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NEXT MEETING

Thursday, April 25th 9:00 - 11:00 A.M.

LOCATION:

SRCSD/SASD Offices 10060 Goethe Road Sacramento, CA 95827

Conference Room: SASD South Conf Rm 1212 Sunset Maple

Nitrogen Removal by Coupling Recirculating Gravel Filters and Constructed Wetlands

by Ron Crites, Rob Beggs, and Craig Lekven | Brown and Caldwell

The performance of a small nitrification/denitrification system treating domestic wastewater from a decentralized facility is described. The existing suspended growth system was abandoned for nonperformance and replaced by a septic tank followed by recirculating gravel filter followed by a denitrifying constructed wetland. One year's performance data shows the benefit of recirculation in nitrification and the benefit of wood chips to enhance denitrification in the wetlands.

The decentralized facility is located north of Sacramento in south Sutter County, California. Wastewater is produced from sanitary waste and a truck maintenance/wash facility.

The truck wash effluent is pretreated by an oil and sand separator, dissolved air flotation (DAF), and dual media filters with disposable oil-absorbent media. Flows are approximately 4,000 gallons per day (gpd) of sanitary wastewater and truck wash wastewater.

Original System

The original wastewater system consisted of a sewage lift station, packaged extended aeration activated sludge se-

> One year's performance data shows the benefit of recirculation in nitrification and the benefit of wood chips to enhance denitrification in the wetlands.

quencing batch reactor treatment system, dual medium filtration, and ozone disinfection prior to reuse/disposal via sub-surface drip irrigation. Operation of the original wastewater treatment system had been problematic and effluent nitrogen concentrations often exceeded 10 mg/L.

New Passive Treatment System

The new treatment system consists of a 15,000 gallon septic tank followed by a 3600 sq. ft. recirculating gravel filter (Figure 1) and then a 4600 sq. ft. denitrifying constructed wetland (Figure 2). Treated effluent is discharged to two 0.55 ac dedicated infiltration basins. Limits for discharge to the infiltration basins are 20 mg/L BOD and TSS on a monthly basis, and 10 mg/L total N on an average annual basis.

The denitrification wetland is a passive, "natural system" dependent on the establishment of dense emergent vegetation to provide plant litter as a carbon source for denitrification. Treatment effectiveness is a function of vegetation establishment, temperature, and retention time. Ten cubic yards of wood chips were added to the entrance zone of the wetland to provide extra carbon during the vegetation establishment period.

The recirculating gravel filter was fully nitrifying the septic tank effluent within 6 weeks after startup. Some wetland effluent was recirculated to provide additional alkalinity for nitrification in the gravel filter. Wetland effluent TSS and nitrogen concentrations were above targets for another two months due primarily to algae growth in the wetland while the wetland plants and added duckweed became established. After initial vegetation establishment in late spring, BOD was non-detect, TSS was less than 20 mg/L and total nitrogen was in the range of 2.5 to 4 mg/L. Other than occasional





President's Letter

Dear Central Valley/Sierra Foothills Chapter Members: As you all know, the water reuse arena has been quite dynamic

throughout the state in the last decade with significant implications in our region. The CA WateReuse conference held in Monterey last month was



a successful event and informative for all attendees; the conference included several panels and presentations regarding policy and regulations updates, reuse technologies, and case studies. For those who could not attend the conference, I strongly encourage you to review the conference proceedings.

We have planned a series of exciting local chapter meetings to keep our members up to date on important regulations, plans, policies, reuse applications and technologies. Dave Smith, Managing Director of the <u>WateReuse Association</u>, will be our honorary guest

speaker for the upcoming chapter meeting on April 25, 2013. Dave will provide an overview of the recycled water trends in CA and an update on legislative policies. Toni Pezzetti from the Department of Water Resources will also present the 2020 and 2030 statewide recycled water targets which will be proposed in the 2013 California Water Plan. In each of our future meetings, we will present a case study or technology application. In the April meeting, Rick Arber from Hatch Mott MacDonald will present the Joint Water Purification Project in Colorado which has an excellence award from the Consulting Engineers Council of Colorado Engineering.

APRIL 2013

We have planned three more meetings in 2013 with other distinguished scientists/engineers. Prof. George Tchobanoglous of University of California at Davis has graciously accepted to attend one of our chapter meetings and present the past, current, and future of the reuse world. We can even expect him to summarize his reuse book of 1,800 pages in one hour. Salt and nutrient management plans are moving forward. We will bring an expert panel together from agencies and consultants to provide an opportunity for our members to hear the latest on these plans and have a lively discussion with these experts. We also wanted to dedicate one of our meetings in 2013 to agricultural reuse, which is the largest reuse application in the region and the state. We will have speakers from wastewater suppliers to agricultural customers and state agency representatives.

Please contact us with your suggestions, questions, or concerns for how we can improve our chapter activities to support water reuse in the Central Valley and Sierra Foothills. I am looking forward to seeing you all in at least one of our meetings in 2013.

Onder Caliskaner, PhD, PE, President CV/SF Chapter

Joint Water Purification Project





Operating since 2010, the 12 mgd Joint Water Purification Plant was designed to serve as the first planned Indirect Potable Reuse system in Colorado.

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Ensuring satisfactory quantities of potable water in the arid parts of the United States, including the metropolitan Denver area, is increasingly driving the implementation of alternatives to conventional water supplies. In 2004, the Arapahoe County Water and Wastewater Authority (ACWWA) and the Cottonwood Water and Sanitation District (CWSD) embarked on a cooperative project to make greater use of the shallow alluvial waters of Cherry Creek.

The 12 mgd Joint Water

Purification Project (JWPP)

water treatment plant was placed into operation in July of 2010. The plant treats raw water pumped from shallow ACWWA and CWSD wells which draw from the Cherry Creek alluvium. Up to 56% of the well pumpage consists of treated effluent, and will increase to about 80% in the future as upstream wastewater discharges increase. The raw water suffers from aesthetic issues, drinking water quality concerns related to radionuclides, and contaminants of emerging concern associated with treated wastewater.

The JWPP was designed to serve as the first planned Indirect Potable Reuse (IPR) system in Colorado and employs reverse osmosis (RO), advanced oxidation process (AOP) with UV light and hydrogen peroxide, air strippers, post treatment stabilization, and disinfection. The RO concentrate is treated by flocculation followed by microfiltration.

Recycled Water Coalition Expands Membership to Delta, Central Valley, Central Coast; Plans 21 New Projects

by Jayne Strommer

he Western Recycled Water Coalition (WRWC), previously known as the Bay Area Recycled Water Coalition, has expanded its membership beyond the San Francisco Bay Area. The Coalition now includes additional members from the Delta region, Central Valley, and Central Coast, in total representing over 3.4 million people. Coalition members are planning 21 new recycled water projects that will reduce the pumping of fresh water from the Delta and local supplies, providing sustainable, drought-resistant water supplies for agricultural, industrial and municipal uses. When funded and built, the projects will annually produce 86,000 acre-feet of water that does not depend on the limited and variable surface and groundwater sources used for drinking water.

The cities of Brentwood, Ceres, Modesto, Fresno, and Turlock, the Del Puerto Water District in Patterson, and the Monterey Regional Water Pollution Control Agency recently joined the coalition, which is comprised of cities, public water and wastewater agencies, and an investor-owned water utility. The coalition has grown from seven members in 2008 to 22 today, and discussions continue with potential new members, including agencies in Nevada and Oregon. Other WRWC members include the cities of Hayward, Mountain View, Palo Alto, Pleasanton, Redwood City, San Jose, and Sunnyvale; the Town of Yountville; and the Central Contra Costa Sanitary District, Delta Diablo Sanitation District, Dublin San Ramon Services District, Ironhouse Sanitary District, San Jose Water Company, Santa Clara Valley Water District, and Zone 7 Water Agency.

Collectively, WRWC members are seeking a federal partnership that allows federal funds to be leveraged with local and state funds to improve the security of water supplies in the western United States for years to come. Members collaborate and speak with one voice to Congress and the Administration regarding the importance of these projects and funding needs. Current legislative efforts are focused on Title XVI reform in order to overcome the current hurdles that limit new authorizations. The WRWC is also pursuing a new loan program to provide up to 100% project loans at 1% or less interest rate in return for the water developed to benefit federal, state and local supplies.

From 2009-2012, the Bay Area Recycled Water Coalition secured \$38.1 million in federal Title XVI funds, which were combined with \$114 million in state and local resources to build eight recycled water projects and prepare feasibility studies for 14 more. The constructed projects now produce over 35,000 acre-feet of recycled water annually for irrigation and industry.

For more information, please see www.westernrwc.org or contact Jayne Strommer at Delta Diablo Sanitation District (JayneS@ddsd.org or 925-756-1910).

www.westernrwc.org

		Projects, Partners and Communities Served	Congressional Districts	(AFY) (Federal Share)	Western Recycled Water Coalition
	s	eeking Authorization			
	A	Brentwood Recycled Water Project: City of Brentwood	Jerry McNerney (CA-9)	3,640 \$9.8 M / (\$2.45 M)	Northern California Congressional Districts and Project Location
	в	Central Contra Costa Sanitary District (CCCSD)-Concord Recycled Water Project: CCCSD; City of Concord	Mike Thompson (CA-5), George Miller (CA-11), Eric Swahwell (CA- 15)	255 \$7.2 M / (\$1.7M)	
		entral Dublin Recycled Water Distribution and Retrofit Project: Dublin San Ra- on Services District (DSRSD)	Miller (CA-11), Swahvell (CA-15)	215 \$4.6 M / (\$0.89 M)	
		entral Redwood City Recycled Water Project: City of Redwood City	Jackie Speier (CA-14), Anna Eshoo (CA-18)	507 \$32 M /(\$7.9 M)	Man 3 manual
ning		ontra Costa County Refinery Recycled Water Project, Phase 1: CCCSD; Shell efinery; Tesoro Refinery	Thompson (CA-5), Miller (CA-11)	5,600 \$25 M / (\$6.07 M)	
•		elta Diablo Sanitation District (DDSD) Recycled Water Project: DDSD	McNerney (CA-9), Miller (CA-11)	3,000 \$34 M / (\$8.39 M)	
ator		DSD High Purity Water Treatment Facility: DDSD	McNerney (CA-9), Miller (CA-11)	5,600 \$50 M / (\$12.39 M)	Sacramento
uter		ublin Recycled Water Expansion Project: DSRSD	George Miller (CA-11), Eric Swalwell (CA-15)	6,460 \$23.9 M / (\$5.81 M)	
educe		esno Tertiary Treatment: City of Fresno	Jim Costa (CA-16), Devin Nunes (CA-22)	12,000 \$34 M / (\$8.5 M)	NIE PALIE
		esno Downtown Recycled Water System: City of Fresno	Jim Costa (CA-16)	1,500 \$10.5 M / (\$2.62 M)	
sch		esno Southwest Recycled Water Distribution: City of Fresno	Jim Costa (CA-16)	2,600 \$38 M / (\$9.5 M)	4 Yosemite Nati
		ayward Recycled Water Project: City of Hayward; Calpine	Eric Swalwell (CA-15)	3,760 \$27 M / (\$6.59 m)	San Francisco
1.		onhouse Sanitary District (ISD) Recycled Water Project: ISD	Jerry McNerney (CA-9)	1,840 \$26 M / (\$6.38 M)	11 1213 (0)
ita an	đ	orth Valley Regional Recycled Water Project: City of Modesto; City of Turlock; City Ceres; Del Puerto Water District; Stanislaus County	Jeff Denham (CA-10)	30,000 \$100 M / (\$25 M)	
more		onterey Peninsula Groundwater Replenishment Project: Monterey Regional ater Pollution Control Agency	Sam Farr (CA-20)	3,500 \$58 M / (\$14.4 M)	San Francisco 80 17 San Jose
more		ountain View Recycled Water Project: City of Mountain View	Anna Eshoo (CA-18)	500 \$12.5 M / (\$3.02 M)	16
+ +		alo Alto Recycled Water Pipeline Project: City of Palo Alto	Anna Eshoo (CA-18)	916 \$33 M / (\$7.91 M)	18 19 Wy Sierra t
ιοαα τη	le	leasanton Recycled Water Project: City of Pleasanton	Eric Swalwell (CA-15)	1,720 \$19.2 M / (\$4.62 M)	
		an Jose Water Company Recycled Water Project: City of San Jose	Eshoo (CA-18), Lofgren (CA-19)	1,200 \$24 M / (\$5.75 M)	
• •		olfe Road Main Extension/San Lucar Pump Station Modifications: City of unnyvale; City of San Jose; SCVWD; California Water Service Company	Mike Honda (CA-17)	1,200 \$2 M / (\$0.5 M)	Fresnow
		ountville Recycled Water Project: Town of Yountville; Veterans Home of California	Mike Thompson (CA-5)	164 \$3.5 M / (\$0.79 M)	
			Subtotal for Seeking Authorization	86,177 \$574 M / (\$141 M)	
	A	uthorized in Public Law 110-229 and seeking Amendment			20]22
O. 0	v	Antioch Recycled Water Project: DDSD; City of Antioch	Jerry McNerney (CA-9)	485 \$12.8 M / (\$0.95 M)	Project Locations by
	w	South Bay Advanced Recycled Water Treatment Facility: SCVWD; Cities of San Jose, Los Gatos, Cupertino, Santa Clara, Campbell, Saratoga, Milpitas, Monte Sereno	Honda (CA-17), Eshoo (CA-18), Zoe Lofgren (CA-19)	8,960 \$59 M / (\$6.5 M)	Participating Agency
			Subtotal for Authorized	9,445 \$71.8 M / (\$7.45 M)	
	A	uthorized in Public Law 110-229 and 102-575			
	x	City of San Jose/South Bay Water Recycling: Phase 1B Federal Share	Eshoo (CA-18), Lofgren (CA-19)	3,000 \$80 M / (\$16 M)	
Jani	Y	South Santa Clara County Recycled Water Project: SCVWD; South County Regional	Eshoo (CA-18), Lofgren (CA-19)	1,790 \$28 M / (\$4.23 M)	
169.0			Subtotal for Authorized	4,790 \$108 M / (\$20.2 M)	

¹ Federal Share is 25% of the total project cost. Some projects have received appropriations so the remaining share shown is less than 25%.

members are plannin 21 new recycled wat projects that will red

WRWC Coalition

the pumping of fresh water from the Delta and local supplies. For more information download the WRWC Fact Sheet.



CV-SALTS Science, Policy and Planning - Moving Forward

by Gary Carlton | Kennedy/Jenks Consultants & Linda Dorn | Sacramento Regional County Sanitation District

Important Central Valley water resources like the San Jouaquin River need to be properly managed to control the balance of salinity and nitrates in the water supply.

V-SALTS is an important science, policy and regulatory planning process making significant progress in planning a sustainable future for Central Valley water users. CV-SALTS has an aggressive schedule to prepare a Draft Salt and Nitrate Management Plan (SNMP) for the Central Valley by next summer. This plan has technical/scientific elements of study and information gathering as well as a variety of policy issues, which are being addressed through examples, call archetypes. CV-SALTS has a





budget of about \$10 million for planning and technical work to complete the SNMP. Because of the size and complexity of the Central Valley, CV-SALTS is focusing on gathering a high level of information needed to make broad policy changes for the entire valley.

Science: The highest level of CV-SALTS work is the Initial Conceptual Model (ICM), a 30,000 foot, 22 zone view of the Central Valley for salt and nitrate water balances, salinity and nitrate trends and 20 year projections. The ICM report will be complete in early summer 2013. The ICM study verifies the high level work with more detailed review in the Kings River and Modesto areas. Once the ICM is complete the SNMP will begin and use a more detailed view, potentially more than three times as many analysis areas, to evaluate areas the ICM indicates need more detailed study.

Water related organizations and agriculture is very involved in CV-SALTS. One of the other technical efforts is gathering existing information on crops, irrigation water, soils, rainfall and water quality to evaluate the differences in water quality needs across the Central Valley. This information will be shown in an agricultural zoning map where like areas can be grouped as a tool for better understanding water quality needs and future regulatory needs. This study will be completed in late summer 2013. Implementation planning is underway with characterization of existing salt and nutrient control projects and methodologies. These will be evaluated and then assessed for the capacity to expand and enhance the processes to address the accumulation of salts and nutrients in the valley. From the initial assessment further study will support decisions about which management alternatives are most appropriate for the various areas and salt issues. Implementation of the projects and practices will still occur on a local scale controlled by regional organizations and communities.

Policy: A significant amount of the time and energy of CV-SALTS is dedicated to addressing critical issues related to salts and nitrate in surface and groundwater and unintended consequences of the basin plans for the Sacramento/ San Joaquin and Tulare Lake Basins. These basin plans have elements which date back to the 1970's and do not efficiently or adequately address issues that are currently confounding both the regulators and regulated community. This slows down good projects resulting in over or under protection of the beneficial uses of the surface and groundwaters. While in some cases over protection may not have a significant cost, in the other areas of the Central Valley salt issues costs can be huge. In some communities, despite regulators working hard to help, the costs due to old basin plan requirements can as much as double the costs of wastewater management.

Archetypes: Because no plan can address all problems, especially in an area as large as the Central Valley we use examples called archetypes to demonstrate how CV-SALTS addresses both science and policy issues. Archetypes removing inappropriate beneficial uses, where water is demonstrated to be naturally too salty to drink or use for agriculture and using the area for salt management is one archetype in the Tulare Lake Bed area. Another archetype looks closely at agricultural drains and the beneficial uses they may or may not actually have for both agriculture and municipal drinking water. Ensuring communities that do not have access to water that meets current nitrate standards is also an archetype that CV-SALTS will be working to ensure the water meets the objectives where it is used.

Addressing salt and nitrate issues helps communities and industry address protecting the waters of the Central Valley better by determining appropriate manageable salt levels, and is a key to future sustainability of the waters and of the communities who use them.

OUR MEMBERS

AECOM

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GOT NEWS?

We're always looking for interesting stories and informational articles to keep our members up to speed on all that's happening in water reuse and reclamation. If you would like to contribute an article or have other ideas about this newsletter, please email Sherri Miller (smiller@dudek.com)

WateReuse Association www.watereuse.org/sections/california/valley-foothills

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