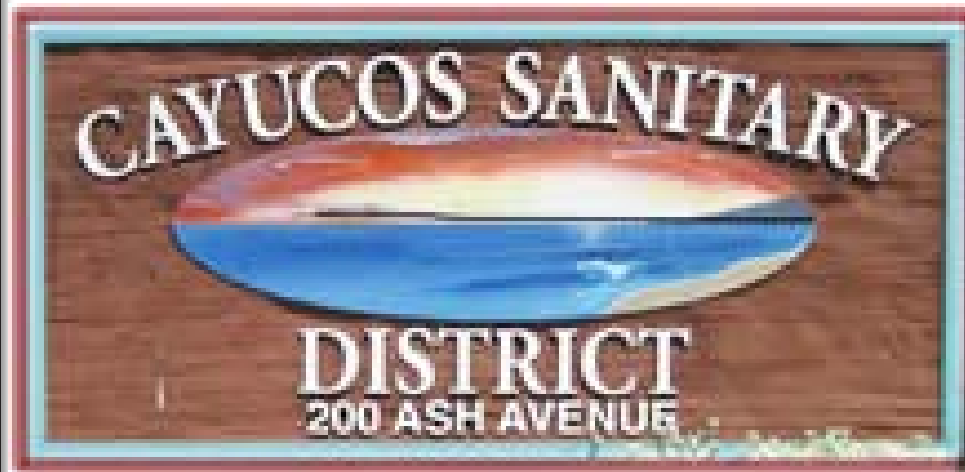


Cayucos Sustainable Water Project

Beneficial Use Analysis



Presentation Overview

- Water Supply & Demand Evaluation
- Recycled Water/Beneficial Use Alternatives



Water Supply

Cayucos Area Water Organizations (CAWO):

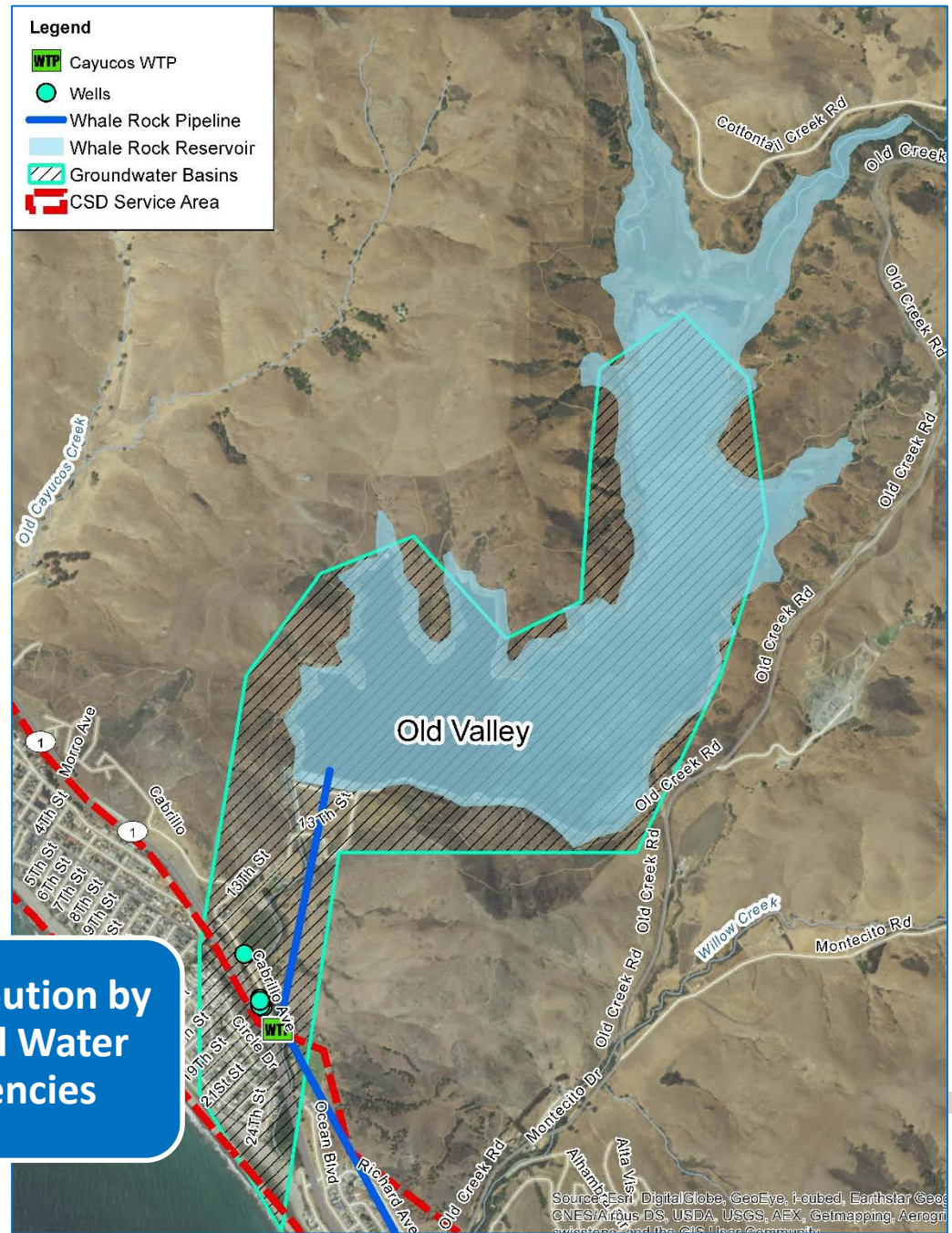
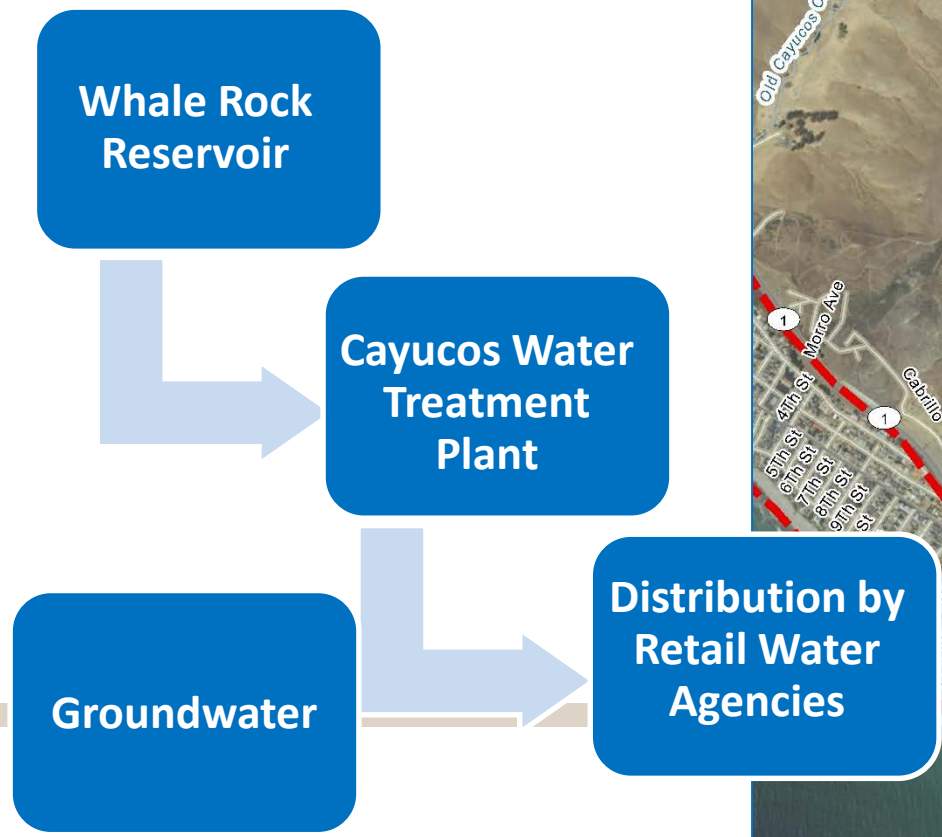
Morro Rock Mutual Water Company, Paso Robles Beach Water Association, County Service Area 10A, and Cayucos-Morro Bay Cemetery District.

Summary of Historical Supplies

Water Supply	Morro Rock MWC	PRBWA	CSA 10A	CCD	Total
Whale Rock Downstream Water Entitlement (AFY)	170	222	190	18	600
Nacimiento Water Project (AFY)			25 ¹		25
Grand Total (AFY)					625

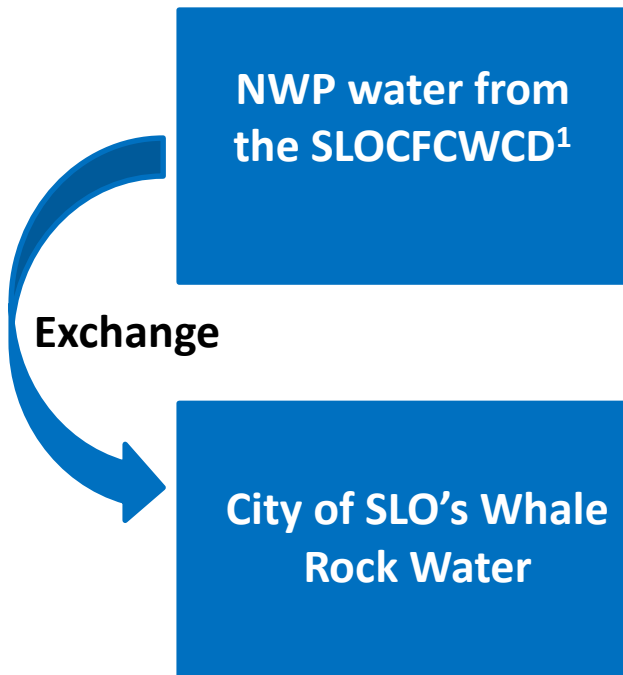
1. San Luis Obispo County Board approved requested increase in allocation from 25 AFY to 40 AFY on December 8, 2015. Final approval expected in March, 2016.

Water Production & Delivery



Water Supply

Nacimiento Water Project Exchange

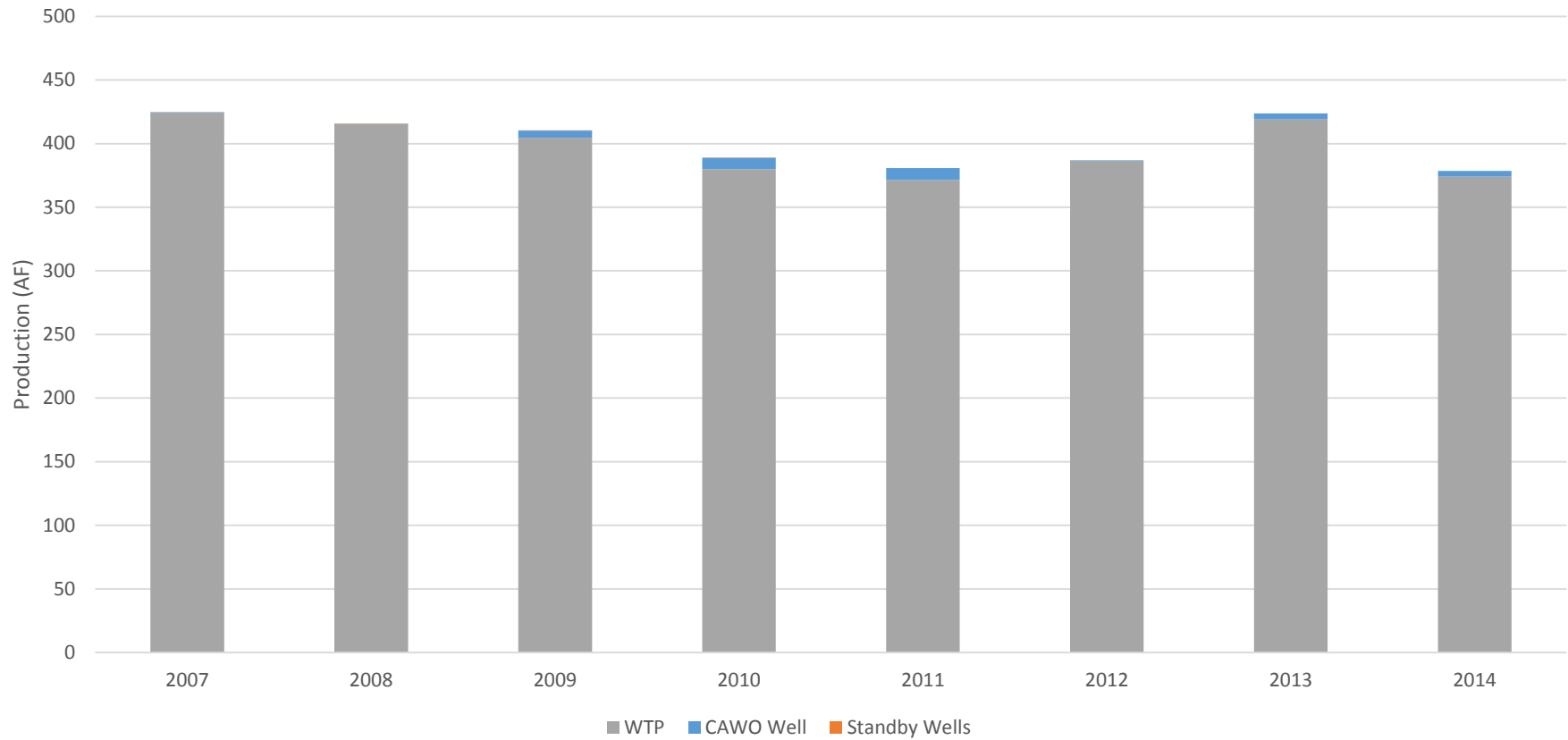


Potential Future Supplies

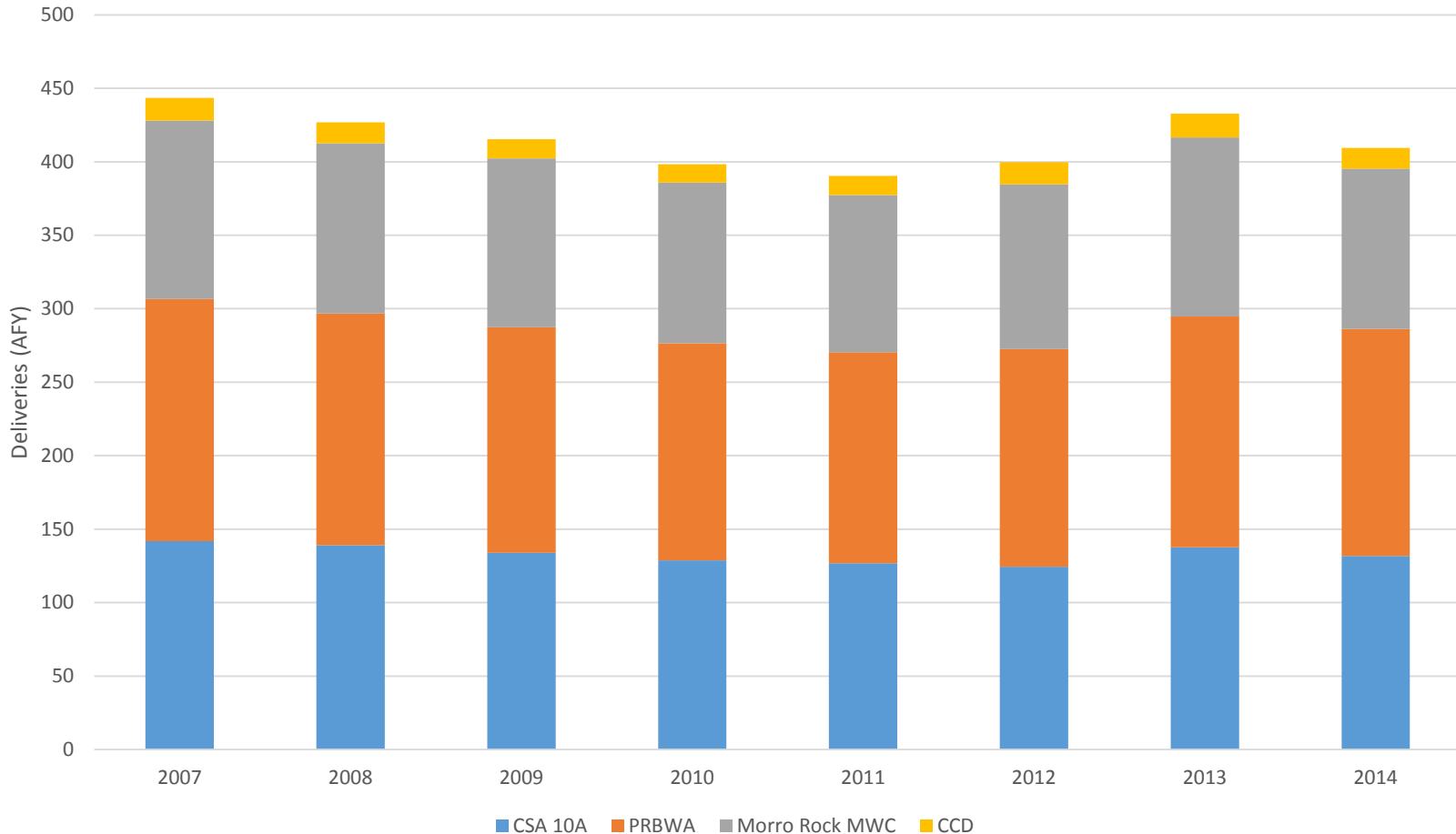
- Future NWP-Whale Rock exchanges allowed up to 160 AFY.
- SLO County Board of Directors approved Cayucos CSA-10A requested allocation increase to 40 AFY.²
- 6,095 AF unallocated NWP water remaining, a portion of which may be available to Cayucos

1. San Luis Obispo County Flood Control and Water Conservation District.
2. San Luis Obispo County Board of Supervisors Meeting December 8th, 2015.

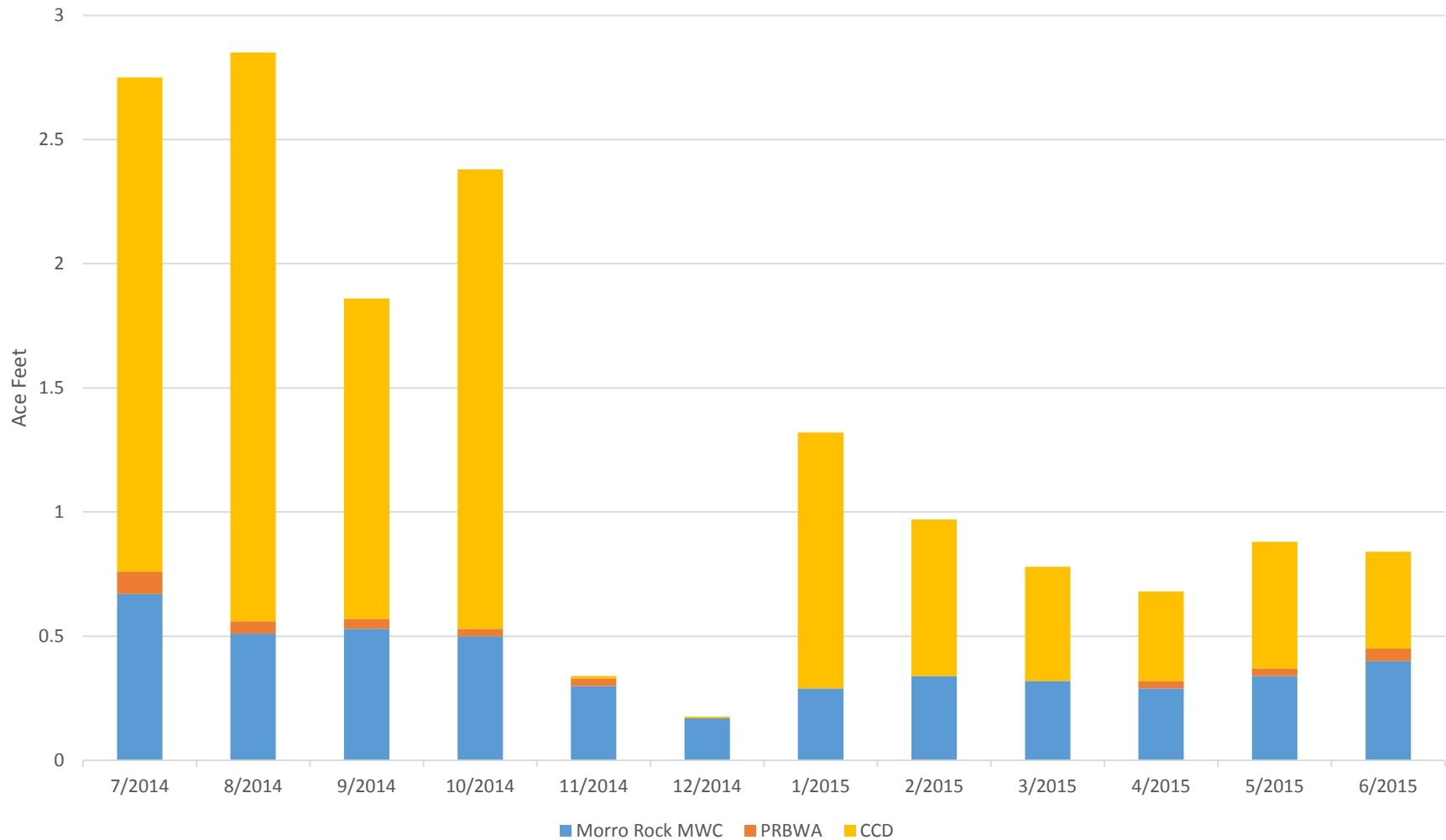
Historical CAWO Production



Historical CAWO Water Demands



Seasonal Urban Irrigation Demands



Current & Future Water Demand

	Morro Rock MWC	PRBWA	CSA 10A	CCD	Total
Existing Demand ¹ (AFY)	133	154	114	14	415
Forecast Demand ² (AFY)	173	218	232	18	641

¹ Existing demands based on average demands from 2007-2014.

² Forecast demands represent high end of anticipated range in future demands at build-out from the 2012 San Luis Obispo County Master Water Report.

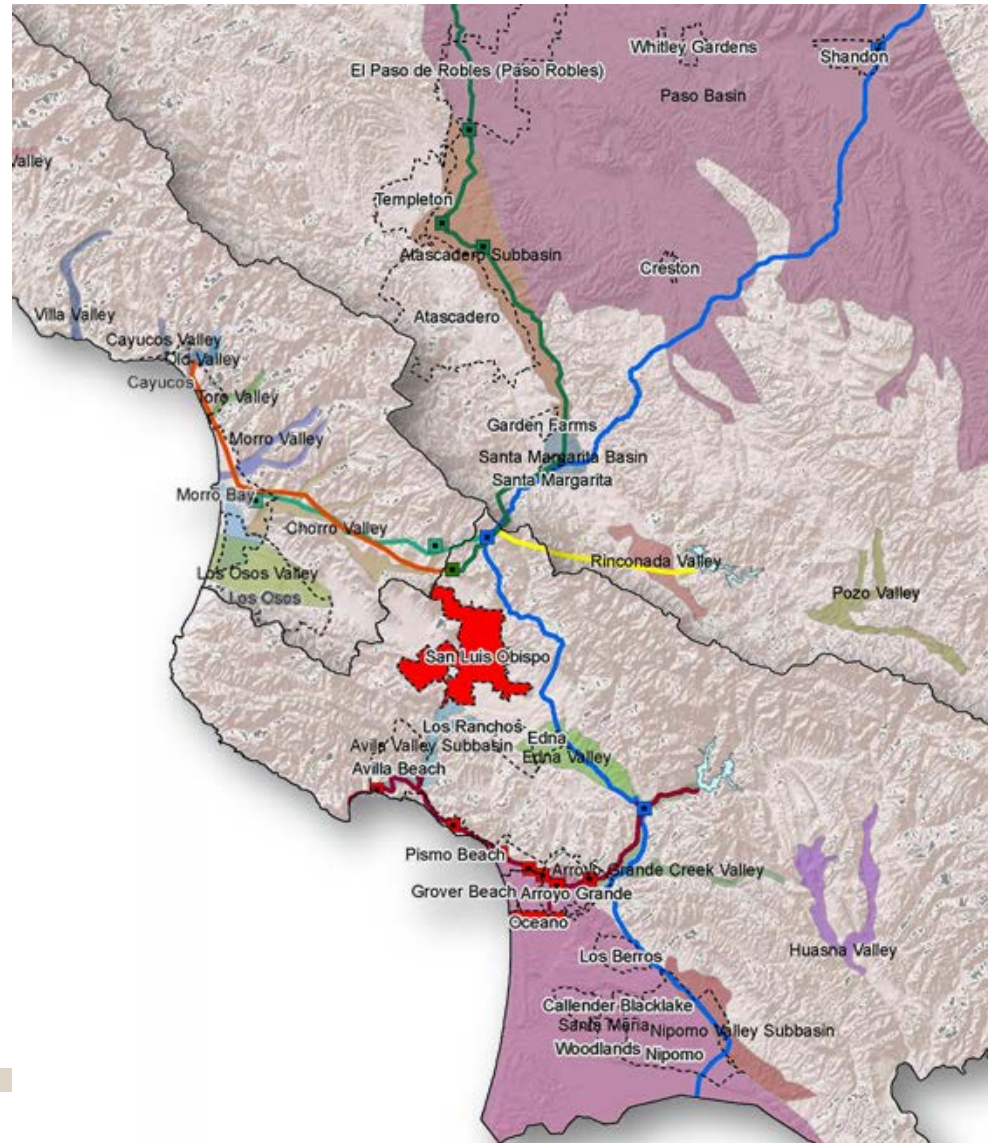
Supply/Demand Evaluation

	Morro Rock MWC	PRBWA	CSA 10A	CCD	Total
Whale Rock Downstream Water Entitlement	170	222	190	18	600
NWP	0	0	25	0	25
Total Supply (AFY)	170	222	215	18	625
Existing Demand (AFY)¹					
Existing Demand (AFY) ¹	121	163	132	16	432
Difference from Supply	37	68	101	4	210
Forecast Demand (AFY)²					
Forecast Demand (AFY) ²	173	218	232	18	641
Difference from Supply	-3	4	-17	0	-16

¹ Existing demands based on average demands from 2007-2014.

² Forecast demands represent high end of anticipated range in future demands at build-out from the 2012 San Luis Obispo County Master Water Report.

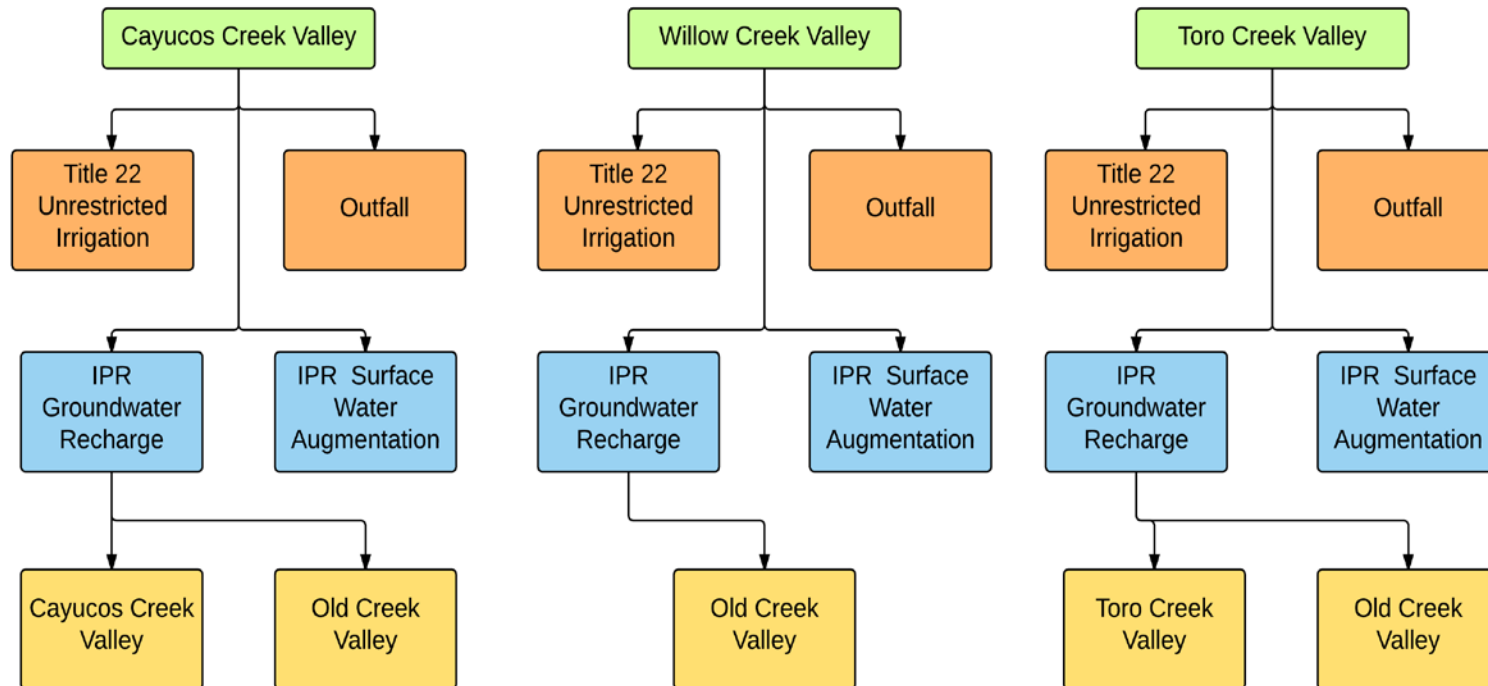
Transfer Opportunities



Beneficial Use Overview

		Beneficial Use Alternative		
		Title 22 Reuse	Indirect Potable Reuse (IPR)	Direct Potable Reuse (DPR)
Beneficial Uses	Unrestricted Landscape Irrigation	Title 22 IPR- Groundwater Replenishment Reuse Project (GRRP) IPR- Surface Water Augmentation	DPR	
	Spray Irrigation of Food Crops			
	Industrial and Other Uses			
	Unrestricted Recreational Impoundment			
Treatment Level	Tertiary Treatment	Tertiary Treatment + Blending Full Advanced Treatment	Full Advanced Treatment + Conventional Surface Water Treatment	

Conceptual WRRF locations and beneficial use alternatives



Disinfected Tertiary Beneficial Use

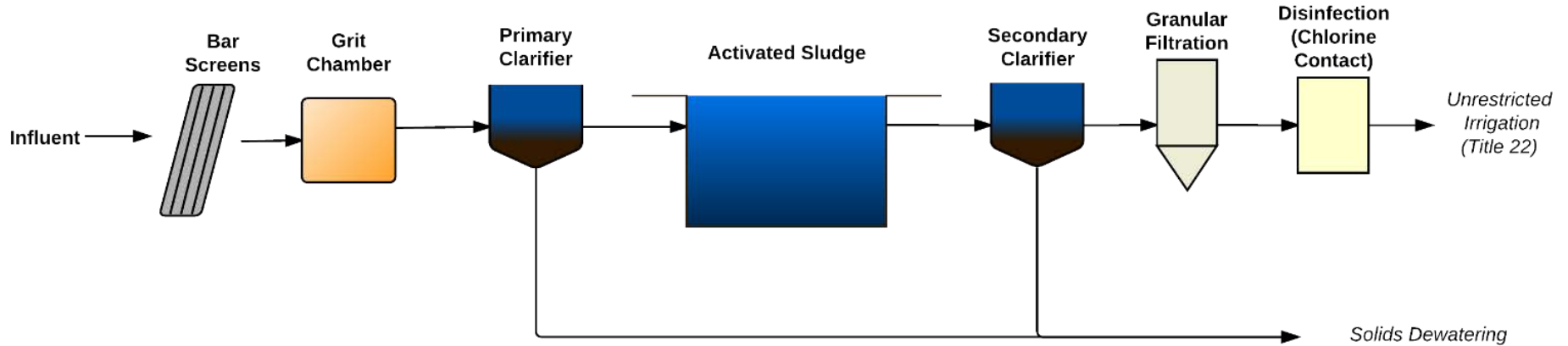
Unrestricted Agricultural/Landscape Irrigation

Treatment Level	Approved Uses	Regulatory Requirements	Operational Considerations
Disinfected Tertiary	<ul style="list-style-type: none">• Spray Irrigation of Food Crops• Landscape Irrigation• Unrestricted Recreational Impoundment• Other Industrial Uses	<ul style="list-style-type: none">• California CCR Title 22• California Basin Plan Irrigation Objectives	<ul style="list-style-type: none">• Protect against Incidental Runoff• Use Area Requirements• Recycled Water Ordinance

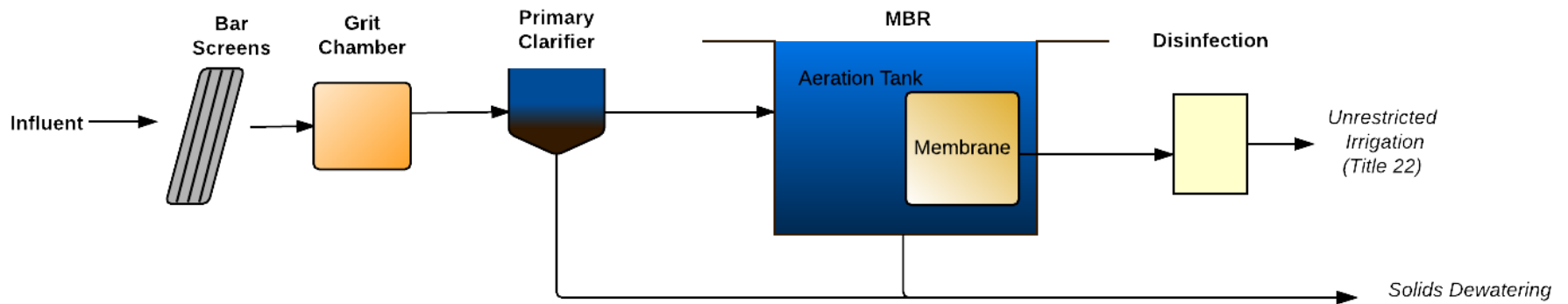
Disinfected Tertiary

Representative Process Flow Diagrams

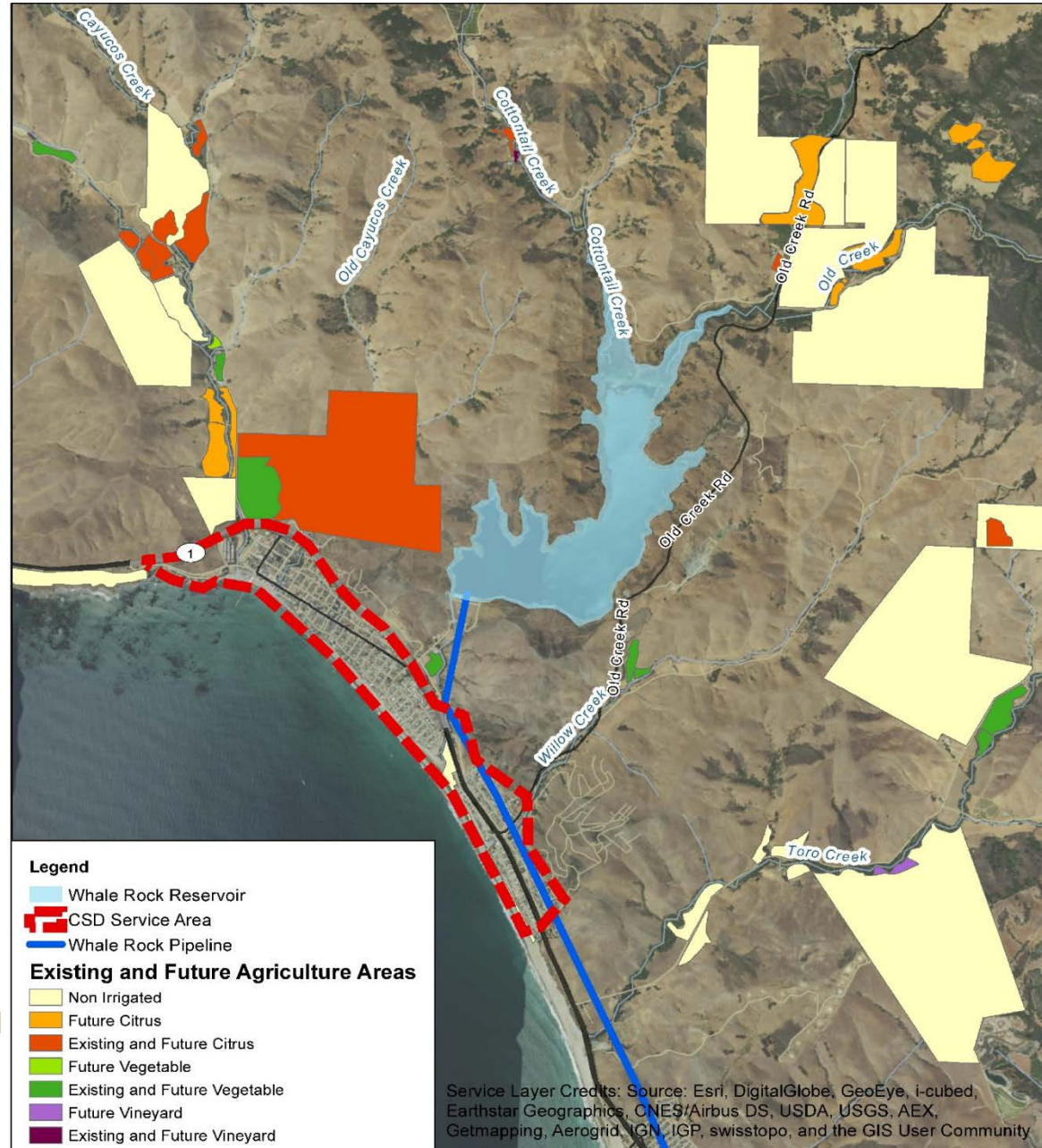
Activated Sludge



Membrane Bioreactor



Disinfected Tertiary Irrigation



Unrestricted Tertiary Irrigation

Agricultural Irrigation

- Irrigation potential for avocados

Potential Recycled Water Production (AFY) ¹	Avocado Demand Factor (AFY/Acre) ²	Potential Agricultural Irrigation Area (Acre)
290	2.17	133

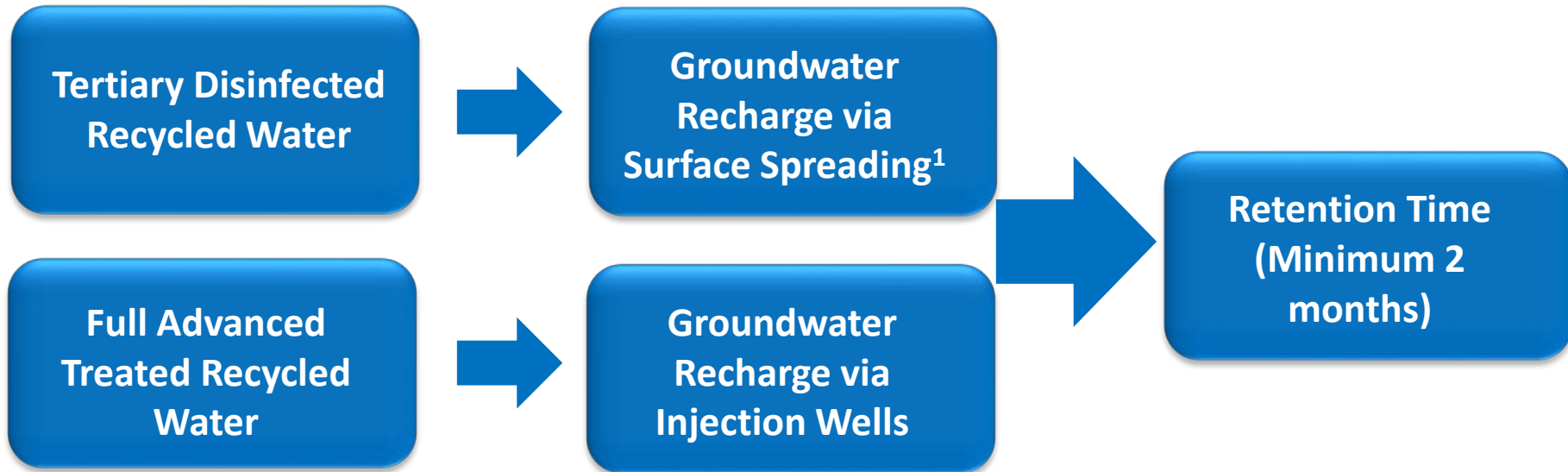


¹ Represents Average Annual Daily Flow (AADF) 2008-2014.

² Based on Irrigation Training and Research Center (ITRC) ETC value in California Agricultural Water Electrical Energy Requirements (2003).

Indirect Potable Reuse

Groundwater Recharge & Extraction



Definitions

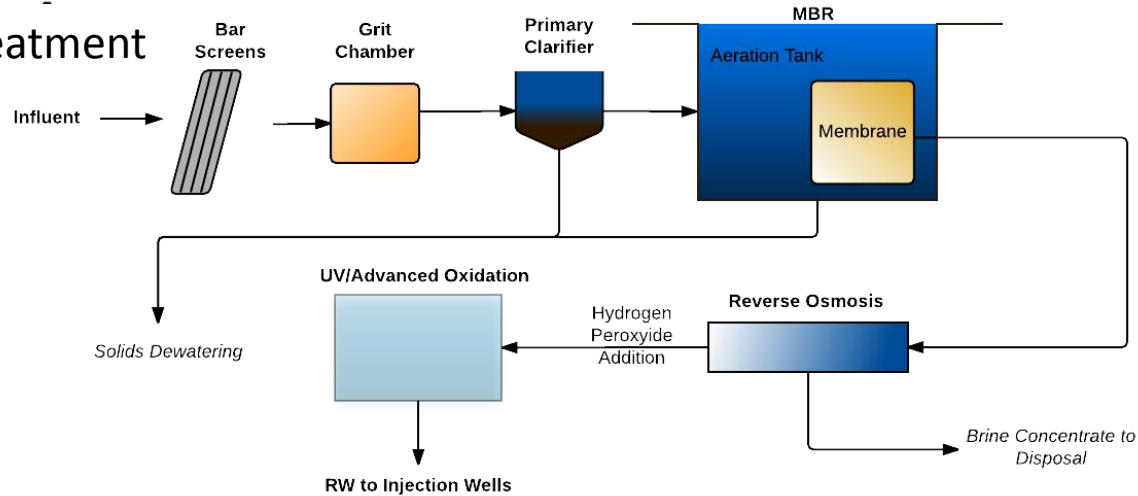
Full Advanced Treatment	Treatment of an oxidized wastewater . . . using a reverse osmosis (RO) and an oxidation treatment process (AOP)”
Retention Time	Response time, or minimum travel time between point of injection and extraction. Must be verified by a tracer study. An 8 month minimum is required for planning level estimates based on numerical modeling.

¹ Requires and 80/20 blend ratio of blend water to tertiary water

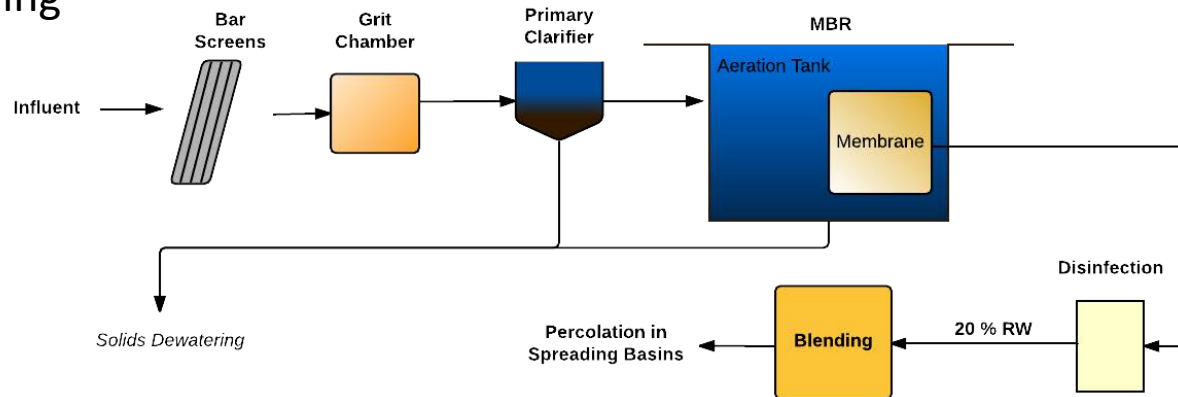
Groundwater Recharge and Extraction

Representative Process Flow Diagrams

Full Advanced Treatment

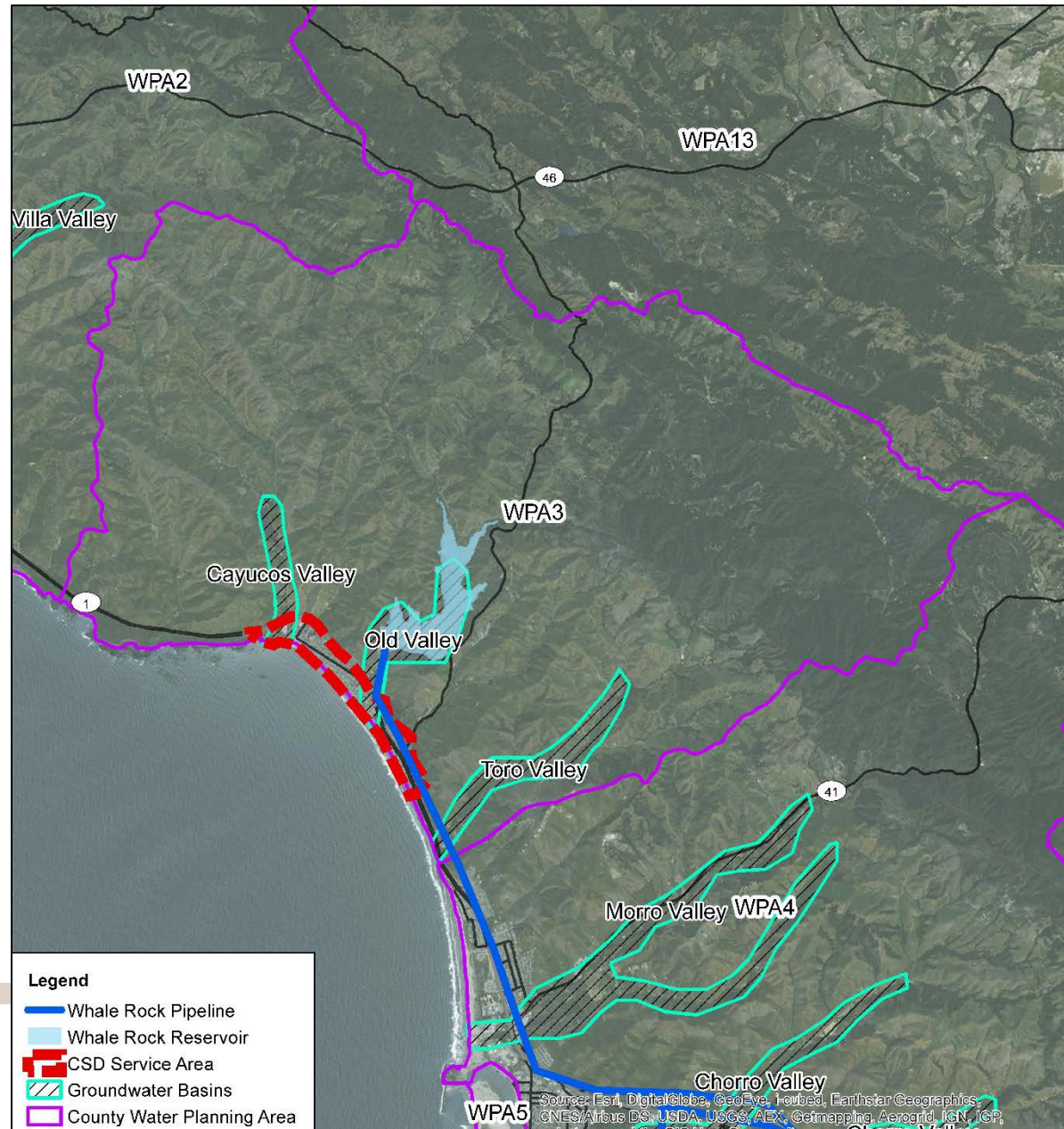


Tertiary w/ Blending



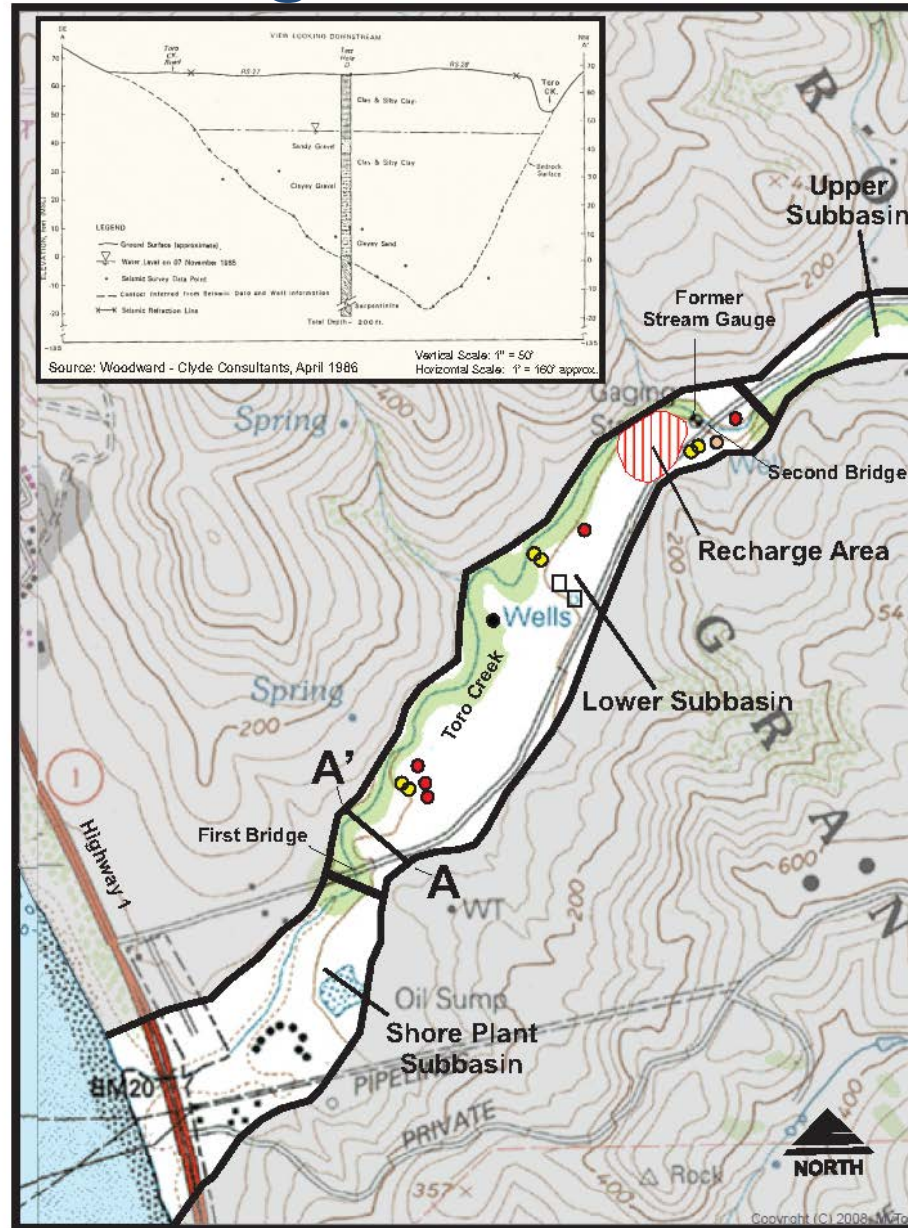
Groundwater Recharge & Extraction

- Evaluation of DWR Bulletin 118 Groundwater Basins
 - Defined as “areas of potential groundwater storage”



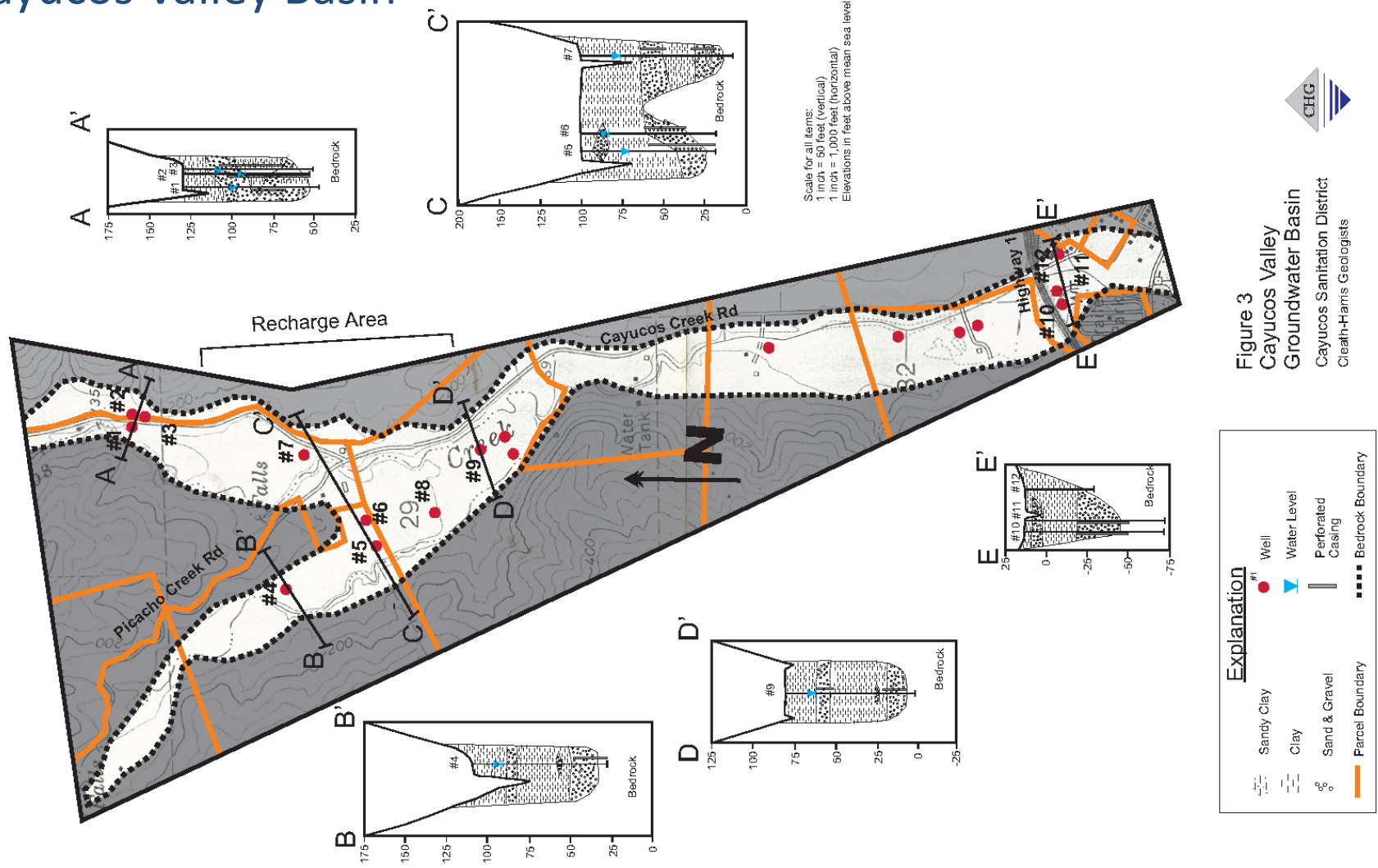
Groundwater Recharge & Extraction

Toro Valley Basin



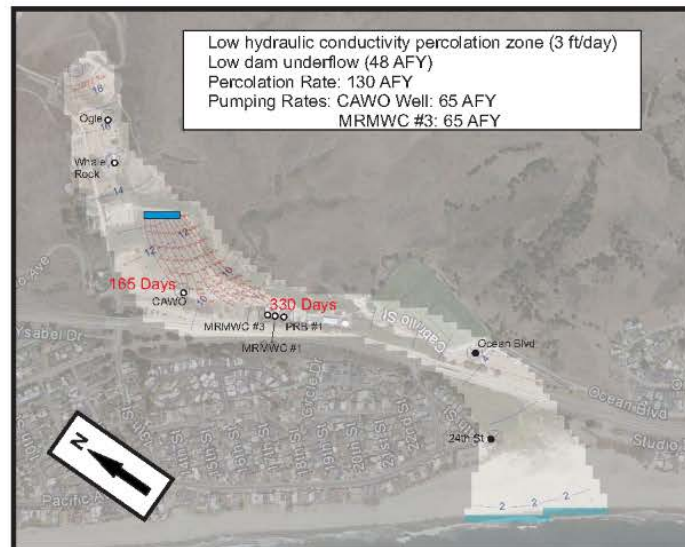
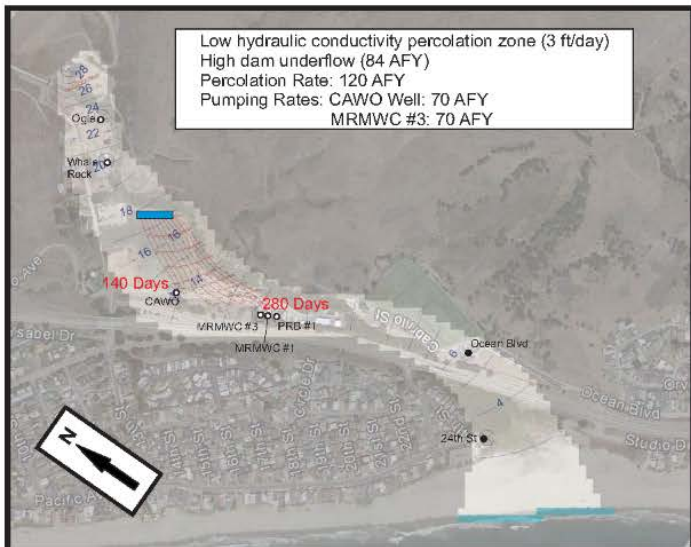
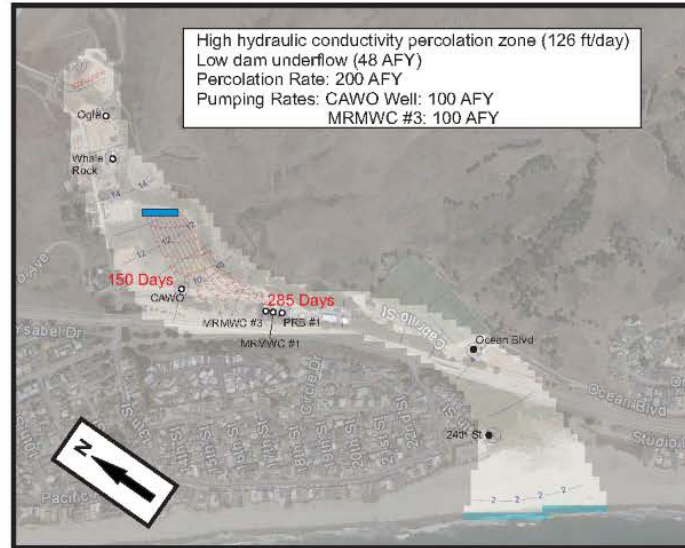
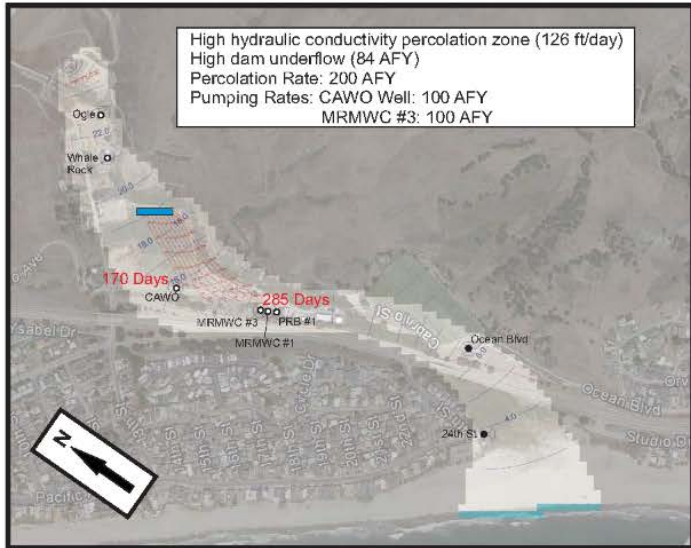
Groundwater Recharge & Extraction

Cayucos Valley Basin



Groundwater Recharge & Extraction

Old Valley Basin



Explanation

- CAWO ○ Equipped Well
- 24th St ● Monitoring Well
- Infiltration Pond
- Ground water flow paths and initial arrival time of percolated water from the infiltration pond to the pumping wells
- 140 Hydraulic head in feet above mean sea level in the aquifer

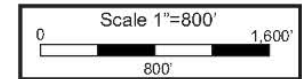


Figure 4
 Percolated Water Travel
 Times to Pumping Wells

Cleath-Harris Geologists



Groundwater Recharge & Extraction

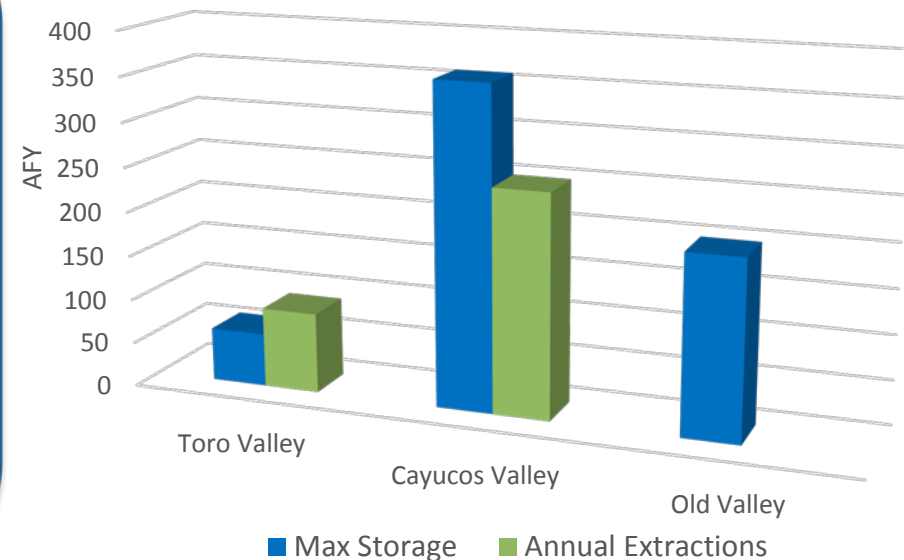
Hydrogeologic Evaluation

Conclusions

- Old Valley Basin
 - Previously used for groundwater recharge and extraction
 - Capacity to recharge and extract 200 AFY of recycled water.
 - Travel time will more than 140 days from recharge point to CAWO well.
- Cayucos Creek Valley
 - Greater available storage capacity
- Toro Creek Valley
 - Limited storage capacity

Recommendations

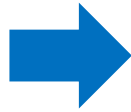
- Old Valley Basin and Cayucos Creek Valley recommended for further evaluation



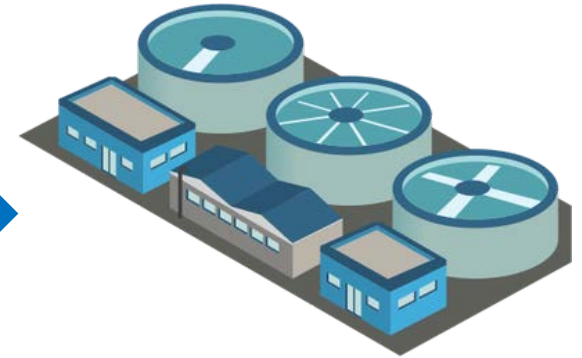
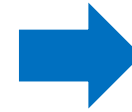
Surface Water Augmentation



Full Advanced Treatment



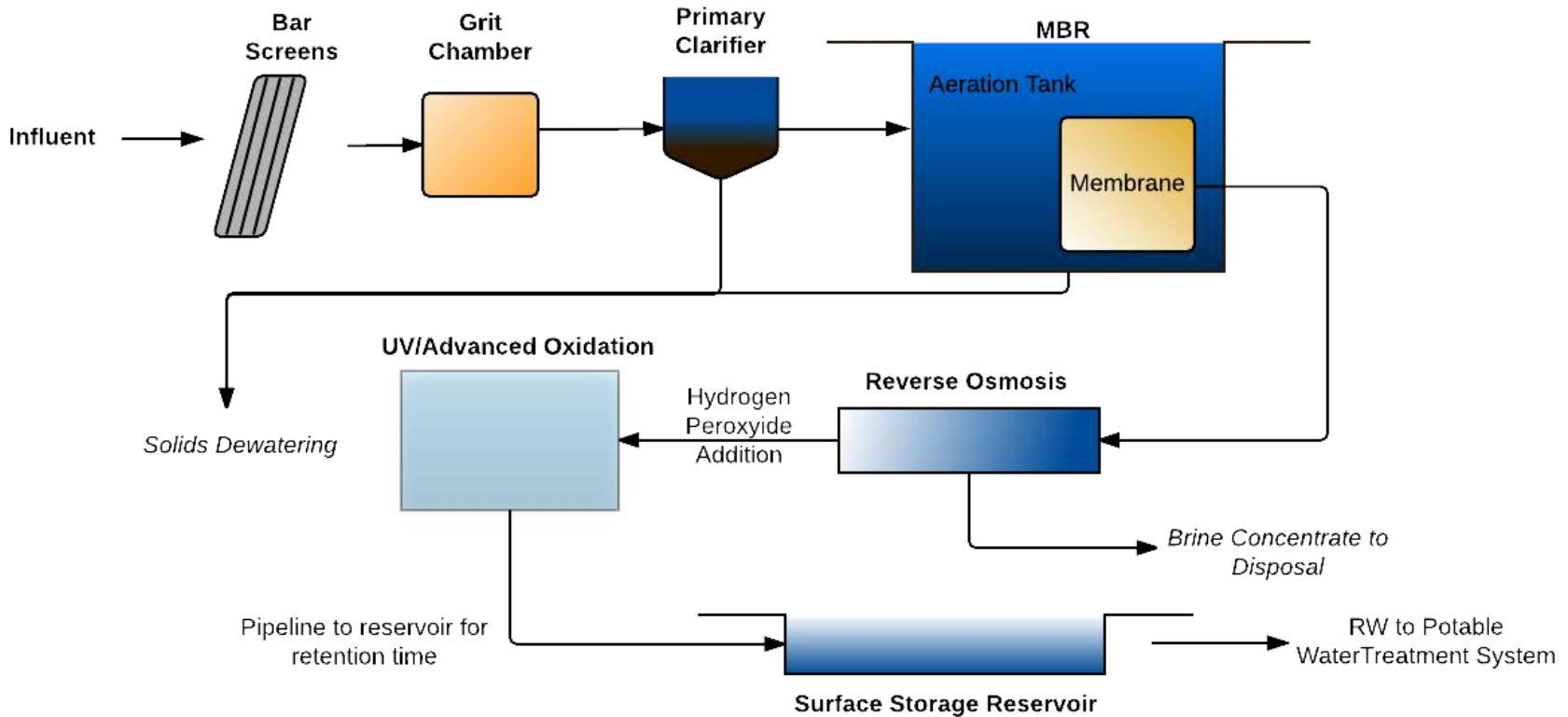
Whale Rock Reservoir



Drinking Water Treatment

- Advisory group and Expert Panel currently assessing public health, scientific, and technical issues to develop uniform criteria
- DDW required to adopt regulations by **December 31st, 2016.**

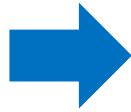
Surface Water Augmentation Representative Process Flow Diagram



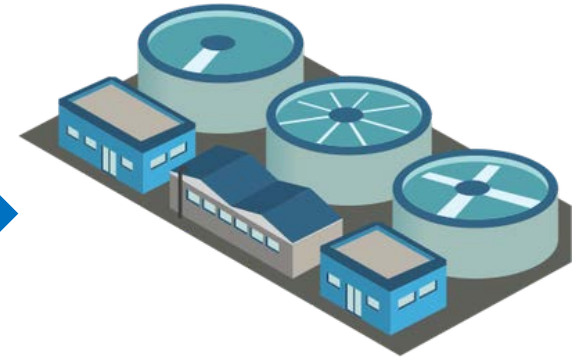
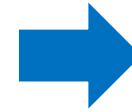
Direct Potable Reuse



Full Advanced Treatment



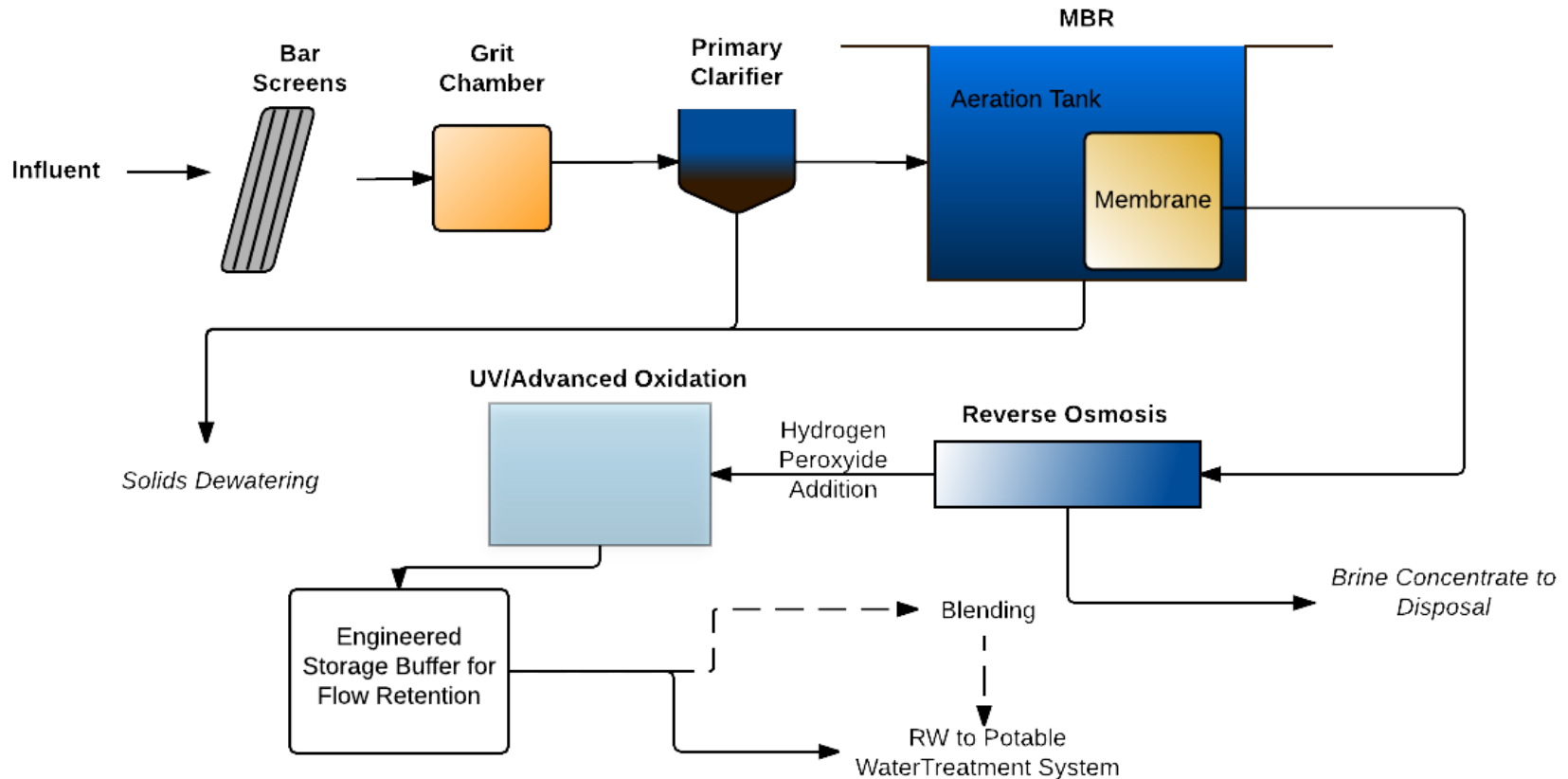
Engineered Storage Buffer



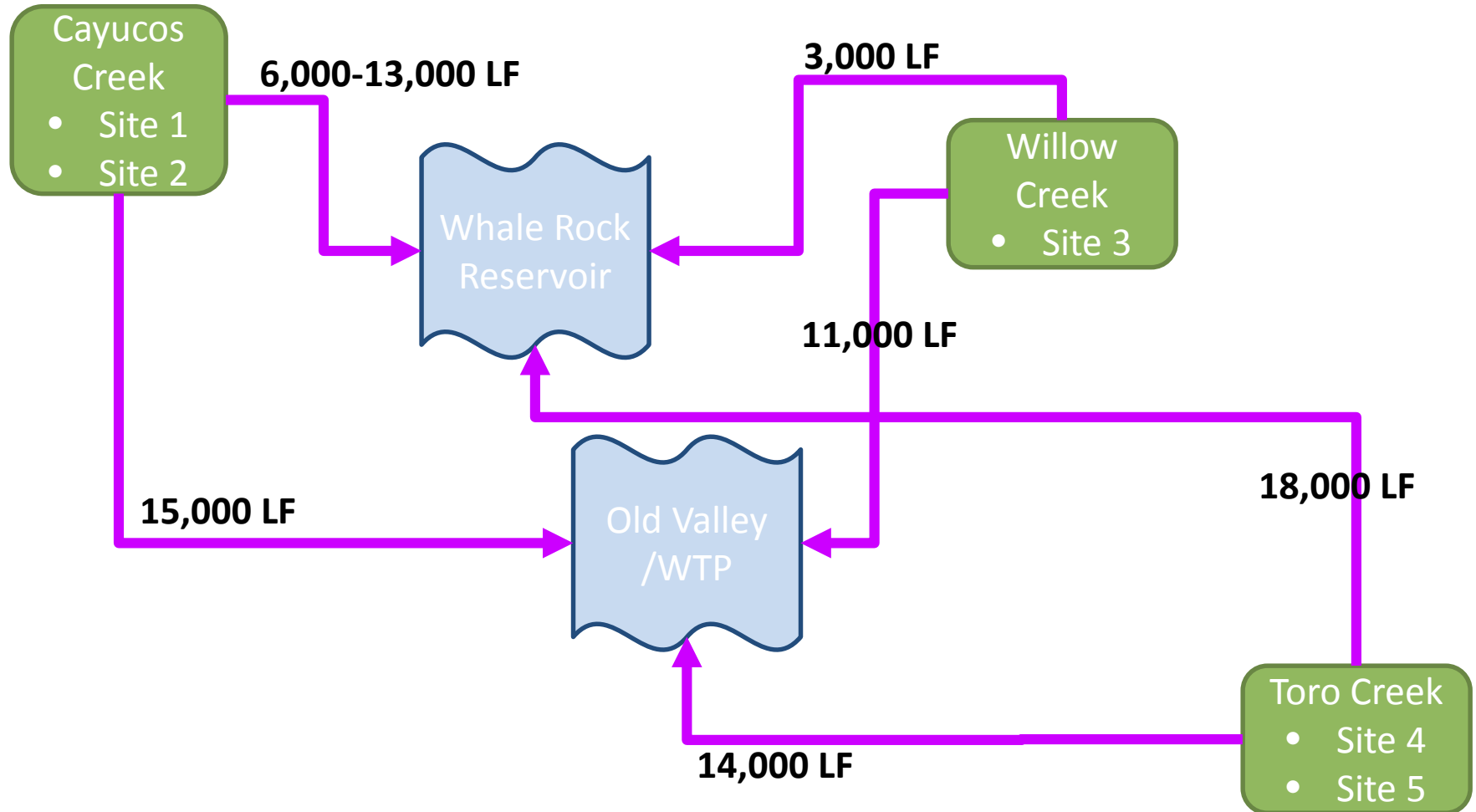
Drinking Water Treatment

- Advisory group and Expert Panel currently assessing public health, scientific, and technical issues to assess feasibility.
- DDW required to report to Legislature on Feasibility by **December 31st, 2016.**

Direct Potable Reuse Representative Process Flow Diagram



Beneficial Use Conveyance Distances



Preliminary Reuse Opportunity Evaluation

	Toro Creek Valley	Willow Creek Valley	Cayucos Creek Valley	Old Valley
Unrestricted Irrigation	High Potential	High Potential	High Potential	
IPR- GR&E ¹	Unfavorable hydrogeology	Unfavorable hydrogeology	Potential	High Potential
IPR – SWA	Significant conveyance distance	Close proximity to Whale Rock	Close proximity to Whale Rock	
DPR	Significant conveyance distance	Close proximity to WTP	Medium proximity to WTP	

1. Groundwater Recharge & Extraction

Next Steps

- Comparative Analysis
 - Engineering, Environmental and Permitting evaluation of conceptual WRRF site locations, collection system re-configuration requirements and beneficial use alternatives
- January 14th Town Hall Meeting