



City of Fairfield

Central Solano Dual Water Systems Master Plan



CITY OF FAIRFIELD
CENTRAL SOLANO DUAL WATER SYSTEMS
MASTER PLAN

August, 1992



Prepared by:

James M. Montgomery, Consulting Engineers, Inc
1652 W. Texas
Fairfield, CA 94533

JMM James M. Montgomery

Consulting Engineers, Inc.



August 25, 1992

Mr. Richard L. Wood
Assistant Director of Public Works
City of Fairfield
1000 Webster Street
Fairfield, CA 94533

Subject: Central Solano Dual Water Systems Master Plan
Final Report

File: 188.1150/3.1.1

Dear Mr. Wood:

We are pleased to transmit twenty-five copies of the Central Solano Dual Water Systems Master Plan Final Report.

In March, 1992, James M. Montgomery, Consulting Engineers, Inc. (JMM) submitted a draft of the subject report to you. That draft report initiated an involved series of meetings and discussions to define the initial reclaimed water project or projects that should be built. The discussions have included representatives of the staffs and Councils or Boards of the following agencies: City of Fairfield, Suisun City, Fairfield-Suisun Sewer District, and the Solano Irrigation District. The discussions have been productive. The participants have agreed on a series of four projects that should be constructed over the next few years to increase the use of reclaimed water in the area. Those four projects differ in several ways from any of the projects defined in the draft report. This final report reflects the results of those discussions to date.

In two cases, the projects agreed to in the discussions over the past four months are the final projects to serve an area. In two other cases, the projects agreed to are merely initial phases of a larger plan. The initial projects are to be built so they can be extended in the future. This report shows both the initial projects and the ultimate plan.

We have appreciated the opportunity to work with you and other representatives of the City of Fairfield, Suisun City, Fairfield-Suisun Sewer District, and Solano Irrigation District. We look forward to working with the various agencies to implement the recommendations of this Plan.

Very truly yours,

Glen Grant
Principal Engineer

/sd

ACKNOWLEDGEMENTS

CITY OF FAIRFIELD CITY COUNCIL

Gary Falati, Mayor
Garry Ichikawa, Vice Mayor
Chuck Hammond, Council Member
George Pettygrove, Council Member
Perry Polk, Council Member

CITY OF FAIRFIELD STAFF

Ron Hurlbut, Public Works Director
Richard L. Wood, Assistant Director of Public Works for Water

PROJECT STAFF

Glen Grant, Project Manager
Annette Adams, Project Engineer
Karen Johnson, Quality Control
Jim Gossett, Project Engineer
Susan Crisfield, Graphic Artist
Jean Matuska, Graphic Artist
Ken Swenson; Creegan & D'Angelo - System Modeling
John De Boice; Bissel & Karn - Regulations Review
Asa Hanamoto; Royston, Hanamoto, Alley & Abbey - Horticultural Suitability
Rick Storey; Royston, Hanamoto, Alley & Abbey - Horticultural Suitability

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Executive Summary



EXECUTIVE SUMMARY

The Central Solano Dual Water Systems Master Plan (CSDWSMP) is a long range, regional plan developed to guide and facilitate the use of raw and reclaimed water in central Solano County. The Fairfield-Suisun Sewer District Wastewater Treatment Plant (Fairfield-Suisun WWTP) currently produces an effluent which meets all requirements for use as reclaimed water. This plan addresses the distribution system needed to make it possible to utilize the available reclaimed water resources. The CSDWSMP summarizes regulations governing non-potable water use, estimates existing and potential non-potable water demands, characterizes the raw and reclaimed water sources in the area, and evaluates alternative non-potable water distribution systems. The CSDWSMP includes recommendations for a non-potable water distribution system, estimates of project costs, and discussion of implementation issues.

STUDY AREA

The study area was defined based on proximity to potential non-potable water supplies, demand densities, and ground elevations. The study area for the CSDWSMP is roughly the area within the spheres of influence of the cities of Fairfield and Suisun City (excluding the area in and around Travis Air Force Base) and specific areas outside this boundary, including Suisun Valley, the proposed White Wing development, Lagoon Valley, and Tolenas. This area includes the majority of potential reclaimed water demands in central Solano County and is relatively close to the sources of supply.

WATER RECLAMATION REGULATIONS

Water reclamation and reuse is addressed and encouraged at the Federal, State, and local levels. Regulations regarding the treatment, distribution and operation of reclaimed water systems are summarized in Section 2 of this report.

The Federal Clean Water Act explicitly encourages integration of water reclamation into all pollution control projects. The California Water Code, on the State level, also encourages water reuse and prohibits potable water use when an acceptable reclaimed water source is available. The State Water Resources Control Board (SWRCB), established by the California Water Code, has primary authority for regulation of water reclamation and reuse. The SWRCB establishes policy and general guidance, and the state's nine Regional Water Quality Control Boards (RWQCB's) establish water reclamation and reuse requirements for specific projects.

The San Francisco Bay RWQCB, the agency responsible for local administration of the SWRCB's authority, adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) in December 1986. The Basin Plan sets forth water quality goals to be used in regulating water quality factors and includes maximum feasible reclamation or reuse of municipal, industrial, and agricultural wastewaters. The Basin Plan does not, however, list any specific requirements or regulations pertaining to reclamation projects.

The San Francisco Bay RWQCB has used the Wastewater Reclamation Criteria set forth by the California Department of Health Services (DHS) in Title 22, Division 4, Chapter 3 of the California Administrative Code, and the DHS Guidelines for Use of Reclaimed Water (June 10, 1988) as the basis for establishing water reclamation requirements for the Fairfield-Suisun WWTP. These criteria address the quality of wastewater acceptable for reuse, types of uses allowed, locations of use, monitoring requirements, and other aspects of the treatment plant and water distribution operations. The Fairfield-Suisun WWTP is currently producing water which meets Title 22 requirements for "Unrestricted Uses".

Executive Summary

DHS requirements (Title 22) and Guidelines for Distribution of Nonpotable Water by the California-Nevada Section, American Water Works Association (CA/NV AWWA Guidelines) as accepted by DHS, are currently undergoing revision. These revisions may affect construction or operating details of a reclaimed water system, but they are not likely to necessitate substantive changes to the recommended plan for non-potable water use.

POTENTIAL NON-POTABLE WATER USERS AND DEMANDS

Section 3 identifies potential non-potable water users, discusses possible constraints to non-potable water use, and estimates potential non-potable water demands. Irrigation uses include agricultural and landscape irrigation; industrial applications include cooling, boiler feed, washing, and processing. Non-potable water supplies include reclaimed water from the Fairfield-Suisun WWTP, and untreated water conveyed through the North Bay Aqueduct (NBA), Putah-South Canal (PSC), and the Cache Slough pipeline. The focus of this study, however, is on the use of reclaimed water except as noted.

The demand analyses in this master plan assumed an average annual demand (AAD) of 2.8 acre-ft/acre/year for schools and 2.5 acre-ft/acre/year for all other turf, agricultural, and landscaped areas where historic demand figures or other estimates were not available. Industrial cooling water and process demands were developed on a case-by-case basis.

Potential Agricultural Irrigation Demands

There are over 4,000 acres of agricultural land in the study area, the majority of which are orchard crops located in Suisun Valley. Solano Irrigation District (SID) officials and Suisun Valley farmers have concerns regarding reclaimed water quality and are not likely to accept reclaimed water on a broad scale unless it is blended with raw water at a currently undetermined ratio. Two different estimates of agricultural demand for reclaimed water were made in this plan, assuming 25 percent and 50 percent, respectively, of Suisun Valley's total irrigation demand. The additional percentage of Suisun Valley's total irrigation demand is assumed to be met by blending raw water from the PSC.

Potential Industrial and Commercial Irrigation Demands

The Solano Business Park, Low Industrial Park, and Gateway Project areas present attractive sites for potential use of non-potable water for landscape irrigation. Both the southwest central and the northeast areas of the City of Fairfield (City) have a significant amount of land designated for future industrial and commercial uses. The Busch Corporate Center, the Gentry-Pierce Business Park, and Fairfield Redevelopment Agency areas are located in the southwest central area of the City. The northeast area is only partially developed. Proposed revisions to the City's General Plan Land Use Element designate additional lands in the northeast area for future industrial and commercial uses.

Potential Schools and Public Facilities Irrigation Demands

There are over 25 schools with a total estimated landscaped acreage of over 190 acres within the study area. Other public facilities include medical facilities, cemeteries, and city and county government facilities. Non-potable water could be used to irrigate landscaping at these facilities and at highway interchanges and along major streets (streetscapes).

Executive Summary

Potential Recreational Area Demands

Recreational areas include parks, park maintenance areas, and golf courses, among others. There are over 25 parks and four existing or proposed golf courses that are considered to be potential users of non-potable water in the study area. Suisun City is planning construction of an 80-acre sports complex along Scandia Road that could be irrigated with reclaimed water.

Potential Industrial User Demands

In addition to allowing for landscape irrigation with reclaimed water, Pacific Bell, who is constructing a new facility in the Solano Business Park, has incorporated provisions for use of non-potable water as cooling water for the building's air conditioning system. Another firm considering building a facility in Solano Business Park has expressed a similar intent to utilize reclaimed water as cooling water. Several other businesses throughout the area have expressed interest in utilizing reclaimed water in their processes or as cooling water.

Potential Suisun Marsh Salinity Control Demand

An additional potential use of non-potable water is for salinity dilution in the Suisun Marsh, located south and east of the study area. This is most important from December through March, coinciding with a period of minimal non-potable irrigation requirements. Hence, salinity control of the marsh and agricultural and landscape irrigation could be complementary uses of non-potable water.

The California State Department of Water Resources (DWR) is preparing an environmental impact report regarding alternative ways to control salinity in the western Suisun Marsh. DWR has estimated that a fresh water flow of 30 to 50 cubic feet per second (cfs) into the marsh would achieve the desired salinity levels. Possible discharge points include Green Valley Creek and Suisun Valley Creek. The proposed non-potable water systems in the area could be used to route reclaimed and raw water into those creeks, however, due to the uncertainty of this demand, the recommended facilities were not sized to accommodate it.

Potential Non-Potable Water Users Not Considered

This master plan does not include non-potable water demands for single-family and multi-family residential users and small commercial users due to public health concerns that would be raised should non-potable water be served to these users. Monitoring use of non-potable water would be extremely difficult for these types of users due to the great number of potential individual customers. There is sufficient demand within the study area to utilize the available reclaimed water without including these user types.

Summary of Potential Demands

The study area logically splits into eleven geographic subareas when viewed from the perspective of non-potable water distribution piping. The nature of the piping systems serving these subareas is discussed in Section 6. The eleven subareas are defined in Section 3. Table ES-1 presents a summary of the potential demands for reclaimed and raw water in the study area. The potential demands are tabulated by geographic subarea. The subareas were then compiled into service areas which correspond to more practical delivery units. These service areas are discussed in Section 6.

Executive Summary

TABLE ES-1

SUMMARY OF POTENTIAL NON-POTABLE WATER DEMANDS

Subarea	Average Annual Demand (acre-ft/yr)
Central Fairfield	2,014
Rancho Solano	858
Lagoon/Paradise Valley	2,130
Northeast Fairfield	161
Suisun Valley	3,610
Lower Suisun Valley	542
White Wing	718
Green Valley	112
Cordelia	182
Suisun City	411
Tolenas	700
Total	11,438

WATER QUALITY AND SOIL CONDITIONS

Section 4 of this report evaluates the water quality of several potential non-potable water sources, including the Fairfield-Suisun WWTP, NBA, PSC, Vallejo Cache Slough Pipeline, and groundwater. Water quality is evaluated with regard to irrigation and industrial uses. Limitations on these uses as a result of water quality are identified. Study area soil characteristics, soil monitoring, and mitigation measures are also discussed.

Water Quality Requirements of Non-Potable Water for Irrigation Uses

Primary water quality parameters that were evaluated include total dissolved solids (TDS), boron, chlorides, sodium adsorption ratio (SAR), turbidity, and total coliform. Irrigation problems are usually associated with salinity (the single most important factor in determining suitability), soil permeability (related to high SAR and salinity), specific-ion toxicity, and bicarbonate. Alternating water sources, blending with higher quality water, and/or modifying irrigation practices will frequently make it possible to irrigate with non-potable water, even when the quality of a given water is less than ideal.

