



Memorandum

MONTEREY REGIONAL WASTE MANAGEMENT DISTRICT

Reviewed by Wmm Date 2/08/08
General Manager

DATE: February 8, 2008
TO: General Manager
FROM: Assistant General Manager
SUBJECT: Biosolids (Sludge) Handling Cost Impacts and Proposed Joint Engineering Study

RECOMMENDATION: That the Board authorize a Joint Agreement between the Monterey Regional Water Pollution Control Agency (MRWPCA), Carmel Area Wastewater District (CAWD), and the Monterey Regional Waste Management District (District) authorizing Carollo Engineers of Sacramento, to provide engineering services and prepare a Monterey Regional Biosolids (Sludge) Management Plan, in accordance with their Proposal (attached) dated January 15, 2008, for a cost not to exceed \$50,000, and the District's share not to exceed \$20,000. The Study is scheduled for completion in May 2008. The ad hoc Finance Committee has recommended proceeding with the joint study.

BACKGROUND

District staff has been working for the past two years on an overall evaluation of the biosolids (wastewater sludge) handling processes at the Monterey Peninsula Landfill (MPL). The study was initially undertaken at the request of the MRWPCA to evaluate a reduction of the cost of sludge management. Staff analysis identified that in fact the handling fee assessed to the MRWPCA, which is a blended average of \$22.18 per ton for FY 2007/2008 covers a significant portion, but not all the costs borne by the District for sludge handling. Staff estimates that approximately 60% of the overall cost of sludge management by the District is covered by this rate. Staff will, as a part of the Carollo study, identify the total specific costs for sludge handling and management including direct and indirect supervision, related administrative and regulatory costs, and a land allocation cost related to sludge management for all incoming sludge waste streams.

In addition, staff analysis has revealed that the volume of stabilized sludge already stockpiled at the landfill exceeds the District's long-term needs for erosion control materials. This means that any additional sludge stockpiled at the site (besides the almost 300,000 tons currently in place) would need to be removed in the future development of the landfill at an additional cost to the District.

The disposition of the sludge is the responsibility of the waste water treatment agencies. Both the shortfall in cost for sludge handling and the ability to continue to accept and utilize sludge for beneficial use present near term challenges to the District. District staff relayed this information on the rate disparity and capacity problem to staff at the MRWPCA in early 2006. From this evaluation, shared with MRWPCA staff, the potential for a joint approach between the District and MRWPCA has been informally discussed over the past 18 months. From these informal discussions with MRWPCA staff, the scope of the review for regional bio-solids management was broadened to include the CAWD and potentially the cities of Santa Cruz, Scotts

Valley, and Watsonville. The MRWPCA's consulting firm Carollo Engineers has submitted a scope of work (attached) to evaluate options for the wastewater treatment agencies and the District. The cost for the Carollo study is proposed by the General Managers of the three agencies to be shared three ways, between the MRWPCA, CAWD, and the District. The cost sharing is proposed to be \$20,000 each from MRWPCA and the District and \$10,000 from CAWD. The District's share of the study would be drawn from the \$20,000 previously allocated to a joint gas utilization study with the MRWPCA which to date has not gone forward.

District staff believes that several fundamental questions need to be answered prior to any long-term discussions with the MRWPCA and CAWD under any scenario. With the renewed emphasis of the financial performance and efficiencies of all District operations as a result of the District's current financial status, it is imperative that the rates for services adequately cover the costs for the provision of those services.

DISCUSSION

District staff believes that several key concerns and questions need to be considered in the evaluation of a joint project with the MRWPCA, CAWD, and any other regional partners. The first major concern to the District is the on-going cost impact of handling sludge at below our current cost of operations. Secondly is the concern that the current stockpile of stabilized sludge at the District's site is sufficient to fulfill operational needs for beneficial and cost effective utilization of this material. Thirdly is the concern that the top deck of Module 3, a 17-acre area currently utilized for the sludge stabilization process, is an area that could be used in the near term for landfilling operations, deferring a more than \$2,000,000 Module 5 liner installation cost for an additional several years (it is currently scheduled for installation starting in FY 2009/10).

District staff has evaluated the potential for acceptance of sludge for disposal from a regulatory and operational framework. With the current incoming tonnage levels of regular refuse (state regulations mandate ratio of 5 to 1 refuse to sludge), the MPL could accept the sludge from the MRWPCA for disposal. However, the coordination and timing for sludge acceptance with refuse deliveries, the operational difficulties for accepting that large volume of sludge for disposal (equipment cleaning, worker exposure, queuing and load integration), pose substantial operational difficulties for landfill operations. This sludge material accepted for disposal may need to be charged the same rate as regular refuse.

Carollo Engineers developed a list of several key questions that are of importance to all parties in these discussions. The issues are presented as follows along with staff responses in bold:

- How important is it to use the sludge in a beneficial manner versus simply disposing of it? Some agencies are willing to pay more to beneficially use the sludge rather than dispose of it in a landfill. This could favor the use of a dryer over the continued use of compost, since the dried pellets could be used on golf courses more easily than compost. ***The District currently has no long term agreements with any agency for sludge management, so any "higher and better" use alternative could be responded to immediately.***
- How willing are the participating agencies, and their contributing agencies, to use the generated bio-solids products? ***Local agencies who contribute bio-solids to a sludge management process would need to support market development and utilization to move the material off-site for a beneficial use.***

- If the sludge is disposed of in a landfill, will this significantly affect the AB 939 diversion requirements for Monterey County and the cities of Santa Cruz, Scotts Valley, and Watsonville? How significant is this concern? ***The MRWPCA regional wastewater treatment plant is located in an unincorporated area of Monterey County. Therefore, the County of Monterey receives over 25,000 tons of diversion credit annually, a significant portion of their AB 939 credits. A conservative estimate as to the value of that diversion credit places the worth of the sludge diversion at a rate of \$100/ton. To try and replace the sludge diversion with some other method of waste diversion is a value to the County of almost \$2.5 million.***
- Diversification and having multiple independent options available for disposal/use requires implementation of a minimum of one or two additional options, and these alternatives will likely be more costly than a single system. How much is diversification worth? ***Diversification of sludge handling is a strategy that would need to be decided based on the risk acceptance of the agencies generating the sludge. Staff believes that any method of composting depends on local market utilization.***
- Landfill gas provides power and income to the District. Is the use of this gas or future excess gas for a dryer viable? ***Gas generation for drying potential could be explored at a later date. Current District contracts are in place for power sales through 2013 for a significant portion of landfill gas generated. It certainly is a viable option to be evaluated along with power production need for de-salinization and potential other power needs for the MRWPCA.***

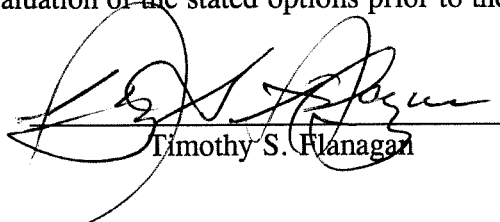
SUMMARY

The major business points of the review of the bio-solids project for FY 2007/2008 are as follows:

- Evaluate and decide on policy of continued management of bio-solids from the MRWPCA and any other bio-solids contributors and support the staff recommendation to raise the tipping fee for bio-solids to \$35/ton to cover the Districts current costs of operation, beginning July 1, 2008.
- Allocate the District's share of the Carollo study (\$20,000) to determine what course of action (if any) to take as to partnering with the MRWPCA, CAWD, and any other regional partners for their bio-solids management and/or gas generation projects.
- Evaluate District needs in managing its landfill handling capacity in the development of Module 3 to defer over \$2,000,000 in Capital Expenses for three to five years.

CONCLUSION

That the Board review these courses of action and allocate the funding to a joint study with the MRWPCA and the CAWD and provide direction to staff on evaluation of the stated options prior to the FY 2008/2009 Budget submittal.



Timothy S. Flanagan

PROJECT UNDERSTANDING AND SCHEDULE

PROJECT UNDERSTANDING

The Monterey Regional Waste Management District (MRWMD) provides integrated waste management services for the Monterey Peninsula. The MRWMD currently accepts and composts or landfills the biosolids from the Monterey Regional Water Pollution Control Agency (MRWPCA), City of Scotts Valley, South County Regional Wastewater Authority, and California Utility Services. In addition, the Carmel Area Wastewater District and the cities of Watsonville and Santa Cruz have expressed interest in being involved in a regional solution to current biosolids disposal/beneficial use problem because they are currently hauling their sludge to the Central Valley and do not view that as a viable long-term solution for biosolids management. MRWMD also accepts over 200,000 tons of garbage per year at the Monterey Peninsula Landfill. The MRWMD is also concerned about the allowable ratio of refuse to biosolids that is allowed in a landfill. Biosolids used as alternative daily cover (ADC) can make up no more than 25 percent of the cover material. Biosolids made up of primary and secondary and secondary sludge must be at least 15 percent solids by weight.

The approximate tonnage of biosolids generated by these agencies based on information from 2006 is presented in Table 1.

Table 1 - Biosolids Generated in 2006 Approximate Wet Tons per year	Wet Tons/year
Monterey Regional Water Pollution Control Agency	19,714
City of Scotts Valley	2,375
South County Regional Wastewater Authority	14,674
California Utility Services	350
Carmel Area Wastewater District	2,000
City of Santa Cruz	9,000
City of Watsonville	9,500

Currently approximately 90 percent of the biosolids received at the landfill is composted. The main reason more is not composted is that some of the biosolids are in a form that is difficult to compost and these are disposed of in the landfill. The composted biosolids are currently being stored for use as an organic cap material to cover the landfill for closure.

The compost is not used offsite and, as such, does not have to meet the federal 40CFR part 503 requirements; therefore, the required testing is not performed to demonstrate compliance. Cured compost has accumulated so that the landfill has material for over 10 years of organic cover and needs to develop a more sustainable use for the material.

The MRWMD has done some preliminary investigations of options including bioreactors, but since this does help with diversion credits it has not been pursued. In addition, MRWMD has considered upgrading the compost to a Class A compost and having it used by Caltrans or the contributing agencies along with other considerations.

The diversion credits that help contributing agencies comply with state law AB 939 requirements to reduce waste going to landfills all go to Monterey County because the compost is diverted after the waste is transported to the landfill. This may be more of a concern for Santa Cruz and Watsonville, since they could currently be getting credit for diverting their biosolids to beneficial use facilities.

The MRWMD has used the gas generated in the landfill to generate power since 1983. Over the years, this system has been upgraded and expanded to the point that it now includes three 20-cylinder Jenbacher engines and one 20-cylinder Caterpillar engine. These engines have replaced the original engines and can generate 4.6 megawatts, enough energy for MRWMD's needs and to supply excess power to PG&E and Three Phase Energy, a renewable power broker. The facilities are at capacity and planning is needed for an additional 3 megawatts. This will involve the difficult PG&E permitting process concerns about compliance with federal Title V air permitting limits.

Even though landfilling is the cheapest option for biosolids disposal, it is not the sustainable option that is needed. In addition, a local biosolids solution needs to be developed for all agencies so that you can control your own destiny and not be subject to issues in other jurisdictions.

The Monterey Area Regional Biosolids Plan also needs to evaluate options to best use the landfill gas now and in the future. This could lead to use of the excess landfill gas above the current cogeneration capacity to treat the biosolids through a dryer, which could lead to energy savings.

In order to determine which biosolids use/disposal options this Monterey Area Regional Biosolids Plan will recommend, the Carollo team must work with the involved agencies collaboratively to:

- Document the goals and objectives for local biosolids use/disposal.
- Develop the most viable uses of the landfill gas and any excess heat from that use.
- Present all available options for biosolids use/disposal and landfill gas use, and review potential flaws for each option.
- Eliminate non-viable options for biosolids use/disposal and landfill gas use.

- Develop treatment systems that can be used to implement the viable biosolids use/disposal options.
- Narrow the treatment systems to those most aligned with the goals.
- Develop capital and operational costs, environmental impacts, regulatory requirements, energy opportunities/costs, and implementation schedules for the alternative treatment systems and landfill gas use systems.
- Develop recommendations for local disposal/use options with associated treatment systems and a schedule for implementation.
- Finally, document these steps in a plan development in a report.

SCHEDULE

We have developed the following preliminary schedule.

Task/Activity	2008			
	February	March	April	May
Notice to Proceed	▼2/15			
Task 1 – Data Evaluation and Workshop Preparation				
1.1 Develop Biosolids Use/Disposal options				
1.2 Develop Landfill Gas Use Alternatives				
Task 2 – Kickoff & Options Narrowing Workshop		▼3/19		
Task 3 – Sludge/Biosolids Treatment Scenario Development				
Task 4 – Scenario Evaluation				
Task 5 – Scenario Evaluation Workshop			4/19▼	
Task 6 – Report Preparation				
Draft Report Submission			4/30▼	
Draft Report Review				
Report Revision				
Final Plan Submission				5/30▼

SCOPE OF SERVICES

INTRODUCTION

The Monterey Regional Biosolids Plan will be a collaborative effort between participating agencies and the Carollo Team. The Carollo Team will prepare technical information and recommendations that will be presented before and during workshops to allow participating agencies to develop goals and objectives for the biosolids program, eliminate the least viable options, select the best options, and develop a plan with triggers. In order to determine which biosolids use/disposal options this Monterey Regional Biosolids Plan will recommend, the Carollo Team must work with the involved agencies collaboratively to:

- Document the goals and objectives for local biosolids use/disposal.
- Develop the most viable uses of the landfill gas and any excess heat from that use.
- Present all available options for biosolids use/disposal and landfill gas use. Review potential flaws for each option.
- Eliminate non-viable options for biosolids use/disposal and landfill gas use.
- Develop treatment systems that can be used to implement the viable biosolids use/disposal options.
- Narrow the treatment systems to those most aligned with the goals.
- Develop capital and operational costs, environmental impacts, regulatory requirements, energy opportunities/costs, and implementation schedules for the alternative treatment systems and landfill gas use systems.
- Develop recommendations for local disposal/use options with associated treatment systems and a schedule for implementation.
- Finally, document these steps in a plan development in a report.

SCOPE OF SERVICES

The following Scope of Services presents the tasks that will be used to complete this study.

Task 1 – Data Evaluation and Workshop Preparation

ENGINEER shall evaluate the annual biosolids data from the participating agencies. The review shall also include all associated master plans and reports relative to solids processing to confirm present and future biosolids production, quality and characteristics.

ENGINEER shall develop a list of options for disposal/use of the participating agencies' biosolids in preparation for the Kickoff and Options Narrowing Workshop. Engineer shall also develop preliminary options for use of the landfill gas or heat from landfill gas fired engines to dry the biosolids.

Task 2 – Kickoff and Options Narrowing Workshop

ENGINEER shall make the first meeting a working session confirming existing data and beginning the steps to evaluate and narrow the options. This meeting will begin by reviewing the existing and planned data, processes, and options for disposal/use of the sludge /biosolids produced, and options to use the landfill gas and waste heat.

ENGINEER shall assist the participating agencies in documenting the goals and objectives for the Monterey Regional Biosolids Plan. The following issues shall be discussed:

1. How important is it to use the biosolids in a beneficial manner versus simply disposing of it? Some agencies are willing to pay more to beneficially use the biosolids rather than dispose of them in a landfill. This could favor the use of a dryer over the continued use of compost, since the dried pellets could be used on golf courses more easily than compost. This may require direction from the participating agencies boards and will require the development of options and associated costs to allow for staff and subsequent Board evaluation.
2. How willing are the participating agencies – and the cities, county and other local jurisdictions that contribute sewage to the participating agencies and other non-participating agencies such as local park districts – to use the generated biosolids products.
3. If the biosolids are disposed of in a landfill, will this significantly affect the AB939 diversion requirements for Monterey County and the cities of Santa Cruz and Watsonville? How significant is this concern?
4. Diversification and having multiple independent options available for disposal/use requires implementation of a minimum of one or two additional options, and these alternatives will likely be more costly than a single system. How much is diversification worth?
5. Landfill gas provides power and income to the MRWMD. Is the use of this gas or future excess gas for a dryer viable?

ENGINEER shall provide data on what other Northern California agencies such as the Bay Area Regional Solids Processing Facility are doing with their biosolids, and legal limitations currently in effect or expected. ENGINEER shall also provide recommendations on these issues, and assist the participating agencies with these policy questions.

ENGINEER shall assist the participating agencies in evaluating available general disposal/use options to determine how well they implement the goals and objectives that have been selected.

ENGINEER shall present general use/disposal options with the advantages and disadvantages of each. The options that do not meet the participating agencies' goals and objectives shall be eliminated. Those that meet the goals and objectives shall be carried forward.

ENGINEER shall also assist the participating agencies in agreeing on criteria to be used in the evaluation of the options. Some possible criteria include:

- ✓ Ability to implement
- ✓ Level of treatment
- ✓ Reliability
- ✓ Operational flexibility
- ✓ Longevity
- ✓ Regulatory compliance
- ✓ Political sensitivity
- ✓ Sustainability
- ✓ Public acceptability
- ✓ Environmental impact
- ✓ Ability to market product
- ✓ Liability potential
- ✓ Capital cost
- ✓ O&M costs

ENGINEER shall use Bob Gillette to facilitate this meeting.

Task 3 – Sludge/Biosolids Treatment Scenario Development

ENGINEER shall develop treatment and transport scenarios that can be used to achieve each selected disposal/use. ENGINEER shall use in-house experience, input from the participating agencies on the processes to evaluate, literature, and vendors' input to develop scenarios. Only options that have been demonstrated to have long-term reliability for systems the size of the needed facilities shall be considered. The scenarios shall include disposal/use for the amount of sludge/biosolids that participating agencies are currently producing and are projected to produce within a 20 year planning horizon.

Task 4 – Scenario Evaluation

ENGINEER shall use a Biosolids Cost Model (BCM) to develop capital as well as operation and maintenance costs for each of the selected scenarios. The BCM will be utilized to adjust unit cost table, staffing assumptions, and sludge/biosolids input assumptions to do sensitivity analyses to evaluate the impact of higher than expected fuel or electric costs or sludge production. Other considerations and impacts associated with each scenario will be developed and documented. These will be presented based on the criteria selected for the evaluation.

ENGINEER shall prepare a criteria spreadsheet, input the criteria and weighting factors, and provide a first cut at ratings for each scenario and criteria.

Task 5 – Scenario Evaluation Workshop

The results of the BCM and criteria development shall be presented in a PowerPoint presentation and spreadsheet to be submitted to the participating agencies before the Scenario Evaluation Workshop. During this workshop, each criterion shall be evaluated and adjusted based on the consensus of those present. The spreadsheet shall be completed during the workshop. The results shall be calculated showing the ranking from highest to lowest, both with and without the weighting criteria. The criteria and weightings can be adjusted at that time if needed.

A key factor in the success of any biosolids beneficial use project is the marketability of the final product. While a marketability study is beyond the scope of this project, general marketing considerations and regional perspective on marketability will be discussed for each of the product options. The results of this discussion and a scope of work for a subsequent marketing study to definitively determine the capacity of the market for the product from the selected technology option will be provided.

Task 6 – Monterey Regional Biosolids Plan Report Preparation

The process used, data generated, and results of the workshops shall be documented in the Monterey Regional Biosolids Plan Report. This report shall be prepared so that it can be used as reference for implementation of any of the evaluated scenarios. A draft of the report shall be submitted for review and a final report shall be completed with the resolution of comments made by the participating agencies on the draft.



January 25, 2008

Mr. William M. Merry, PE, BCEE
General Manager
Monterey Regional Waste Management District
P.O. Box 1670
Marina, CA 93933-1670

Mr. Keith Israel
General Manager
Monterey Regional Water Pollution Control Agency
5 Harris Court, Building D
Monterey, CA 93940

Mr. Ray von Dohren, PE
General Manager
Carmel Area Wastewater District
P.O. Box 22142
Carmel, CA 93923

Subject: Revised Proposal to Provide Professional Engineering Services – Monterey Regional Biosolids Plan and Labor Hour and Fee Estimate

Dear Mr. Merry, Israel, and von Dohren:

Biosolids generating and handling agencies in the Monterey area including Monterey Regional Waste Management District (MRWMD), Monterey Regional Water Pollution Control Agency (MRWPCA), Carmel Area Wastewater District, City of Scotts Valley, South County Regional Wastewater Authority, California Utility Services, City of Watsonville, and City of Santa Cruz are at a turning point where many factors point to the need to develop a plan to treat and use your biosolids locally. Carollo Engineers appreciates the opportunity to provide you with this proposal to develop a Monterey Regional Biosolids Plan with you.

The attached for documents include;

1. Carollo's related experience
2. Project Team
3. Project Understanding and Schedule
4. Proposed Scope of Services
5. Labor Hour and Fee Estimate

Please let us know how you would like to proceed from here. Please call us if you have any questions regarding our proposal.

Sincerely,
CAROLLO ENGINEERS, P.C.

Robert A. Gillette, P.E., BCEE
Partner and Project Manager

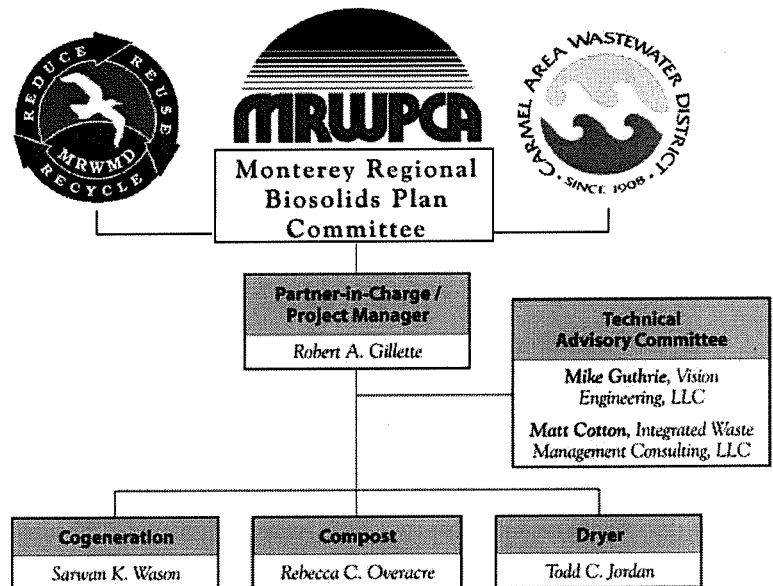
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PROJECT TEAM / QUALIFICATIONS

The key to the success for the Monterey Regional Biosolids Plan will be the experience and abilities of the project team. A successful project team must demonstrate practical and relevant experience in all of the technical aspects of the project, a well-conceived project approach, and a commitment to the project goals. The roles, qualifications, and availability of our key team members are presented in the table on the following pages. Detailed Resumes can be provided if they are desired.

Carollo Team Experience

As partner-in-charge, Bob will be responsible for making sure that the resources needed to complete this project to your satisfaction are provided when needed. He will also provide continuity based on his work on previous projects. As project manager, **Bob Gillette** has been responsible for management, regulation, grant funding, operation, biosolids use, planning, design, construction, and startup of wastewater facilities. He has written Water Environment Federation manuals on thickening and dewatering and has served as a principal investigator in a Water Environment Research Foundation biosolids thickening and dewatering research project. Bob is well known in the biosolids arena and serves on several biosolids committees, including serving as the Tri-TAC Land Committee past co-chair, founder of the CWEA Biosolids Committee, and active member of the WEF Residuals and Biosolids Committee.



As a California-certified Grade V Wastewater Operator, Bob has been responsible for planning, design, troubleshooting, operation evaluation and startup for many of Carollo's biosolids system projects.

Sarwan Wason will develop the cogeneration options that optimize the use of the landfill gas and the waste heat from any cogeneration or dryer facility. Sarwan has extensive cogeneration experience ranging from the large engines at EBMUD to recently installed fuel cells at EBMUD and other facilities throughout California.

Todd Jordan has recently finish evaluating dryer facilities for the City of Los Angeles, Bay area Regional Solids Processing Facility, and City of Monroe, Washington. Monroe has now retained Carollo and Todd to complete the design of its dryer facility. He will prepare the dryer evaluation for this project.

Rebecca Overacre worked for a composting manufacturer prior to coming to work for Carollo Engineers. Since joining Carollo, Rebecca has worked on biosolids projects for Carpenteria Sanitary District and the Bay Area Solids Processing Facility.

Technical Advisors

Mike Guthrie of **Vision Engineering, LLC**, has direct involvement with numerous composting and drying projects. He developed the overall design concept for Milwaukee, Wisconsin's highly successful 200-dry-ton-per-day Milorganite™ processing facility and the Upper Occoquan Sewage Authority's new 60-dry-ton-per-day sludge drying facility. He has designed facilities containing more than 20 dryers in the United States and overseas.

Matthew Cotton of **Integrated Waste Management Consulting, LLC**, will provide input on biosolids composting and permitting. Matt's experience ranges from evaluating the solid waste management plans of major regional areas to managing complex issues of regulatory compliance to the nuts and bolts of hands on composting. In over twenty years of work, he has completed hundreds of significant solid waste projects, including permitting and assisting in the development of some of the major composting facilities in California. Integrated Waste Management Consulting was formed specifically to address practical solid waste management for municipal and private sector clients. The goal of the firm is to provide a high level of professional service responding to each client's unique needs with a sound management strategy, a practical approach, and efficient and timely implementation.

GENERAL EXPERIENCE

Carollo Engineers specializes in the planning, design, and construction management of water and wastewater facilities for our clients. We have been a leader in the planning and design of wastewater and water treatment projects, completing over 15,000 projects since our inception in 1933. We have provided engineering services for more than 100 wastewater treatment facilities in California alone. Carollo provides engineering services only on water and wastewater related projects, and our capabilities in this area match or exceed even the largest national consulting firms. We have full-discipline capabilities, including civil, mechanical, structural, chemical, electrical, instrumentation, and corrosion engineers. Carollo is currently ranked 44th in *Engineering News Record's* listing of pure design firms.

A selected list of our recent biosolids planning experience is included in the matrix below. This matrix also shows features of these master plans that are similar to the Monterey Regional Biosolids Plan. Descriptions of three representative projects are included on the following pages.

Representative Experience

Client & Project	Year Completed	Master Plan	Dewatering	Compost	ADC/ Landfilling	Dryer
City of Monroe WA, Dryer Feasibility Analysis and Dryer Design	In Progress		■			■
Bay Area Regional Solids Processing Facility,	In Progress		■	■		■
Delta Diablo Sanitation District, Contra Costa County, CA, Biosolids Master Plan 2002 Update	2002	■	■	■	■	■
East Bay Municipal Utility District, Oakland, CA, Biosolids Management Plan	2004	■	■	■	■	■
City of Stockton, CA, Biosolids Management Plan and Privatization	1999	■	■	■		
Orange County Sanitation District, Fountain Valley, CA, Short-Term Biosolids Management Study	2001	■	■	■		■
South Orange County Wastewater Agency, Biosolids Strategic Plan Update	2007	■		■		■
City and County of San Francisco, CA, Long-Term Biosolids Management Plan	1997	■		■	■	■
City of Santa Barbara, CA, Biosolids Alternatives Analysis	2001	■	■	■	■	■
Eastern Municipal Water District, Perris, CA, Biosolids Master Plan	2002	■	■	■		■
Fairfield-Suisan Sewer District, Fairfield, CA, Dewatering Design	In progress		■			

Delta Diablo Sanitation District, California – Biosolids Master Plan 2002 Update

Mr. Gary W. Darling, General Manager, 925-778-4040

Relevant project team: Bob Gillette – project manager

The Delta Diablo Sanitation District (DDSD) serves the cities of Pittsburg, Antioch and Oakley, California, as well as unincorporated areas in eastern Contra Costa County. DDSD had two existing dewatering centrifuges and associated equipment that had reached the end of their useful life. In addition, DDSD did not have any backup to the current land application of their dewatered Class B biosolids.

This Master Plan Update, initiated in December of 2001, started by completing a fast-track technical memorandum evaluating alternatives to replace the centrifuges. The centrifuge replacement required the use of trailer-mounted temporary dewatering equipment while new centrifuges were installed.

The Master Plan Update evaluation included land filling, alternative daily cover, continued land application, thermophilic anaerobic digestion, composting, heat drying, and chemical stabilization.

Unique features of the master plan were the evaluation of the use of waste heat from the power generation plant adjacent to the District's treatment plant and the evaluation of the impact of water treatment chemicals from the power plants on the biosolids treatment, capacity, and costs.

The District has implemented the dewatering results from the master plan installing centrifuges. They have also completed developing the backup or emergency outlet for their biosolids by entering into an agreement with their local landfill to take a small portion of their biosolids as ADC in exchange with developing this site for emergency use as well. Finally, to implement a Class A alternative, the District has become the lead agency for the Bay Area Regional Solids Processing Facility which is currently in the planning stage.

South Orange County Wastewater Agency – Biosolids Strategic Plan Update

Mr. Brian Peck, Director of Engineering, 949-234-5411

Relevant project team: Bob Gillette – project manager

The South Orange County Wastewater Authority (SOCWA) operates four wastewater treatment plants in Southern Orange County. The Regional Treatment Plant processes sludge from one of the other plants, the Coastal Treatment Plant, and accepts raw sludge from the El Toro Water District. In 2005, Carollo Engineers assisted SOCWA with an update to its biosolids strategic plan.

In 2004, the combined biosolids disposed of averaged 77 wet tons per day. This could increase to almost 90 wet tons per day at build-out. Current disposal includes disposal at the local County landfill and private hauling and disposal. The landfill disposal is limited to about 12 wet

tons per day based on a minimum trash to biosolids ratio set by the County. Biosolids are composted then privately hauled for land application, except for biosolids from the J.B. Latham Wastewater Treatment Plant, which do not meet Class B requirements.

SOCWA is considering the implementation of an enclosed composting facility that would be co-located with the local landfill. The composting facility would have a total capacity of 110 wet tons per day, and half of the capacity would be owned by the Orange County Sanitation District. SOCWA has also recently completed evaluations of heat drying and advanced digestion as methods to produce Class A biosolids and reduce the disposal volume.

The SOCWA composting facility would require a significant investment. The resulting biosolids unit cost would exceed the projected costs for private hauling and disposal. Considering the costs as well as other uncertainties, SOCWA prepared the update to their strategic plan.

Carollo Engineers assisted SOCWA by preparing specific chapters of the plan. Carollo also conducted two workshops with SOCWA members to help formulate policy. The specific chapters that Carollo was responsible for include:

- Regulatory Update
- Private Disposal and Reuse Options
- Treatment, Disposal, and Reuse Option Matrix
- Alternative Summary
- Market Analysis Update
- Biosolids Management Scenarios
- Cost Analysis
- Sensitivity Analysis

As part of the work, Carollo updated the cost estimates for the previously completed studies. Cost estimates were prepared for other options such as chemical treatment, pasteurization, pyrolysis, incineration, and vermiculture.



Orange County Sanitation District, California – Short-Term Biosolids Management Study

Mr. Michael Moore, Environmental Compliance and Monitoring Manager, 714-962-2411

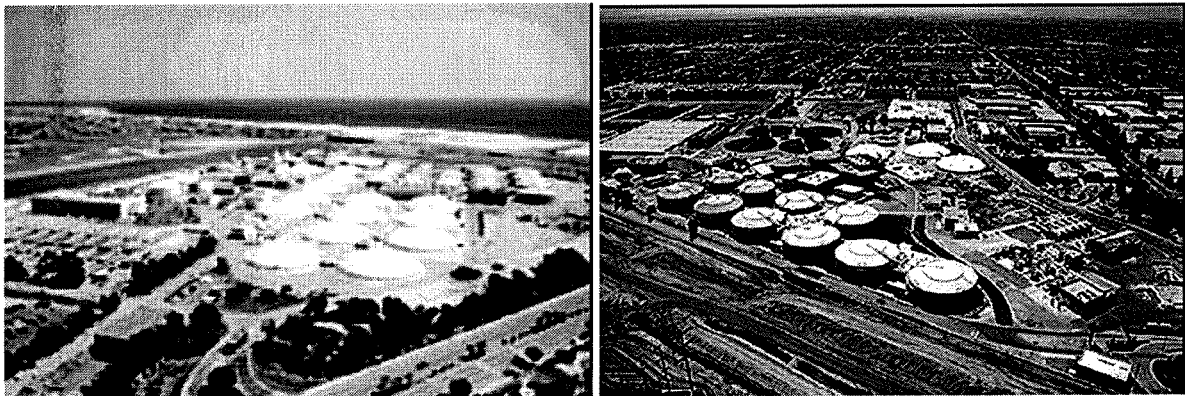
Relevant project team: Allen Todd – partner-in-charge, Bob Gillette – project manager

Carollo's long-standing work with OCSD includes several solids handling facilities projects and a recent biosolids management study. Carollo provided planning, design, and construction services of a unique 108-mgd biosolids handling facility that combines state-of-the-art pumping, storage, and loading technology with computer automation in a system capable of transporting nearly 600 cubic yards of biosolids cake daily.

The Short-Term Biosolids Management Plan identified all of the technologies available to OCSD for short-term compliance with changing local regulations and ordinances that would significantly limit the management options available for the reuse of biosolids produced from Plant 1 and Plant 2. The report evaluated these technologies on their reliability, proven track record and ability to produce a compost-like marketable product for unrestricted use. The report presented several technologies that showed promising alternatives both technically and economically for implementation at OCSD. Several alternatives were identified as potential candidates for long-term solutions but their implementation schedule did not meet the Jan 2003 deadline.

Services performed include:

- Gathered information on various biosolids handling technologies.
- Performed a fatal flaw analysis to select technologies that would potentially provide EPA approved Class A biosolids.
- Performed a detailed present worth cost analysis.
- Summarized findings in a report.
- Presented findings to the Board of Directors.



Carollo has planned and designed many of the major joint works treatment plant expansions for OCSD since its inception in 1953. Wastewater conveyance, treatment, and disposal facilities include over 100 projects totaling in excess of \$600 million.

East Bay Municipal Water District - Biosolids Master Plan Update

Mr. Ed McCormick: 510-287-1657

Relevant project team: Bob Gillette – project manager,

The East Bay Municipal Utility District Biosolids Master Plan Update was a \$300,000 project to evaluate all alternatives including possible locations for dedicated land disposal and land application sites to purchase. During the planning effort the District made the first step to diversify by sending a developing the alternative daily cover beneficial use option. The District also is in the process of implementing new gravity belt thickeners to replace their thickening centrifuged and replacing their aging dewatering centrifuges with new high solids centrifuges. The District has also become one of the major stakeholders in the Bay Area Regional Solids Processing Facility to develop additional capacity to produce Class A Biosolids.