Title 22 Engineer's Report
Amendment No. 2
January 2000

Delta Diablo Sanitation District

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January 7, 2000

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Mr. Keyvan Moghbel
SF Bay RWQCB
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Subject: Amendment 2 to the Engineering Report for the Delta Diablo Sanitation District Recycled Water Facility
Project No. 5010

Gentlemen:

This letter serves as Amendment 2 to the Engineering Report for Delta Diablo Sanitation District Recycled Water Facility. The Engineering Report was originally submitted June 25, 1999 with Amendment No.1 submitted July 23, 1999. The initial Engineering Report was based on the project's design criteria at the time of the Preliminary Design Report (approximately 30% design completion). Since then, there have been several changes to the process sizing and configuration as a result of the final design of the Recycled Water Facility (RWF).

Summary of Process Changes

The following list summarizes the process changes that have occurred since submittal of the initial Engineering Report in June 1999.

- The production capacity of the RWF has been increased from 12.2 mgd to 12.8 mgd.
- The tertiary filter has been changed to a continuous backwash filter process with the backwash returned to the RWF influent pump station. This change eliminated the need for extensive backwash storage basin and pumping systems and also eliminated potential impacts to the DDSD secondary treatment process from the returned backwash.
- The chlorine contact basins have been increased in volume to provide the full contact time within the basins themselves. In addition, baffles have been added and the length to width ratio has been changed to over 40:1 to provide better plug flow conditions.
- A bypass weir has been added to the chlorine contact basins to automatically bypass water that does not meet Title 22 requirements. When non-compliance with Title 22 is detected, the influent and effluent pumps will automatically shut down and water will be bypassed over the weir. The water will be returned to the RWF treatment process for additional treatment or will be discharged through the DDSD disinfection process and outfall.

- The Process Flow Diagram has been revised to show these changes and is included as Attachment A.
- In your review of the June 1999 Engineering Report, you requested more information on the RWF Operations Plan and the Cross-Connection Program. These are included in this Amendment as Attachment B and C, respectively. These documents will also be incorporated into the Notice of Intent application to the RWQCB for the "blanket permit".

Each of these changes is discussed in more detail in the subsequent text.

RWF Capacity:

The peak day production capacity of the RWF (flow available for delivery to recycled water users) has been revised to 12.8 mgd. In addition to the production capacity, the first two treatment processes must also treat the backwash required for the filters. Therefore, the capacity of the first two treatment processes, the flocculating clarifiers and the filters, has been increased to provide a 10% allowance for filter backwash. The resulting treatment capacities are shown below:

Condition/ Treatment Process	Treatment Capacity (mgd)	Filter Backwash Allowance (10%)	Production Capacity (mgd) (Treatment minus Backwash)
Average Day			
Flocculation	7.1	0.7	6.4
Filtration	7.1	0.7	6.4
Disinfection	6.4	N/A	6.4
Peak Day			
Flocculation	14.2	1.4	12.8
Filtration	14.2	1.4	12.8
Disinfection	12.8	N/A	12.8

Flocculating Clarifiers

The peak day capacity of the flocculating clarifiers has been revised to 14.2 mgd. Otherwise there are no significant changes in the flocculating clarifier process since the June 25, 1999 Engineering Report.

Tertiary Filters

The type of tertiary filtration has been changed to a continuous backwash process as manufactured by Waterlink Technologies (Parkson in Europe). This change was initiated due to the ability to delete the large backwash equalization and handling facility required with the "batch" backwash type of filter. Another advantage of the continuous backwash filter is that the backwash occurs while the filter cell is in service. This helps increase the reliability of the

process since all filter cells are normally in continuous service; i.e. a cell does not have to be taken out of service for backwashing.

The configuration proposed for the DDSD RWF is a total of four filter cells, each with an area of 500 square feet. The filter design criteria is summarized in the following table.

Summary of Filter Criteria		
Criteria	**Average Day Treatment Capacity of 7.1 mgd**	**Peak Day Treatment Capacity of 14.2 mgd**
Number of filters	4	4
Area per Filter	500 sf	500 sf
Total Filter Area	2000 sf	2000 sf
Media Depth	80 in	80 in
Loading Rate with 4 filters in service	2.5 gpm/sf	4.9 gpm/sf

Note that filter pilot testing, submitted as part of the June 1999 Engineering Report, demonstrated that an average effluent turbidity of 2 ntu could be obtained at a loading rate of 5 gpm/sf using direct filtration. The process ultimately selected for the RWF is more conservative since it is based on conventional filtration with upstream flocculating clarifiers.

Chlorine Contact Basins

The size of the chlorine contact basins has been significantly increased since the June 25, 1999 Engineering Report. The revised sizing allows the entire required contact time to occur within the chlorine contact basins without including any additional contact time that might occur in the downstream recycled water storage tank. Note that the filter backwash is removed from the process stream at the filters, so the design capacity for the chlorine contact basins is maximum day of 12.8 mgd and average day of 6.4 mgd

Two chlorine contact basins will be included, each 12 feet wide and 495 feet long. Each basin is divided into three passes. A target baffle will be included at the influent gate to slow and disperse the flow as it enters the basin. Three large baffles within the chlorine contact basin, at the entrance and at each turn, will help prevent short circuiting within the basin. The following table summarizes the design criteria for the chlorine contact basin sizing.

Chlorine Contact Basin Sizing		
Criteria	**At Average Day Conditions 6.4 mgd**	**At Peak Day Conditions 12.8 mgd**
Number of Basins	2	2
Length per Basin	495 ft	495 ft
Width per Basin	12 ft	12 ft

Chlorine Contact Basin Sizing		
Criteria	**At Average Day Conditions 6.4 mgd**	**At Peak Day Conditions 12.8 mgd**
Average depth per Basin	12 ft	12 ft
Total Volume per Basin	71,280 cu ft	71,280 cu ft
Total Volume Both Basins	142,560 cu ft	142,560 cu ft
Total Theoretical Detention Time	240 minutes	120 minutes
Total Required Modal Contact Time	90 minutes	90 minutes
Baffling Factor	38%	75%

Recycled Water Bypass

An overflow weir has been added at the chlorine contact basins to automatically bypass recycled water that does not meet Title 22 requirements. When a non-compliance event is detected, the influent, effluent, and recycled water distribution pumps will automatically shut down. Water already in the RWF facility will flow over the bypass weir and will be returned to the influent pump station wet well until it reaches hydraulic equilibrium and stops flowing. From the influent pump station wet well, as long as the RWF influent pumps remain off, the water will flow back to the DDSD treatment process for disinfection and discharge out of the outfall. To restore the RWF process, the RWF influent pumps will be re-started and the treated water will continue to be bypassed until Title 22 compliance has been restored. At that point, the effluent pumps and distribution pumps will be re-started.

Supplemental Water

Supplemental water from the Contra Costa Canal will be available to supply water to the recycled water customers under two conditions:

Case 1: If there is a process upset within the DDSD secondary plant and the secondary effluent is not usable as a feed water to the RWF, canal water will be introduced through an air gap into the RWF influent pump station. The canal water will be treated through the RWF treatment process and be discharged through the distribution system.

Case 2: If the RWF treatment facilities are out of service, supplemental canal water can be introduced through an air gap into the distribution system downstream of the treatment facilities.

In either case, an air gap is provided to separate the canal water from the RWF facilities.

Process Flow Diagram and Design Summary

Attachment A contains the revised Process Flow Diagram (Dwg. No. G-5). The table below summarizes the design criteria for the RWF.

SUMMARY OF DESIGN CRITERIA

DESIGN FLOW	
Average Day	6.4 mgd
Peak Day	12.8 mgd
SECONDARY EFFLUENT QUALITY	
Average Total Suspended Solids	11 mg/l
Average Turbidity	12 ntu
FLOCCULATING CLARIFIERS	
Number of Units	2
Design Capacity, each	7.1mgd
CHEMICAL FEED SYSTEM	
Coagulant	Liquid Alum
Dry Concentration	5.3 lb/gal
Average Dose	60 mg/l
Coagulant Storage	
Number of Tanks	2
Capacity, each	7,000 gal
Storage at Max Day	12 days
Coagulant Feed Pumps	
Number	2
Capacity, each	100 gph
Polymer	
Type	Anionic
Average Dose	1.2 mg/l

FILTERS	
Type	Continuous Backwash
Media Type	Silica Sand
Number of Filters	4
Area per Filter	50 sf
Media Depth	80 in
Filter Loading Rate	
Average Day	2.5 gpm/sf
Peak Day	4.9 gpm/sf
DISINFECTION	
Number of Basins	2
Size of Basins, each	
Length	495 ft
Width	12 ft
Depth	12 ft
Theoretical Detention Time	
Average Day	240 min
Peak Day	120 min
Disinfectant	Sodium Hypochlorite
Design Dosage	15 mg/l
RECYCLED WATER STORAGE TANK	
Capacity, nominal	2.5 MGAL

Operations Plan and Cross-Connection Program

These documents are included as Attachments B and C, respectively.

This Amendment was prepared for the District by the consulting firm Raines, Melton & Carella, Inc. (RMC). Questions regarding the Amendment or the original report should be addressed to me or to Marilyn Bailey of RMC (925-299-6733). We look forward to discussing the report and project with you at your convenience.

Very truly yours,

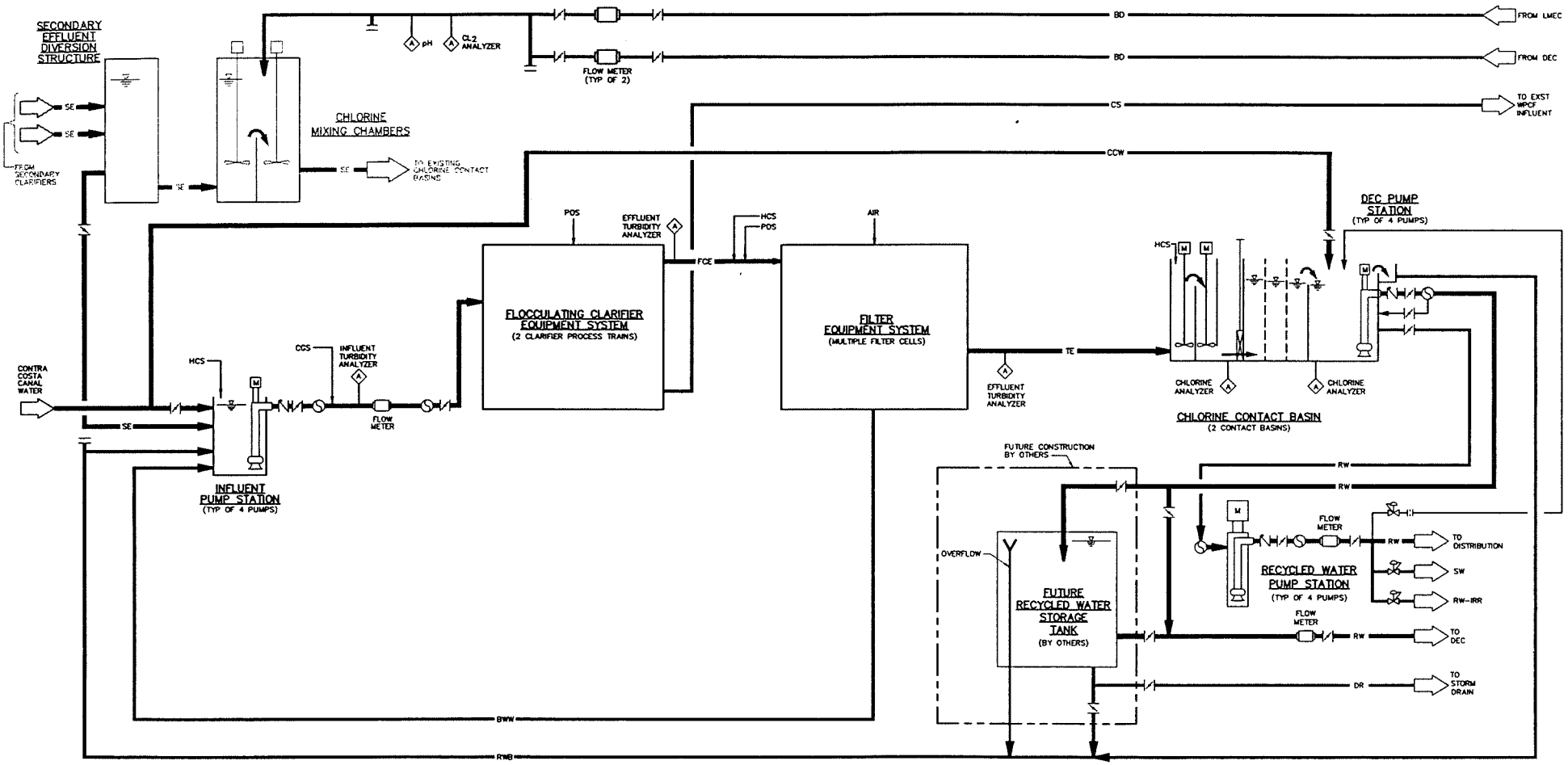
Gregory G. Baatrup
Technical Services Manager

Attachments

Attachment A: Process Flow Diagram

Attachment B: Operations Plan

Attachment C: Cross-Connection Program



NOTES:
1. CONSTRUCTION STAGING NOT SHOWN.

REV	DATE	BY	APVD	DESCRIPTION			

DESIGNED	M. MATSON
DRAWN	J. MAY
CHECKED	M. MATSON
APPROVED	M. BAILEY

RMC
Raines, Melton, & Carella, Inc.

CALPINE

RECYCLED WATER FACILITY

RECYCLED WATER FACILITY PROCESS FLOW DIAGRAM

DWG NO	G-5
SHEET NO	- OF
PROJ NO	028.0050
DATE	MAR 2000