WHO USES THE PLANT

The cities of San José and Santa Clara co-own the Plant. Either directly or through sanitation districts, six other cities contract for the Plant's services. These cities and districts collectively fund Plant operations and include:

1. San José, co-owner
2. Santa Clara, co-owner
3. Milpitas
4. Cupertino/Cupertino Sanitary District
5. Los Gatos/West Valley Sanitation District
6. Monte Sereno/West Valley Sanitation District
7. Campbell/West Valley Sanitation District
8. Saratoga/West Valley Sanitation District
9. County Sanitation Districts 2-3 (unincorporated)
10. Burbank Sanitary District (unincorporated)

PROJECT MANAGEMENT AND CONTACTS

City of San José Environmental Services Department operates the Plant and is overseeing the Plant Master Plan. For more information, contact:

(area code for all numbers: 408)

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www.sanjoseca.gov/esd/plantmasterplan

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT
700 Los Esteros Road, San José, CA 95134

Master Plan Approach

PLANNING PRINCIPLES

The Plant Master Plan will chart a course for the next 30 years that continues the Plant's success in protecting public health and the environment and in supporting the region's economy. The intent is to achieve the four master plan goals (below) in coordination with other key planning efforts, such as the South Bay Salt Pond Restoration Project, the Watershed Management Initiative, the City of San José's Envision 2040 General Plan, and the City of San José's Green Vision — including initiatives pertaining to energy, water recycling, and zero waste.

PLANT MASTER PLAN GOALS

- Operational — Result in a reliable, flexible Plant that can respond to regulations and changing conditions.
- Environmental — Improve habitat and minimize impacts to the local and global environment.
- Economical — Develop cost effective technical and land use options to benefit customers.
- Social — Maximize community benefits through improved aesthetics and recreational uses.

Plant Master Plan

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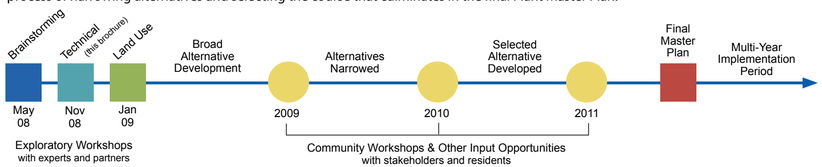
NEXT STEPS

The Plant Master Plan involves a three-year process that begins with a series of exploratory workshops that lead to development of a set of alternatives for the Plant and site. The public will be engaged through community meetings and other ways to give input for the process of narrowing alternatives and selecting the course that culminates in the final Plant Master Plan.



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THE PLANT'S 24/7 JOB IS TO MANAGE WASTEWATER. Every day it sends about 100 million gallons of treated effluent into the Bay and recycles another 10 million gallons. Every year roughly 45,000 tons of dried biosolids are "harvested" from an 800-acre drying area; this gets used as a daily cover at the adjacent landfill. Enough methane is captured in the treatment process and landfill to power about two-thirds of the Plant's energy needs. Can this process be improved to … ■ *Use less land?* ■ *Extract more energy from waste and produce less carbon?* ■ *Become more cost-effective?* ■ *Contribute to the overall sustainability of Silicon Valley?* To answer such questions, a panel of renowned wastewater experts convened with local officials to …

Explore Technologies & Approaches

SUMMARY

Plant Master Plan Technology Workshop

November 13-14, 2008

The second of three workshops with experts to lay a foundation for developing Master Plan alternatives for public review

SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT

Plant Master Plan

THE TECHNICAL ADVISORY GROUP . . .

The eight-member Technical Advisory Group (TAG) toured the Plant property with staff from the City of San José and the Carollo consulting team. From left to right are: Jon Newby (City, Plant staff), Glen Daigger (TAG), Alex Ekster (City, Senior Engineer), B. Narayanan (Carollo team), Bhavani Yerrapotu (City, Technical Services Manager), Dale Ihrke (City, Plant Manager), Cecil Lue-Hing (TAG), Perry Schafer (Carollo team) David Jenkins (TAG), George Tchobanoglous (TAG), John Stufflebean (City, Environmental Services Director), Bruce Wolfe (TAG), Walter Niessen (TAG), and John Rosenblum (TAG). Not pictured: Bob Gearheart (TAG) and David Jenkins (TAG).

Technical Advisory Group (TAG) Members ~ Areas of Expertise

George Tchobanoglous, Ph.D., P.E., NAE (TAG Chair) — Professor Emeritus, UC-Davis.
George holds many honors for his contributions to the wastewater management field, and he consults around the world.

David Jenkins, Ph.D., NAE (TAG Vice Chair) — Professor Emeritus, UC-Berkeley.
Much of David's honor-laden research has focused on sludge treatment; he is often tapped for troubleshooting process problems at treatment facilities.

Bob Gearheart, Ph.D. — Professor Emeritus, Humboldt State University.
Bob is an expert on constructed wetlands used for wastewater treatment; among many projects, he helped design the City of Arcata's wetland treatment system.

Bruce Wolfe, P.E. — Executive Officer, San Francisco Bay Regional Water Quality Control Board.
Bruce is an expert on the programs and regulations that work to protect the quality of Bay waters.

Cecil Lue-Hing, D.Sc, P.E., DEE, NAE — Principal, Cecil Lue-Hing & Associates, Inc.
Cecil is nationally recognized for his expertise in biosolids management.

Glen Daigger, Ph.D., P.E., BCEE, NAE — Senior Vice President and Chief Technology Officer, CH2M HILL. Glen is widely recognized as an expert in biological treatment processes.

John Rosenblum, Ph.D., P.E., BCEE, NAE — Principal, Rosenblum Environmental Engineering.
John's expertise is evaluating energy efficiency as it relates to water use and wastewater treatment.

Walter Niessen, P.E., BCEE — President, Niessen Consultants and Senior Consultant, CDM, Inc.
Walter is an honor-winning expert on applied thermal processes in waste management.

The 2-Day Workshop

On Day One (November 13, 2008), TAG toured the Plant for a first-hand look at its facilities and operations; they also were supplied with the Plant's operational data. On Day Two, the group discussed their ideas with an audience that included the Plant's operation managers and staff from the Plant's tributary agencies.

"The value of what your Plant accomplishes — protecting public health and the environment — is well beyond the costs anticipated in rebuilding the Plant. By focusing on a mix of new technologies, process improvements, upstream considerations, and site enhancements, your Plant will evolve into a cutting edge, world-class facility." ~ George Tchobanoglous, TAG Chair

Pond A18

Don Edwards National Wildlife Refuge

Discharge channel

"The site has outstanding beauty ... to the extent possible, the [land] should be returned to its natural state."
~ TAG Summary Report

A palette of options...

The Technical Advisory Group discussed the Plant's operations and future within four key areas:

Managing Wastewater Upstream

Managing wastewater closer to its source is necessary for a sustainable urban water system, resulting in both resource and cost savings. The Master Plan should consider the role of the Plant and its site in the regional watershed. The panel pointed to:

- *Using less water.* Conservation is the key to stabilizing the drinking water supply, reducing energy use and treatment costs, and reducing effluent into the Bay. California's trend of promoting water-saving devices (low-flow toilets, flow-regulating showerheads, etc.) needs to continue and expand—with, for example, the promotion and institution of dual-plumbed buildings that can accommodate use of recycled water for flushing toilets.
- *Considering satellite systems.* Some large cities, such as Los Angeles, have built upstream satellite treatment plants to reduce pumping costs and operational demands at the downstream "mother" plant. Our Plant has relatively low pumping costs and adequate capacity, but small satellite facilities could have merit for cost-effective delivery of recycled water. Satellite facilities could be built to treat liquid only and, with little conveyance costs, return high quality recycled water into irrigation systems and dual-plumbed buildings—making it an option worth investigating.

Modern architectural design as applied to Munich's digesters

Greenhouse system used in Miltenberg, Germany.

The Future of Liquid Treatment

Handling 110 million gallons of wastewater daily is a lot. The panel pointed to options that could improve liquid treatment:

- *Upfront screening.* Currently only objects larger than 5/8-inch are screened out of incoming wastewater. A finer screening system installed at the Plant's headworks could improve the entire process chain: The activated sludge (the microbial mix that "digests" organics) would work better; sludge solids would dry faster; and less energy would be used. The final biosolids product would also have greater marketability with the elimination of trash components, such as bits of plastic.
- *UV disinfection.* The Plant is already piloting studies with ultraviolet (UV) radiation, which is safer than chlorine to work with and as effective at destroying pathogens. UV treatment also would avoid the generation of undesirable chlorine byproducts.
- *Rehabilitate primary tanks.* The panel recognized and supported the need to rehabilitate the 24 primary tanks (each with a half million gallon capacity) that have been subject to the corrosive influence of raw sewage for fifty years. Fixing these tanks may also reduce odors.

For more information on TAG's recommendations, their workshop report can be found at:
www.sanjoseca.gov/esd/plantmasterplan

The Future of Solids Treatment

At our Plant, the solids that are separated from wastewater are sent through large digester tanks that produce a thick sludge. This sludge is transferred to an 800-acre area where it first stabilizes for three years in lagoons, and then is spread to dry over the course of one more year. While the operation is low-cost, there is a question of whether this land could be used for greater benefit to the environment and community. Open-air drying also has the potential to create odors at downwind properties. And, dirt unavoidably mixes with the sludge to result in roughly 45,000 tons annually (about 35% dirt) of a material that needs reuse or disposal. Currently, the dried solids get used as daily cover at the adjacent landfill, which will likely close in 12-15 years. For the future management of solids, the panel recommended using a combination of these options:

- *Rebuild Digesters.* Continuing the use of anaerobic digester tanks is appropriate for the future, but they need rebuilding and can incorporate process adjustments that will deliver greater energy capture.
- *Greenhouses.* Some treatment plants have built greenhouses to solar dry their sludge while enclosing odors. At our Plant, greenhouses could reduce the drying area footprint to under 100 acres.
- *Thermal options.* Some treatment plants use heat to treat their sludge. These systems also have small footprints and enclose odors. The end product of some thermal treatment systems is inert sand, which can be used in concrete and masonry products.

More Energy, Less Carbon

Our Plant uses a significant amount of energy, mostly for pumping wastewater through the facility and for injecting air into secondary treatment tanks to provide aerobic bacteria with oxygen. The Plant produces a large amount of the energy it needs from the very waste it is treating — the separated biosolids produce methane gas as they break down in the digester tanks. It's possible to enhance this methane production and meet all of the Plant's energy needs — perhaps even enabling the Plant to become an energy supplier. There also are improvements that would reduce the Plant's carbon production. Altogether, these include:

- *Adding grease and food waste.* The Plant is already piloting a Fats-Oils-Grease (FOG) program with the dual goals of keeping sewers unclogged while tapping the energy value of FOG content. Grease and food waste could be combined with solids in thermal processing systems for high energy production. This latter idea links with San José's zero waste goals and is currently under study.
- *Algae cultivation.* The powerful filtration capacity of algae makes it an ally for cleaning wastewater and sequestering carbon. If grown in Pond A18 or the lagoons, it could potentially sequester all of the Plant's carbon emissions and also produce biofuels.
- *Carbon market revenue.* If the Plant becomes carbon neutral, it could develop revenue by selling its carbon credits to companies that are challenged to meet their carbon emission caps. This could contribute to keeping down ratepayer fees.

Making Technology Decisions

How do we wisely rebuild the Plant? TAG is helping our team develop a decision framework that includes:

➢ **Plan for increased pollutant and biosolids concentration.** Population forecasts for Silicon Valley point to significant growth, but panelists predicted that — due to ramped-up water conservation — the liquid flow to the Plant might actually decrease in the future, resulting in higher concentrations of pollutants and biosolids. This is a key factor to address as high concentrations of pollutants/biosolids present significant challenges to the sewer system and treatment plant processes.

➢ **Research byproduct markets.** "Disposal" gives way to "reuse" when markets can be realized for the byproducts of processed waste. For example, there is a market for phosphorous, which can be extracted from the liquid stream. Considering uses for byproducts can help determine the Plant's optimal treatment path.

➢ **Prepare for stricter regulations.** TAG includes a regulatory expert to help our team determine issues that could affect the Plant's future permit requirements for effluent. PCBs, selenium, fire retardants, and trace organics and nutrients could be included in future regulations.

➢ **Consider sea level rise.** Sequestration of carbon could also become a policy or regulatory driver as governments work to stem the trend of climate change and related sea level rise. The impact of sea level rise on the Plant itself must be considered, as it could require raising levees and installing pumps for discharge into the Bay.

➢ **Test drive.** The pursuit of sustainable processes is a path to be traveled and tested. Prior to major investment, undertaking pilot tests of new processes enables the fine-tuning or hybridization that delivers successful outcomes.