The Protection of Highly Valued Water Resources Impacted by Groundwater-Surface Water Interconnections Through Maximized Recycled Water Reuse

11 August 2015
Project Location

Surfrider Beach

Malibu Lagoon
RWQCB Requirements Force Project Development

- 2009 – LA RWQCB prohibits septic tank systems and discharges in Malibu Civic Center Area
- 2010 – SWRCB establishes schedule for compliance
- 2011 – City of Malibu and LA RWQCB sign MOU defining Prohibition Zone, and schedule for compliance
- 2014 – MOU updated to reflect current project schedule
- March 2015 LA RWQCB approves WDR/WRR for project
What are Goals of the CCWTF Project?

• Meet the environmental requirements of RWQCB Prohibition
  ▪ Protect water quality in Lagoon and beaches
  ▪ Protect groundwater quality in Malibu Valley Groundwater Basin
  ▪ Protect public health
  ▪ Meet deadlines of RWQCB

• Provide a solution that is acceptable to community and NGOs
  ▪ Protect public health
  ▪ Maximize water reuse
  ▪ No ocean outfall
CCWTF Project Phasing

Phase 1: 191,000 gpd by June 2017
Phase 2: 361,000 gpd by Nov 2022
Phase 3: 507,000 gpd by Nov 2025
General Project Components

Water Recycling is First Priority Use of Effluent
Reuse Potential Assessed for Every Parcel

Recycle Potential Rises from 25% in Phase 1 to 50% in Phase 3
CCWTF Project through Phase 3
Project Maximizes Reuse Potential

• High quality effluent
  ▪ Groundwater injection requires:
    • MBR treatment
    • Chlorine residual to prevent biofouling
  ▪ Protection of groundwater requires denitrification (< 8 mg/l)

• Recycled water distribution system parallels wastewater collection system
  ▪ All properties will have access to Title 22 water

• Recycled water mains in same trench as sewers
  ▪ DDW approval minimizes cost of dual system
Treatment Plant Will Be Covered and Fully Landscaped

- School/church
- School
- Condos
- Civic Center Way
- De Ville Way
- Treatment Plant Site
Existing Site Conditions
Site Perspective – 5 yrs post-construction
Site Perspective After Landscaping Matures
Water Injection will be in Buried Stream Bed

Area of Injection

Malibu Creek 60,000 yrs ago

Malibu Creek 20,000 yrs ago
Phase 3 – No Flow to Lagoon

60,000 yr old channel  20,000 yr old channel
Groundwater Model Indicates Lagoon will be Protected

- Calibrated to data from hydraulic testing of aquifer
- Groundwater basin has sufficient injection capacity for all project phases
- Project will not adversely impact groundwater levels
  - Lowered in most areas
  - Raised 2 to 3 inches in selected areas
Project Summary

- Will protect Malibu Lagoon, beaches, and Malibu Valley Groundwater Basin
- Treatment needed for injection provides very high quality water for recycling
- Inability to use ocean outfall resulted in project with high level of recycle potential
  - 25% at project start
  - 50% at build out conditions
And now onto Legacy Park...
**Approach:** Manage Runoff from 337 Acres to Meet TMDL, and...

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<th>Location</th>
<th>Total Coliform</th>
<th>Fecal Coliform</th>
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... Create a Community and Environmental Asset
Stormwater Components, Project Operation

- 30 ft³/sec
- 8 AF
- Pacific Coast Highway
- Irrigation PS
- Title 22 Recycled Water
Long-term Flow Simulation Used to Size Facilities

• Continuous flow analysis
  ▪ Spanning 57 yrs
  ▪ 762 storms analyzed

• Optimized ‘dual’ use of detention volume
  ▪ 4 AF to comply with stormwater TMDL
    ▪ 100% of years
  ▪ 4 AF for irrigation storage
### Project Meets Stormwater TMDL Requirements

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Note: All TMDL values, 30-day mean MPN

These values may be exceeded:
3 days during winter dry weather
17 days during winter wet weather
Park Features:
Forebay For Sediment Capture
Park Features:
8 AF Detention Pond
Park Features:
Six Endangered Habitats

- Vernal Pools
- Woodland
- Coastal Prairie
- Wet Meadow
- Riparian
- Coastal Bluff
Park Features:
Educational Elements
Park Features:
Outdoor Classroom
Park Features:
1.5 Miles of Pathways, Lookouts
Project Generated Significant Grants and Donations

- $4M – SWRCB/SMBRC
- $4M - Regional Grants
- $2M – Annenberg Foundation
- $1M – SMBRC/SCC
- $1M – Los Angeles County
- $0.7 M – Private Donors
- $0.5 M – CIWMB

Total Design & Construction Cost: $16 million
Questions?

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Groundwater Model Predicts Injection Capacity

- Calibrated to measured data
- Predicts:
  - Impacts on groundwater elevations
  - Direction and speed of groundwater flow
  - Maximum injection rates
Phase 2 would Allow Removal of these Facilities

Open treatment tanks

Open treatment facilities
Project Includes Measures to Protect Neighborhood Quality

- Site will be fully landscaped
- Will remove two existing antiquated plants
- Will be less visible than two existing plants
- Architectural treatment to all buildings
- Full odor scrubbing will be provided
- All equipment within buildings
  - Noisy equipment within sound deadening enclosures, and inside buildings
Winter Canyon Percolation Modeling Results

- Can percolate 50,000 gpd in Phase 1
- Can percolate 100,000 gpd in Phase 2
- Provides backup to injection capacity
Collection System Pump Station – Legacy Park

Malibu Legacy Park - Typical Pump Station Site Plan
Collection System Pump Station – Bluffs Park
Collection System Pump Station – Bluffs Park

Bluffs Park - Typical Pump Station Site Plan

Typical Utility Cabinet

Typical Lift Station and Meter Box
Preliminary Injection Well Design – Malibu Rd

Existing Site Conditions

Example Well Enclosure
Phase 1 – No Flow to Lagoon

Phase 1 - Injection Only  
311,135 gal/day
Phase 2 – No Flow to Lagoon

Phase 2 - Injection Only
497,642 gal/day
Phase 3 – No Flow to Lagoon

Phase 3 - Injection Only

611,655 gal/day
Collection System Pump Station – Legacy Park
Site Layout at Build-Out

1. Odor Media Bed
2. Bioreactor Odor Fans
3. Future Odor Control Beds
4. Operations/Lab/Controls
5. Recycled Water Pump Station
6. UV Disinfection Facility
7. Generator
8. Chemical Area
9. Transformer
10. Backpulse Tank

11. Membrane Reactors
12. Blower and Electrical Rooms
13. Biological Reactor Basins
14. Odor Control Beds
15. Equalization Basin
16. Headworks
17. Influent Pump Station
18. Solids Storage Tanks and Buildings
19. Percolation Ponds

Above Ground Facilities