Napa Sanitation District

Capital Cost Allocation and Accounting

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Executive Summary

Bartle Wells Associates was retained by Napa Sanitation District (the District) to perform a comprehensive review of historical capital spending and cost allocations. BWA was also tasked with recommending a procedure for tracking and funding capital projects moving forward.

BWA has completed the following key tasks in the course of this project:

- Reviewed historical capital spending from 1995/96 through 2007/08;
- Developed a methodology for determining the fair allocation of these project costs among existing connections to the system (existing users) and future users (new development);
- Recommended a one-time reconciliation of the difference between actual capital spending and the recommended funding of these historical projects; and,
- Recommended a method for funding and accounting for capital project spending in the future.

Among the key findings of this study:

- Between fiscal 1995/96 and 2007/08, total capital project expenditures in the District were $135.0 million. With assistance from District staff, BWA examined this project spending and developed allocation ratios showing the benefit for each phase of project work that fairly and equitably divided the costs of the projects between current and future users. In total, approximately **49.8%** of project costs benefited existing connections to the system, and **50.2%** of project costs benefited future development (new capacity).
- Taking into account all funding sources (rates, reserves, debt, and connection fees), existing connections to the system financed approximately **64.2%** of total project costs; connection fees for future connections to the system funded approximately **35.8%** of total project costs. In total, the expansion fund (connection fees) is in deficit to existing ratepayers and the rehabilitation capital fund by approximately **$19.4 million** as of July 1, 2008.
- BWA recommends that the District conduct a one-time transfer, on or around the start of fiscal 2009/10, of the $6.8 million available in the connection fee fund to the general capital project fund (which is rate-funded) to reduce this deficit. While BWA understands that State law and District policy restrict the use of connection fee revenues to projects that provide capacity for new development, the transfer of these funds is, in effect, a reimbursement for past capacity improvement projects that were funded by rate-payers. This reimbursement does not exceed the proportional cost of providing new development capacity.
- BWA also recommends that the District adopt a new policy for funding and accounting for capital projects. A more detailed description of this new process is included on page 8. BWA further recommends that the Rehabilitation Fund be re-named a "Capital Projects Fund." The Capital Projects Fund would become the source of all funds for capital projects, itself being funded from both excess rate revenues (fund 7800) and connection fee revenues allocated to capital (fund 7810), in accordance with the cost allocation methodology previously adopted.

Project Cost History 1995/96 to 2007/08

Using project cost data provided by the District, BWA has conducted an analysis of all capital project spending from 1995/96 through 2007/08. Total project expenditures during this period were $135.0 million.

This spending can be roughly divided into three distinct categories: Phase 1 - Plant Upgrade for increased recycled water quantity and improved quality; Phase 2 - Plant Upgrade for new primary and secondary treatment facilities at the Soscol Treatment Plant; and all other project costs. Phase 1 expenditures totaled $15.8 million, Phase 2 spending was $53.6 million, and all remaining project expenditures totaled $65.7 million.

Table 1 summarizes these capital expenses and their categories.

Table 1
Napa Sanitation District
Total Project Expenditures 1995/96 to 2007/08

	Actual Expenditures
Phase 1 - Recycled Water Project	$15,756,000
Phase 2 - New Primary and Upgraded Secondary Treatment	53,592,000
All other projects	65,698,000
Total	$135,046,000

Source: NSD Project Cost History 1995/96 - 2007/08

Proposed Allocation of Project Costs

Working closely with District staff, BWA has developed the following methodology for allocating historical project costs.

Phase 1: Prior to 1994, the District produced restricted Title 22 wastewater for use in select irrigation activities in the area. The production of this water, combined with use of the storage capacity in the oxidation ponds, allowed the District to meet the conditions of its NPDES permit, which prohibits discharge to the Napa River in the summer months.

The Phase 1 upgrade of the District's system was designed to increase both the quantity and quality of the District's Title 22 water production. The upgrade allowed the District to generate unrestricted recycled water that could be used for wider array of projects. By increasing the amount of recycled water that the District could produce, Phase 1 indirectly increased the District's overall treatment capacity. This increased capacity was not needed to meet the demand of current users; instead, it provided the District with the ability to service new growth in the area. As such, BWA finds that the District can justifiably allocate 100% (or $15.8 million) of Phase 1 expenditures to expansion.

Phase 2: The Phase 2 upgrade of the District's treatment system was designed to meet two objectives: provide primary treatment to the District's raw sewage at the Soscol Plant in order to replace the aging Imola Plant, and; upgrade and expand secondary treatment capacity to reduce BOD loadings to the oxidation ponds. BWA proposes that project costs associated with these two objectives be allocated differently, as they differentially benefited current and future users.

Total Phase 2 expenditures totaled $53.6 million. Using project cost projections included in the Carollo 1990 Master Plan Update (pg. 5.20), BWA estimates that approximately $21.8 million was spent to replace primary treatment facilities (in the form of new headworks, clarifier conversion to primary sedimentation, and primary sludge pump station). This amount includes 40% of the cost for "shared" equipment used by both primary and secondary treatment processes, such as digesters, belt presses, yard piping, and associated administrative costs. BWA estimates that $31.8 million was spent to upgrade and expand secondary treatment facilities, to include construction of distribution structures, aeration basins, clarifiers, secondary effluent pump station, and the blower/RAS building. This amount includes the remaining 60% cost share for shared equipment.

Allocation of Primary Treatment Costs: As discussed above, BWA estimates that $21.8 million of total Phase 2 expenditures were related to the replacement of primary treatment capacity at Imola. At the time of the upgrade, the Imola Plant was handling primary treatment for approximately 70% to 75% of total NSD flows (pg. 2.6, June 1990 Master Plan Update). Primary treatment for the remaining flow was already provided by the Soscol facility.

Because this portion of the Phase 2 project was primarily replacement in nature, BWA recommends that the costs of this project be born primarily by existing connections to the system. As between 70% and 75% of total flows were treated at the Imola plant, BWA recommends that 72.% of the primary treatment project costs be allocated to existing users. The balance of the capacity provided by this project exists to serve new development.

As such, BWA finds that $15.8 million of Phase 2 primary treatment costs should be born by current users and $6.0 million should be born by future users.

Allocation of Secondary Treatment Costs: As discussed above, BWA estimates that approximately $31.8 million of Phase 2 project costs were incurred to upgrade the secondary treatment capacity of the system. The improvements were designed primarily to reduce BOD loadings to the oxidation ponds, which had recently experienced loadings during the winter months that were well beyond the effective capacity of the ponds, resulting in severe odor problems.

The oxidation ponds were rated at 13,000 pounds BOD/day removal, but engineering studies suggested that this number could fall to as low as 3,000 pounds BOD/day in periods of low sunlight and temperature such as the winter months. In 1997, average daily BOD loadings were approximately 16,100 pounds BOD/day. (1995-2004 Ops Report, Napa Sanitation District)

Research included in the 1990 Master Plan update by Carollo Engineers projects the theoretical minimum and maximum BOD treatment capacity for the oxidation ponds. To arrive at an estimate for the "true" treatment capacity of the oxidation ponds, BWA averaged the midpoint between the theoretical maximum and minimum for the three winter months with the lowest treatment capacity (December-February). For cost allocation purposes, BWA estimates treatment capacity during this time period at 6,100 pounds BOD/day.

Average daily BOD loadings in the three years prior to Phase 2 construction (1995-1997) was 11,900 pounds BOD/day. Therefore, BWA estimates that the District had a shortfall in capacity of approximately 5,800 lbs pounds BOD/day.

The activated sludge system that was chosen to add secondary treatment capacity to the system included the installation of two aeration basins. Each basin was rated for 4.3 mgd and, at average annual flow levels, can remove 5,420 pounds BOD/day, for a total system capacity of 10,840 pounds BOD/day at average annual flow levels. At average day peak month flow rates, the two basins can remove up to 13,660 pounds BOD/day. BWA uses the mean of these two numbers, or 12,250 pounds BOD/day to estimate the additional capacity added by this upgrade.

Given the shortfall that the District was facing prior to Phase 2 construction, BWA estimates that 47.3% of the new capacity was needed to meet the needs of current users (5,800 pounds BOD/day ÷ 12,250 pounds BOD/day = 47.3%). The remaining added capacity was available for future expansion and can be allocated to future users. As such, 47.3% of the costs of this portion of Phase 2 (or, $15.0 million) can be allocated to current users, while 52.7% of these costs (or, $16.8 million) can be allocated to expansion.

In sum, BWA estimates that $30.8 million (or 57.5%) of total Phase 2 costs of $53.6 million can be allocated to current users and $22.8 million (or 42.5%) can be allocated to future users.

Table 2 details project expenditures and proposed allocations for Phase 2.

Table 2
Napa Sanitation District
Allocation of Phase 2 Project Expenditures

		Current Users		Future Users	
	Actual total	Allocation	Cost	Allocation	Cost
Primary treatment					
Headworks	$4,501,000	72.5%	$3,263,000	27.5%	$1,238,000
Primary sedimentation	4,678,000	72.5%	3,392,000	27.5%	1,286,000
Primary sludge pump station	1,051,000	72.5%	762,000	27.5%	289,000
Digesters (40%)	3,773,000	72.5%	2,735,000	27.5%	1,038,000
Belt filter presses (40%)	1,302,000	72.5%	944,000	27.5%	358,000
Yard piping (40%)	798,000	72.5%	579,000	27.5%	219,000
Sitework fill (40%)	709,000	72.5%	514,000	27.5%	195,000
Engineering, admin (40%)	4,947,000	72.5%	3,587,000	27.5%	1,360,000
	$21,759,000		$15,776,000		$5,983,000
Secondary treatment					
Intermediate pump station	1,829,000	47.3%	865,000	52.7%	964,000
Aeration basins	5,255,000	47.3%	2,486,000	52.7%	2,769,000
Secondary clarifiers	1,663,000	47.3%	787,000	52.7%	876,000
Blower/RAS building	4,130,000	47.3%	1,953,000	52.7%	2,177,000
DAF thickners	1,663,000	47.3%	787,000	52.7%	876,000
Digesters (60%)	5,659,000	47.3%	2,677,000	52.7%	2,982,000
Belt filter presses (60%)	1,953,000	47.3%	924,000	52.7%	1,029,000
Yard piping (60%)	1,197,000	47.3%	566,000	52.7%	631,000
Sitework fill (60%)	1,064,000	47.3%	503,000	52.7%	561,000
Engineering, admin (60%)	7,420,000	47.3%	3,510,000	52.7%	3,910,000
	$31,833,000		$15,058,000		$16,775,000
Total	**$53,592,000**		**$30,834,000**		**$22,758,000**

Source: 1990 Master Plan Update and NSD Project Cost History 1995/96 - 2007/08

All remaining projects: The balance of the District's project cost history ($65.7 million in projects) includes all those projects that cannot be assigned to either the Phase 1 or Phase 2 upgrades of the wastewater treatment plant. These projects include a diverse array of projects, from new furniture and replacement trucks to new collection lines and force mains. These project expenditures were spread more or less evenly across the ten years of the project cost history.

To develop a proposed allocation for these projects, BWA recommends that the District adopt a policy of three unique benefit allocations.

1. 100% Rehabilitation/Replacement: This allocation is used for a project that is only replacing a worn or aged asset for the benefit of existing users. This project should be funded solely by **rate-provided funds**.

2. 100% Expansion: This allocation is used for a project that is only required for new growth. It should be funded solely by **connection fee revenue**.
3. "Mixed" benefit allocation: This allocation is used when a project provides both replacement for an existing capital asset as well as new capacity or upgraded treatment for future users. It should be funded by a mix of rate funds and connection fees. (See below)

For the mixed benefit allocation, BWA recommended in 2007 that the District adopt one uniform allocation for all mixed benefit projects, based on an "average" allocation between existing and future users. BWA calculated this "mixed benefit" allocation based on the ratio of actual wastewater flows to total flow capacity in the system. The result was an allocation of 60.6% to existing users, and 39.4% to future users. If applied to all mixed benefit projects, this allocation ensures that, in aggregate, existing and new users fund shared projects in proportion to the benefit provided by the facilities and their impact on the system.

As the balance between existing use of the system and future capacity reserved will change over time, BWA also recommends that the District revisit this ratio at least every five years.

(More detailed information on this calculation is included in the Appendix.)

Applying this methodology to the $65.7 million in other project costs, results in a weighted allocation of 55.4% to existing users and 44.6% to future users.

Summary: Table 3 summarizes the overall cost allocation analysis for all historical project expenditures. In total, BWA estimates that $67.3 million (49.8%) of total capital expenditures can be allocated to existing ratepayers, while $67.8 million (50.2%) can be allocated to future users.

Table 3
Napa Sanitation District
Summary of Proposed Allocation of Historical Project Costs, 1995/96 to 2007/08

		Current Users		Future Users	
	Total	Allocation	Cost	Allocation	Cost
Phase 1 upgrade	$15,756,000	0.0%	$0	100.0%	$15,756,000
Phase 2 upgrade	53,592,000				
Replacement of Imola Plant	21,759,000	72.5%	15,775,000	27.5%	5,984,000
Upgrade of secondary treatment	31,833,000	47.3%	15,057,000	52.7%	16,776,000
All other projects	65,693,000				
"100% replacement" projects	8,739,000	100.0%	8,739,000	0.0%	0
"100% expansion" projects	11,270,000	0.0%	0	100.0%	11,270,000
Mixed allocation projects	45,684,000	60.6%	27,685,000	39.4%	17,999,000
Total project costs 1995/96 - 2007/08	$135,041,000	49.8%	$67,256,000	50.2%	$67,785,000

Actual Sources of Project Funding

Funding for capital projects during this period was provided by three sources: rate revenue (including available fund balances in the rehabilitation fund), debt financing (including $34.5 million in COPs issued in 1998), and expansion (or connection fee) revenues and reserves.

District staff prepared a summary of connection fee revenues from 1995/96 through 2007/08 for BWA. The beginning balance in the expansion fund as of July 1, 1995 was $6.8 million. The District collected an additional $29.4 million in connection fee revenue over the next thirteen fiscal years.

BWA also estimates that the District earned no less than $3.8 million in interest on these connection fee reserves. This calculation uses the annual LAIF interest rate for each year in the time period of interest, compounded by the estimated yearly balance in the expansion fund for that year.

Taken together, total connection fee resources available for use were $40.048 million. With a remaining fund balance as of July 1, 2008 of $6.789 million, BWA estimates that the District expended approximately $33.3 million in connection fee revenues on capital projects.

Table 4 details these calculations.

Table 4
Napa Sanitation District
Connection Fee Revenue and Expense Analysis

Starting connection fee reserves (July 1, 1995)	6,795,000
Total connection fee revenue 1995/96 - 2007/08	29,389,296
Interest earnings	3,863,937
Total available connection fee reserves	40,048,234
Less current balance	(6,789,563)
Total connection fee reserves spent	$33,258,670

Source: NSD Connection Fees Collected 1995/96 - 2007/08

The balance of funding for these capital projects came from debt financing or rates and rehabilitation reserves. Total outstanding debt as of July 1, 2008 includes 1998 Certificates of Participation ($28.580 million), a WaterReuse Installment Sale agreement ($9.105 million) and an SRF loan ($745,000). In total, approximately $38.4 million in debt financing was outstanding as of July 1, 2008.

Importantly, this outstanding debt is the responsibility of both existing **and** future connections to the system, and it will be paid back in roughly the proportion of existing to future users

developed in the previous capacity analysis. As such, the amount of debt outstanding should be reflected in calculations of the total cost allocation as being "credited" to both existing and future users, not just existing users. Debt that has been paid off since issuance, however, should be credited to existing connections only.

Table 5 summarizes the findings of the cost allocation analysis. BWA finds that future users and the expansion fund have a capital funding deficit of approximately $19.4 million, as of July 1, 2008.

Table 5
Napa Sanitation District
Connection Fee Revenue and Expense Analysis

Total project costs 1995/96 - 2007/08	$135,041,000
Allocated to existing users	67,256,000
Allocated to future users	67,785,000
Actual funding of project costs	
Rate-funded (includes replacement fund reserves) (1)	$63,382,330
Debt-funded - existing users share (2)	23,270,400
Subtotal rate-funded project costs	$86,652,730
Connection fee-funded	33,258,670
Debt funded - future users share (2)	15,129,600
Subtotal connection fee-funded project costs	$48,388,270
Future users deficit/(surplus)	$19,396,730

(1) Includes debt re-payments made by existing users since debt issuance
(2) Total debt outstanding as of July 1, 2008 was $38.4M;
outstanding debt "credited" to existing and future users based on existing-future benefit split (60.6%-39.4%)

Future Project Cost Funding And Accounting

As the previous analysis demonstrates, future users and the expansion fund (connection fees) have under-funded historical project costs by approximately $19.4 million. As such, BWA recommends that, by June 30, 2009, the District transfer the entire cash balance in the expansion fund (approximately $6.8 million) into the rehabilitation capital fund for use in future capital projects funded by replacement/rehabilitation funds.

While BWA understands that State law and District policy restrict the use of connection fee revenues to projects that provide capacity for new development, BWA would argue that the transfer of these funds is, in effect, a reimbursement for past capacity improvement projects that were funded by rate-payers. Importantly, even after the transfer, the contribution of new development to these project costs does not exceed the proportional cost of providing capacity (in fact, new development has still funded less than its share).

After this transfer, the expansion fund would be in deficit by approximately $12.6 million.

Further, in order to simplify future funding and accounting of capital projects and facilitate the proper allocation of costs among funding sources, BWA has developed the following procedure for funding and accounting for capital projects.

1. On July 1, 2009, the District performs a one-time "zero out" of the expansion (connection fee) fund, leaving a connection fee funding deficit of approximately $12.6 million due to current users/rate payers.
2. Starting in fiscal 2009/10 and thereafter, the District annually develops a yearly "expected" CIP by July 1 of each fiscal year, using the 3 unique allocations discussed above (100%-0%, 0%-100%, and "mixed benefit). This results in an "expected" split of costs between existing and future users.
3. The District collects connection fee revenues for the entire fiscal year and deposits them, as required by law, into the expansion fund (fund 7810).
4. The District funds all capital expenditures, regardless of type, from one account (7830) for the fiscal year. BWA recommends that the District consider renaming this fund the "Capital Projects Fund."
5. At the end of each fiscal year, District staff develops a report updating the *expected* capital program (which was part of the budgeting process) with *actual* expenditures during that year. The results in an actual project cost liability for both the existing users (rates) and the expansion fund (new development).
6. On June 30 of each fiscal year, the District transfers all connection fee revenues received in that year into the Capital Projects Fund, accompanied by a report detailing the use of those funds as required by law.
7.
    a. If the amount transferred into the Capital Projects Fund is **greater than** the actual capital expenditures in that year allocated to connection fees, the difference is "credited" towards the expansion fund deficit detailed above ($12.6 million as of July 1, 2008).
    b. If the amount transferred is **less than** the actual capital spending allocated to connection fees and growth, the difference is added to the expansion fund/connection fee deficit.
    c. If the amount transferred is **equal to** the actual capital spending allocated to connection fees for that year, no further action is required.
8. Each July 1, the District should develop a report to the Board detailing the year's activity in capital spending and accounting. This should include,
    a. The actual capital expenditures through June 30 of that year,
    b. The proposed allocation of benefit of those projects between rate payers and expansion funds,
    c. The amount of connection fee revenue collected,
    d. The projects that were funded by those connection fee funds, and
    e. The resulting "balance" of the connection fee deficit after taking into account the activity of that fiscal year.

9. Once the expansion fund "deficit" is re-paid, the District should re-examine this process and develop a new capital spending and allocation policy.

Appendix

Calculation of "mixed benefit" allocation.
Based on information from District staff and consulting engineers, BWA first calculated the effective capacity of the treatment system during the summer months (when discharge to the Napa River is restricted). BWA estimated this capacity by combining the capacity of the filtration system with an additional "capacity allowance" to account for the storage capacity of the oxidation ponds during the summer months. While on a day-to-day basis the maximum capacity of the filters is 9.8 mgd (less 10% to account for backwash) the District can also handle some flow above and beyond this amount by storing excess influent in the oxidation ponds for treatment at a later date. This, in effect, increases the District's maximum daily treatment capacity by some amount above and beyond what the filters alone can handle.

These storage ponds combined have 340 surface acres and an average storage depth of 5 feet, which results in a total storage capacity of 1,700 acre-feet of water. When divided equally among the six months where discharge is prohibited, this gives the District an added 3.1 mgd of capacity. Taken together, BWA estimates that the maximum daily dry weather capacity of the system is 11.9 mgd. (This calculation assumes that there is sufficient demand for recycled water production).

BWA analyzed operations data provided by District staff. From 1995 to 2004, average daily dry weather flows in the District were 7.2 mgd. As such, BWA estimates that the District was using 60.6% (7.2 mgd/11.9 mgd) of its capacity during this time period. The remaining capacity remained available for future users (39.4%).