Pacific Grove WWTP & Decentralized Reuse

Presentation to WateReuse Association
Northern California Chapter Meeting
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GREENBERG VENTURA COUNTY STAR '07
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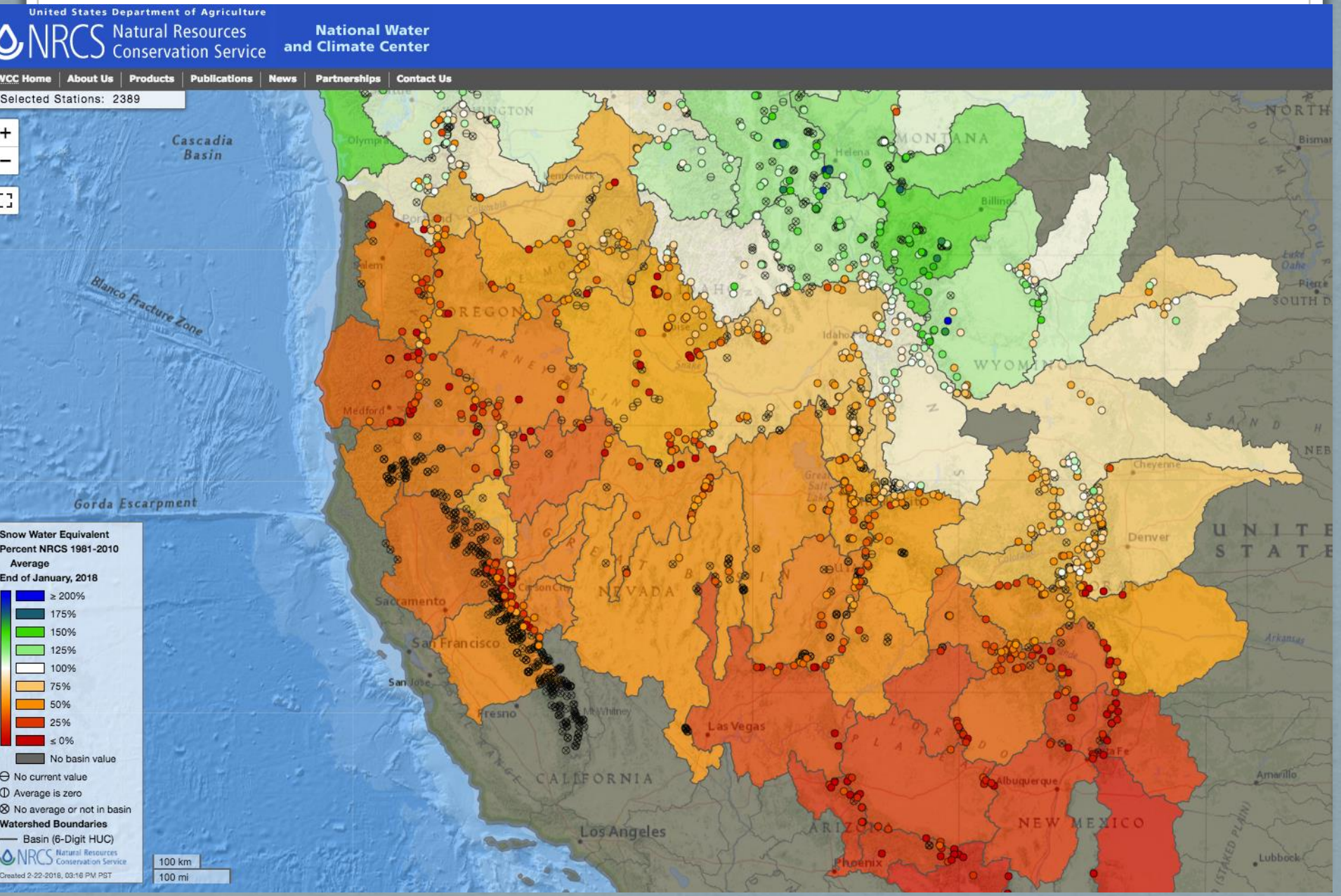
BRING YOUR OWN WATER
ENTERING
CALIFORNIA

Presentation Focus

- Trends In Wastewater Recycling From Regional To Satellite Systems
- Pacific Grove Local Water Project Example
  - A local Satellite Water Recycling Project


United States Department of Agriculture
NRCS Natural Resources Conservation Service
National Water and Climate Center
WCC Home | About Us | Products | Publications | News | Partnerships | Contact Us
Selected Stations: 2389
Cascadia Basin
Blanco Fracture Zone
Gorda Escarpment
Snow Water Equivalent
Percent NRCS 1981-2010 Average
End of January, 2018
≥ 200%
175%
150%
125%
100%
75%
50%
25%
≤ 0%
No basin value
No current value
Average is zero
No average or not in basin
Watershed Boundaries
Basin (6-Digit HUC)
NRCS Natural Resources Conservation Service
Created 2-22-2018, 03:16 PM PST
100 km
100 mi
OREGON
NEVADA
CALIFORNIA
ARIZONA
NEW MEXICO
MONTANA
WYOMING
Sacramento
San Francisco
San Jose
Fresno
Mt Whitney
Las Vegas
Los Angeles
Phoenix
Albuquerque
Santa Fe
Denver
Cheyenne
Billings
Helena
Boise
Portland
Salem
Medford
Olympia
Amarillo
Lubbock

Trends In Wastewater Recycling Include Regional To Satellite Systems

- Development of Regional WWTP Was Part of The Method to Achieve Fishable & Swimmable Objectives
- Federal Clean Water Act Acknowledged Water Reuse As A Part of The Innovative/Alternative (I/A) Technology Program
- Scalping/Satellite Recycling Facilities Were Not Initially Envisioned

Development of Alternative Water Supplies in California

- Water Conservation
- Stormwater Capture & Graywater Development
- Recycled Wastewater
  - Non-Potable, Irrigation Supplies
  - Seawater Barriers
  - Indirect & Direct Potable Reuse

Trend In Funding Inovation

- USEPA Developed Alternative/Innovative Technology Program (I/A)
  - 1977 CWA Wastewater Reuse & Small Community Systems As Alternative Technology
  - A/I Program Provided Increased Grant Incentives

What Is Centralized Water Reuse?

- Large Centralized WWTPs
  - Tend to Discharge to Surface Waters, Percolation/Evaporation
  - Or, Develop RW Distribution Networks
- RW Distribution Networks May Have Significant Effects:
  - Environmental Impact Analysis & Mitigation Measures
  - Need for Additional Easements & R-O-W
  - Additional Permitting (e.g. WOTUS)
  - Additional Capital and O&M Costs Impact Project Feasibility
  - Additional Power Requirements

What Is Decentralized Water Reuse?

- Satellite Water Recycling Facilities (SWRF)
- Developed to Meet Specific End Use(s) Demands
- Targets Community, Facility or Consumer Level
- Recycles Only A Portion of Available Wastewater Flows
- Feasibility Is Based On:
  - Existing & Projected Cost Comparison to Potable Water
  - Reliability & Sustainability of Available Water Supplies
  - Value of Having A "Drought-Proof" Supply
  - Value of Potable Offset By Local Recycled Water Supply

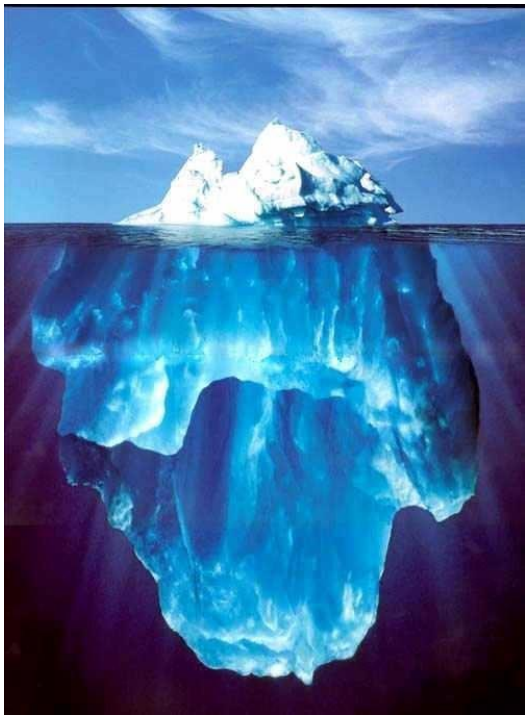
Components of Typical Satellite Water Recycling Facility

1. Diversion Facility (Intercepting Manhole, Diversion Pump and Force Main Pipeline
2. SWRF With MBR
3. Disposal of Waste Activated Sludge to Offsite Treatment Facilities
4. Operational Storage Facility (Ponds or Tanks)
5. Local Recycled Water Distribution System
6. Offsite Hauling of Inorganics To Disposal

Proximity Is Very Important

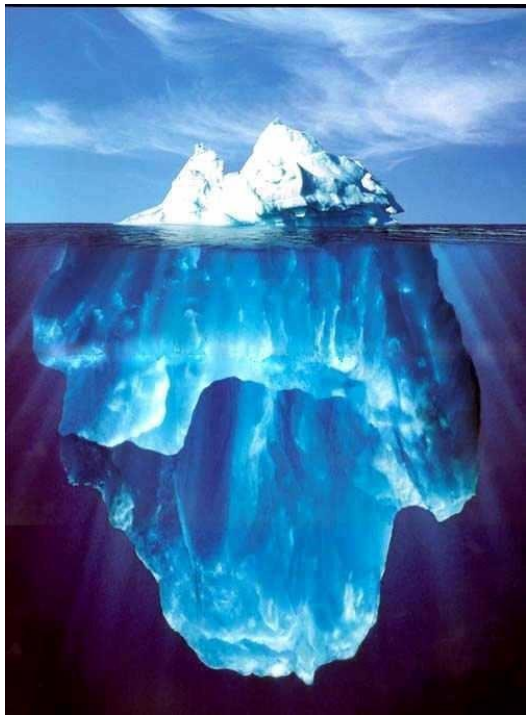
Golf As An Example

- Relatively Large Irrigation Demand
- Approximately 100 Acres
- Often Distant From Centralized Urban Wastewater Facilities
- Excellent Irrigation Managers
- Cost-Benefit Is Well Defined



California Golf

- California Has 912 Courses
  - Municipal, Private, Restricted, Resort & Combination
- As An Economic Driver
  - California's golf industry produced $13.1 billion of economic activity & over 128,000 jobs in 2011
- Conversion to recycled water irrigation represents an untapped drought-proof supply of over 90,000 AFY of water to California



Advances In Technology & Project Delivery That Are Facilitating Local Recycled Water Response

- Advances in Development of Membrane Technologies
- Lower Capital and O&M Costs
- Acceptance by RB and DDW to meet WDRs & WRRs
- Funding Assistance at Local, State & Federal Levels

Design-Build Procurement

- Project Development Focus On Importance of Planning Level Actions
  - Identify & Orient Project To Meeting Owner Objectives
  - Procurement of Design & Construction Contractor Under A Single Contract
  - Use of Best Value Selection
  - Process Management As Owners Rep Maintains Focus on Owner Objectives

Challenges in Meeting California's Water Supply Availability

1. California's Failing Infrastructure

   Per ASCE's Infrastructure Report Card for California:

   - Drinking Water Needs = $44.5 Billion
   - Wastewater Needs = $26.2 Billion
   - 678 Dams Are High – Hazard Potential

2. Projects of Statewide Significance
   - Oroville Dam Spillway Emergency Repairs
   - Proposed Twin (Single?) Tunnel Project $10.7 to $16.3 Billion
   - Salton Sea Restoration $9 Billion

3. Climate Change & Reduced Sierra Snowpack

Challenges in Meeting California's Water Supply Availability

4. Analysis of Sufficient Supplies for Purveyors
   - Urban Water Mgt Planning Act
5. Analysis of 20-Year Adequacy for New Projects
   - SB610 & 221
6. Over Subscription of CO River
   - Quantification Settlement Agreement (QSA)
7. Impacts to Critical Habitat & TES
8. Contaminants of Emerging Concern

Trends

- Working Locally for Feasible Solutions
- Managing Demand
- Technology Improvements Local Capital and O&M Costs, Shrink Project Footprint
- Education / Outreach to Involve Stakeholders
- Willingness to Think Differently

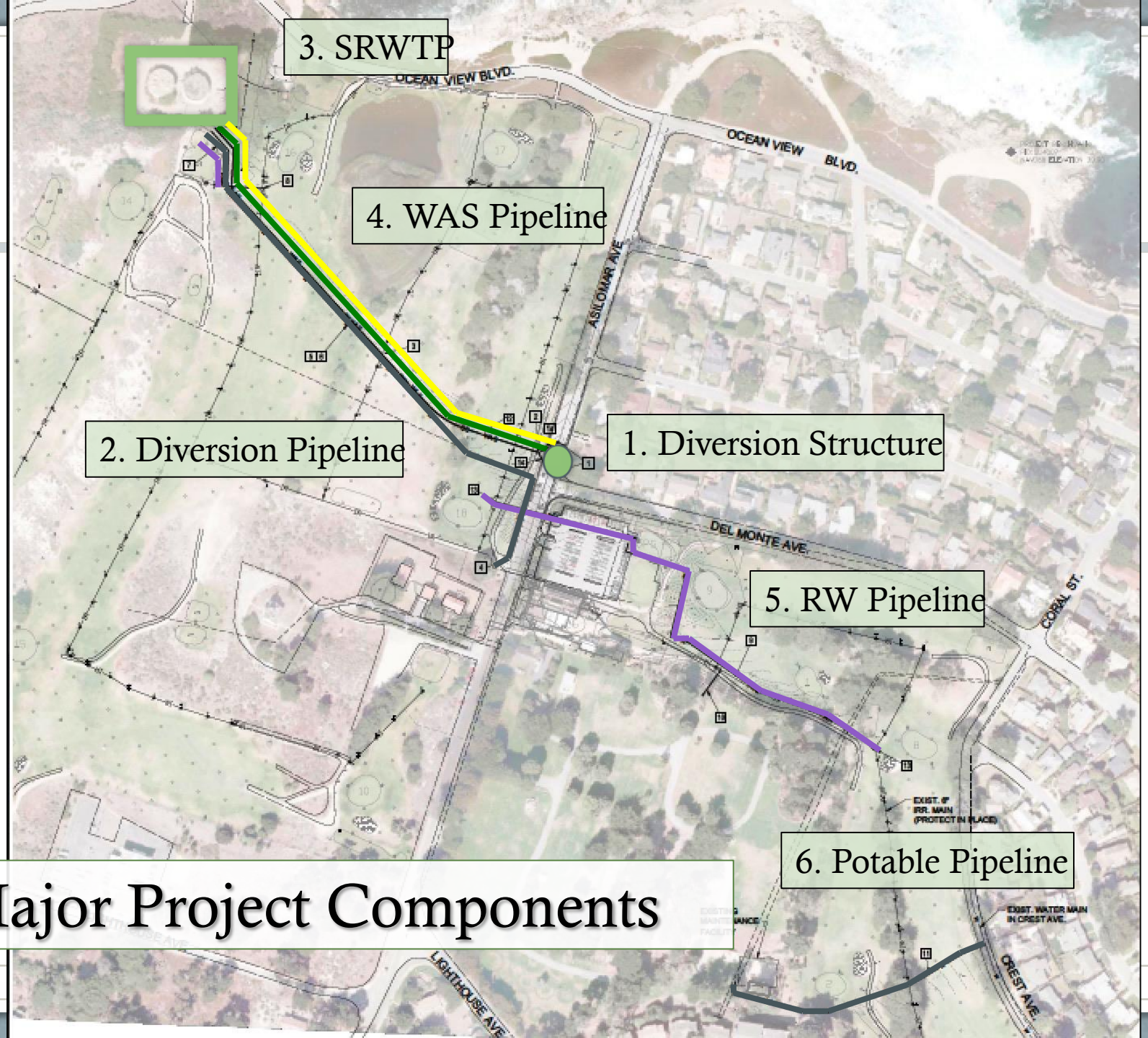
Pacific Grove Example

City of Pacific Grove's Objectives

- ***Produce*** 125 acre-feet per year of Recycled Water for Local Irrigation Use
- ***Achieve*** Final Completion by Spring 2017
- ***Avoid*** Implications of Cease and Desist Order
- ***Comply*** with Regulatory and SRF Loan Requirements
- ***Design & Build*** a Cost Competitive Facility with Capacity of 0.25 MGD
- ***Focus*** Design on Future Expansion Capacity
- ***Focus*** on Life-Cycle Cost and Long /Useful Life of Facilities
- ***Allocate*** Project Risk to a Single Design/Build Team

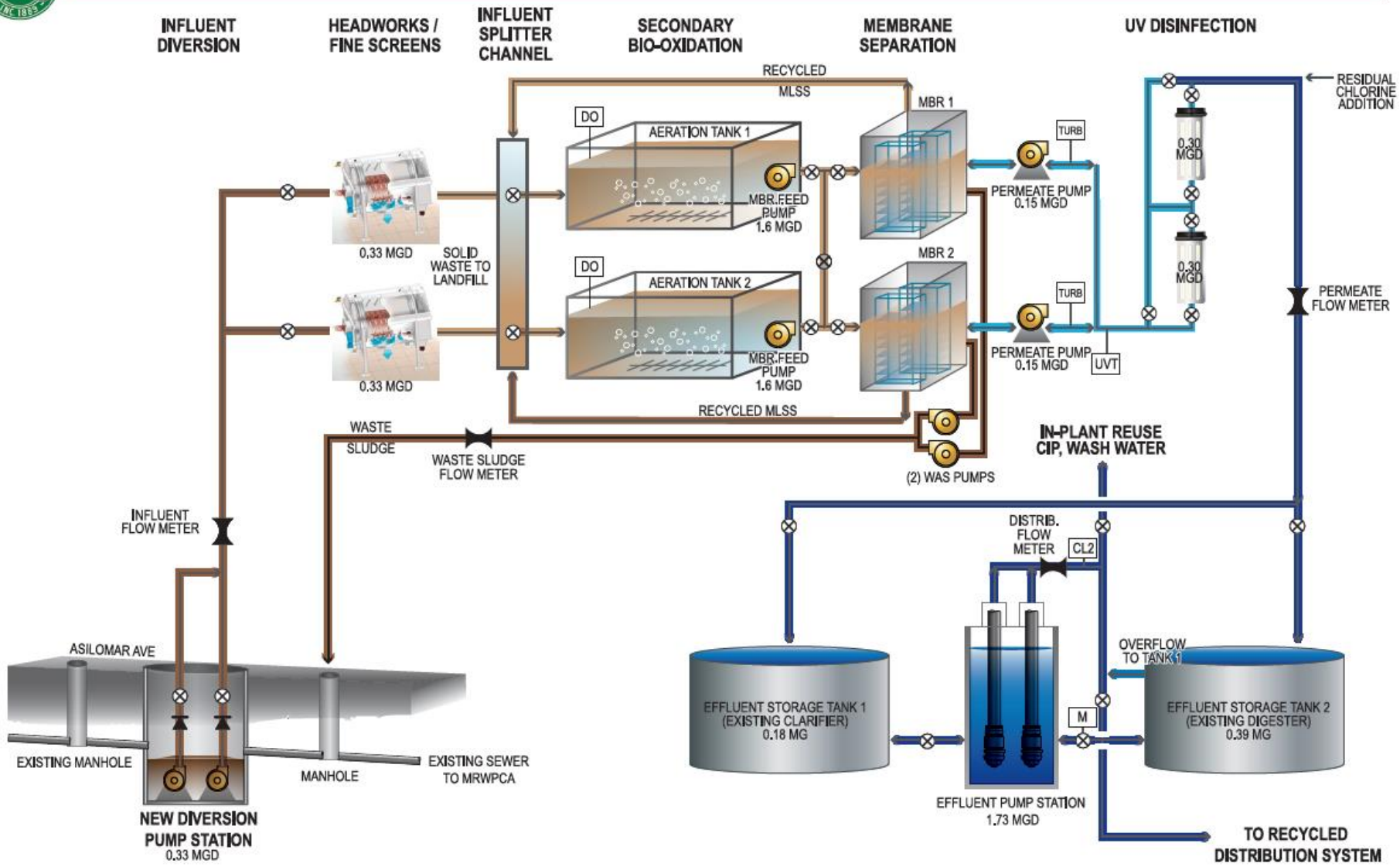
Design Response

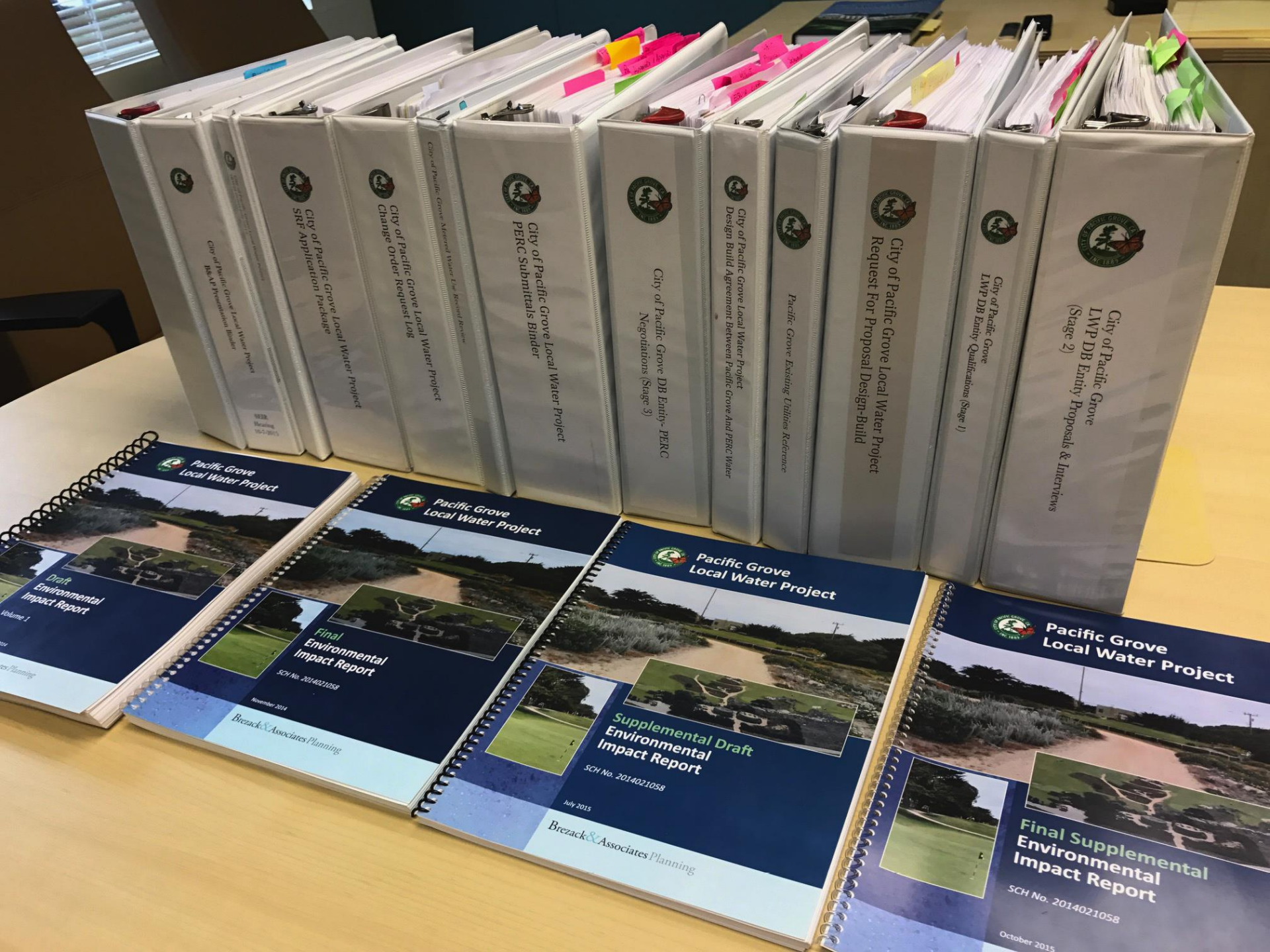
- ***Quality*** Materials and Equipment, Designed for Corrosive Environment
- ***Proven*** Reliable MBR Technology with Extended Warranties
- ***Competitive*** Procurement Process
- ***Designed*** to Consistently Produce 0.25 MGD
- ***Flexibility*** for ease of Future Expansion
- ***Designed*** for Aesthetics and Appearance
- ***Meets*** the Project Schedule



Major Project Components

PACIFIC GROVE LOCAL WATER PROCESS FLOW DIAGRAM




City of Pacific Grove
LWP DB Entity Proposals & Interviews
(Stage 2)
City of Pacific Grove
LWP DB Entity Qualifications (Stage 1)
City of Pacific Grove Local Water Project
Request For Proposal Design-Build
Pacific Grove Existing Utilities Reference
City of Pacific Grove Local Water Project
Design Build Agreement Between Pacific Grove And PERC Water
City of Pacific Grove DB Entity- PERC
Negotiations (Stage 3)
City of Pacific Grove Local Water Project
PERC Submittals Binder
City of Pacific Grove Local Water Project
Change Order Request Log
City of Pacific Grove Local Water Project
SRF Application Package
Pacific Grove
Local Water Project
Draft
Environmental
Impact Report
Volume 1
Pacific Grove
Local Water Project
Final
Environmental
Impact Report
SCH No. 2014021058
November 2014
Brezack & Associates Planning
Pacific Grove
Local Water Project
Supplemental Draft
Environmental
Impact Report
SCH No. 2014021058
July 2015
Brezack & Associates Planning
Pacific Grove
Local Water Project
Final Supplemental
Environmental
Impact Report
SCH No. 2014021058
October 2015

Water Recycling Facility Layout

Water Recycling Facility Longevity

What We Learned

Challenges		Lessons Learned
Competition for $ Availability		Allow Additional Time
Innovation Isn't Easy		Transparency & Openness Pays Off
Your Issues ≠ Their Issues		Stakeholder Support Is Important
City's 1st Time Through This Process		Team's Experience Is Important to Anticipate Issues & Craft Robust Process

Permits Approvals Received

- CC-RWQCB / SWRCB DDW:
  - General Waste Discharge Requirements for Recycled Water Use
  - Recycled Water Production Permit
  - General Construction Storm Water NPDES Permit
- Cal-AM:
  - Compliance w/Backflow Prevention Requirements (Submitted; Final @ Start-Up)
- City Utility Plan Approval
- CCC: Coastal Development Permit Waiver
- MBUAPCD: Authority to Construct/Permit To Operate

Groundbreaking to Ribbon Cutting

December 9, 2016

December 6, 2017

PGLWP Financial Overview

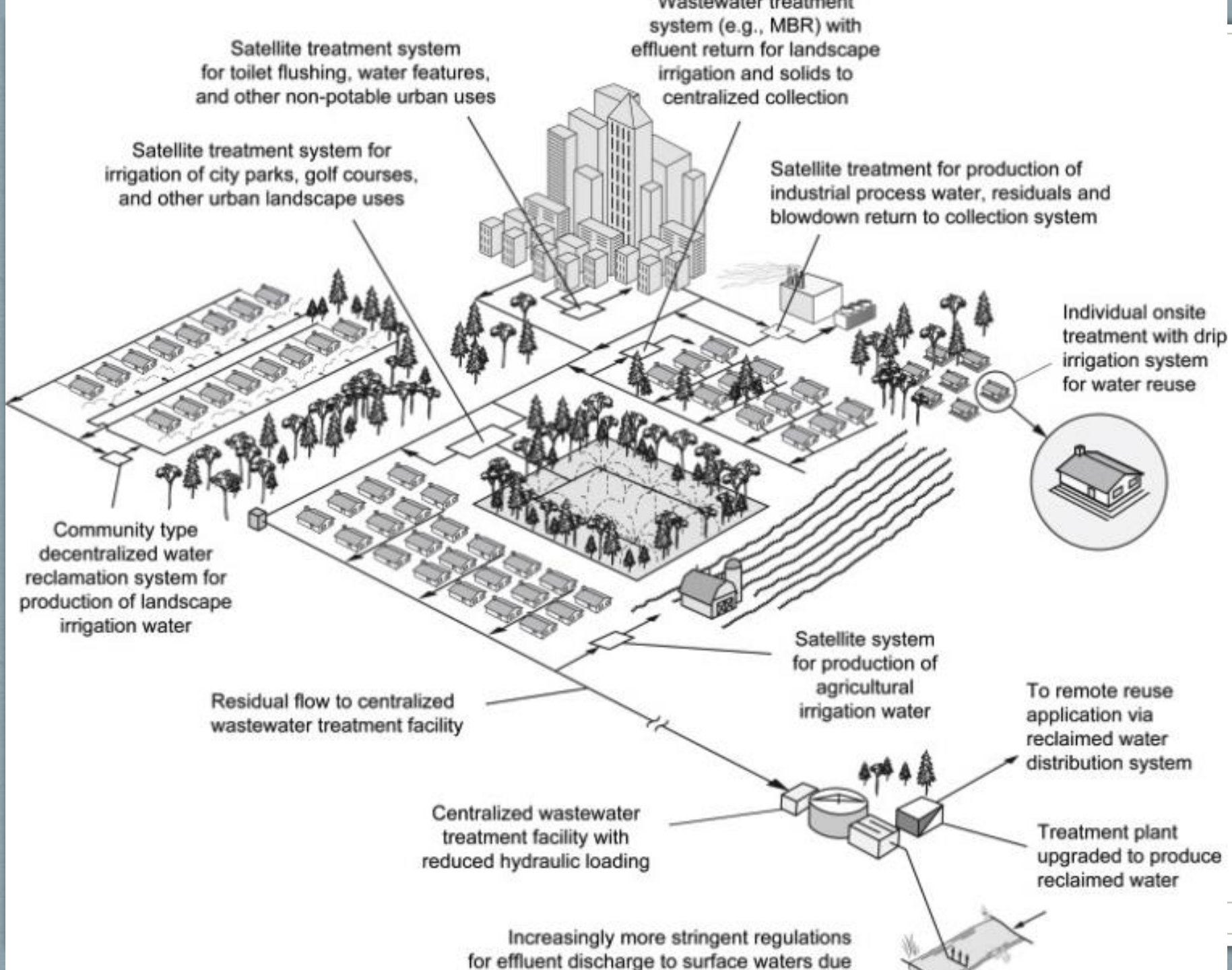
PROJECT COST	=	$7.7 M
STATE WRLP GRANT	=	$2.42 M
NET FINANCED	=	$5.29 M
30 YEAR @ 1%	=	$205,000
ANNUAL O&M	=	$238,000
TOTAL ANNUAL	=	$443,000
UNIT COST	=	$3,544 / AF

Structure Being Built

Discussion

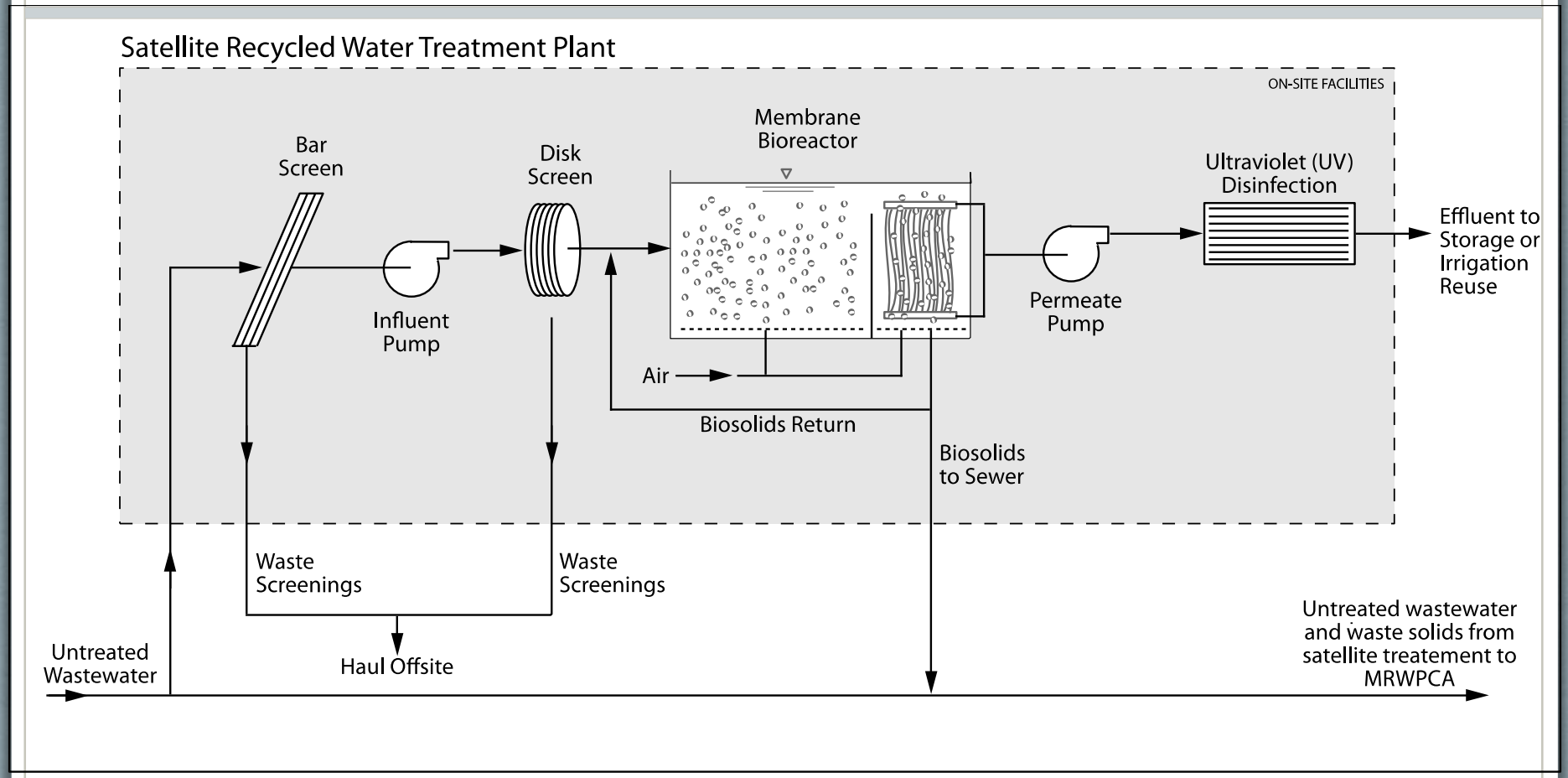
Major Milestone Status

• Design Notice to Proceed	11/18/15
• 100% Designs Approved	8/26/16
• Final SWRCB Budget Approval	10/11/16
• Construction Notice to Proceed	10/18/16
• Recycled Water Production Permit	12/8/16
• City Groundbreaking	12/9/16
• Construction Completion	8/14/17
• O&M Startup	11/2/17
• Full Implementation	11/10/17

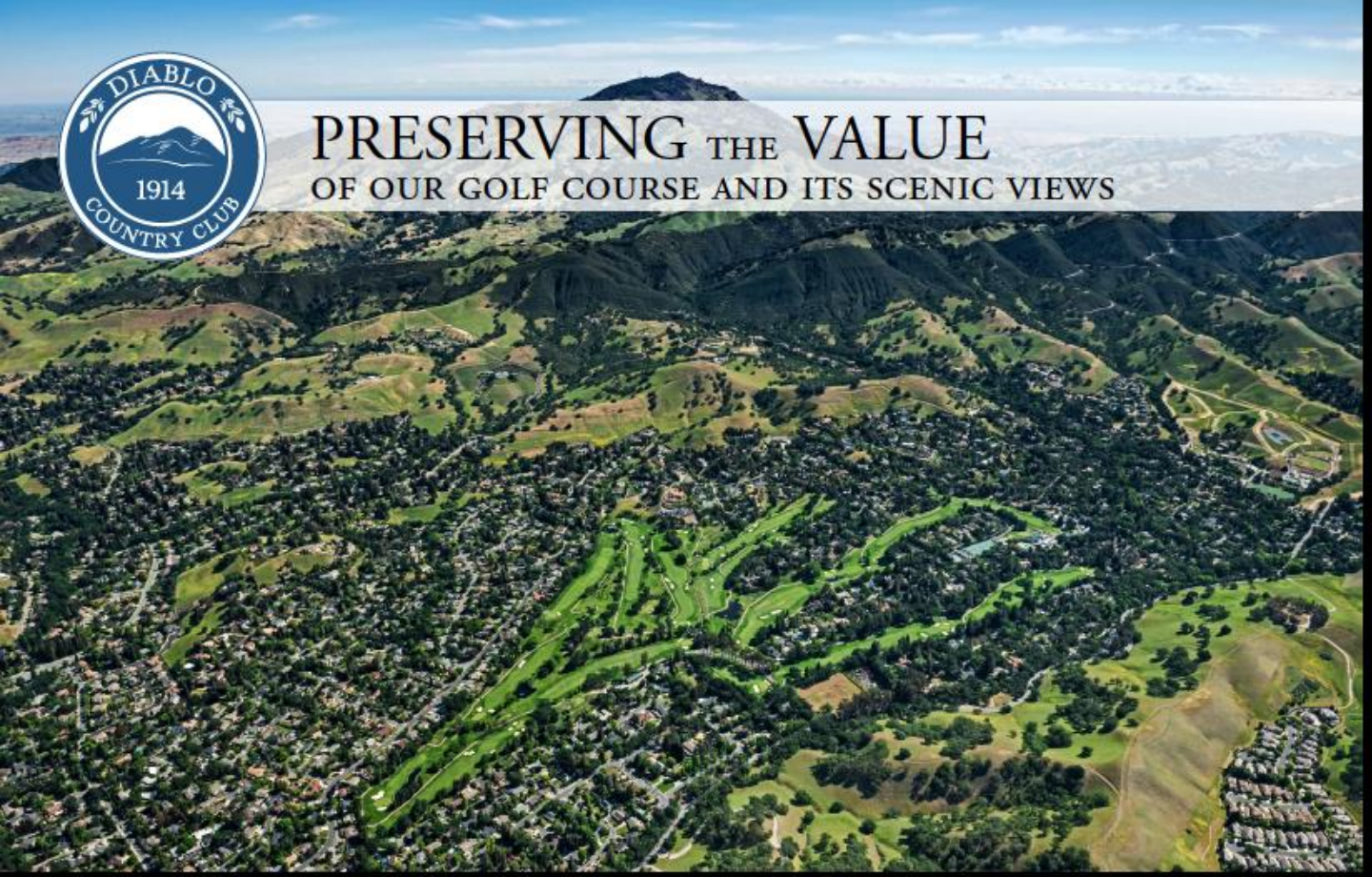

Wastewater treatment system (e.g., MBR) with effluent return for landscape irrigation and solids to centralized collection
Satellite treatment system for toilet flushing, water features, and other non-potable urban uses
Satellite treatment system for irrigation of city parks, golf courses, and other urban landscape uses
Satellite treatment for production of industrial process water, residuals and blowdown return to collection system
Individual onsite treatment with drip irrigation system for water reuse
Community type decentralized water reclamation system for production of landscape irrigation water
Satellite system for production of agricultural irrigation water
Residual flow to centralized wastewater treatment facility
To remote reuse application via reclaimed water distribution system
Centralized wastewater treatment facility with reduced hydraulic loading
Treatment plant upgraded to produce reclaimed water
Increasingly more stringent regulations for effluent discharge to surface waters due

Diablo CC Example

Proposed Treatment Train

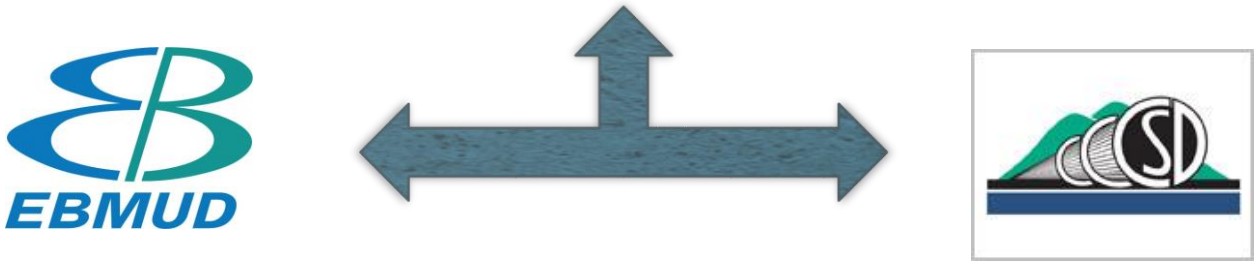


PRESERVING THE VALUE
OF OUR GOLF COURSE AND ITS SCENIC VIEWS



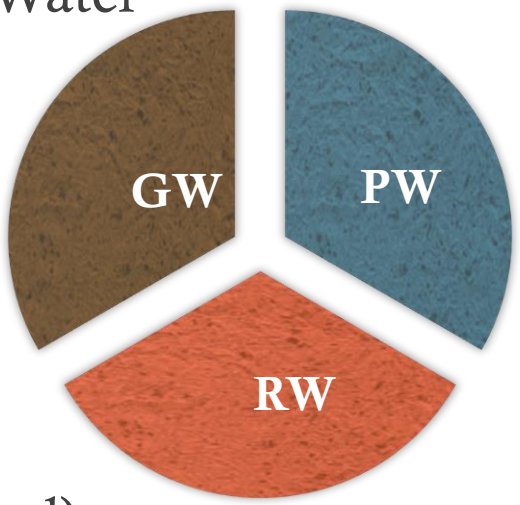
SWRF Satellite Recycled Water Treatment Plant

- Ongoing Coordination with Central San & EBMUD:
  - Club Signed Memorandums of Understanding for Project Collaboration & Development.
  - Project Agreement w/Central San
  - Investigated Potential Grant Funding.

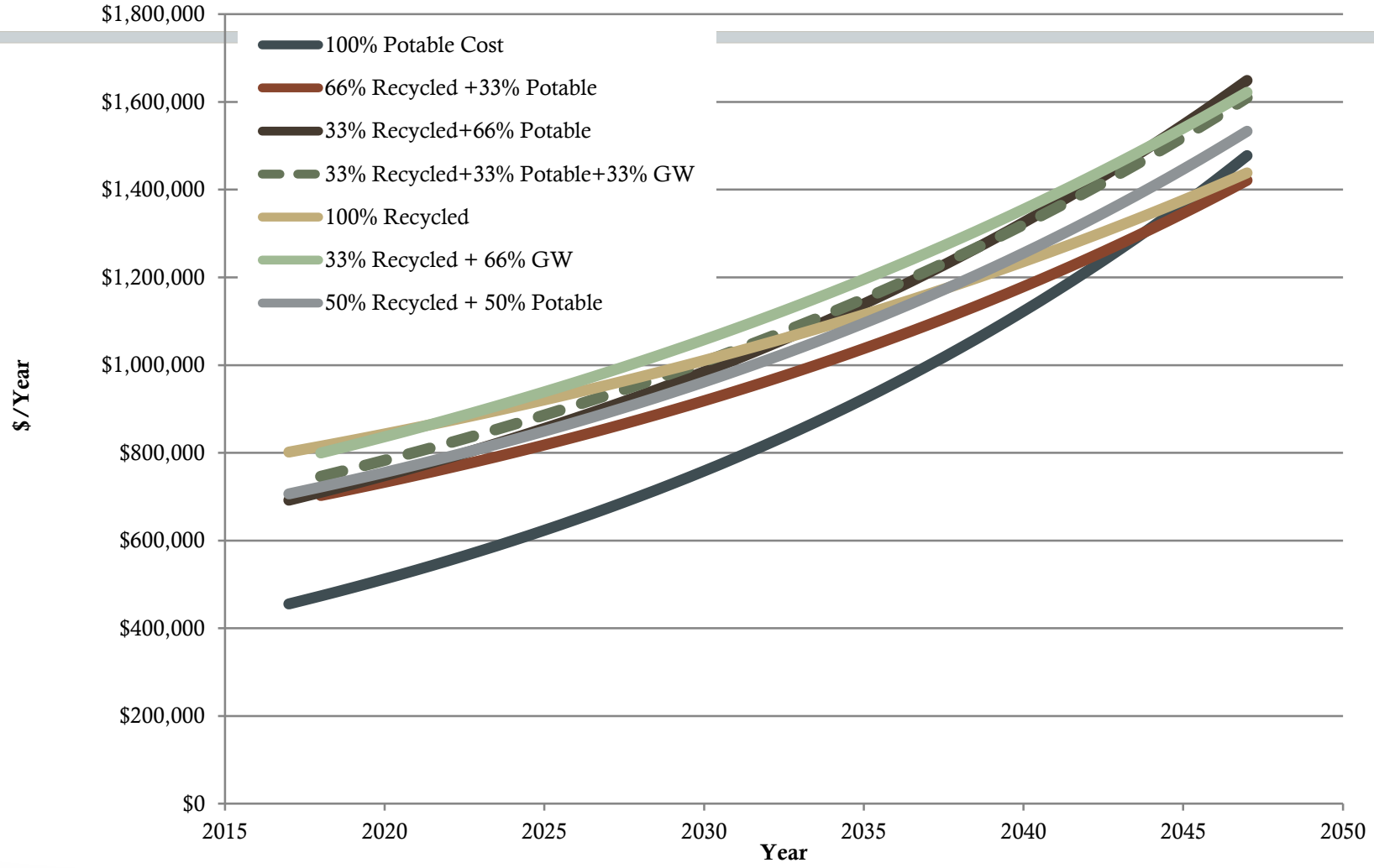


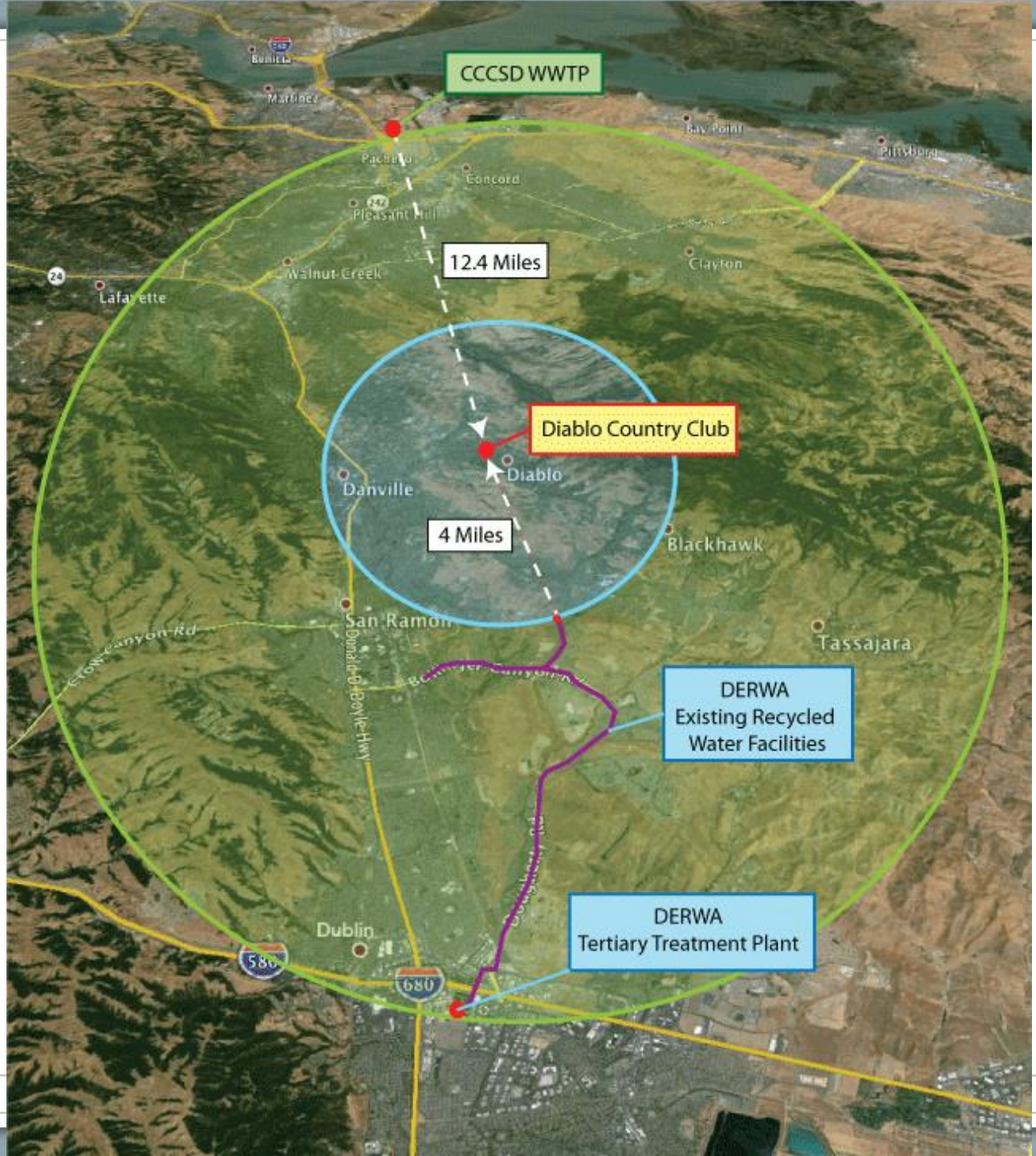
Groundwater Investigations

- Initial Project Objective = 60 gpm
  - Designed to Meet 1/3 of Irrigation Demands
  - Matched w/Potable + Reclaimed Water
- Historical Data Search
- Utility Investigations
- Onsite Testing:
  - St Timothy's = 7.5 gpm
  - Local Well = 9 gpm (not sustained)



Unit Cost Basis




CCCSD WWTP
12.4 Miles
Diablo Country Club
4 Miles
DERWA
Existing Recycled
Water Facilities
DERWA
Tertiary Treatment Plant
Martinez
Concord
Pleasant Hill
Walnut Creek
Lafayette
Clayton
Danville
Diablo
Blackhawk
San Ramon
Tassajara
Dublin
680

215 AFY SWRF (0.4 MGD)

Application	Number	Design Capacity
Influent Pumps	Duty and installed backup	0.53mgd [a]
Screens	Duty and installed backup	0.53mgd [a]
Biological Reactors	Two trains, no backup	0.20 mgd each train
Biological System Support Equipment (Blowers, Pumps etc.)	Duty (2)	0.20 mgd each train
MBR Tanks	Two trains, no backup	0.20 mgd each train with peaking factor of 1.2
MBR Support Systems (blowers, pumps, etc.)	Duty (2) and installed backup	0.20 mgd each train with peaking factor of 1.2
UV Disinfection	Duty and installed backup	0.48 mgd
Chemical Feed Systems for MBR: (e.g.; Liquid Hypochlorite, MBR cleaning chemicals)	Duty and boxed spare	0.48 mgd

[a] Provides feed at the maximum MBR filtration rate (0.4 mgd x 1.2 peaking factor) plus 10%, which is maximum, WAS rate. 1.2 PF is for Max day. Max hour could be greater

PROPOSED PROJECT
DIABLO COUNTRY CLUB SWRF

Bull Stockwell Allen Photo Simulation

"Pilot" Nature of Diablo Project

- Other Similar Projects Had Previously Been Proposed
- Not Precedent Setting for the Purveyors
- Timing Was Ripe for Diablo:
  - Middle of 4-Year Drought
  - Similar Old & New Projects in Monterey County
  - Lack of Debt & Financial Capacity to "Go It Alone"
  - Willingness to Invest for the Club's Next 100 Years

Benefits of Recycled Water Extend Beyond the Club

- Saves Potable Water for Potable Uses
- Expands Regional Water Supply Portfolio
- Produces A "Drought-Proof" Supply for the Club
- Stabilizes the Club's Costs of Water
- Produces Positive Public Relations
- Consistent with Environmental & Conservation Ethics

Diablo's Irrigation Demand

- Average Annual Day
  - 260,000 GPD Year-round 2009
  - 180,000 GPD Year-round 2015
- Historical Peak Day
  - 800,000 GPD
- Annual Average Demand
  - 198 AFY
  - ~90 Million Gallons / Year 2009
  - ~65 Million Gallons / Year 2015
- 1 Billon Gallons Over the Life of 30-Year Loan

DCC Recycled Water Focus

1. Required Investigations:
   - Monetary Feasibility
   - Acceptable to Membership
   - Acceptable to Local Utilities & Regulatory Agencies
2. Initial Planning Level Cost Estimates:
   - Based on Above Investigations
   - Foundational to Everything Else

Diablo County Club's Initial Project Development

- Investigate Potential Water & Energy Conservation Savings
- Alternatives for Onsite Energy Production
- Review of Water & Energy Billing Records
- Interior & Exterior Audits of Water & Energy Use
- Club's Conclusion:
  - To Strongly Pursue Water Savings
  - Including Focus on Recycled Water