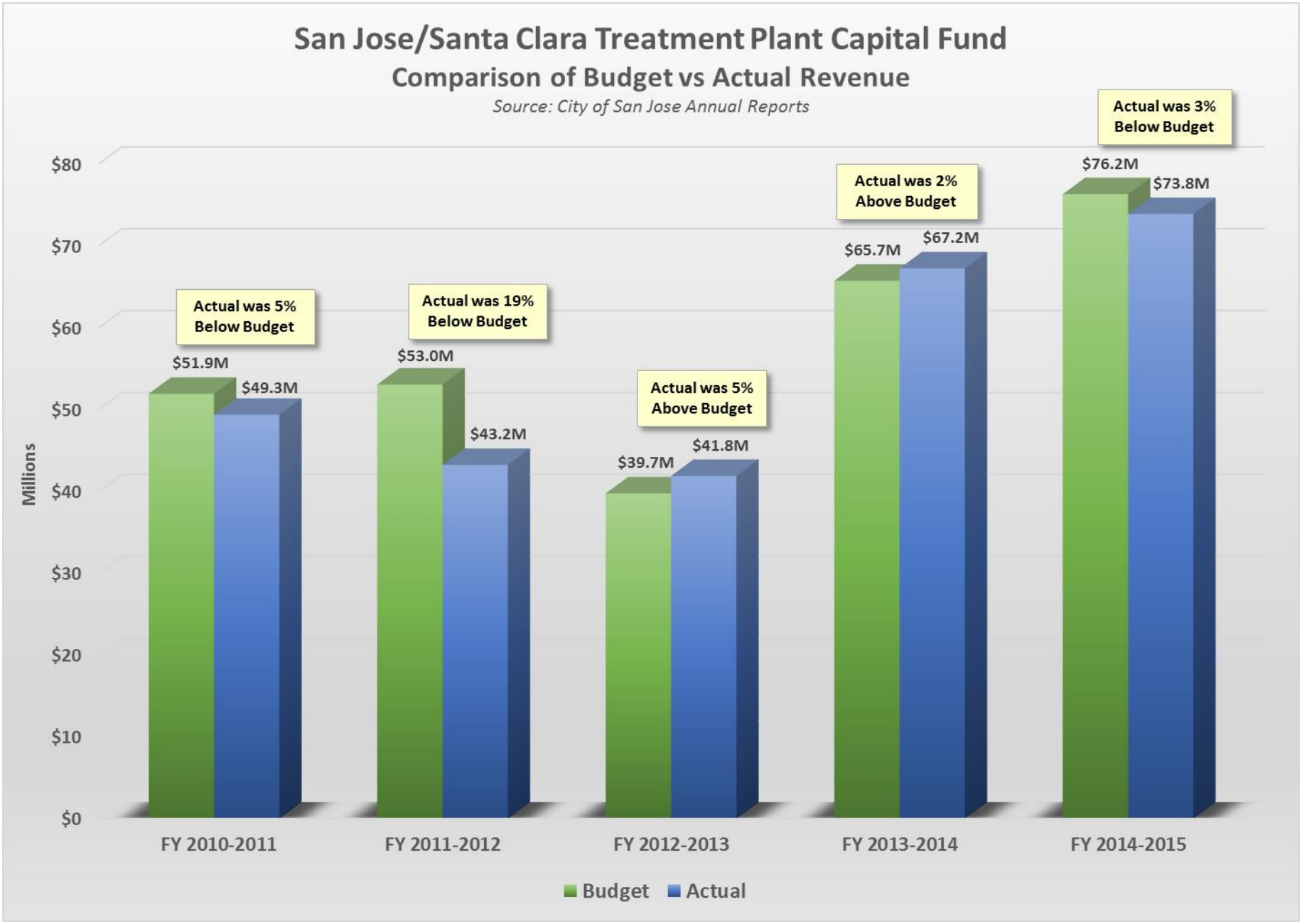
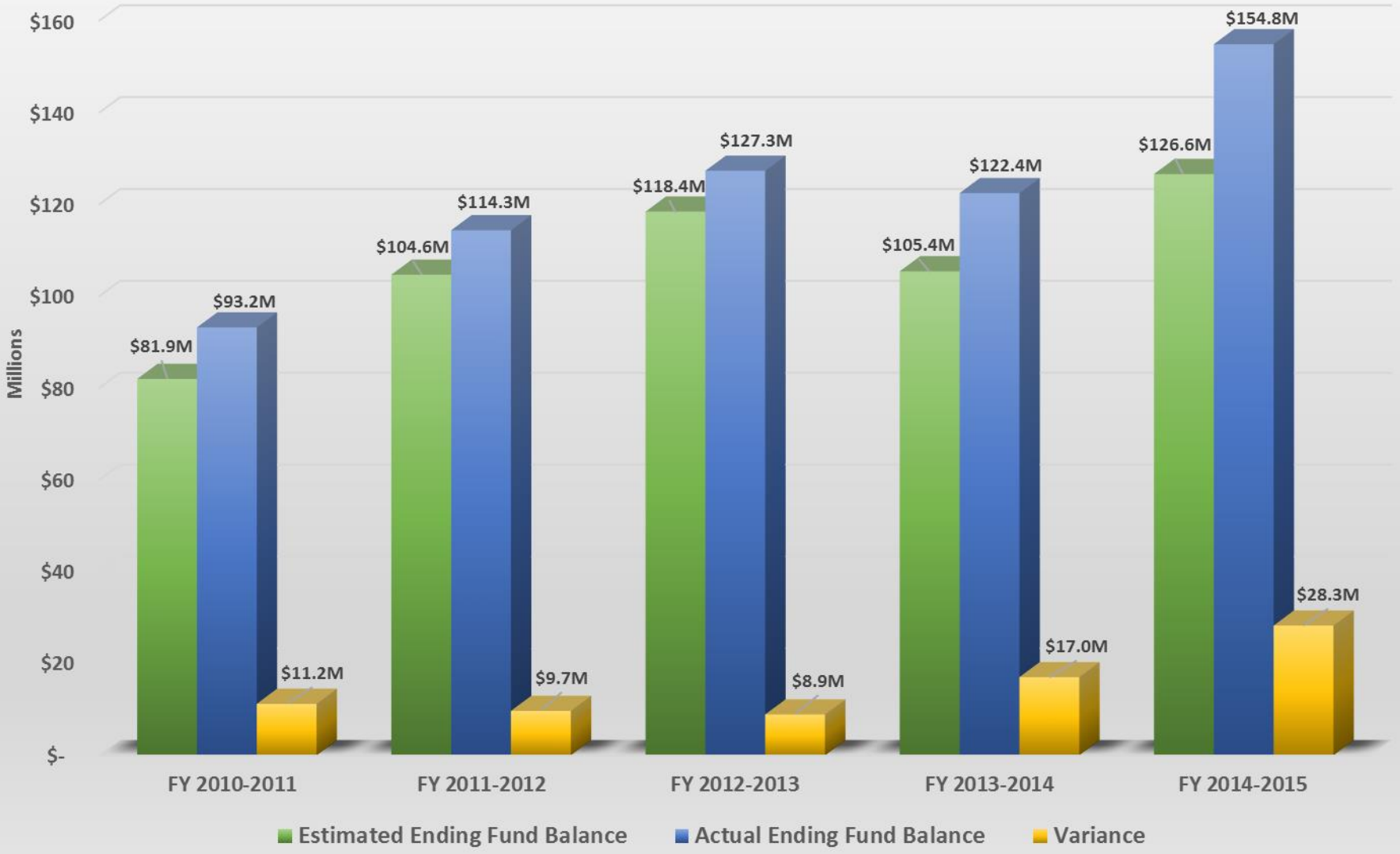


Prepared by Hemming Morse, LLP

San Jose/Santa Clara Treatment Plant Capital Fund

Comparison of Estimated vs Actual Ending Fund Balance

Source: City of San Jose Annual Reports



Prepared by Hemming Morse, LLP

Package ID:	PS-04	**Project ID(s):**	S-07	**Other Ref. ID:**	PMP: 56
Package Name:	FOG Receiving		**Process Area:**	Solids	
Function:	New		**Priority:**	Medium	
Estimated Project Cost($):	9,700,000.00		**Source of Estimate:**	B&C/MWHC (2014$)	
Delivery Method:	Low-bid DB				
Phasing of project:	No		**No. of Phases:**	1	
Current Schedule- Start Dates:					
Planning Date:	Jul 2019	**Design Date:**	Nov 2020	**Bid Date:**	
Construction Date:	May 2021	**Startup Date:**	Dec 2022		
Packaging Criteria:	Bundling of small projects where possible, Comprehensive scope to include ancillary facilities/utility feeds				
Package Need:	Fat, Oil and Grease (FOG) management is an ever-growing concern for wastewater treatment plant operators, as FOG is known to cause problems in a number of ways: flow inefficiencies, sewer-cleaning costs, build up/accumulations at pumping stations and treatment works. All of these aspects directly affect the performance of the plant and lead to increased operations and maintenance issues and associated costs. The controlled collection and then introduction of FOGs into the treatment process (e.g. Anaerobic Digesters) is increasingly being seen as a viable, cost effective and sustainable option which if planned and managed well, can provide an efficient renewable energy source while offering healthy economic and environmental benefits. Accepting FOG at the Wastewater Facility will enhance gas production and increase energy and heat production.				
Background:	Fat, Oil and Grease (FOG) management is becoming popular in California in order to reduce O&M costs in the collection system and also provide for additional biogas production that can be used to generate substantial electrical power at the PLANT. The City is very interested in these benefits. The controlled introduction of FOGs into the treatment process (e.g. Anaerobic Digesters) is increasingly being seen as a viable, cost effective and sustainable option which if investigated, planned and managed well, can provide an efficient renewable energy source while offering healthy economic and environmental benefits. Accepting FOG at the PLANT will enhance gas production and increase energy and heat production. A FOG receiving station will be provided, including a new dedicated receiving and screening facility for haulers bringing FOG and other liquid wastes to the PLANT. It would provide some storage capacity, and the capability to distribute and monitor the flow of FOG to the digesters. The facility location has not been determined at this time, so a new access road and gateways are provided to allow multiple options to be considered.				

Package Description:	This project entails the construction of a FOG (Fats, Oils, Grease) receiving station; including storage tankage, access control, feed piping from the receiving station to the digesters accepting FOG, and a ½-mile of access road improvements. A FOG receiving station will provide a dedicated receiving point for haulers bringing FOG to the Plant. It would provide some storage capacity, and the capability to distribute and monitor the flow of FOG to the digesters.
Required Predecessor Effort:	none
Benefits of Project:	• Positive return on Investment • Improve plant reliability/flexibility • Aligns with City's 'Green Vision' goal
Scope of Work:	The project includes: • **Preparation of a Concept Design Report.** A review of the current and future FOG and other liquid waste loadings which may be expected to be processed at the Facility will be performed. FOG and other liquid wastes can vary widely, in terms of strength, chemical composition, pH, toxicity, and volume. The expected quantities and quality will be summarized in a technical memorandum which will define pre-treatment, storage, conveyance, and other specialty handling requirements. This report will review health & safety requirements during construction, operation and maintenance; • **New FOG Handling and Processing Facility**. Work includes addition of FOG handling facility, with access control, storage, pumping, odor control, and automation components. • **New Access Roadway.** Provide a new ½-mile access road and access gates at the Facility site.

Author:	Petrik	**Reviewer:**	DJB
Date:	12/04/2013	**Date:**	12/06/2013

Attachments:

No Entries

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Environmental Services Department
SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT

March 10, 2016

TO: Tributary Agencies

SUBJECT: FY 2016-17 Treatment Plant Capital Cost and SRF Loan Repayments Allocation

The following is submitted for your use in preparing your FY 2016-17 budgets:

- Attachment I - Treatment Plant Capital Cost Allocation: This cost allocation is for the FY 2016-17 Estimated Capital Projects. The capital cost projections are preliminary but are not anticipated to differ materially from the final proposed budget that will be submitted to the Treatment Plant Advisory Committee and to the San Jose City Council for adoption.

- Attachment II - State Revolving Fund Loan Repayments:
  Attachment II contains each agency's share of SRF Loan repayments for FY 2016-17. To date, South Bay Water Recycling has received $73,566,018 in State Revolving Fund Loan program funds. The loan proceeds and annual repayments are allocated to each agency, except for the City of Milpitas, in the same proportion as its participation in the South Bay Water Recycling projects for which the loan are obtained. The City of Milpitas has elected to not participate in the SRF Loan program.

If you have any questions, please call me at 975-2599 or Lillian Nguyen at 975-2567.

Sincerely,

LAURA BURKE
Principal Accountant
Business Services Division
Environmental Services Department

Attachments

ATTACHMENT I

CITY OF SAN JOSE
ENVIRONMENTAL SERVICES DEPARTMENT
SAN JOSE - SANTA CLARA
REGIONAL WASTEWATER FACILITY (RWF)

CAPITAL COST ALLOCATION
FISCAL YEAR 2016-17

Allocation of capital project costs is governed by the provisions of the Master Agreements for Wastewater Treatment, which require that these costs be allocated proportionally to the agencies based on their treatment plant capacity rights. Accordingly, the attached tables distribute the estimated FY 2016-17 capital project costs to the agencies based on their capacity rights in the 167 MGD plant.

TABLE 1 TRIBUTARY AGENCY COST ALLOCATION.

Table 1 contains each agency's share of FY 2016-17 capital project costs. Each agency's cost sharing percentage is a function of two sets of parameters including an agency's capacity percent of the overall RWF capacity (Table 4) and the RWF capacity investment percentage associate with each parameter (Table 5)

TABLE 2 FY 2016-17 ESTIMATED CAPITAL PROJECT COSTS.

Table 2 lists the projects for which the agencies will be charged in FY 2016-17.

TABLE 3 ALLOCATION OF CAPITAL COSTS.

Table 3 contains the cost allocation to the agencies based on capacity rights in the 167 MGD plant.

TABLE 4 CAPACITY ALLOCATIONS.

Table 4 contains each agency's capacity percent of the overall RWF capacity. These percentages are the basis for allocating capital costs to the agencies on Table 3.

TABLE 5 SUMMARY OF DISTRIBUTION OF CAPITAL COSTS TO PARAMETERS.

This table contains the percentages for distributing total capital costs to treatment parameters on Table 3.

TABLE 1

SAN JOSE - SANTA CLARA REGIONAL WASTEWATER FACILITY

TOTAL PROJECTS FROM TABLE 2
AGENCY COST ALLOCATION (1)
FISCAL YEAR 2016-17

AGENCY	TOTAL COST	SHARE OF TOTAL COST
City of San Jose	67,377,900	66.476%
City of Santa Clara	15,137,300	14.935%
Subtotal	$82,515,200	81.410%
West Valley Sanitation District	6,495,400	6.408%
Cupertino Sanitary District	4,228,400	4.172%
City of Milpitas	7,362,600	7.264%
County Sanitation District 2-3	525,400	0.518%
Burbank Sanitary District	230,000	0.227%
Total	$101,357,000	100.000%

Notes: (1) This cost allocation will serve as the basis for estimated quarterly billings in FY 2016-17.

TABLE 2

SAN JOSE - SANTA CLARA REGIONAL WASTEWATER FACILITY (RWF)
FY 2016-17 CAPITAL PROJECTS COSTS

PROJECT (1)	Process-related Projects Over $2M: Estimated Costs	Design Start Date	Project-specific Allocation (2)	Rolling Weighted-Average Allocation (3)	FY 2016-17 ESTIMATED COST
Headworks Improvements	630,000	5/22/18	0	630,000	630,000
New Headworks	925,000	5/22/18	0	925,000	925,000
Iron Salt Feed Station	434,000	9/22/14	434,000	0	434,000
Nitrification Clarifier Rehabilitation	3,773,000	6/6/17	0	3,773,000	3,773,000
Aeration Tanks and Blower Rehabilitation	15,717,000	1/25/17	0	15,717,000	15,717,000
East Primary Rehab, Seismic Retrofit, and Odo	1,505,000	5/29/18	0	1,505,000	1,505,000
Secondary Clarifier Rehabilitation	104,000	10/23/18	0	104,000	104,000
Filter Rehabilitation	4,295,000	8/28/17	0	4,295,000	4,295,000
Outfall Bridge and Levee Improvements	327,000	2/19/18	0	327,000	327,000
Digested Sludge Dewatering Facility	2,627,000	2/21/18	0	2,627,000	2,627,000
Digester and Thickener Facilities Upgrade	16,664,000	6/30/14	16,664,000	0	16,664,000
Lagoons & Drying Beds Retirement	1,158,000	9/24/19	0	1,158,000	1,158,000
Combined Heat and Power Equipment Repair & Rehab				120,000	120,000
Energy Generation Improvements				31,986,000	31,986,000
Advanced Facility Control and Meter Replacement				2,025,000	2,025,000
Treatment Plant				670,000	670,000
Support Building Improvements				2,300,000	2,300,000
Tunnel Rehabilitation				700,000	700,000
Construction-Enabling Improvements				785,000	785,000
Urgent and Unscheduled TP Rehabilitation				1,500,000	1,500,000
Plant Infrastructure Improvements				1,000,000	1,000,000
Yard Piping and Road Improvements				247,000	247,000
Facility Wide Water				1,528,000	1,528,000
Public Art				360,000	360,000
Payment for CWFA Trustee				5,000	5,000
City-wide & PW CAP Support Costs				797,000	797,000
Preliminary Engineering				1,000,000	1,000,000
Program Management				8,175,000	8,175,000
TOTAL			$17,098,000	$84,259,000	$101,357,000

Source: San Jose - Santa Clara Regional Wastewater Facility 2016-17 Capital Budget and 2017-21 Five-Year Capital Improvement Program.

Notes: (1) The 2016-17 Capital Projects include items with cost in excess of $2 million. According to the Master Agreements, process related projects costing more than $2 million should be allocated to treatment parameters based on engineering design. If a different cost allocation than the parameters was applied to the Agencies, the appropriate credit or charge will be made.

(2) Includes Process-related projects costing more than $2 million. These projects are allocated to treatment parameters based on the specific-project allocation in the fiscal year following start of design.

(3) Includes Process-related projects costing more than $2 million in planning phase, Projects costing less than $2 million and/or not process-related. These projects are allocated based on the rolling weighted-average of the RWF.

TABLE 3 (Page 1 of 3)

SAN JOSE - SANTA CLARA REGIONAL WASTEWATER FACILITY
ALLOCATION OF CAPITAL COSTS - **ALL PROJECTS**
FISCAL YEAR 2016-17

AGENCY	FLOW $	BOD $	SS $	NH3 $	TOTAL $	PERCENT SHARE OF TOTAL COST
San Jose	40,130,000	12,821,300	11,817,000	2,609,600	67,377,900	66.476%
Santa Clara	9,015,300	2,880,600	2,655,000	586,400	15,137,300	14.935%
Subtotal	49,145,300	15,701,900	14,472,000	3,196,000	82,515,200	81.410%
West Valley S.D.	4,360,500	964,200	950,800	219,900	6,495,400	6.408%
Cupertino	2,926,500	553,700	570,400	177,800	4,228,400	4.172%
Milpitas	5,312,500	918,800	909,700	221,600	7,362,600	7.264%
C.S.D. No. 2-3	366,600	67,900	69,800	21,100	525,400	.518%
Burbank	149,300	27,800	30,200	22,700	230,000	.227%
TOTAL	62,260,700	18,234,300	17,002,900	3,859,100	101,357,000	100.000%

Note: Process related facilites and equipment that cost in excess of $2 million shall be allocated to treatment parameter based on engineering design. Capital costs that are less than $2 million and/or are not process related shall be allocated to treatment parameters using the percentages contained in the most current Revenue Program Form 8A Form 8A or Table 5.

TABLE 3 (Page 2 of 3)

SAN JOSE - SANTA CLARA REGIONAL WASTEWATER FACILITY
ALLOCATION OF CAPITAL COSTS - **Projects Costing Less Than $2 Million and/or Not Process-Related**
FISCAL YEAR 2016-17

AGENCY	FLOW $	BOD $	SS $	NH3 $	TOTAL $	PERCENT SHARE OF TOTAL COST
San Jose	39,850,100	8,134,300	4,867,700	2,609,600	55,461,700	65.823%
Santa Clara	8,952,500	1,827,600	1,093,700	586,400	12,460,200	14.788%
Subtotal	48,802,600	9,961,900	5,961,400	3,196,000	67,921,900	80.611%
West Valley S.D.	4,330,100	611,700	391,800	219,900	5,553,500	6.591%
Cupertino	2,906,100	351,400	235,100	177,800	3,670,400	4.356%
Milpitas	5,275,500	583,100	375,000	221,600	6,455,200	7.661%
C.S.D. No. 2-3	364,000	43,000	28,600	21,100	456,700	.542%
Burbank	148,300	17,700	12,600	22,700	201,300	.239%
TOTAL	61,826,600	11,568,800	7,004,500	3,859,100	84,259,000	100.000%

Note: Total Capital Costs of $84,259,000 were allocated to the treatment parameters using the following rolling weighted-average percentages contained in Table 5 or Form 8A of the FY16-17 Revenue Program:

FLOW	BOD	SS	NH3
73.377%	13.730%	8.313%	4.580%

The total cost for each treatment parameter is then reallocated to the agencies using the percentages contained in Table 4.

TABLE 3 (Page 3 of 3)

SAN JOSE - SANTA CLARA REGIONAL WASTEWATER FACILITY
ALLOCATION OF CAPITAL COSTS - **Process-related Facilities And Equipments That Cost In Excess Of $2 Million**

FISCAL YEAR 2016-17

AGENCY	FLOW $	BOD $	SS $	NH3 $	TOTAL $	PERCENT SHARE OF TOTAL COST
San Jose	279,900	4,687,000	6,949,300	0	11,916,200	69.694%
Santa Clara	62,800	1,053,000	1,561,300	0	2,677,100	15.657%
Subtotal	342,700	5,740,000	8,510,600	0	14,593,300	85.351%
West Valley S.D.	30,400	352,500	559,000	0	941,900	5.509%
Cupertino	20,400	202,300	335,300	0	558,000	3.264%
Milpitas	37,000	335,700	534,700	0	907,400	5.307%
C.S.D. No. 2-3	2,600	24,900	41,200	0	68,700	.402%
Burbank	1,000	10,100	17,600	0	28,700	.168%
TOTAL	434,100	6,665,500	9,998,400	0	17,098,000	100.000%

Note: The Process-related project costs of $17,098,000 are allocated to treatment parameters on project-specific basis in the fiscal year following start of engineering design (Capital Project Cost Allocations Technical Memorandum, Carollo Engineers, March 2016, p. 8)

TABLE 4

SAN JOSE - SANTA CLARA REGIONAL WASTEWATER FACILITIES
CAPACITY ALLOCATION (1)
AGENCIES' CAPACITY PERCENTS OF THE OVERALL RWF CAPACITIES
FISCAL YEAR 2016-17

167 MGD PLANT

AGENCY		FLOW		BOD		SS		NH3	
		MGD	%	Klbs/Day	%	Klbs/Day	%	Klbs/Day	%
San Jose (2)	81.655%	107.638	64.453%	380.420	70.317%	337.793	69.504%	33.541	67.622%
Santa Clara (2)	18.345%	24.182	14.480%	85.467	15.798%	75.890	15.615%	7.536	15.194%
Subtotal	100.000%	131.820	78.933%	465.887	86.115%	413.683	85.119%	41.077	82.816%
West Valley S.D. (3) & (5)		11.697	7.004%	28.611	5.289%	27.173	5.591%	2.825	5.696%
Cupertino (6)		7.850	4.701%	16.419	3.035%	16.299	3.354%	2.287	4.611%
Milpitas (5) (6)		14.250	8.533%	27.249	5.037%	25.990	5.348%	2.847	5.740%
C.S.D. No. 2-3 (4)		0.983	0.589%	2.019	0.373%	2.002	0.412%	0.267	0.538%
Burbank		0.400	0.240%	0.815	0.151%	0.853	0.176%	0.297	0.599%
TOTAL (1)		167.000	100.000%	541.000	100.000%	486.000	100.000%	49.600	100.000%

(1) SOURCE: Master Agreements for wastewater treatment between San Jose/Santa Clara and Agencies (Revised 9/85).

(2) San Jose and Santa Clara share cost and capacity between themselves proportionally based on assessed valuations in accordance with their 1959 Agreement.

(3) Reflects transfers of West Valley S.D. capacities to San Jose & Santa Clara resulting from annexations and detachments.

(4) Agency's estimated discharge capacity as reported in its FY 2016-17 Revenue Program Report.

(5) Reflects sale of capacities from West Valley S.D. to Milpitas - July 1, 2006

(6) Reflects sale of capacities from Cupertino to Milpitas - January 1, 2009

FORM No. 8A (of the Revenue Program) 3/16

TABLE 5 (Page 1 of 2)

SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT
SUMMARY of DISTRIBUTION of CAPITAL COST to PARAMETERS
For Capital Projects Costing Less Than $2 Million and/or Not Process-Related

FACILITIES		FLOW	BOD	SS	NH3	TOTAL
Primary & Secondary	Percent	42.441%	38.726%	18.833%	0.000%	100%
	Cost	$26,176,800	$23,885,400	$11,615,800	$0	$61,678,000
AWTF	Percent	74.111%	1.343%	1.451%	23.095%	100%
	Cost	$49,149,000	$890,600	$962,300	$15,316,200	$66,318,100
Inter. Term Improvements	Percent	25.125%	42.190%	26.185%	6.500%	100%
	Cost	$21,741,100	$36,507,100	$22,657,900	$5,624,100	$86,530,200
First Stage Expansion	Percent	84.284%	5.501%	10.215%	0.000%	100%
	Cost	$22,900,000	$1,494,500	$2,775,500	$0	$27,170,000
South Bay Water Recycling	Percent	100.000%	0.000%	0.000%	0.000%	100%
(phases 1A & 1B)	Cost	$215,535,300	$0	$0	$0	$215,535,300
Total Original Cost	Percent (2)	73.377%	13.730%	8.313%	4.580%	100%
	Cost	$335,502,200	$62,777,600	$38,011,500	$20,940,300	$457,231,600
Estimated Replacement Cost (June 2015) (1)	Percent	73.377%	13.730%	8.313%	4.580%	100%
	Cost	$1,125,899,100	$210,673,600	$127,555,000	$70,275,700	$1,534,403,400

(1) The original cost of the facilities was escalated to June 2015 replacement value using the ENR (San Francisco) construction cost index. The June 2015 value is the current value of 'excess pooled capacity' contained in the Master Agreements for wastewater treatment between San Jose/Santa Clara and Agencies.

(2) These are the rolling weighted-average percentages used to allocate the current year capital costs to treatment parameters for projects costing less than $2 million and/or not process-related AND for process-related projects costing over $2 million in planning phase.

TABLE 5 (Page 2 of 2)

SAN JOSE - SANTA CLARA REGIONAL WASTEWATER FACILITY
SUMMARY OF DISTRIBUTION of CAPITAL COST TO PARAMETERS BASED ON PROJECT-SPECIFIC BASIS
Process-related Projects Costing Over $2 Million

PROCESS UNIT (2)	FY16-17 Over $2M Process-Related Capital Projects (1)	(%) Loading Parameters (1)				AGENCY COST SHARING PERCENTAGES PROJECT-BY-PROJECT (3)								AGENCY COST SHARING - PROJECT BY PROJECT							
		FLOW	BOD	SS	NH3	SJ	SC	WVSD	CuSD	Milpitas	CSD2-3	Burbank	Total	SJ	SC	WVSD	CuSD	Milpitas	CSD2-3	Burbank	Total
Headworks Improvements	0	100	0	0	0	64.453	14.480	7.004	4.701	8.533	0.589	0.240	100.000	$0	$0	$0	$0	$0	$0	$0	$0
New Headworks	0	100	0	0	0	64.453	14.480	7.004	4.701	8.533	0.589	0.240	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Iron Salt Feed Station	434,000	100	0	0	0	64.453	14.480	7.004	4.701	8.533	0.589	0.240	100.000	$279,726	$62,843	$30,397	$20,402	$37,033	$2,556	$1,042	$434,000
Nitrification Clarifier Rehabilitation	0	40	60	0	0	67.971	15.271	5.975	3.701	6.435	0.459	0.187	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Aeration Tanks and Blower Rehabilitation	0	20	60	0	20	68.605	15.414	5.713	3.683	5.877	0.449	0.258	100.000	$0	$0	$0	$0	$0	$0	$0	$0
East Primary Rehab, Seismic Retrofit, and Odor Control	0	60	0	40	0	66.473	14.934	6.439	4.162	7.259	0.518	0.214	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Secondary Clarifier Rehabilitation	0	40	60	0	0	67.971	15.271	5.975	3.701	6.435	0.459	0.187	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Filter Rehabilitation	0	100	0	0	0	64.453	14.480	7.004	4.701	8.533	0.589	0.240	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Outfall Bridge and Levee Improvements	0	100	0	0	0	64.453	14.480	7.004	4.701	8.533	0.589	0.240	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Digested Sludge Dewatering Facility	0	0	40	60	0	69.829	15.688	5.470	3.226	5.224	0.396	0.166	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Digester and Thickener Facilities Upgrade	16,664,000	0	40	60	0	69.829	15.688	5.470	3.226	5.224	0.396	0.166	100.000	$11,636,338	$2,614,282	$911,554	$537,647	$870,461	$66,056	$27,662	$16,664,000
Lagoons & Drying Beds Retirement	0	0	40	60	0	69.829	15.688	5.470	3.226	5.224	0.396	0.166	100.000	$0	$0	$0	$0	$0	$0	$0	$0
Total Estimated Costs of Process-related Projects over $2M	$17,098,000													$11,916,064	$2,677,125	$941,951	$558,050	$907,494	$68,612	$28,704	$17,098,000

(1) Source: Parameter allocations from Capital Project Cost Allocations Technical Memorandum, Carollo Engineers, March 2016, page 8.
(2) Process-related projects costing more than $2M are allocated to treatment parameters on project-specific basis in the fiscal year following start of engineering design.
(3) FY16-17 Agency cost sharing percentages based on project-specific basis.

ATTACHMENT II

CITY OF SAN JOSE
ENVIRONMENTAL SERVICES DEPARTMENT
SAN JOSE - SANTA CLARA
REGIONAL WASTEWATER FACILITY (RWF)

STATE REVOLVING FUND LOAN REPAYMENTS
FISCAL YEAR 2016-17

Loan No.	Total Loan Amount	Debt Service 100.000%	San Jose 69.225%	Santa Clara 15.409%	West Valley 8.448%	Cupertino (2) 5.081%	Milpitas (2) 0.486%	CSD 2-3 1.092%	Burbank 0.259%
110	$ 7,523,850	$ 451,433	$ 312,504	$ 69,561	$ 38,137	$ 22,937	$ 2,194	$ 4,930	$ 1,169
120	$ 4,899,379	$ 309,436	$ 214,207	$ 47,681	$ 26,141	$ 15,722	$ 1,504	$ 3,379	$ 801
130	$ 5,250,994	$ 331,643	$ 229,580	$ 51,103	$ 28,017	$ 16,851	$ 1,612	$ 3,622	$ 859
140	$ 3,111,638	$ 186,699	$ 129,242	$ 28,768	$ 15,772	$ 9,486	$ 907	$ 2,039	$ 484
150	$ 12,630,523	$ 757,834	$ 524,611	$ 116,775	$ 64,022	$ 38,506	$ 3,683	$ 8,276	$ 1,963
160	$ 11,778,763	$ 706,729	$ 489,233	$ 108,900	$ 59,704	$ 35,909	$ 3,435	$ 7,717	$ 1,830
170	$ 8,732,841	$ 523,973	$ 362,720	$ 80,739	$ 44,265	$ 26,623	$ 2,547	$ 5,722	$ 1,357
180	$ 4,532,364	$ 271,943	$ 188,253	$ 41,904	$ 22,974	$ 13,817	$ 1,322	$ 2,970	$ 704
190	$ 3,009,808	$ 180,589	$ 125,013	$ 27,827	$ 15,256	$ 9,176	$ 878	$ 1,972	$ 468
310	$ 6,443,637	$ 386,620	$ 267,638	$ 59,574	$ 32,662	$ 19,644	$ 1,879	$ 4,222	$ 1,001
320	$ 5,652,221	$ 356,984	$ 247,122	$ 55,008	$ 30,158	$ 18,138	$ 1,735	$ 3,898	$ 925
Totals	$ 73,566,018	$ 4,463,883	$ 3,090,123	$ 687,840	$ 377,109	$ 226,810	$ 21,694	$ 48,746	$ 11,561

(1) Agencies' share of annual debt service will be invoiced twice a year, one-half in October and one-half in April.
(2) Milpitas assumes 0.486% of the debt service payment on and after its capacity purchase from Cupertino on January 1, 2009.

TECHNICAL MEMORANDUM

CH2M HILL

TO: E.H. Braatelien Jr.

FROM: Glen Daigger

DATE: March 4, 1982

SUBJECT: Alernative SJ/SC WPCP Cost Allocation

PROJECT: F227.70.50

SUMMARY

This Technical Memorandum provides a preliminary allocation of the cost for the proposed Capital Improvements Program for the SJ/SC WPCP into flow, BOD, TSS, and ammonia categories. The results of that allocation are presented in Tables 1 and 2. A summary of present and required capacities for each of the major areas of the plant is presented in Table 3.

INTRODUCTION

The purpose of this memo is to present for discussion purposes an alternative facilities and cost allocation analysis of the proposed Capital Improvements Program for the SJ/SC WPCP. This analysis classifies the required facilities into those needed to provide capacity for flow, BOD, TSS, and ammonia.

For this preliminary analysis it was assumed that the entire program, as proposed in the September, 1981 Capital Improvements Program for the San Jose/Santa Clara Water Pollution Control Plant (CH2M HILL), will be implemented. The BOD loadings upon which the proposed program is based are currently being revised, and this will result in some minor reductions in the facilitess provided and the projected costs. These reductions in loadings and required facilites will be presented in Technical Memoranda (TM) 2.5A and 4.10B, respectively, which will be published within 2 to 3 weeks. In addition, options exist concerning the allocation of certain facilities, and policy decisions are required to allow proper allocation of these facilities. While a final analysis will be required when these issues are resolved, the present analysis will serve to illustrate the procedure and to provide information appropriate for preliminary budgeting purposed.

PROCEDURE

The facilities allocation analysis was accomplished by identifying those design criteria which exert the most significant influence on the size of the required facility. These criteria were then related to the relevant constituent loadings to allocate the facility to a particular category. This approach results in a degree of simplification which neglects the functional interaction between the various facilities, and it may not represent an optimal allocation of facilities to the various categories. The benefits of this approach are its simplicity and the fact that many facilities can be attributed entirely to a single category.

The cost allocation analysis presented here is based upon the facilities allocation analysis discussed above and upon estimated capital costs including contingencies, engineering, and inflation to the estimated mid-point of construction at 2.87 percent per quarter. Thus, they are the total anticipated costs to construct the required facilities. Also presented is a summary of the present and required capacities of each facility.

FACILITIES ALLOCATION ANALYSIS

Existing Grit Chamber Modifications

Sizing of the grit chambers is controlled by the allowable overflow rate and detention time. The costs for these modifications are attributed to the wastewater flow.

Raw Sewage Pump Station

These facilities are required to provide plant hydraulic capacity. Thus, costs for these facilities are attributed to the wastewater flow.

Biofilters

Sizing of the biofilters is determined directly by the design organic loading for the canning season (i.e., lb BOD/day/1,000 ft^3). Thus, the costs for these facilities can be attributed to the canning season BOD loading.

Aeration Basin Modifications

The size of the aeration basins is determined by the design mean cell residence time (MCRT) or Food-to-Microorganisms ratio (F/M). For a fixed MLSS concentration the aeration

volume can be calculated directly using the design MCRT (or F/M) and the design BOD loading for the canning season. Thus, the costs for these mofications can be attributed to the canning season BOD loading.

Secondary Clarifiers

Sizing of the secondary clarifiers is generally controlled by the allowable hydraulic overflow and solids loading rate. Thus, the costs for these facilities can be attributed to the wastewater flow.

Biofilter Pump Station

This pump station provides three functions: (1) pumping to the biofilters, (2) pumping to the aeration basins, and (3) pumping to the equalization basins. Pumping to the biofilters is required only in conjunction with the biofilters. Thus, the cost for this function can be attributed to the biofilters and to the canning season BOD loading. The other two functions are required to provide plant hydraulic capacity that would be needed even if the biofilter were not built. Thus, the cost for these functions can be attributed to the wastewater flow.

One method to allocate the cost between the flow and canning season BOD is to distribute it in proportion to the pumping horsepower provided for each function. This method will account for both pumping capacity and discharge head which varies for each function. The pump horsepower are as follows:

- Pump to biofilters
  - 2 pumps at 700 hp each = 1400 hp
  - 3 pumps at 500 hp each = 1500 hp
- Pump tp aeration basin
  - 2 pumps at 500 hp each = 1000 hp
  - 3 pumps at 350 hp each = 1050 hp
- Pump to equalization
  - 3 pumps at 150 hp each = 450 hp

5400 hp

This allocation method will then result in 54 percent of the cost attributed to canning season BOD and 46 percent of the cost attributed to flow.

RAS Pumping

This function is associated directly with the secondary clarifiers, which are flow related. Thus, the cost for these facilities is attributed to the wastewater flow.

Blower and Engine/Generator Facility

Sizing of the blowers is related directly to the noncanning season BOD load and, thus, the costs for these facilities is attributed to the noncanning season BOD loading. As discussed in the previous Facilities and Cost Allocation Analysis (CH2M HILL, January 1982), the new motor-driven blowers are required to replace the existing engine-driven blowers during the noncanning season and to allow the existing units to be operated only during the canning season. Thus, the new motor-driven blowers replace the existing engine-driven blowers and are most properly attributed to a "capital replacement" category. Rather than create additional cost allocation categories for this analysis, the costs for the new motor-driven blowers will be allocated to the wastewater flow. This is reasonable because the noncanning season BOD and the wastewater flow vary in a similar fashion. Nevertheless, it is recommended that the creation of an additional "capital replacement" category be considered for subsequent versions of this analysis.

Like the blowers, the Engine/Generators cannot be clearly associated with a particular constituent. As discussed in the previous Facilities and Cost Allocation Analysis, these units are added to increase plant power generation capabilities and it may be desirable to allocate them to a "power generation" category.

An alternative cost allocation method considers that the actual sizing of the engine generators is related to the anaerobic digester gas production rate, which itself is related to the total primary sludge and waste activated sludge (WAS) production rate. As described in a following section titled Sludge Digestion, Sludge Pumping, and Lagoon Reclamation, 65 percent of the cost could then be attributed to canning season TSS loading and 35 percent to canning season BOD loading. The second approach will be used in this preliminary analysis, although the creation of the proposed "power generation" category should be considered for subsequent versions of the analysis.

Flow Equalization Basins

These facilities are required to provide hydraulic capacity and to avoid expansion of the filtration facility. Since the filters are flow-related (see below), the costs for these facilities are attributed to the wastewater flow.

Nitrification Clarifiers and WNS Pumps

Both of these facilities are required to nitrify the applied ammonia. Thus, the costs for these facilities are attributed to the ammonia loading.

Tertiary Filter Influent Pumps, Tertiary Filter Modifications, and the Spent Backwash Treatment System

Sizing of the filtration facility is generally controlled by the design hydraulic loading rate. Thus, the costs for these facilities can be attributed to the wastewater flow.

Electrical and Computer System Rehabilitation

The previous Facilities and Cost Allocation Analysis allocated these improvements to the replacement category. They are basic plant functions, and for the purposes of this preliminary analysis they will be allocated to the wastewater flow category. It is recommended, however, that subsequent versions of this analysis evaluate the allocation of these facilities to a replacement category.

Sludge Digestion, Sludge Pumping, and Lagoon Reclamation

These facilities are required to treat the wastewater sludges produced. In general, 1 lb of plant influent TSS will result in 0.85 lb of total sludge (primary and WAS), and 1 lb of BOD will result in 0.4 lb of total sludge (primary and WAS). At the First-Stage Expansion canning season average TSS and BOD loadings upon which the September 1981 Capital Improvements Program is based (458,000 lb/day and 528,000 lb/day, respectively), the total sludge production from the TSS loading is 0.85 x 458,000 lb/day or 389,000 lb/day and the total sludge production from BOD is 0.40 x 528,000 lb/day or 211,000 lb/day. The proportion of the total sludge production attributed to TSS is:

Thus, 65 percent of the cost of these facilities is attributed to the TSS loading, and 35 percent of the cost is attributed to the BOD loading.

COST ALLOCATION ANALYSIS

Table 1 summarizes the facilities included in the Capital Improvements Program proposed in September 1981, the estimated costs for these facilities, and the allocation of these facilities into one of the four categories (flow, BOD, TSS, and ammonia). Table 2 summarizes the cost allocation by category, including the 1982 Priority Improvements.

The costs presented in these tables have been inflated (at a rate of 2.87 percent per quarter) to the anticipated midpoint of construction and they include contingencies and estimated costs for engineering. Thus, they are the total anticipated costs to construct the required facilities. They should be considered budget level estimates (+30 to -15 percent).

FACILITY CAPACITY

Table 3 summarizes the capacities of the various components of the SJ/SC WPCP and compares them to the design values. In most cases the capacities are those reported in the Capacity Report (CH2M HILL, January 1982). In all cases the capacities reported are plant influent values, accounting for the effects of processes proceeding the indicated process. These capacities may be used as an aid to allocate costs between the various tributary agencies.

sa

Table 1

COST ALLOCATION ANALYSIS
ACCORDING TO CONSTITUENT

Facility	Constituent	Cost[a]
Existing Grit Chamber Modifications	Flow	$ 32,000
Raw Sewage Pump Station	Flow	1,167,000
Biofilters	BOD	34,928,000
Aeration Basin Modifications	BOD	16,844,000
Secondary Clarifiers	Flow	8,138,000
Biofilter Pump Station	BOD	4,941,000
	Flow	4,209,000
RAS Pumping	Flow	3,501,000
Blower Facility	Flow[b]	10,839,000
Engine/Generator Facility	BOD[c]	10,316,000
	TSS	5,554,000
Flow Equalization Basins	Flow	6,342,000
Nitrification Clarifiers	Ammonia	5,150,000
WNS Pumps	Ammonia	124,000
Tertiary Filter Influent Pumps	Flow	627,000
Tertiary Filter Modifications	Flow	2,158,000
Spent Backwash Treatment System	Flow	2,600,000
Electrical and Computer System Rehabilitation	Flow[b]	4,721,000
SUBSTOTAL (Liquid Processes)		$122,191,000
Sludge Digestion and Pumping		
Upgrade Existing Facilities	BOD	$ 238,000
	TSS	441,000
New Facilities	BOD	6,601,000
	TSS	12,258,000
Lagoon Reclamation	BOD	1,565,000
	TSS	2,906,000
SUBTOTAL (Solids Processes)		$ 24,009,000
TOTAL (LIQUID AND SOLIDS)		$146,200,000

[a] Budget level costs (+30 to -15 percent) which include contingency, engineering, and inflation to the currently estimated midpoint of construction at 2.87 percent/quarter.

[b] Allocation of this item to a Capital Replacement category should be evaluated.

[c] Allocation of this item to a Power Generation category should be evaluated.

Table 2

COST ALLOCATION ANALYSIS

Category	Cost[a]
Flow	$ 44,334,000
BOD	75,433,000
TSS	21,159,000
Ammonia	5,274,000
Subtotal	$146,200,000
1982 Priority Improvements	1,800,000
TOTAL	$148,000,000

[a]Budget level costs (+30 to -15 percent) which include contingency, engineering, and inflation to the currently estimated midpoint of construction at 2.87 percent/quarter.

3/4/82

Table 3

FACILITY CAPACITY SUMMARY

Facility	Controlling Constituent	Current Capacity[a]	Design Capacity: Intermediate-Term Improvement	Design Capacity: First-Stage Expansion	Remarks
Preliminary Treatment	Flow	167 mgd nominal peak week with all units operating	143 mgd nominal peak week with largest unit down	167 mgd nominal peak week with largest unit down	Existing aerated grit chambers rehabilitated to meet reliability requirements
Raw Sewage Pumping	Flow	240 mgd maximum peak hour with all units operating	233 mgd maximum peak hour with longest unit down	271 mgd maximum peak hour with largest unit down	Three 45-mgd pumps added to increase capacity and meet reliability requirements
Primary Treatment	Flow	155 mgd nominal peak week	143 mgd nominal peak week	167 mgd nominal peak week	Addition of spent filter backwash treatment system will provide capacity required
Secondary Treatment	Flow BOD	96 mgd and 453,000 lb BOD/ day nominal peak week	143 mgd and 624,000 lb BOD/ day nominal peak week	167 mgd and 665,000 lb BOD/ day nominal peak week	
Nitrification	Ammonia	23,400 lb NH_3/ day nominal peak week	25,000 lb NH_3/ day nominal peak week	29,900 lb NH_3/ day nominal peak week	
Filtration	Flow	110 mgd nominal peak week	143 mgd nominal peak week	167 mgd nominal peak week	Improvements required include tertiary filter influent pumps, tertiary filter modifications, spent backwash treatment system, and flow equalization
Anaerobic Digestion	BOD TSS	361,000 lb BOD/ day and 340,000 lb TSS/day nominal peak week	624,000 lb BOD/ day and 588,000 lb TSS/say nominal peak week	655,000 lb BOD/ day and 625,000 lb TSS/day nominal peak week	
Sludge Lagoon Reclamation	BOD TSS	Unknown	Storage through 1985 required	Storage through 1990 required	

[a]All loadings expressed as plant influent valves.

San José-Santa Clara Regional Wastewater Facility

CIP Program

Capital Program Support

Technical Memorandum

Title:	Capital Project Cost Allocations Revised Final
To:	City of San José
Author(s):	Robert Grantham (Carollo Engineers), Alex Bugbee (Carollo Engineers), Toby Weissert P.E. (Carollo Engineers)
Date:	March 8, 2016
Reviewed by:	Colin Page P.E. (MWH Global)

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CAPITAL PROJECT COST ALLOCATIONS

1.0 INTRODUCTION

The Master Agreements for Wastewater Treatment between the City of San José, the City of Santa Clara and Tributary Agencies[1] (Master Agreements) stipulate that future improvements that are process related, and over $2 million should be allocated between the four billable parameters: wastewater flow (Flow), Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and Ammonia (NH3) based on engineering design. The Program Management Team[2] developed a preliminary memorandum, dated January 30, 2014, that provided initial guidance on how capital costs could be allocated based on unit processes. The preliminary memorandum presented high level parameter allocations that were used in the development of the RWF Ten Year Funding Needs Forecast (February 2015). This document builds upon that preliminary memorandum and provides engineering guidance for allocating the projects included within the $1.4 billion Capital Improvement Program as implementation of those projects continues.

The purpose of this memorandum is to present the methodology for allocating capital costs for the San José - Santa Clara Regional Wastewater Facility (RWF) to the billable parameters. Once allocated to the billable parameters, these costs can be distributed to each agency based on their capacity ownership of each parameter. The capital cost estimates presented within this memorandum are based on the best known information as of the writing of this document. While the costs for specific projects are expected to be updated and refined, these revisions are not expected to significantly change the proposed allocations by parameter.

2.0 PROJECT ALLOCATION PROCESS

The Master Agreement requires that capital cost for future improvements that are process related and over $2 million be allocated to billable parameters based on engineering design. These billable parameters include Flow, BOD, TSS, and NH3. Based on these allocations, each agency pays for the future improvements based on its contract capacity in each parameter. Projects that are less than $2 million, or projects that are not process related, are allocated to billable parameters based on the Revenue Program. The Revenue Program is a rolling weighted average that reflects the total capital investment in the RWF, as described in Section 2.2 below.

[1] Tributary Agencies refers to West Valley Sanitation District, The City of Milpitas, Cupertino Sanitary District, County Sanitation District 2-3, and Burbank Sanitary District

[2] The Program Management Team consists of City of San José RWF staff and MWH/Carollo.

2.1 Project Allocations

The allocation to billable parameters is intended to provide a reasonable basis for distributing costs between the Owners[3] and Tributary Agencies. Costs associated with process related projects will be allocated to billable parameters based on the engineer's best judgment. This allocation will initially be performed prior to the design once an engineer's cost estimate becomes available. The engineer's cost estimate provides a cost breakdown sufficient to relate the components of the overall estimated project cost to billable parameters. Though costs might change during design and construction, it is not expected that these changes would typically impact the parameter allocations. Thus, the initial engineer's cost estimate will provide a sound and reliable basis for allocating project costs to billable parameters absent significant changes to the project and project costs.

The following steps will be taken to develop the parameter allocations and verify the validity of the allocations through the project completion cycle.

1. **Project Planning, *Start of Planning*:** Costs incurred during project planning should be allocated based on the rolling weighted average of the RWF.
2. **Initial Project Specific Allocation, *Start of Design*:** Design related costs should be allocated to billable parameters based on the project specific planning level cost estimate. This project cost estimate would ostensibly include a breakdown of costs between structural and mechanical equipment.
3. **Final Project Allocation:**

   Design, Bid, Build Projects, *Completion of Design*: Once the project design is complete and a final cost estimate is available, the initial parameter allocation will be reviewed for accuracy and revised if necessary. However, it is not expected that significant changes will be required at this time.Construction costs should be allocated based on the billable parameters established following completion of design.

   Design-Build Projects, *Contract Award*: For design-build projects, the construction costs will be allocated based on the billable parameters established prior to the award of design-build contract. The initial allocation will be reviewed for accuracy at the time of awarding the definitive contract with the Guaranteed Maximum Price. If necessary, the allocations will be revised accordingly at this time.
4. **Final Allocation Review, *Completion of Construction*:** At the time of project acceptance, a final review of the parameter allocations will be performed to confirm that no major project changes have occurred. If it is found that major project modifications warrant revisiting the allocations, the allocations will be revised accordingly. At that time, the costs allocated to each agency will be reconciled based on a revised parameter allocation.

[3] Owners refers to the City of San José and the City of Santa Clara

2.2 Revenue Program - Rolling Weighted Average Allocation

Projects that are deemed to not to be process related, or are under $2 million will be allocated based on the rolling weighted average distribution of all RWF assets. Each project's allocation will be established based on the weighted average at the time that the project costs commence.

2.2.1 Adjustments to the Rolling Weighted Average

The rolling weighted average that is used to allocate the costs associated with non-process related projects or projects that are less than $2 million has been developed over time based on the RWF revenue program. It is intended to reflect the overall value of the RWF and its overall allocation to billable parameters. The rolling weighted average should be maintained to add assets as projects become operational or to remove assets when the asset is removed from service or replaced.

Addition of New or Rehabilitated Assets: The value of new or rehabilitated assets will be added to the rolling weighted average at the beginning of the first fiscal year after a project is completed. A project will be considered complete after the RWF accepts the project from the contractor (typically referred to as project acceptance). Though a small amount of spending may continue after that time for activities such as post construction or testing, the majority of the hard project elements will be completed at that time. Those additional costs will be added to new or rehabilitated assets in the rolling weighted average for the fiscal year following the last year that they are incurred. Value associated with rehabilitated or replaced assets will not be added to the rolling weighted average without removing the value of the assets that they replace.

Removal of Disposed Assets: The rolling weighted average will be adjusted to reflect disposed or fully depreciated assets at the time that those assets are replaced by new assets or are removed from service.

3.0 UNIT PROCESS ALLOCATIONS

In order to account for system costs and equitably charge wastewater dischargers for their share of capital costs, the treatment plant is divided into a number of unit processes. Capital costs associated with each unit process are then allocated to billable parameters based on a specific set of allocations developed for each unit process. Costs can then be allocated among the users in proportion to their capacity ownership of each billable parameter.

The basis for allocating capital costs to unit processes was to assess which parameter(s) determine the function of the unit process and/or cause capital costs to be incurred. In most cases, the basis of this determination is directly related to design criteria.

3.1 Capital Costs

Capital costs can appropriately be allocated among the billable parameters through the design criteria for the sizing (and therefore, the cost) of the facility. Typically, the controlling design flow and/or loading condition is the maximum flow and/or load which the facility must accommodate.

The proposed listing of treatment processes and the associated percentage allocation to each billable constituent for distributing capital costs are shown in Table 3-1 below. There are many items in the RWF Capital Improvement Program (CIP) that cannot be directly attributed to a unit process. In those cases, the allocations are done as indirect costs or "As All Others." These costs are allocated to the billable parameters using the RWF rolling weighted average allocation.

Table 3-1 Unit Process Allocation Summary

Unit Process	Flow	BOD	TSS	NH3
Preliminary Treatment	100%	0%	0	0
Primary Treatment	60%	0%	40%	0%
Iron Salt Feed Station	100%	0%	0%	0%
Secondary - Aeration Basins	20%	60%	0%	20%
Secondary - Clarifiers	40%	60%	0%	0%
Biosolids/Digestion	0%	40%	60%	0%
Filtration	100%	0%	0%	0%
Disinfection/Effluent Disposal	100%	0%	0%	0%
General FOG Receiving Electrical Systems and Power Generation	As Weighted Average	As Weighted Average	As Weighted Average	As Weighted Average

3.2 Unit Process Allocation Details

The following sections discuss the methodology used to develop capital cost allocation percentages for each of the identified unit process.

3.2.1 Preliminary Treatment

The CIP projects to upgrade the preliminary wastewater treatment facilities include both improvement of the existing headworks and addition of new headworks facilities.

3.2.1.1 Capital Cost Allocation

The purpose of the preliminary treatment process is to remove grit and foreign solids (such as trash or plastic) from the raw sewage stream and to pump influent sewage up to the hydraulic grade of the treatment plant. Although the installed equipment is designed to remove foreign solids, design criteria for sizing headworks screens and grit basins are specifically related to the quantity of raw sewage entering the treatment plant. As such, the capital costs for preliminary treatment are allocated 100 percent to flow.

3.2.2 Primary Treatment

The work planned to upgrade the primary treatment system includes rehabilitation of the primary clarifiers, seismic retrofitting, and odor control.

3.2.2.1 Capital Cost Allocation

Although the main purpose of the primary treatment process is to remove TSS, the capital costs that are incurred for this process category are primarily determined by the amount of flow that must be treated, due to the sizing of the structures. The equipment within the primary clarifiers is related to the removal of TSS.

A portion of the influent BOD is removed by this process because it is exerted by the solids that are removed in the primary sedimentation process. However, oxygen demand is a relatively poor indicator of the capital costs that are incurred for this process. Therefore, none of the capital costs are allocated to oxygen demand.

Certain components of the upcoming primary clarifier rehabilitation project can be specifically identified as being related to either the structural capacity of the clarifier or the mechanical equipment. Costs associated with the rehabilitation or improvement of structures are allocated directly to flow. Costs associated with the replacement, rehabilitation, or improvement of mechanical equipment within the primary clarifier are allocated to TSS. This allocation process yields a 60 percent allocation to Flow and a 40 percent allocation to TSS. Appendix A shows the calculation of the parameter allocation based on the primary clarifier cost estimates developed for the RWF CIP Validation Study.

3.2.3 Iron Salt Feed Station

The CIP includes an Iron Salt Feed Station project to add ferric chloride to the wastewater at the primary clarifier. The project also provides the ability to add polymer in the future if chemically enhanced primary treatment (CEPT) is required. The primary driver for the project is odor control.

3.2.3.1 Capital Cost Allocation

Although there will be some benefits to the primary treatment process, the iron salts facilities are primarily for odor control, which is considered to be related to the amount of flow being treated

in the RWF. Therefore, the capital costs associated with the Iron Salt Feed Station project are allocated 100 percent to flow.

3.2.4 Aeration Basins

The projects within the CIP related to aeration basins include modifications to the existing aeration basins, as well as rehabilitation and replacement of several mechanical and structural components.

3.2.4.1 Capital Cost Allocation

Much like the primary treatment projects, the value of the CIP's aeration basin projects can be broken down into smaller components. These components, and their respective costs, were categorized and grouped according to the loading constituent most closely related to the project component.

The CIP includes two projects: Aeration Tanks and Blower Rehabilitation and the Aeration Basin Future Modifications. The costs associated with the aeration basin projects are allocated between Flow, BOD, and NH3.

- Flow – Costs associated with the structure of the basins are related to the amount of flow that is treated. For the Aeration Tanks Rehabilitation and Repair project, approximately 15 percent of costs are related to structural work and are therefore allocated to flow. For the Aeration Basin Future Modifications project, approximately 30 percent of costs are allocated to flow.

- BOD – Costs associated with BOD removal include the repair, replacement, and improvement of blowers, diffusers, air piping, return activated sludge (RAS) valves, and associated electrical equipment. For the Aeration Tanks and Blower Rehabilitation and Repair project, approximately 70 percent of costs are allocated to BOD. For the Aeration Basin Future Modifications project, approximately 30 percent of costs are allocated to BOD.

- NH3 – Costs associated with NH3 removal include baffle walls, recirculation pumps, nitrification valves, and piping realignments. For the Aeration Tanks Rehabilitation and Repair project, approximately 15 percent of costs are allocated to NH3. For the Aeration Basin Future Modifications project, approximately 40 percent of costs are allocated to NH3.

In total, the aeration basins projects in the CIP yield a combined allocation of 20 percent to Flow, 60 percent to BOD, and 20 percent to NH3. Appendix B shows the calculation of the parameter allocation based on the aeration basins cost estimates developed for the CIP Validation Study.

3.2.5 Nitrification and Secondary Clarifiers

The CIP includes projects to rehabilitate existing secondary clarifier facilities and nitrification clarifier facilities. It should be noted that the secondary clarifiers and nitrification clarifiers serve the same function, secondary clarification. The parameter allocations developed are based on the estimates developed by the Project Team for the Nitrification Clarifier Rehabilitation project. The Secondary Clarifiers Rehabilitation Project will involve similar rehabilitation work.

3.2.5.1 Capital Cost Allocation

The purpose of secondary clarification is to settle the biosolids generated by the biological treatment system, returning a portion of the settled biosolids to the activated sludge process (aeration basins), with the remaining biosolids being removed to the solids treatment process. Principal components of this process include the sedimentation tanks, biosolids collection mechanisms installed inside of the tanks, and the return and waste sludge pumps, valves, and piping.

Secondary clarification tank sizing criteria are determined based on the quantity of flow and the amount of biosolids to be handled. The amount of biosolids is a direct function of the organic load treated within the activated sludge process as expressed by the BOD constituent and the overall plant flow rate. For this reason, costs for secondary clarification projects are allocated exclusively to flow and BOD.

While there is additional TSS removal in the secondary clarifiers, this removal is a result of the biological treatment occurring in the aeration basins, which allows for flocculation and improved settlement. Thus, the biosolids removed in the process are directly related to the amount of BOD applied to the secondary treatment system. Additionally removal of nitrogen from ammonia occurs within the aeration basins, thus, NH3 is not considered as a cost driver for the secondary clarifiers.

The relative cost allocations between the flow and BOD parameters were developed based upon the breakdown of costs between structural costs and equipment costs. The controlling criteria for the size of the tankage and associated channels and hydraulic control systems for this process is flow. Therefore, the structural costs would be allocated entirely to the flow component. Equipment costs allocated to flow and BOD based on the function served by each equipment component. Equipment related to handling biosolids is sized primarily based on the amount of solids carried in the process, and in turn, associated costs are allocated to the BOD parameter. Equipment related to hydraulic conveyance is sized based on the amount of flow through the clarifiers, as such associated costs are allocated to the flow parameter. The net capital cost allocation for the secondary clarification projects is estimated to be about 40 percent for flow and 60 percent for BOD. Appendix C the calculated parameter allocation is based on the Nitrification Clarifier Rehabilitation cost estimates developed for the RWF CIP budget.

Staff has indicated that the components to be repaired and replaced in the Secondary Clarifier Rehabilitation Projects will mirror those replaced in the Nitrification Clarify Rehabilitation Project.

Thus, it is expected that the initial parameter allocation developed for the Nitrification Clarifier Rehabilitation will also pertain to the Secondary Clarifier Rehabilitation project.

3.2.6 Biosolids Digestion, Handling, and Disposal

The RWF CIP includes several projects within the RWF's solids treatment and handling process. Specific projects include Digester and Thickener Facilities Upgrades, the Digested Sludge Dewatering Facility, Lagoons and Drying Beds Retirement, and Additional Digester Rehabilitation.

3.2.6.1 Capital Cost Allocations

The allocations for Biosolids and Digestion projects are based on the solids process model developed for Technical Memorandum No. 8 (Future Biosolids Quantities and Loads) of the Aeration Demands and Biosolids Production Assessment (Carollo Engineers, June 2015). Table 3-2 below shows a summary of the pounds of TSS and Volatile Suspended Solids (VSS) removed from primary and secondary treatment processes and discharged to the solids treatment process. Relevant pages from the aforementioned memo are included for reference in Appendix B.

Table 3-2 Allocation Based on Sludge Load to Biosolids/Digestion Processes

Source of Solids	Allocation Constituent	TSS (klbs/day)		VSS (klbs/day)	
Primary Sludge	**TSS**	176	**60%**	158	**60%**
Secondary Sludge	**BOD**	134	**40%**	99	**40%**
Total		310	100%	257	100%

Notes:
(1) All allocation values rounded to nearest 10 percent.

3.2.6.2 Sludge Thickening Capital Cost Allocation

The sizing of sludge thickening structural and mechanical (equipment) facilities is driven by the amount of solids in the sludge entering the thickening process from the primary and secondary treatment processes. Sludge from primary treatment is attributable to the amount of TSS removed in the primaries. Secondary sludge is produced through the removal of BOD in secondary treatment. Therefore, the capital costs of the thickening facilities are allocated between TSS and BOD based on the relative amount of total suspended solids from primary sludge (TSS) and secondary sludge (BOD), respectively. This results in an allocation of 40 percent to BOD and 60 percent to TSS.

3.2.6.3 Digestion Capital Cost Allocation

Digestion processes are assumed to be sized based on an organic loading rate expressed in terms of pounds of solids per unit volume per day. For this reason, capital costs will be directly proportional to the quantities of volatile suspended solids in sludge received from the primary

(TSS) and secondary (BOD) treatment systems. This results in an allocation of 40 percent to BOD and 60 percent to TSS.

3.2.6.4 Dewatering and Drying Capital Cost Allocation

The sizing of sludge dewatering and drying structural and mechanical (equipment) facilities is driven by the amount of sludge entering the solids process from the primary and secondary treatment processes. Sludge from primary treatment is attributable to the amount of TSS removed in the primaries, while secondary sludge is produced through the removal of BOD in secondary treatment. Therefore, the capital costs of the dewatering and drying facilities are split between TSS and BOD based on the relative amount of total suspended solids from primary sludge and secondary sludge, respectively. This results in an allocation of 40 percent to BOD and 60 percent to TSS.

3.2.7 Filtration

The CIP includes one Filter Repair and Rehabilitation project.

3.2.7.1 Capital Cost Allocation

Although the purpose of the filtration process is to remove the small amount of residual solids not removed by the primary and secondary processes, much like the preliminary treatment process, the design criteria for the sizing of the filters is based entirely on flow. Therefore, the capital costs for filtration are allocated 100 percent to flow.

3.2.8 Disinfection and Effluent Disposal

The CIP includes several projects related to final disinfection and effluent disposal. These projects include a New Disinfection Package, Outfall Bridge and Levee Improvements, and Final Effluent Pump Station, and Stormwater Channel Improvements.

3.2.8.1 Capital Cost Allocation

Disinfection and effluent disposal facilities are sized entirely based on the flow of effluent. Therefore, the capital costs of each project within the Disinfection and Effluent Disposal projects are allocated 100 percent to flow.

3.2.9 Electrical Systems and Power Generation

The CIP includes several projects related to Electrical Systems and Power Generation. These projects include upgrades to the cogeneration facility, digester gas compressors, and digester gas storage.

3.2.9.1 Capital Cost Allocation

The electrical systems and power generation facilities generate and distribute electricity and heat that is available for use throughout the entire plant. Consequently, the costs of these

facilities are allocated between the four billable parameters relative to the rolling weighted average distribution of all RWF assets.

3.2.10 Fats, Oils, and Grease (FOG) Receiving

The CIP includes a project to build a FOG receiving station to process FOG in the digesters. The FOG will be converted to biogas which will in turn be used to generate electricity in the cogeneration facility.

3.2.10.1 Capital Cost Allocation

The electricity generated as a result of FOG processing is available for use throughout the entire plant, therefore, the costs of these facilities are allocated between the four billable parameters relative to the rolling weighted average distribution of all RWF assets.

3.2.11 General Plant Projects

The CIP includes a number of projects that are associated with the rehabilitation and improvement of the general operation of the facility.

3.2.11.1 Capital Cost Allocation

As the general facilities serve the entire system, the costs of these facilities are allocated between the four billable parameters relative to the rolling weighted average distribution of all RWF assets.

APPENDIX A - PRIMARY CLARIFIER ALLOCATIONS

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SJ-SC RWF
Technical Memorandum
Capital Project Cost Allocations
APPENDIX A **PLP-02**

Estimate Source: CIP Validation Study

Program Package Cost Estimate

Class 5 Level

Clie **San Jose-Santa Clara Regional WW Facility** *Package Name* **East Primaries Rehabilitation & Repair**

OPC **JSW/MMM** *Date* **31-Dec-13** *Rev* **0** *Package ID* **PLP-02** *Package Cost*[1] **$92,470,000**

Construction Cost (OPCC)

#		EQ Procure $	Install/Construct $	OPCC Total	
1	Allowances:				
2	Replace all mechanical, electrical, and control equipment on (10) Clarifiers - 200' x 40'	$6,000,000	$2,400,000	*$8,400,000*	*Equipment*
3	Replace all mechanical, electrical, and control equipment on (8) Clarifiers - 150' x 40'	$3,840,000	$1,540,000	*$5,380,000*	*Equipment*
4	Concrete Refurbishment - 172,000 SF		$4,300,000	*$4,300,000*	*Structural*
5	Concrete Coating - 172,000 SF		$2,150,000	*$2,150,000*	*Structural*
6			$1,300,000	*$1,300,000*	*Structural*
7	(200) caissons for structure support - 48" Ø x 35' deep		$1,150,000	*$1,150,000*	*Structural*
8	Reinforced internal walls - 40 LF		$30,000	*$30,000*	*Structural*
9	Covers for East Primary Clarifiers and select inlet & outlet junction boxes - 130,000 SF	$8,480,000	$1,950,000	*$10,430,000*	*Structural*
10	Concrete and Steel corrosion protection - 250,000 SF		$3,070,000	*$3,070,000*	*Structural*
11	Installation of conduits for collecting foul air - 85,000 LBS		$1,300,000	*$1,300,000*	*Flow*
12	Odor Control - (2) 9' Ø Bio Scrubbers & (2) 12' Ø Carbon Vessel with (1) fan & ductwork	$1,200,000	$900,000	*$2,100,000*	*Flow*
13	Replace (11) Light Poles	$30,000	$20,000	*$50,000*	*As All Others*
14	Replace (18) 15 HP progressive cavity pumps for Primary Sludge - 300 GPM	$710,000	$880,000	*$1,590,000*	*Equipment*
15	(2) 20 HP Centrifugal Pumps - 1,500 GPM	$80,000	$110,000	*$190,000*	*Equipment*

Allocation of Primary Project to Parameters

Contingency and existing costs do not effect allocation

East Primaries Rehabilitation & Repair

Total Allocable Sub-Costs	Constituent Cost	Distribution	Redistribution of As All Others	Final Distribution of Package Cost[1]
Equipment	$ 15,560,000	37.5%	37.6%	$34,760,000
Structural	$ 22,430,000	54.1%	54.2%	$50,110,000
Flow	$ 3,400,000	8.2%	8.2%	$7,600,000
As All Others	$ 50,000	0.1%	NA	NA

Finalized Allocation to Billable Parameters

Combined Final Distribution of Aeration Project Costs		Distribution of Primaries Costs, Rounded
Flow[2]	$ 57,710,000	60%
TSS[3]	$ 34,760,000	40%

Notes:

(1) Package Cost includes Allocable Sub-Costs, contingency factors, and existing costs.

(2) As the facility is sized and structured to handle a certain level of flow, structural costs are included in the allocation as flow related costs.

(3) As the equipment within the primary treatment facility is utilized to remove TSS, the equipment cost is allocated to TSS.

APPENDIX B - AERATION BASIN ALLOCATIONS

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SJ-SC RWF
Technical Memorandum
Capital Project Cost Allocations
APPENDIX B

PLS-01 and PLS-03

Estimate Source: CIP Validation Study

Program Package Cost Estimate

Class 5 Level

Clie **San Jose-Santa Clara Regional WW Facility** — *Package Name* **Aeration Tanks Rehabilitation & Repair**

OPC **JSW/MMM** — *Date* **23-Jan-14** — *Rev* **4** — *Package ID* **PLS-01** — *Package Cost* [1] **$97,170,000**

Construction Cost (OPCC)

#		*EQ Procure $*	*Install/Construct $*	*OPCC Total*	
1	Allowances:				
2	Convert remaining (24) aeration basins from coarse bubble to fine bubble - 3,385 SF	$1,160,000	$910,000	*$2,070,000*	*BOD*
3	Substitution of Fine Bubble Diffusers in (40) basins -3,385 SF	$1,930,000	$1,510,000	*$3,440,000*	*BOD*
4	Installation of FRP baffle/partition walls - 33,000 SF	$1,320,000	$500,000	*$1,820,000*	*NH3*
5	Re-alignment of existing diffuser grids and aeration header piping		$1,200,000	*$1,200,000*	*NH3*
6	Replace (48) 24" RAS Plug valves with actuators	$910,000	$570,000	*$1,480,000*	*BOD*
7	Replace (6) 100 HP Sludge pumps at BNR1 - 5,500 GPM	$540,000	$570,000	*$1,110,000*	*NH3*
8	Replace (2) 200 HP Sludge pumps at BNR2 - 11,000 GPM	$270,000	$220,000	*$490,000*	*NH3*
9	Rehabilitate concrete on (96) aeration basins - 25% of 1,228,800 SF total		$6,140,000	*$6,140,000*	*Structural*
10	Replace corroded piping	$600,000	$1,200,000	*$1,800,000*	*BOD*
11	Replace (128) nitrification valves	$1,280,000	$640,000	*$1,920,000*	*NH3*
12	Replace (70) Light Poles	$180,000	$110,000	*$290,000*	*As All Others*
13					
14	Installation and interconnection of (5) 2,250HP 4,160V VFDs	$3,070,000	$80,000	*$3,150,000*	*BOD*
15	Update (5) Control Panels	$630,000	$750,000	*$1,380,000*	*BOD*
16	Upgrade (5) 2,250 HP blower motors with new fans & bearings	$80,000	$70,000	*$150,000*	*BOD*
17	Install new S11 Switchgear - 13 Sections	$1,630,000	$140,000	*$1,770,000*	*BOD*
18	Relocate loads to new S11 Switchgear - 400 AMPS at 480V	$660,000	$420,000	*$1,080,000*	*BOD*
19	Demo old S11 Switchgear		$30,000	*$30,000*	*BOD*
20	Evaluate using VFD vs Inlet Guide Van adjustment		$130,000	*$130,000*	*BOD*
21	New outdoor enclosure for S11	$270,000	$60,000	*$330,000*	*BOD*
22					
23	Replace (6) 2,250 HP Engine Blowers with 4,160V Electric Blowers	$2,880,000	$2,170,000	*$5,050,000*	*BOD*
24	Install (6) Blower VFD's - 2,250 HP	$3,680,000	$100,000	*$3,780,000*	*BOD*
25	Electrical Conduit and Wire	$350,000	$100,000	*$450,000*	*BOD*
26	Impeller Replacement for (3) 4,000 HP Single stage blowers	$300,000	$60,000	*$360,000*	*BOD*
27	Impeller Replacement for (5) 2,250 HP Single stage blowers	$210,000	$40,000	*$250,000*	*BOD*
28	Replacement of aeration instrumentation	$770,000	$1,150,000	*$1,920,000*	*BOD*
29	New PLC based control System	$130,000	$20,000	*$150,000*	*BOD*
30	Fiber Optic Communication	$10,000	$20,000	*$30,000*	*BOD*
31	Decommissiong of existing engine driven blowers and other obsolete items in SBB		$500,000	*$500,000*	*BOD*

Clie **San Jose-Santa Clara Regional WW Facility** — *Package Name* **Aeration Basin Future Modifications**

OPC **JSW** — *Date* **13-Jan-14** — *Rev* **2** — *Package ID* **PLS-03** — *Package Cost* [1] **$36,990,000**

Opinion of Probable Construction Cost (OPCC)

#		*EQ Procure $*	*Install/Construct $*	*OPCC Total*	
1	Allowances:				
2	MLE Process				
2	Structural Modifications to existing tankage to create anoxic zones		$5,000,000	*$5,000,000*	*Structural*
3	(48) new anoxic mixers - Top Mounted	$860,000	$710,000	*$1,570,000*	*NH3*
4	Fine bubble diffusers - 180,000 SF (with valves & FIT's)	$2,570,000	$2,000,000	*$4,570,000*	*BOD*
5	(24) IMLR Pumps - 4,000 GPM	$1,950,000	$1,830,000	*$3,780,000*	*NH3*
6	(3) Methanol Feed Systems - (2) tanks & (3) pumps, containment, & truck offload pad	$350,000	$1,160,000	*$1,510,000*	*NH3*

Allocation of Aeration Projects to Parameters

Contingency and existing costs do not effect allocation

Aeration Tanks Rehabilitation & Repair

Total Allocable Sub-Costs	Constituent Cost	Distribution	Redistribution of As All Others	Final Distribution of Project Cost[1]
BOD	$ 29,300,000	69.3%	69.8%	$67,820,000
Structural	$ 6,140,000	14.5%	14.6%	$14,210,000
NH3	$ 6,540,000	15.5%	15.6%	$15,140,000
As All Others	$ 290,000	0.7%	NA	NA

Aeration Basin Future Modifications

Total Allocable Sub-Costs	Constituent Cost	Distribution	Redistribution of As All Others	Final Distribution of Project Cost[1]
BOD	$ 4,570,000	27.8%	27.8%	$10,290,000
Structural	$ 5,000,000	30.4%	30.4%	$11,260,000
NH3	$ 6,860,000	41.8%	41.8%	$15,440,000
As All Others	$ -	0.0%	NA	NA

Finalized Allocation to Billable Parameters

Combined Final Distribution of Aeration Project Costs		Distribution of Aeration Costs, Rounded
BOD	$ 78,110,000	60%
Flow[2]	$ 25,470,000	20%
NH3	$ 30,580,000	20%

Notes:

(1) Package Cost includes Allocable Sub-Costs, contingency factors, and existing costs.

(2) As the facility is sized and structured to handle a certain level of flow, structural costs are included in the allocation as flow related costs.

APPENDIX C - NITRIFICATION CLARIFIERS ALLOCATIONS

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SJ-SC RWF
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Capital Project Cost Allocations
APPENDIX C Nitrification Clarifiers Rehabilitation

Estimate Source: Scoping Estimate For Nitrification Clarifiers

	"Project Scoping Phase" Scope Items	Scoping Costs	Allocation
1	Replace clarifier mechanism	$ 6,747,200	BOD
2	Replace turnbuckles and scum telescoping valve actuators	$ 132,800	BOD
3	*not included	$ -	N/A
4	*project to be completed by O&M	$ -	N/A
5	Replace galvanized pipe supports for meter vaults	$ 359,800	BOD
6	*project to be completed by O&M	$ -	N/A
7	*project to be completed by O&M	$ -	N/A
8	*not included	$ -	N/A
9	Repair grout and base slab coating (spot repair, assume 25%)	$ 781,600	Structural
10	Repair cracks in 12 LF deep walls in Clarifiers	$ 316,800	Structural
11	Repair interior launder walls in Clarifiers	$ 150,400	Structural
12	Repair cracks in meter vaults for Clarifiers	$ 6,000	Structural
13	Replace BNR2 MCC sections for Clarifiers	$ 196,000	BOD
14	Repair access walkway bridges	$ 139,200	Structural
15	Replace groundwater relief valves and rehab wall sleeves and drain rock	$ 1,268,800	Structural
16	Replace main motor and drive for Clarifiers	$ 1,153,600	BOD
17	Replace spray water system	$ 155,200	BOD
18	Replace influent flowmeters	$ 611,200	BOD
19	Replace influent valves and fittings (manual and auto valves) and actuators	$ 1,771,200	Flow
20	Replace settled sludge (RAS) and drain valves and actuators	$ 681,600	BOD
21	Replace settled sludge flowmeters	$ 259,200	BOD
22	Remove abandoned ammonia piping	$ 19,200	As All Others
23	Repair 3W system including piping, valves, and hosebibs	$ 88,000	BOD
24	Install hoses and hose-racks for manual washdown	$ 54,400	BOD
25	Replace MLSS channel isolation gates	$ 103,300	Flow
26	Include lighting/electrical improvements	$ 30,000	As All Others
27	Replace settled sludge piping	$ 3,622,700	BOD
28	Repair influent baffle (skirt); (assume 25% of total replacement cost)	$ 246,400	Flow
29	Repair effluent weir plate and scum baffle; (assume 25% of total replacement cost)	$ 711,600	Flow
30	*Replace influent baffle (skirt); (assume remaining 75% of total replacement cost)*	$ 739,200	Flow
31	*Repair grout and base slab coating (remaining area, assume 75%)*	$ 2,344,800	Structural
32	*Replace (effluent) weir plate and scum baffle; (assume remaining 75% of total replacement cost)*	$ 2,134,800	Flow
	Scoping Estimate Total	**$ 24,825,000**	

Allocation of Nitrification Clarifier Rehabilitation Project to Parameters
Contingency and existing costs do not effect allocation

Nitrification Clarifiers Rehabilitation

Total Allocable Sub-Costs	Constituent Cost	Distribution	Redistribution of As All Others	Final Distribution of Project Cost[1]
Structural	$ 5,007,600	20.2%	20.2%	$5,020,000
Flow	$ 5,706,500	23.0%	23.0%	$5,720,000
BOD	$ 14,061,700	56.6%	56.8%	$14,090,000
As All Others	$ 49,200	0.2%	N/A	$0

Nitrification Clarifiers Rehabilitation - Structural Costs

Total Allocable Sub-Costs	Final Distribution of Project Cost	Distribution
Flow[2]	$ 5,020,000	100%

Nitrification Clarifiers Rehabilitation - Equipment Costs

Total Allocable Sub-Costs	Final Distribution of Project Cost	Distribution
Flow	$ 5,720,000	29%
BOD	$ 14,090,000	71%

Finalized Allocation to Billable Parameters

Combined Final Distribution of Nitrification Clarifier Project Costs		Distribution of Nitrification Clarifier Project Costs, Rounded
Flow	$ 10,740,000	40%
BOD	$ 14,090,000	60%

Notes:

(1) Based on scoping estimate provided at left.

(2) As the facility is sized and structured to handle a certain level of flow, all structural costs are allocated to flow.

APPENDIX D - BIOSOLIDS QUANTITIES AND LOADS

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San José-Santa Clara Regional Wastewater Facility

CIP Program

Study 2:
Aeration Demands and Biosolids Production Assessment (Process Modeling)
Technical Memorandum No. 8

Title:	Future Biosolids Quantities and Loads
To:	Iris Huang, P.E., CIP Program Issayas Lemma, Ph.D., City of San José
Author(s):	A. Ron Appleton, Jr., P.E., BCEE Andre Gharagozian, P.E. Kyle Leonard
Date:	June 29, 2015
Reviewed by:	Rod Reardon, P.E.

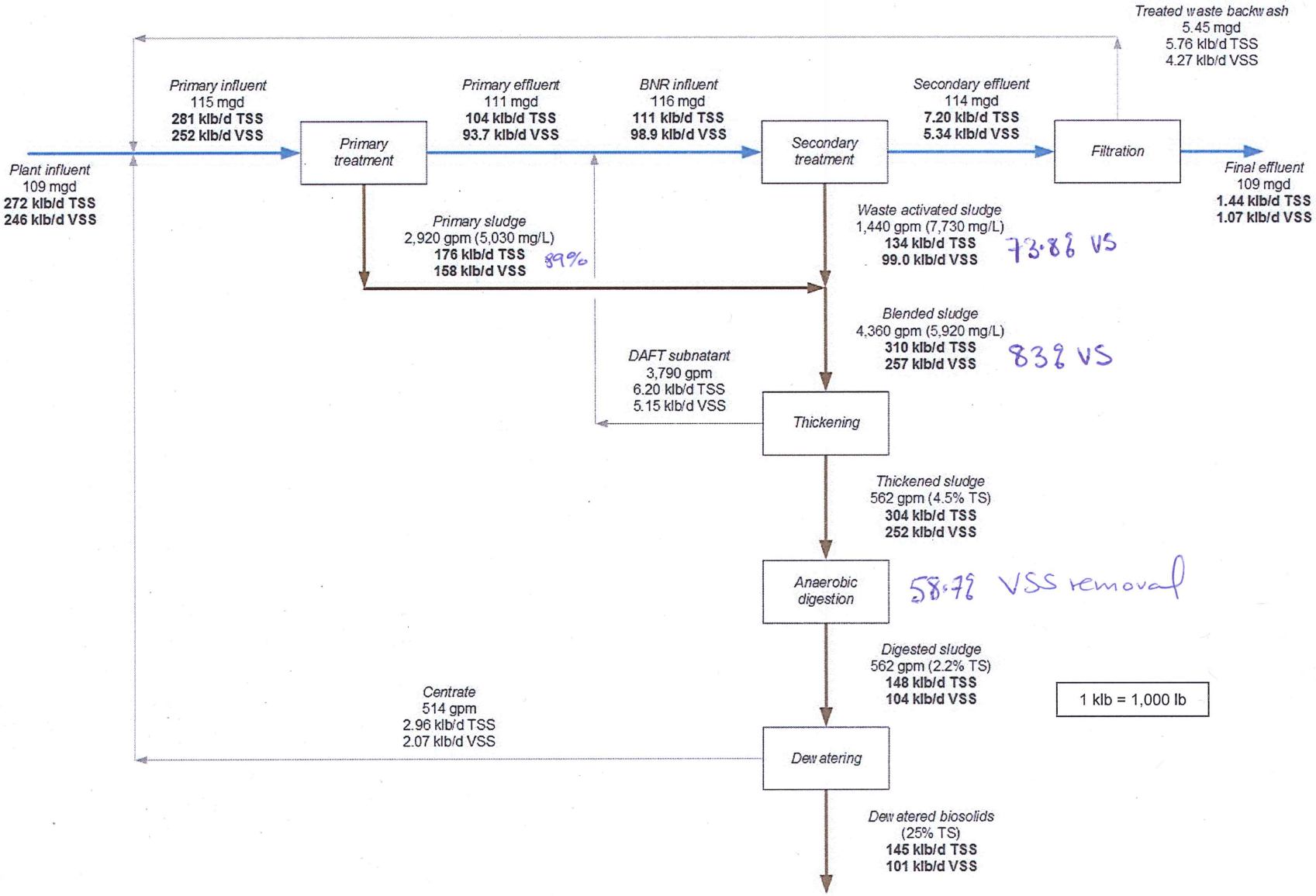

Figure 7 Alternative 1 – Solids balance for current (2014) annual average conditions