



PUBLIC WORKS DEPARTMENT
WATER RESOURCES DIVISION

Subsurface Desalination Intake & Potable Reuse Feasibility Studies

Regional Water Quality Control Board
San Luis Obispo, CA
May 11, 2017

SantaBarbaraCA.gov/Water



Agenda

- Feasibility Studies Background & Objectives
- Subsurface Intake Study Summary
- Potable Reuse Study Summary
- Overall Study Summary



Feasibility Studies

Background & Objectives

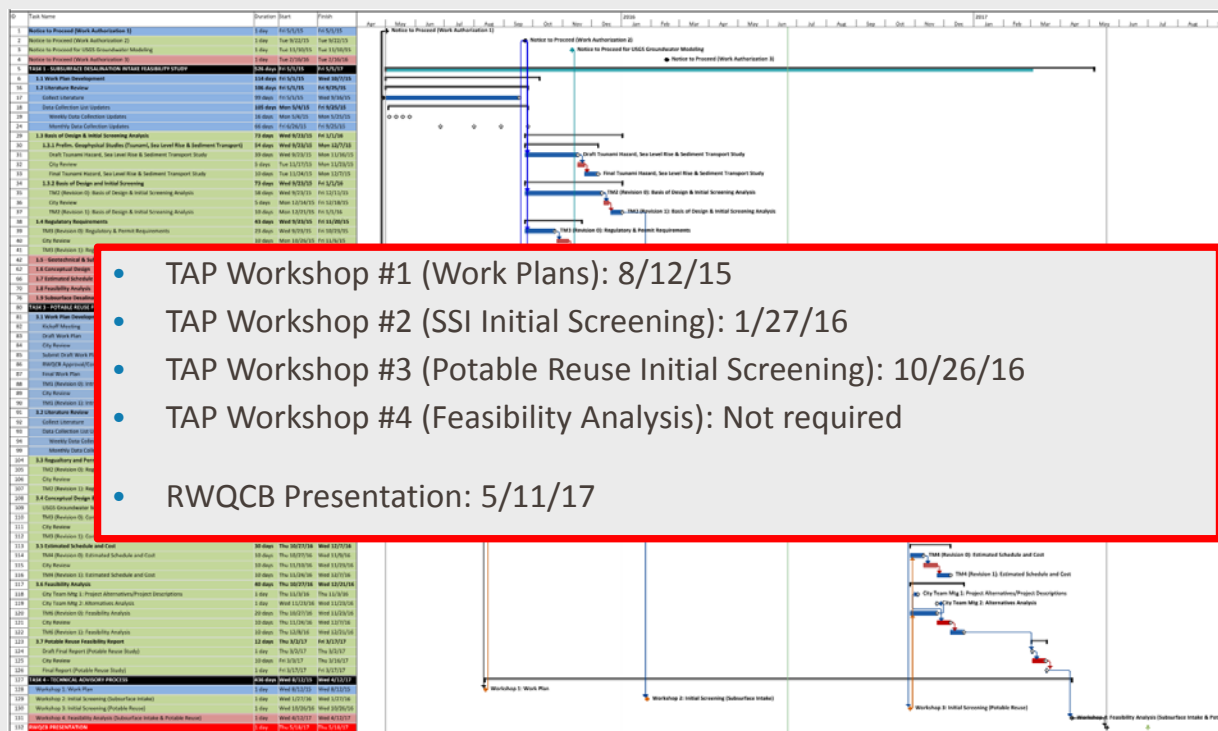
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City Council & RWQCB directed City staff to evaluate the feasibility of subsurface intakes & potable reuse

- **Scope of Study:** “direct staff...[to evaluate the] feasibility, cost & timeline associated with both converting the offshore facility to a subsurface intake & look at the options about potable reuse” (City Council 9/23/14)
- Scope includes:
 - Identifying feasible alternatives
- Scope excludes:
 - Determining best alternative

Permit deadline drove the project schedule



- TAP Workshop #1 (Work Plans): 8/12/15
- TAP Workshop #2 (SSI Initial Screening): 1/27/16
- TAP Workshop #3 (Potable Reuse Initial Screening): 10/26/16
- TAP Workshop #4 (Feasibility Analysis): Not required
- RWQCB Presentation: 5/11/17



Work Plans define how the studies are to be conducted

- Circulated publicly
- Reviewed by third party Technical Advisory Panel (TAP)
- Approved by RWQCB in October 2015



Work Plan – Study objectives

- Included analysis of maximum yield that is technically feasible, even if the yield is not sufficient to fully replace:
 - Desal Screened Open Ocean Intake, or
 - Desal Plant Production
- Will be used to inform future studies
- All information associated with the Approved Work Plan, and both the SSI and Potable Reuse Studies are available at the following website:

<http://www.nwri-usa.org/santa-barbara-panel.htm>



Alternatives fell under the following categories during the initial screening of technical feasibility

1. Infeasible (NF)
2. Potentially feasible, does not meet Study goals (PF*)
3. Potentially feasible (PF)

Only "PF" alternatives were evaluated for social, environmental & economic feasibility

Process approved by RWQCB October 2015



Subsurface Intake (SSI) Study Summary

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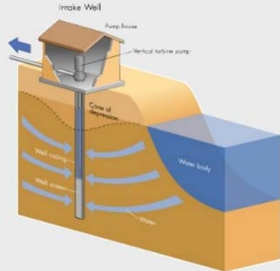


Project capacity

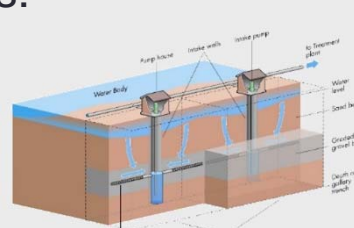
- Replace City's existing screened open ocean intake
- Provide seawater for build-out capacity of 10,000 AFY
 - Design capacity: 15,898 gpm
 - *Includes:*
 - 45% RO recovery
 - Volume of raw water needed for pretreatment backwashing

Intake technologies

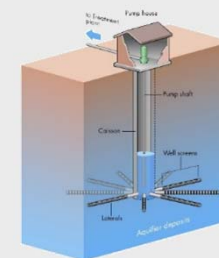
- Based on state of intake technology & recent studies conducted by others:



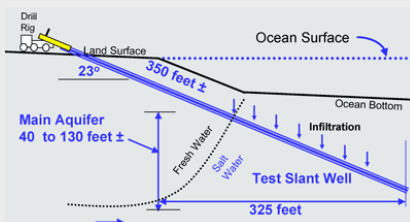
Vertical Wells



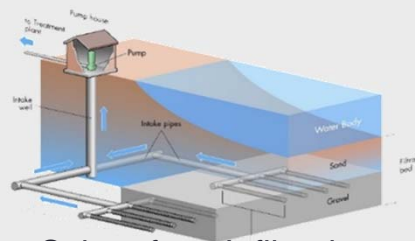
Lateral Beach Wells (Onshore Infiltration Galleries)



Radial Collector Wells (i.e., Ranney Wells)



Slant Wells



Subsurface Infiltration Galleries (SIG) – offshore

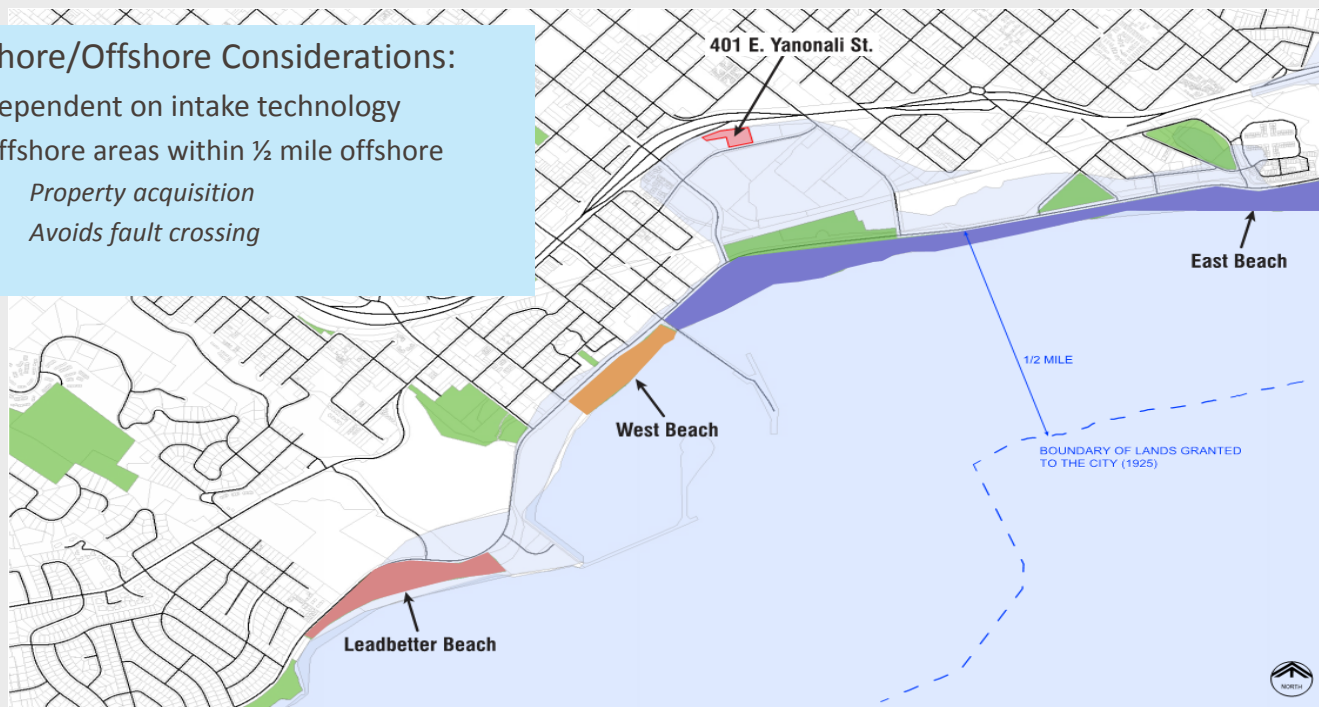


HDD wells (i.e., Neodren)

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Site alternatives

- Onshore/Offshore Considerations:
 - Dependent on intake technology
 - Offshore areas within ½ mile offshore
 - Property acquisition
 - Avoids fault crossing



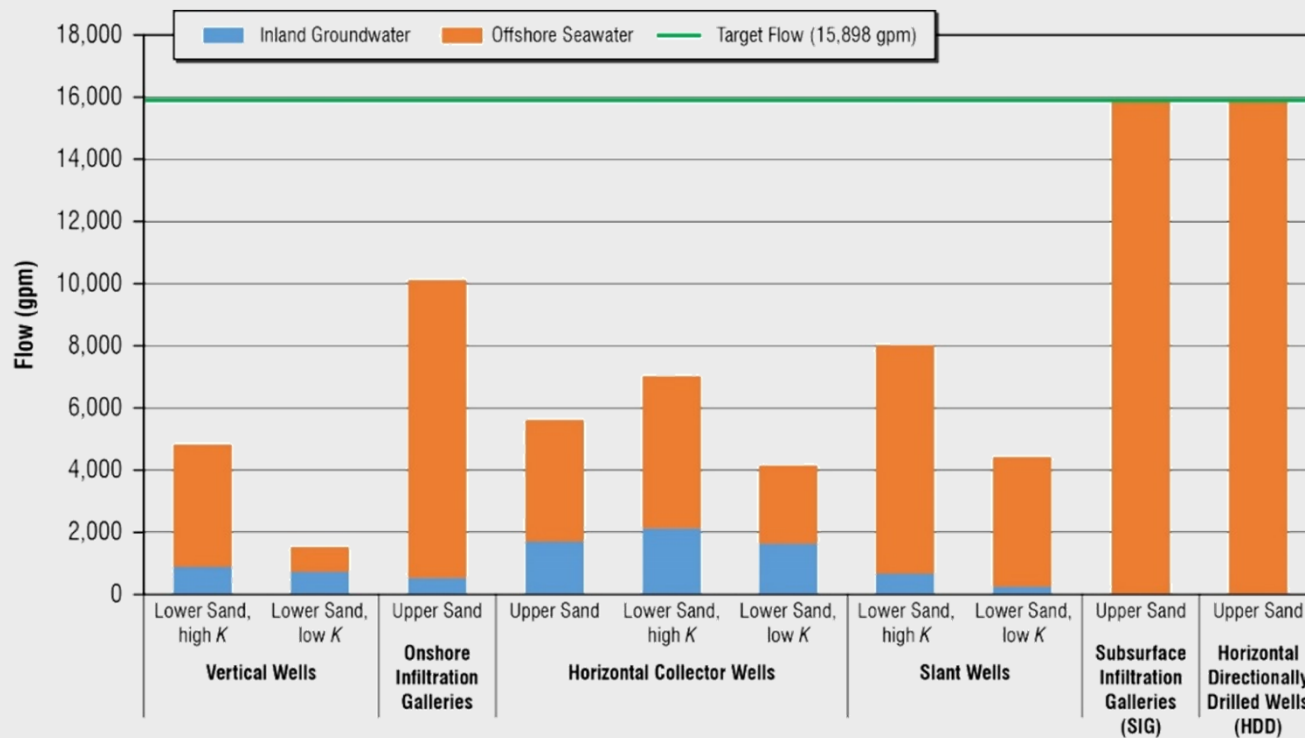


Conceptual designs developed for alternatives

- Based on greatest production capacity if unable to meet 10,000 AFY production requirement
- 9,000 feet of beach available for SSI development
 - East Beach: 5,300 feet
 - West Beach: 1,300 feet
 - Leadbetter Beach: 2,400 feet
- Property available (condemnation not required)
- Assume re-use of existing intake pipeline



Maximum water yield from SSI alternatives obtained



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No alternative passed initial screening criteria

- All well options and onshore infiltration galleries
 - Impacted sensitive habitat areas
 - Design and construction constraints
- SIG alternative constrained by seismic and oceanographic factors



HDD wells passed all initial screening criteria except for precedent

- No California or U.S. experience
- 10 years of global experience
 - Inconsistent performance
- “Not Feasible” conclusion supported by TAP assembled by California Coastal Commission for proposed Huntington Beach desalination facility.
- Experience at San Pedro de Pinatar (Spain)
 - Capacity loss & poor water quality
 - Expansion will use screened open ocean intake

HDD wells conceptual design





SSI feasibility study recommends monitoring HDD technology

- HDD technology is being tested by others
 - SDCWA pilot test @ Camp Pendleton



Potable Reuse (PR) Study Summary

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Potable Reuse study considers

- Non-Potable Reuse (NPR)
- Indirect Potable Reuse (IPR)
- Direct Potable Reuse (DPR)

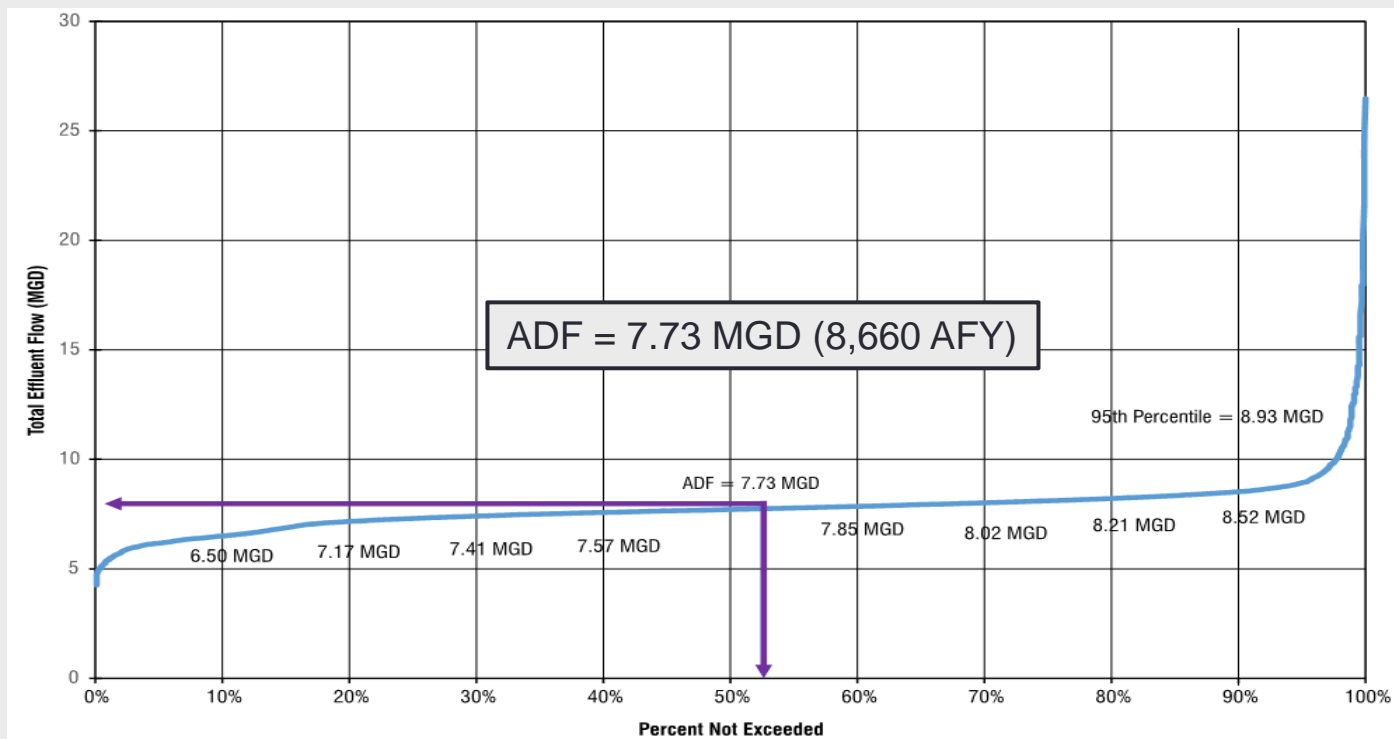
** Regulations and terminology for potable reuse continues to evolve*



Target production capacity is specified in the Work Plan

- Yield based on City's permitted desalination plant capacity
 - 10,000 AFY
- City produces 1,400 AFY of NPR water
 - Potable Reuse alternatives cannot impact NPR production
- Combined Potable Reuse and NPR production capacity
 - 11,400 AFY
- El Estero WWTP Flow Characterization
 - Annual, daily, and hourly flows

How much feed water is available for Potable Reuse?

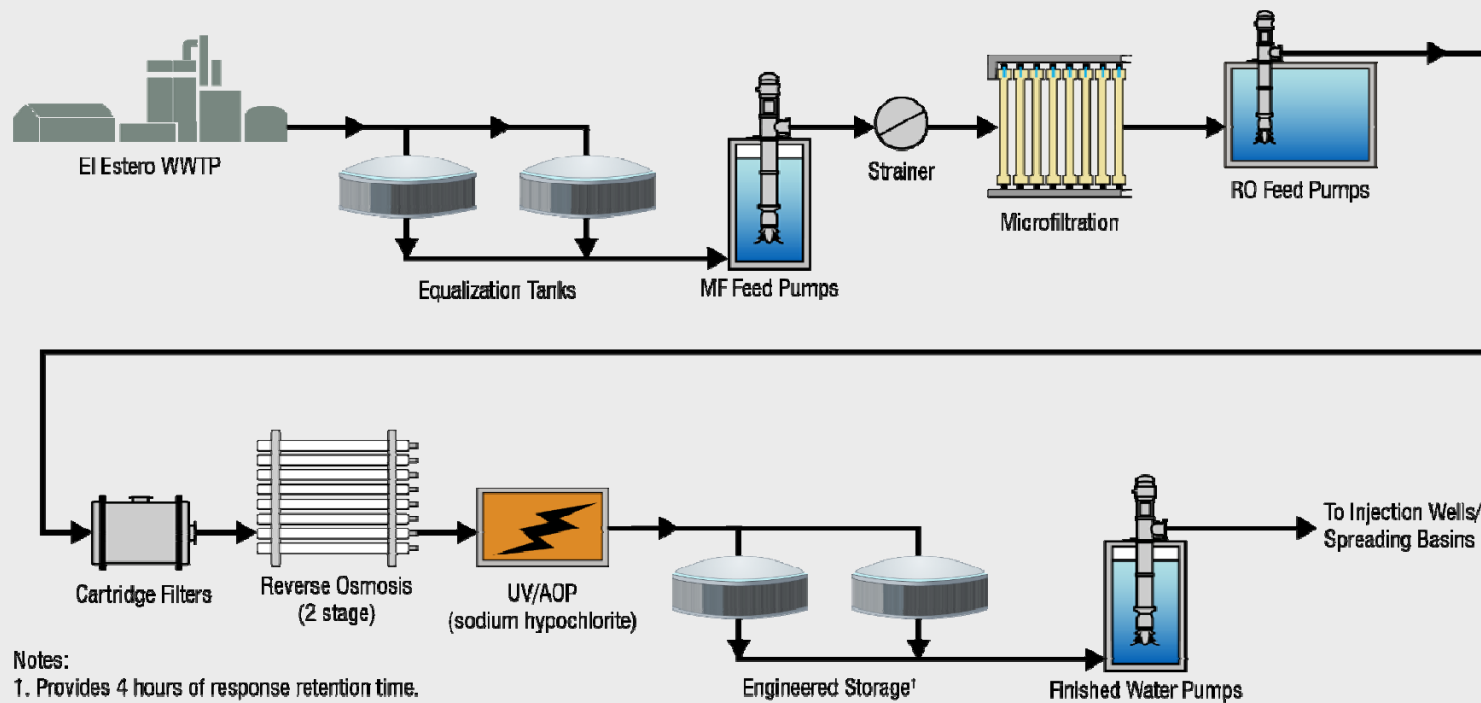




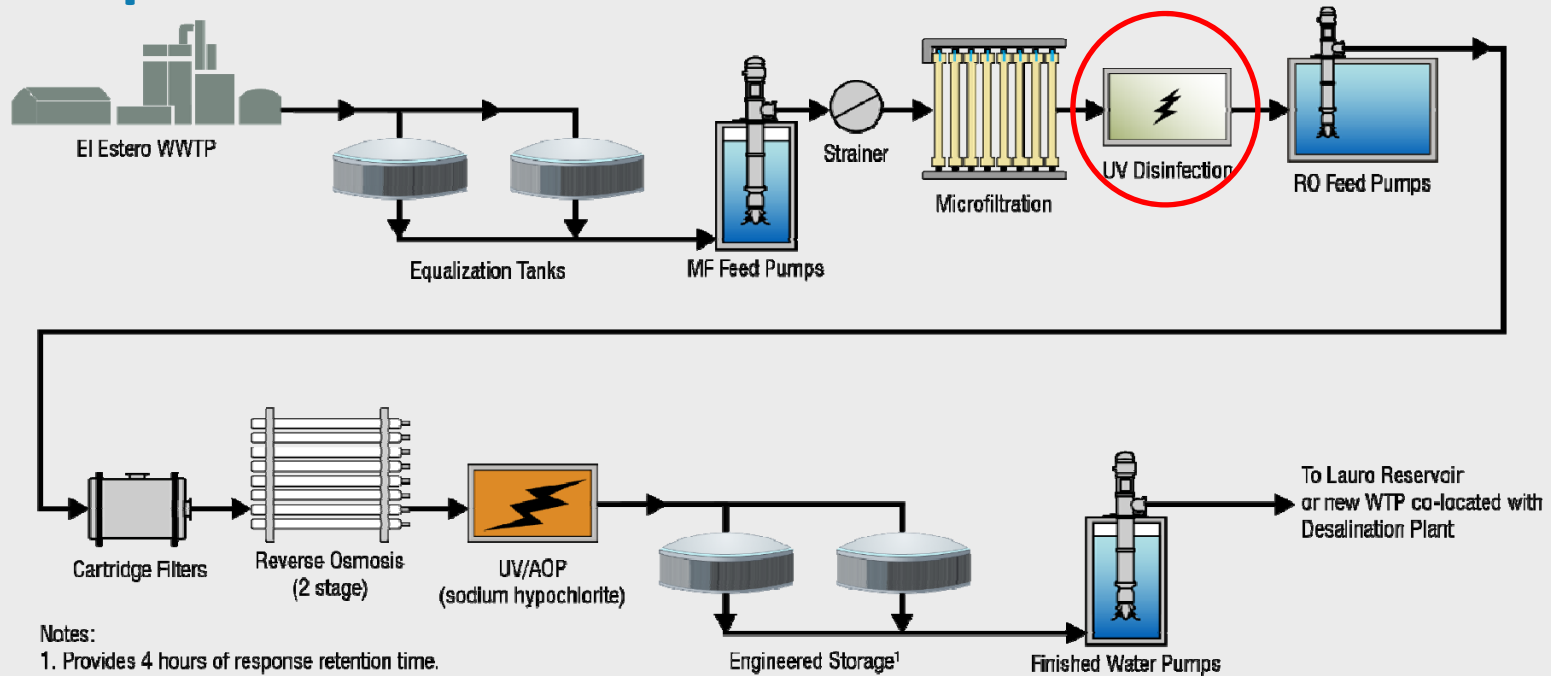
Non-Potable Reuse (NPR)

- Currently practiced by City
- Secondary effluent treated with MF & chlorination
- For study, it is assumed that NPR facilities will be relocated to Annex Yard
 - Incorporated into new IPR or DPR AWTF
 - Free up space at El Estero WWTP site
 - Consolidation of treatment equipment & operations expertise

IPR process is dictated by Title 22 requirements



DPR process based on most recent regulatory activity and precedents in California

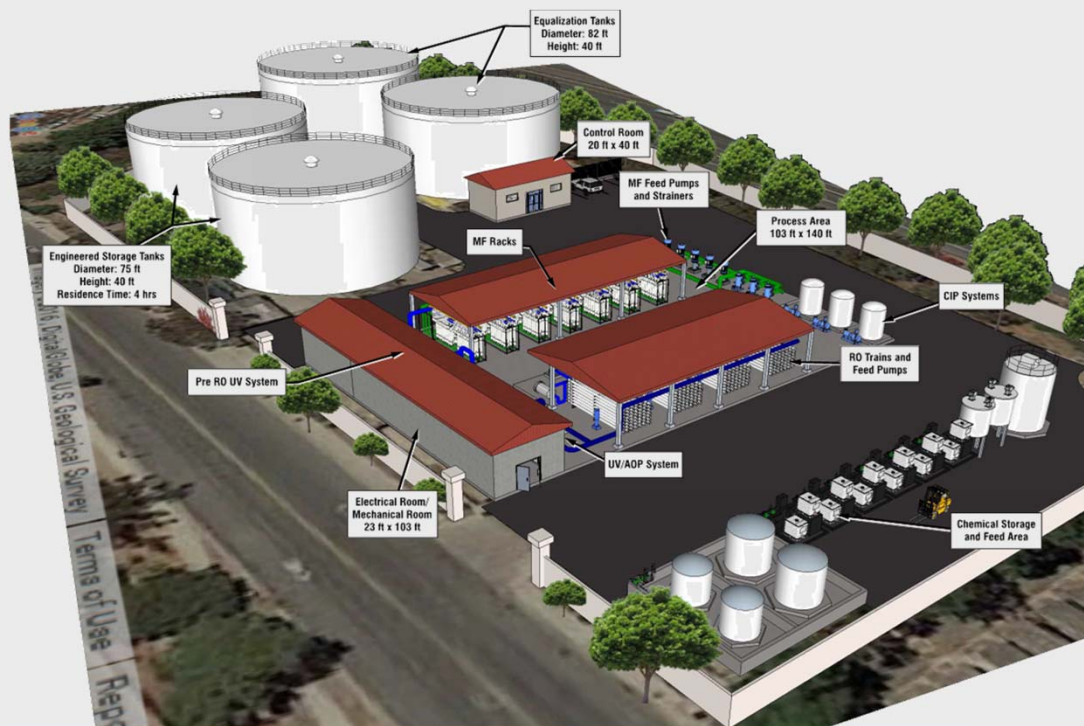




Advanced Water Treatment Facility (AWTF)

- Required for IPR and DPR
- Requires approximately 2.5 acres of land to accommodate tanks and equipment
- Proximity to the El Estero WWTP is key
 - Piping
 - Brine Disposal
 - Industrial Operation

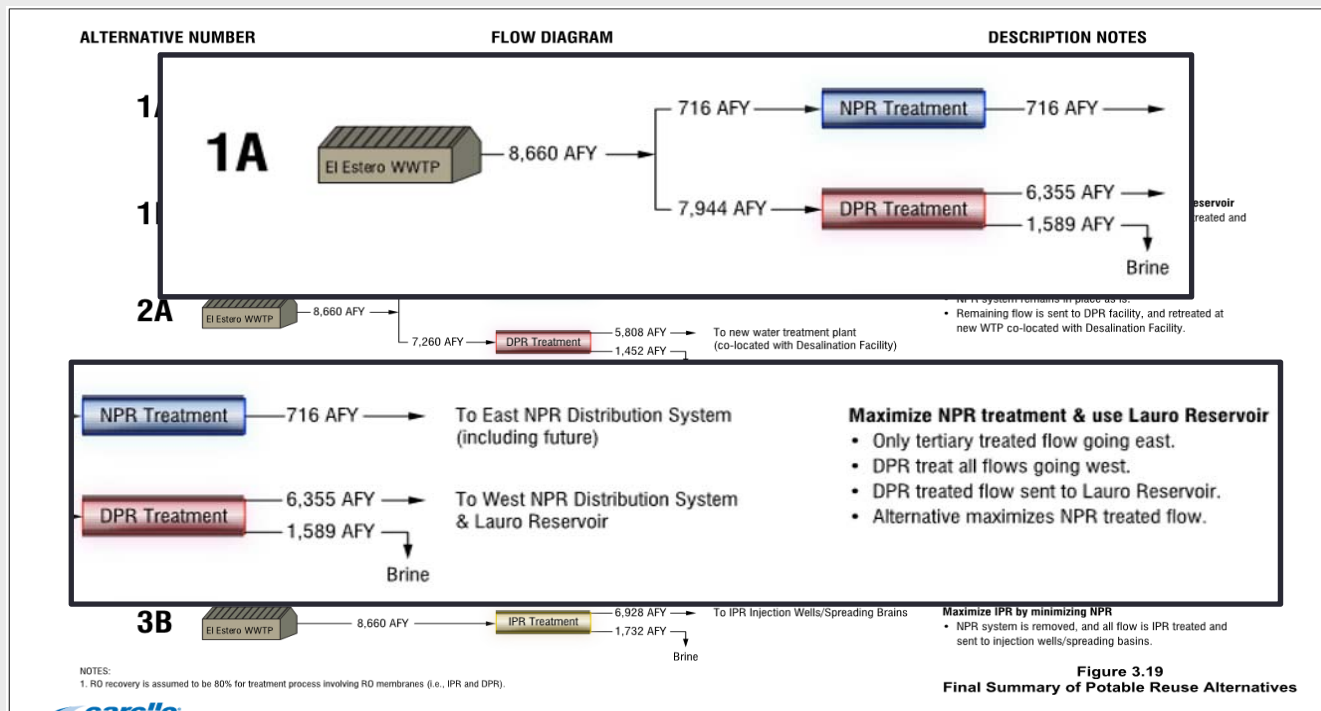
AWTF sited on Annex Yard property



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Final summary of PR alternatives

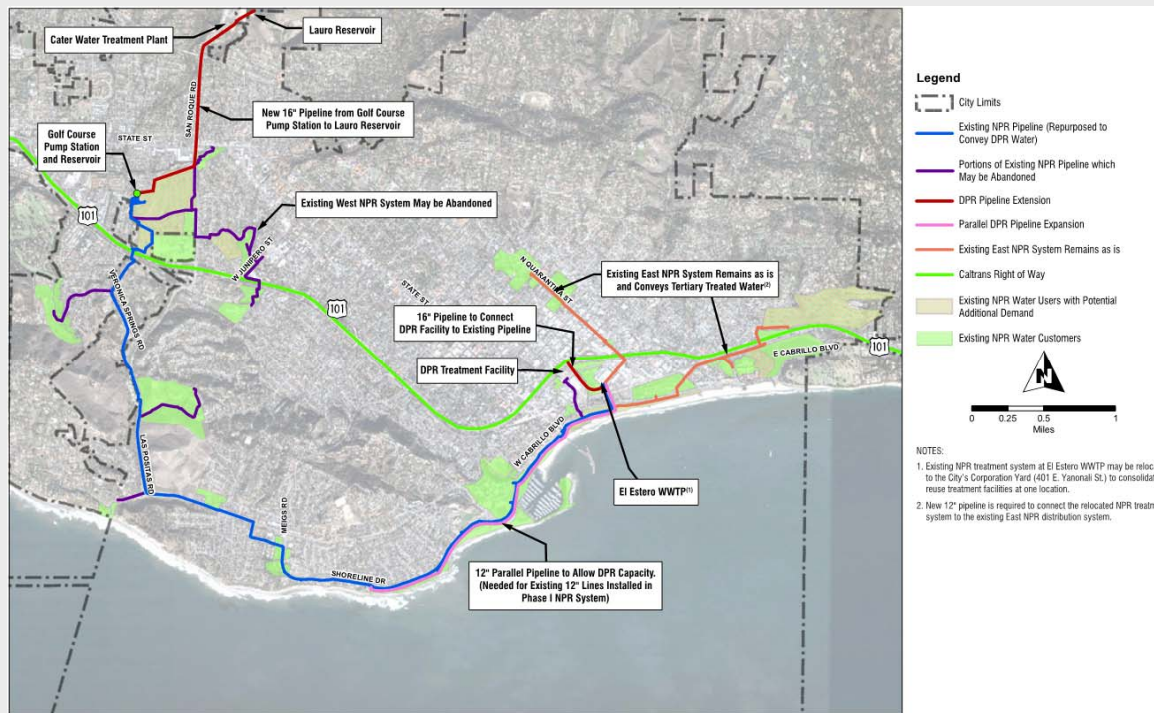


Summary of Potential Maximum Yields

Alternative Number	<u>Potential Maximum Yields (AFY)</u>			Total Yield
	NPR Yield	IPR Yield	DPR Yield	
Alt. 1A	716	0	6,355	7,071
Alt. 1B	0	0	6,928	6,928
Alt. 2A	1,400	0	5,808	7,208
Alt. 2B	0	0	6,928	6,928
Alt. 3A	1,400	5,808	0	7,208
Alt. 3B	0	6,928	0	6,928



Alternative 1A – Pipeline Alignment



None of the PR alternatives met study goals & survived initial screening

- **IPR** alternatives did not meet capacity or additional study criteria:
 - Insufficient groundwater storage capacity, regardless of available effluent
- **DPR** passed all initial screening criteria, except for one – adequate capacity
 - Limited availability of effluent from El Estero WWTP
 - Unable to produce 10,000 AFY (or 11,400 AFY)
 - No regulations exist



DPR regulations

- The State Water Resources Control Board (SWRCB) Division of Drinking Water concluded in late 2016 that it is feasible to develop regulations for DPR in California
- SWRCB is pushing forward with development of DPR guidelines and regulations
 - Establishing a schedule for development of Regulations
 - Taking steps to get away from DPR/IPR designation

DPR coalition

- The City is teaming up with three other Water Agencies to put forth plans for how DPR might work for each agency
 - *City of Santa Barbara*
 - *City of Ventura*
 - *San Francisco Public Utility Commission*
 - *Los Angeles Department of Water and Power*
- Plan to present findings to SWRCB to help with development of regulations
- The project will be facilitated by the National Water Research Institute (NWRI) with support from the Water Environment & Reuse Foundation (WE&RF)



Study Summary



SSI & PR Studies provide valuable information for future City planning efforts

- Study information will be used in the next Long-Term Water Supply Plan (LTWSP) Update to reflect:
 - *New Drought of Record*
 - *Pending Cachuma environmental decisions*
 - *Pending re-assessment of Cachuma operational yield*
 - *New normal for water usage and conservation*
- SSI & PR alternatives, along with other potential options, to be evaluated in the LTWSP Update



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Questions?

RWQCB
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