to commodities which provide higher economic returns. However, the loss of agricultural land remains an adverse impact. Project facilities will remove status farmland from use. In some cases, entire farms will be eliminated.

Alternatives 1, 4, and 5 do not have a storage reservoir component.

Mitigation: *Alternatives 2A, 2B, 2C, and 3A.* No feasible mitigation has been identified.

Alternatives 1, 2D, 3B, 3C, 3D, 3E, 4, and 5. No mitigation is needed.

After

Mitigation: *Significant; Alternatives 2A, 2B, 2C, and 3A.*

Impact: 2.5.2. Will the storage reservoir component cause Williamson Act contracts to be canceled?

Analysis: *Significant; Alternatives 3B and 3E.*

Purchase of Williamson Act Contract Land for a storage reservoir will leave a remainder parcel of less than 40 acres at both the Bloomfield and Huntley reservoir sites. Depending on ownership patterns, this may disqualify these parcels from Williamson Act statutes.

No Impact; Alternatives 1, 2, 3A, 3C, 3D, 4 and, 5.

The Tolay Extended, Adobe Road, Tolay Confined, Lakeville Hillside, Sears Point, Two Rock, Carroll Road, and Valley Ford reservoirs sites will result in the purchase of portions of parcels under Williamson Act contract, requiring cancellation of the contract on those lands. However, the remaining parcels will be large enough to allow continuation of the contract. Table 4.2-7 shows the amount of land which will be removed from Williamson Act, parcel by parcel, as a result of construction of each proposed reservoir.

The Sears Point reservoir site has no Williamson Act contract land; however, it is part of Alternative 2D with the Lakeville Hillside reservoir.

Table 4.2-7

Loss of Williamson Act Contract Land by Reservoir

| Reservoir | Parcel Number | Parcel Size (acres) | Reservoir Size within Parcel (acres) | Total Area Remaining in Williamson Act (acres) |
|--------------------|--------------------------------------|------------------------|--|---|
| Tolay Extended | 68-050-23 | 303 | 55 | 248 |
| | 68-060-55 | 118 | 46 | 72 |
| | 68-080-03 | 607 | 5 | 602 |
| | 68-080-02 | 325 | 6 | 319 |
| Adobe Road | 136-14-03 | 160 | 9 | 151 |
| Tolay Confined | 68-08-03 | 607 | 15 | 592 |
| | 68-080-02 | 325 | 18 | 307 |
| Lakeville Hillside | 68-110-17 | 174 | 55 | 119 |
| | 68-110-29 | 201 | 27 | 174 |
| | 68-110-33 | 91 | 18 | 73 |
| | 68-110-34 | 128 | 55 | 73 |
| Sears Point | No Williamson Act contract lands. | --- | --- | --- |
| Two Rock | 22-020-01 | 404 | 37 | 367 |
| Bloomfield | 27-020-06 | 319 | 83 | 236 |
| | 27-030-03 | 162 | 126 | 36 |
| | 27-030-02 | 277 | 19 | 258 |
| | 27-040-11 | 216 | 16 | 200 |
| | 27-020-02 | 200 | 4 | 196 |
| | 27-010-12 | 106 | 14 | 92 |
| | 73-020-04 | 458 | 7 | 451 |
| Carroll Road | 73-020-04 | 458 | 99 | 359 |
| | 73-020-07 | 487 | 165 | 322 |
| Valley Ford | 26-070-12 | 186 | 28 | 158 |
| | 26-070-08 | 549 | 178 | 371 |
| | 26-080-05 | 600 | 80 | 520 |
| Huntley | 27-230-07 | 101 | 46 | 55 |
| | 27-230-08 | 92 | 18 | 74 |
| | 27-230-10 | 174 | 4 | 170 |
| | 27-230-04 | 202 | 73 | 129 |
| | 27-230-06 | 92 | 55 | 37 |

Source: Parsons Engineering Science, Inc., 1996,
Harland Bartholomew & Associates, Inc. 1996

In order to find that the cancellation is consistent with the purposes of the Williamson Act, the Sonoma County Board of Supervisors must find that the conditions set forth in the setting section are met. A preliminary analysis of these conditions is provided below. The County Board of Supervisors will make Findings to grant or deny approval for cancellation based on their own evaluation.

- A notice of nonrenewal has been filed.

It is assumed that a notice of nonrenewal will be filed at the time the land is purchased.

That adjacent lands will not likely be removed from agricultural use.

By providing a reliable source of water for agriculture, the Project would likely help to maintain agricultural use on adjacent parcels.

- That cancellation is for an alternative use consistent with the Sonoma County General Plan.

The Sonoma County General Plan is not specific regarding consistency of large storage reservoirs within an agricultural land use designation. Because the reservoirs are for the purpose of supporting increased agricultural production, this document concludes that the storage reservoirs are consistent with the County General Plan. The County has not made a determination of consistency.

- That cancellation will not result in discontinuous patterns of urban development.

Cancellation is not for the purpose of unplanned urban development. Development of a reservoir to store nonpotable reclaimed water is expected to enhance the long-term prospects of agriculture in the area, and, therefore, reinforce agricultural land uses.

- That there is no nearby, noncontracted land, available and suitable for the proposed use.

The reservoir sites which are being analyzed were chosen for their topographic properties, size, hydraulic suitability, proximity to the treatment plant, existing reclaimed water distribution system, and proposed reuse areas. Selection of these sites was made after an extensive process. Because of the requirements necessary for a reservoir site and the selection process used, it is unlikely that noncontracted land that will meet the storage reservoir engineering criteria is available in the vicinity of the selected sites.

The following are conditions for locating public improvements in an agricultural preserve:

- The location is not based primarily on a consideration of the lower cost of acquiring land in an agricultural preserve.

The location is not based on cost of agricultural land, but is controlled by the need to locate reservoir sites near agricultural irrigation areas, and by the requirement for suitable topography.

- If the land is Prime Farmland covered under a contract pursuant to Article 6 for any public improvement, that there is no other land within or outside the preserve on which it is reasonably feasible to locate the public improvement.

None of the reservoir sites contains Prime Farmland.

This preliminary evaluation indicates that cancellation of Williamson Act contract status is possible and indeed consistent with Williamson Act intentions.

Alternatives 1, 4, and 5 do not have a storage reservoir component.

Mitigation: *Alternatives 3B and 3E.* No feasible mitigation has been identified.
Alternatives 1, 2, 3A, 3C, 3E, 4 and 5. No mitigation is proposed.

After
Mitigation: *Significant; Alternatives 3B and 3E.*

Impact: 2.5.3-4. Will the storage reservoir component impact agriculture based on evaluation criteria 3 and 4?

Analysis: *No Impact; All Alternatives.*

Storage reservoirs will not cause erosion of agricultural soils beyond the footprint of the reservoir. Therefore, there is no impact.

Storage reservoirs will not cause build-up of trace elements or salt in the surrounding agricultural soils. Therefore, there is no impact.

Alternatives 1, 4, and 5 do not have a storage reservoir component.

Mitigation: No mitigation is needed.

Pump Station Component

Table 4.2-8

Agricultural Impacts by Component - Pump Stations

| Evaluation Criteria | Point of Significance | Impact | Type of Impact ¹ | Level of Significance ² |
|--|---|--------|-----------------------------|------------------------------------|
| 2.7.1. Will the pump station component cause loss of farmland? | Greater than 0 acres of status ³ farmland removed. | | | |
| • Tolay Extended | | 0.2 | P | ● |
| • Adobe Road/Lakeville | | 0.2 | P | ● |
| • Tolay Confined | | 0.2 | P | ● |

Table 4.2-8

Agricultural Impacts by Component - Pump Stations

| Evaluation Criteria | Point of Significance | Impact | Type of Impact ¹ | Level of Significance ² |
|---|---|--------|-----------------------------|------------------------------------|
| • Lakeville/Sears Point | | 0.3 | P | ● |
| • Two Rock | | 0.2 | P | ● |
| • Bloomfield | | 0.2 | P | ● |
| • Carroll Road | | 0.2 | P | ● |
| • Valley Ford | | 0.2 | P | ● |
| • Huntley | | 0.2 | P | ● |
| • Geysers Recharge | | 0.1 | P | ● |
| • Discharge | | -- | P | -- |
| 2.7.2. Will the pump station component cause Williamson Act contracts to be canceled? | Greater than 0 parcels | None | P | == |
| 2.7.3. Will the pump station component reduce agricultural soil productivity due to erosion of topsoil? | USLE-predicted annual soil loss exceeds the T value | None | O&M | == |
| 2.7.4. Will the pump station component reduce agricultural soil productivity due to build-up of trace elements? | a. Exceedence of FAO Guidelines | None | O&M | == |
| | b. Exceedence of state guidelines or federal rules | None | O&M | == |

Source: Parsons Engineering Science, Inc., 1996

Notes: 1. Type of Impact: 2. Level of Significance:

O&M Operation and Maintenance ● Significant impact before and after mitigation

P Permanent -- Not applicable

== No impact

3. Status Farmland is Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance as defined by the California Department of Conservation.

Impact: 2.6.1. Will the pump station component cause loss of farmland?

Analysis: *Significant; Alternatives 2, 3, and 4.*

Booster pump stations will be constructed on farm and grazing lands. Impacts from Pump Stations at reservoir sites are addressed under Impact 2.5.1. For each of the South and West County alternatives, at least one

Booster pump station will be constructed on either Prime, Unique, or Locally Important Farmland. This removal of status farmland from agricultural use for the lifetime of the pump stations will be a significant impact. The largest area lost to pump station construction will be about 0.3 acres (13,500 sq. ft.) required for building the pump stations associated with the Lakeville/Sears Point Alternative. Table 4.2-9 summarizes pump station dislocation of Prime, Unique or Locally Significant Farmland.

No Impact; Alternatives 1 and 5.

These alternatives do not have a pump station component.

Mitigation: *Alternatives 2, 3, and 4.* No feasible mitigation has been identified.

Alternatives 1 and 5. No mitigation is needed.

After

Mitigation: *Significant; Alternatives 2, 3, and 4.*

Avoidance is not possible because of other factors involved in selecting pump station sites. Replacement cannot be achieved with status agricultural land which has the same Farmland Mapping Program category because the replacement land will already be in agricultural use.

Table 4.2-9

Status Farmland Required for Pump Stations

| Alternative | Pump Station | Size (square feet) | Status of Farmland |
|----------------------|--------------|-----------------------|-----------------------|
| Tolay Extended | SBPS-3 | 800 | Local |
| | SBPS-8 | 1,500 | Local |
| | SBPS-10 | 2,700 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 8,500 | |
| Adobe Road/Lakeville | SBPS-3 | 800 | Local |
| | SBPS-8 | 1,500 | Local |
| | SBPS-10 | 2,700 | Local |
| | SBPS-11 | 1,500 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 10,000 | |

Table 4.2-9

Status Farmland Required for Pump Stations

| Alternative | Pump Station | Size (square feet) | Status of Farmland |
|-----------------------|--------------|-----------------------|-----------------------|
| Tolay Confined | SBPS-3 | 800 | Local |
| | SBPS-8 | 1,500 | Local |
| | SBPS-10 | 2,700 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 8,500 | |
| Lakeville/Sears Point | SBPS-3 | 800 | Local |
| | SBPS-7 | 2,700 | Local |
| | SBPS-8 | 1,500 | Local |
| | SBPS-9 | 800 | Local |
| | SBPS-10 | 2,700 | Local |
| | SBPS-11 | 1,500 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 13,500 | |
| Two Rock | WBPS-1 | 800 | Local |
| | WBPS-3 | 800 | Local |
| | WBPS-4 | 1,500 | Local |
| | WBPS-5 | 2,700 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 9,300 | |
| Bloomfield | WBPS-1 | 800 | Local |
| | WBPS-3 | 800 | Local |
| | WBPS-4 | 1,500 | Local |
| | WBPS-5 | 2,700 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 9,300 | |
| Carroll Road | WBPS-1 | 800 | Local |
| | WBPS-3 | 800 | Local |
| | WBPS-4 | 1,500 | Local |
| | WBPS-5 | 2,700 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 9,300 | |

Table 4.2-9

Status Farmland Required for Pump Stations

| Alternative | Pump Station | Size (square feet) | Status of Farmland |
|------------------|--------------|-----------------------|-----------------------|
| Valley Ford | WBPS-1 | 800 | Local |
| | WBPS-3 | 800 | Local |
| | WBPS-4 | 1,500 | Local |
| | WBPS-5 | 2,700 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 9,300 | |
| Huntley | WBPS-3 | 800 | Local |
| | WBPS-4 | 1,500 | Local |
| | WBPS-5 | 2,700 | Local |
| | LBPS-1 | 800 | Prime |
| | LBPS-2 | 2,700 | Unique |
| | Total: | 8,500 | |
| Geysers Recharge | GSP2-2 | 43,560 | Prime |

Source : Parsons Engineering Science, Inc., 1996, and
California Department of Land Conservation, Office of
Land Conservation, Farmland and Monitoring Mapping
Program, 1992

Impact: 2.6.2-4. Will the pump station component impact agriculture based on evaluation criteria 2, 3 and 4?

Analysis: *No Impact; All Alternatives.*

Pump stations delivering water to agricultural areas will occupy from 800 to 2,700 square feet of land adjacent to roads. They will not interfere with the ability of a parcel to meet the requirements of the Williamson Act.

Pump stations will have no impacts on surrounding soils.

Pump stations will not cause build-up of trace elements or salt in the surrounding agricultural soils.

Alternatives 1 and 5 do not have a pump station component.

Mitigation: No mitigation is needed.

Agricultural Irrigation Component

Table 4.2-10

Agricultural Impacts by Component - Agricultural Irrigation

| Evaluation Criteria | Point of Significance | Impact | Type of Impact ¹ | Level of Significance ² |
|--|---|--|-----------------------------|------------------------------------|
| 2.7.1. Will the agricultural irrigation component cause loss of farmland? | Greater than 0 acres of status farmland removed | None | P | + |
| 2.7.2. Will the agricultural irrigation component cause Williamson Act contracts to be canceled? | Greater than 0 parcels | None | P | == |
| 2.7.3. Will the agricultural irrigation component reduce agricultural soil productivity due to erosion of topsoil? | USLE-predicted annual soil loss exceeds the T value | Soil loss greater than T value for orchards and vineyards on slope greater than 10%; specialty crops on slopes greater than 5% | O&M O&M-CP | ⊙ ⊙ |
| 2.7.4. Will the agricultural irrigation component reduce agricultural soil productivity due to build-up of trace elements? | a. Exceedence of FAO Guidelines | No exceedences | O&M | ○ |
| | b. Exceedence of state guidelines or federal rules | No exceedences | O&M | ○ |

Source: Parsons Engineering Science, Inc., 1996

| | | |
|---|--|---|
| Notes: | 1. Type of Impact: | 2. Level of Significance: |
| O&M | Operation and Maintenance | == No impact |
| O&M-CP | Operation and Maintenance - Contingency Plan | + Beneficial impact |
| P | Permanent | ○ Less than significant impact; no mitigation proposed |
| | | ⊙ Significant impact before mitigation; less than significant impact after mitigation |
| 3. Status Farmland is Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance as defined by the California Department of Conservation. | | |

Impact: 2.7.1. Will the agricultural irrigation component cause loss of farmland?

Analysis: *Beneficial Impact; Alternatives 2 and 3.*

Availability of proposed irrigation water could cause new land to be brought into agricultural production, and will cause existing agricultural land to become irrigated, thus raising its value under the categories of the State Farmlands Mapping Program. The gain in acres of land qualifying as Prime Farmland or Farmland of Statewide Importance cannot be estimated, because it is currently unknown which landowners may contract with the City for reclaimed water. However, Farmland of Local Importance includes areas of dairies and other dryland farming that have soils qualifying as Prime Farmland or Farmland of Statewide Importance; availability of irrigation water will raise some of these areas to the higher status category. A lack of water currently prevents these areas from being used at their highest agricultural potential.

No Impact; Alternatives 1, 4, and 5.

These alternatives do not have an agricultural irrigation component.

Mitigation: No mitigation is needed.

Impact: 2.7.2. Will the agricultural irrigation component cause Williamson Act contracts to be canceled?

Analysis: *No Impact; All Alternatives.*

Irrigation of Williamson Act lands is not cause for contract cancellation.

Alternatives 1, 4 and 5 do not have an agricultural irrigation component.

Mitigation: No mitigation is needed.

Impact: 2.7.3. Will the agricultural irrigation component reduce agricultural soil productivity due to erosion of topsoil?

Analysis: *Significant; Alternatives 2 and 3.*

With implementation of the following measures adopted as part of the Project, on-site erosion within agricultural areas will be reduced:

2.2.1. Irrigation Conservation and Management Program.

2.2.2. Irrigation Site Resource Maps.

2.2.3. Restrict Surface and Subsurface Irrigation Water Runoff.

2.2.4. Restrict Sediment Movement (Irrigation Sites).

2.2.5. Avoid Sensitive Biological Resources (Irrigation Areas).

Using these measures, erosion will be less than existing for most types of agriculture. However, even with these management practices, soil erosion

is found to exceed the T value (see Methodology portion of this section) in the following circumstances:

- New orchards and vineyards on slopes greater than 10 percent; and
- Specialty crops on slopes greater than 5 percent.

Although it is expected that erosion in the West County will be greater, erosion for these two categories would be significant in both South and West County.

Erosion problems associated with changes in grazing practices cannot be directly evaluated using the same methodology. Irrigation of pasture lands may cause an increase in the number of animals per acre. However, with implementation of the project design measures listed above, the potential for erosion will not increased.

Winter irrigation, if required, will be subject to similar constraints and will have impacts similar to dry-season irrigation.

No Impact; Alternatives 1, 4, and 5

Alternatives 1, 4 and 5 do not have an agricultural irrigation component.

Mitigation: *Alternatives 2 and 3.*

2.3.2. Restrict Approval of Agricultural Irrigation Contracts.

2.3.3. Agricultural Irrigation Demonstration Program.

Alternatives 1, 4 and 5. No mitigation is needed.

After

Mitigation: *Less than Significant; Alternatives 2 and 3.*

These measures will prohibit irrigation contracts for new orchards and vineyards with slopes greater than 10 percent and for specialty crops on slopes greater than percent unless the demonstration program described below can develop methods for erosion control that will not cause T values to be exceeded.

If the T value is not exceeded, then contracts for irrigation on similar slopes with similar crops may be signed. Monitoring of these contracts shall include erosion measurements for the first two seasons; contracts are subject to cancellation if erosion cannot be reduced below the T value.

Impact: 2.7.4. Will the agricultural irrigation component reduce agricultural soil productivity due to build-up of trace elements or salts?

Analysis: *Less than Significant; Alternatives 2 and 3.*

A. Suitability of Reclaimed Water for Irrigation.

Trace elements are metals that are needed by plants in low concentrations. Higher concentrations may prove detrimental. The trace element loading analysis was completed using long-term average reclaimed water data and annual average irrigation application rates of 2.0 acre-feet per acre for the West County and 2.9 acre-feet per acre for South County. (Application rates will be slightly different for Sebastopol, at about 1.7 acre-feet per year, and for the Bay Flats, at about 3 acre-feet per year.) The analysis is conservative in that it includes no loss of metals by leaching. As indicated in Table 4.2-11, the reclaimed water is of high quality and no significant direct toxicity or other effects are anticipated.

As indicated in Table 4.2-11, the salt content of the reclaimed water (as measured by Total Dissolved Solids and Salinity) is within the guidelines for agricultural irrigation. Further study of the possible build-up of salts in relation to leaching requirements was conducted and no potential problems were identified (Questa Engineering Corporation 1995d).

Table 4.2-11

Suitability of Reclaimed Water for Agricultural Irrigation

| Constituent | Reclaimed Water Quality (mg/l unless noted) | FAO Irrigation Water Guidelines¹ (mg/l unless noted) |
|-------------------------------|--|--|
| pH | 7.0-7.4 pH | 6.5-8.4 pH |
| Total Dissolved Solids | 450 | 450-1000 |
| Salinity | 0.78 mmhos/cm | 0.5-0.8 mmhos/cm |
| Sodium Absorption Ratio (adj) | 2.8 | <6.0 |
| Sodium | 80 | 70-80 |
| Chloride | 120 | 140-200 |
| Boron | 0.48 | <1.5 |
| Ammonium nitrogen | 4.1 | 5-30 |
| Nitrate nitrogen | 16.3 | 5-30 |
| Arsenic | 0.002 | 0.1 |
| Cadmium | 0.001 | 0.01 |
| Chromium | 0.002 | 0.1 |
| Copper | 0.01 | 0.2 |
| Lead | 0.005 | 5.0 |
| Nickel | 0.004 | 0.2 |
| Selenium | 0.005 | 0.05 |
| Zinc | 0.03 | 3.0 |

Source: Parsons Engineering Science, Inc., 1996

Notes:

1. United Nations Food and Agricultural Organization Irrigation Water Guidelines

B. Metals Loading in Soils from Application of Reclaimed Water and Fertilizer/Manure.

A trace element loading analysis was completed for select metals. Reclaimed water chemistry data and average irrigation application rates used were the same as those used for the previous analysis of irrigation suitability. The analysis is conservative in that it assumes no loss of metals by leaching, although in reality approximately 2 to 20 percent of the applied metals may leave the site in leachate.

Although the reclaimed water contains some small fertilizer values (principally nitrogen), the irrigation water will not be likely to meet total plant nutrition needs for all elements, particularly phosphorus. Therefore, application of supplemental fertilizers is likely. Fertilizers will contribute small quantities of metals to the soil, including impurities associated with commercial chemical fertilizers used for vegetables and specialty crops and animal manure used on forage and pasture lands. In Table 4.2-12, the projected metals loadings are presented as a range, representing reclaimed water only and reclaimed water plus chemical fertilizer or manure. As indicated in the Table, accumulation of metals in soil is very low and will not affect productivity or toxicity after 25 years or even 500 years of use.

Accumulation will be lower for crops than for grazing because trace elements are absorbed by crops, reducing soil concentrations. No reduction through this mechanism has been assumed, because trace elements will remain in any areas that are used for grazing. The overall conclusion that impacts will be less than significant is supported by ongoing monitoring of the existing reclamation system, which has shown no measurable accumulation of salts or metals in soils (personal communication, Don Fox, CH2M Hill, February 1, 1996).

Table 4.2-12

Metals Loading Due to Irrigation with Reclaimed Water and Fertilizer or Manure

| Constituent | Loading after 25 Years ¹ (kg/hectare) | | State ⁴ Guidelines (kg/hectare) | EPA Rules ⁵ (kg/hectare) | Least Number of Years until State Guidelines or EPA Rules Exceeded | |
|-------------|---|-----------------------------|---|--|--|--------------------------|
| | South County ² | West County ³ | | | South County ² | West County ³ |
| Arsenic | 0.68 | 0.46 | -- | 41 | 1,500 | 2,200 |
| Boron | 106 | 73 | -- | -- | -- | -- |
| Cadmium | 0.45-0.62 | 0.31-0.47 | 20 | 39 | 800 | 1,100 |
| Chromium | 0.88-0.93 | 0.61-0.67 | -- | 3,000 | 80,400 | 112,400 |
| Copper | 2.9-3.0 | 2.0-2.1 | 500 | 1,500 | 4,200 | 6,000 |

Table 4.2-12

Metals Loading Due to Irrigation with Reclaimed Water and Fertilizer or Manure

| Constituent | Loading after 25 Years ³ (kg/hectare) | | State ⁴ Guidelines (kg/hectare) | EPA Rules ⁵ (kg/hectare) | Least Number of Years until State Guidelines or EPA Rules Exceeded | |
|-------------|---|---------|---|--|--|-------|
| | | | | | | |
| Lead | 2.0-2.3 | 1.4-1.7 | 2,000 | 300 | 3,200 | 4,400 |
| Molybdenum | 8.5 | 6.0 | -- | -- | -- | -- |
| Nickel | 1.5-2.1 | 1.1-1.6 | 500 | 420 | 5,100 | 6,700 |
| Selenium | 0.43 | 0.31 | -- | 100 | 5,900 | 8,200 |
| Zinc | 7.2 | 5.0-5.1 | 1,000 | 2,800 | 3,500 | 1,400 |
| Silver | 0.44 | 0.31 | -- | -- | -- | -- |
| Mercury | 0.63 | 0.15 | -- | 17 | 700 | 2,800 |

Source: Trace Element Loading Analysis for the West
County and South County Alternatives. Questa
Engineering Corporation 1995c.

Note:

1. The lower value in the range is the effect of reclaimed water without fertilizer; the higher value is the effect of reclaimed water plus fertilizer or manure, whichever contributes more. Chemical fertilizer contributes more metals for all constituents except zinc; manure contributes more zinc than fertilizer.
2. The Bay flats area will be irrigated at about 3.5% higher application rate than the rest of South County, so loading after 25 years will be about 3.5% higher, and it will take about 3.5% fewer years to exceed specified levels.
3. Sebastopol will be irrigated at about a 10% lower application rate than West County, so loading after 25 years will be about 10% lower, and it will take about 10% more years to exceed specified levels.
4. State Water Resources Control Board Report #84-1.
5. EPA 503 Rules for Application of Sludge.

Effects on Livestock. These analyses show that levels of trace elements in the soils are so low that no effects on crops or livestock will be expected. The National Research Council's 1996 publication on *Use of Reclaimed Water and Sludge in Food Crop Production* provides additional information regarding effects on crops and livestock, which is summarized below (National Research Council 1996).

Previous studies have shown that irrigation with reclaimed water does not result in elevated levels of trace elements in crops. For many elements (e.g., chromium, mercury, and lead) there is a "soil-plant barrier" that prevents movement of elements into edible plant parts. Elements such as copper and zinc are more mobile within plants, but are toxic to plants at much lower levels than those which will affect animals. These two mechanisms prevent adverse effects to livestock, even in situations where levels of trace elements are elevated in soils. Livestock can, however, be harmed by excessive levels of selenium, molybdenum, or cadmium in crops. Most studies of these elements have focused on sludge application, because levels of trace elements are higher in sludge than in reclaimed

water. Levels of selenium in reclaimed water are exceptionally low, and no cases of molybdenum toxicity to animals have been reported as resulting from consumption of feed from sludge-amended soils. Cadmium has been shown to accumulate in liver and kidneys of animals fed crops grown on sludge-amended soils. However, no adverse effects were observed, and milk from goats fed silage grown on sludge-amended soils did not have elevated levels of cadmium. The National Research Council concludes that there is no evidence for adverse effects to livestock due to trace elements in feed from sludge-amended soils. (National Research Council 1996)

No Impact; Alternatives 1, 4 and 5.

These Alternatives do not have an agricultural irrigation component.

Mitigation: No mitigation is proposed.

Geysers Steamfield Component

Impact: 2.8.1-4. Will the geysers steamfield component impact agriculture based on evaluation criteria 1 through 4?

Analysis: *No Impact; All Alternatives.*

The geysers steamfield component does not occur on agricultural soils and will not affect prime farmland, Williamson Act contracts, or agricultural production.

Alternatives 1, 2, 3, and 5 do not have a geyser steamfield component.

Mitigation: No mitigation is needed.

Discharge Component

Impact: 2.9.1-4. Will the discharge component impact agriculture based on evaluation criteria 1 through 4?

Analysis: *No Impact; All Alternatives.*

The discharge facilities will not cause the loss of any agricultural land or reduce agricultural soil productivity. Discharge of reclaimed water into the Laguna or directly into the Russian River will not impact agricultural productivity.

Mitigation: No mitigation is needed.

CUMULATIVE IMPACTS

There are four impacts -- either less than significant or significant -- identified in the Agriculture section:

Impact: 2.1C. Will the Project plus cumulative projects cause a loss of farmland?

Analysis: In Sonoma County between 1990 and 1992, status farmland decreased by 2,239 acres of grazing land, by 5,522 acres of Farmland of Local Importance, and increased by 231 acres of Unique Farmland. Impacts of the Long-Term Project on status farmland have been designated as significant and unavoidable even though impacts are less than one acre for all alternatives except the Tolay, Adobe Road, and Two Rock reservoirs. Cumulative impacts exacerbate the significance of this loss of farmland, however, cumulative impacts would not warrant a change in either the finding of significance either before or after mitigation.

Despite the impacts described above, Alternatives 2 and 3 would have an overall cumulative benefit to agriculture. Provision of reclaimed water, and implementation of long-term contracts with agricultural users would enhance productivity of existing agricultural lands, provide substantial economic benefits (see Socio-economics Section), and would tend to maintain lands in agricultural use that might otherwise be converted to other uses. The availability of reclaimed water may be a major factor in reducing loss of agricultural land in Sonoma County.

Impact: 2.2C. Will the Project plus cumulative projects cause Williamson Act contracts to be canceled?

Analysis: Refer to cumulative impacts described in the preceding impact.

Impact: 2.3C. Will the Project plus cumulative projects reduce agricultural soil productivity due to erosion of topsoil?

Analysis: Reduction of soil productivity due to erosion of topsoil is a long-term, existing problem in the study area. In recent years, there has been a trend to cultivate steeper slopes, especially for vineyards, causing accelerated erosion. In addition, proposed expansion of irrigation with reclaimed water from other sewage treatment plants includes: 2,075 acres from Petaluma, 745 acres from Windsor, 400 acres from the Russian River County Sanitary District, and a couple of hundred acres from Forestville, Camp Meeker, Geyserville, Graton, Occidental, and the Sonoma County Airport.

Long-Term Project impacts on soil productivity are identified as significant for orchards and vineyards on slopes greater than 10 percent and for specialty crops on slopes greater than 5 percent. However, for most other lands proposed for irrigation, the Long-Term Project would actually reduce erosion rates due to required management techniques listed in Chapter 2.2. Therefore, impacts from cumulative projects would not be

significant, except for the sloping lands where impacts have already been identified as significant. No change in mitigation is warranted.

Impact: **2.4C. Will the Project plus cumulative projects reduce agricultural soil productivity due to build-up of trace elements?**

Analysis: This impact occurs on a very localized basis. Even though there are other agricultural lands proposed for irrigation as identified in the previous impact discussion, there would be no interaction or overlapping of impacts such that the standard used as the point of significance would be exceeded.

SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Table 4.2-13

Summary of Significant Impacts and Mitigation Measures- Agriculture

| Impact | Level of Significance | Mitigation Measure |
|---|---|--|
| Storage Reservoir Component | | |
| 2.5.1. The storage reservoir component may cause loss of farmland. | Alt2A - ● Alt 2B - ● Alt 2C - ● Alt 3A - ● | No feasible mitigation has been identified. |
| 2.5.2. The storage reservoir component may cause Williamson Act contracts to be canceled. | Alt 3B - ● Alt 3E - ● | No feasible mitigation has been identified. |
| Pump Station Component | | |
| 2.6.1. The pump station component may cause loss of farmland. | Alt 2 - ● Alt 3 - ● Alt 4 - ● | No feasible mitigation has been identified. |
| Agricultural Irrigation Component | | |
| 2.7.3. The agricultural irrigation component may reduce agricultural soil productivity due to erosion of topsoil. | Alt 2 - ⊙ Alt 3 - ⊙ | 2.3.2 Restrict Approval of Agricultural Irrigation Contracts. 2.3.3. Agricultural Irrigation Demonstration Program. |

Source: Parsons Engineering Science, Inc., 1996

Although the Summary Tables, 4.2-13 and 4.2-14, show significant impacts associated with loss of farmland and cancellation of Williamson Act contracts, Alternatives 2 and 3 will have a substantial benefit to agriculture, and will increase the classification status of

some agriculture land. For example, some Farmland of Local Importance would be converted to Prime Farmland with the provision of irrigation water. Because specific acreage cannot be calculated until contracts with individual users are established, it is not possible to determine which status farmland might experience a net increase, but there are benefits to agriculture that offset loss of agriculture lands at reservoir sites and pump stations.

SUMMARY OF IMPACTS BY ALTERNATIVE

Table 4.2-14

Summary of Impacts by Alternative Agriculture

| Component | Alt 1 | Alt 2A | Alt 2B | Alt 2C | Alt 2D | Alt 3A | Alt 3B | Alt 3C | Alt 3D | Alt 3E | Alt 4 | Alt 5A | Alt 5B |
|------------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|--------|
| No Action (No Project) Alternative | == | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Headworks Expansion | -- | == | == | == | == | == | == | == | == | == | == | == | == |
| Urban Irrigation | -- | == | == | == | == | == | == | == | == | == | -- | -- | -- |
| Pipelines | -- | == | == | == | == | == | == | == | == | == | == | == | -- |
| Storage Reservoirs | -- | ● | ● | ● | == | ● | ● | == | == | ● | -- | -- | -- |
| Pump Stations | -- | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | -- | -- |
| Agricultural Irrigation | -- | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | -- | -- | -- |
| Geysers Steamfield | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | == | -- | -- |
| Discharge | -- | == | == | == | == | == | == | == | == | == | == | == | == |

Source: Parsons Engineering Science, Inc., 1996

Notes: Level of Significance Codes

-- Not applicable

● Significant impact before and after mitigation

== No impact

⊙ Significant impact; less than significant after mitigation

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References

HBA Team Documents

Questa Engineering Corporation, Inc. 1995a. *Irrigation Management Guidelines for the West County and South County Alternatives*. July. (Appendix D-19).

Questa Engineering Corporation, Inc. 1995b. *Cropping Scenarios for the West County and South County Reclamation Alternatives*. September 19. (Appendix E-3).

Questa Engineering Corporation, Inc. 1995c. *Trace Element Loading Analysis for the West County and South County Reclamation Alternatives*. September 19. (Appendix E-6).

Questa Engineering Corporation, Inc. 1995d. *Irrigation Water Quality and Salt Management Leaching Requirements, South County and West County Reclamation Alternatives*. December 18. (Appendix E-5).

Questa Engineering Corporation, Inc. 1996. *Evaluation of Soil Erosion Impacts of the West and South County Reclamation Alternatives*. February 1. (Appendix E-7).

Other References

California Department of Land Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program. 1984. *Advisory Guidelines for the Farmland Mapping and Monitoring Program*.

California Department of Land Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program. 1992. *Important Farmland Series Maps for Sonoma County*.

California Department of Conservation, Office of Land Conservation. 1995a. *Cancellation Process for Williamson Act Contracts*.

California Department of Conservation, Office of Land Conservation. 1995b. *The Williamson Act: Protecting Our Land Resources*.

California Department of Conservation, Office of Land Conservation. 1995c. *Notification Provisions of the Williamson Act*.

California Department of Land Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program. 1988. *Sonoma County Farmland Conversion Report 1984 to 1986*.

California Department of Land Conservation, Office of Land Conservation, Farmland Mapping and Monitoring Program. 1994. *Sonoma County Farmland Conversion Report 1990 to 1992*.

Environmental Protection Agency (EPA). 1993. *Standards for the Use or Disposal of Sewage Sludge* (Title 40 of the Code of Federal Regulations [CFR], Part 503), Federal Register (58 FR 9248 to 9404). February 19.

Government Code - Article 6, Sections 51290-51295.

National Research Council. 1996. *Use of Reclaimed Water and Sludge in Food Crop Production*. National Academy Press.

Office of Agricultural Commissioner Sonoma County. 1995. *Agricultural Crop Report Sonoma County 1994*.

Pettygrove G.S. and Asano, T. 1985. *Irrigation with Reclaimed Municipal Wastewater - A Guidance Manual*, (Chapter 12, Nitrogen and Phosphate and Chapter 13, Metals). Lewis Publishers, Inc. Chelsea, Michigan (originally published as State Water Resources Control Board Publication #84-1).

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder. 1994. *Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)* USDA-ARS. 1994.

Consultation and Coordination

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Don Fox, CH2M Hill, February 1, 1996.

Jeffery Peters. Questa Engineering Corporation, Inc. 1995f. *Summary of South and West County Existing Agricultural Use*. Facsimile to Nannie Turrell at Parsons Engineering Science, Inc. from Jeffrey Peters. August 17.