

Recycled Water Master Plan Update

Board Workshop
July 24, 2018

Agenda

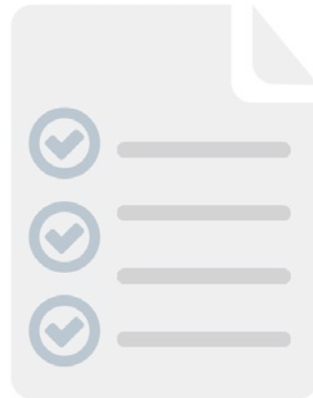


- Recycled Water Overview
- Project Alternatives
- Evaluation of Alternatives
- Recommended Strategy
- Next Steps

Overview of Master Plan Process



**1. Understand
Recycled Water
Landscape**

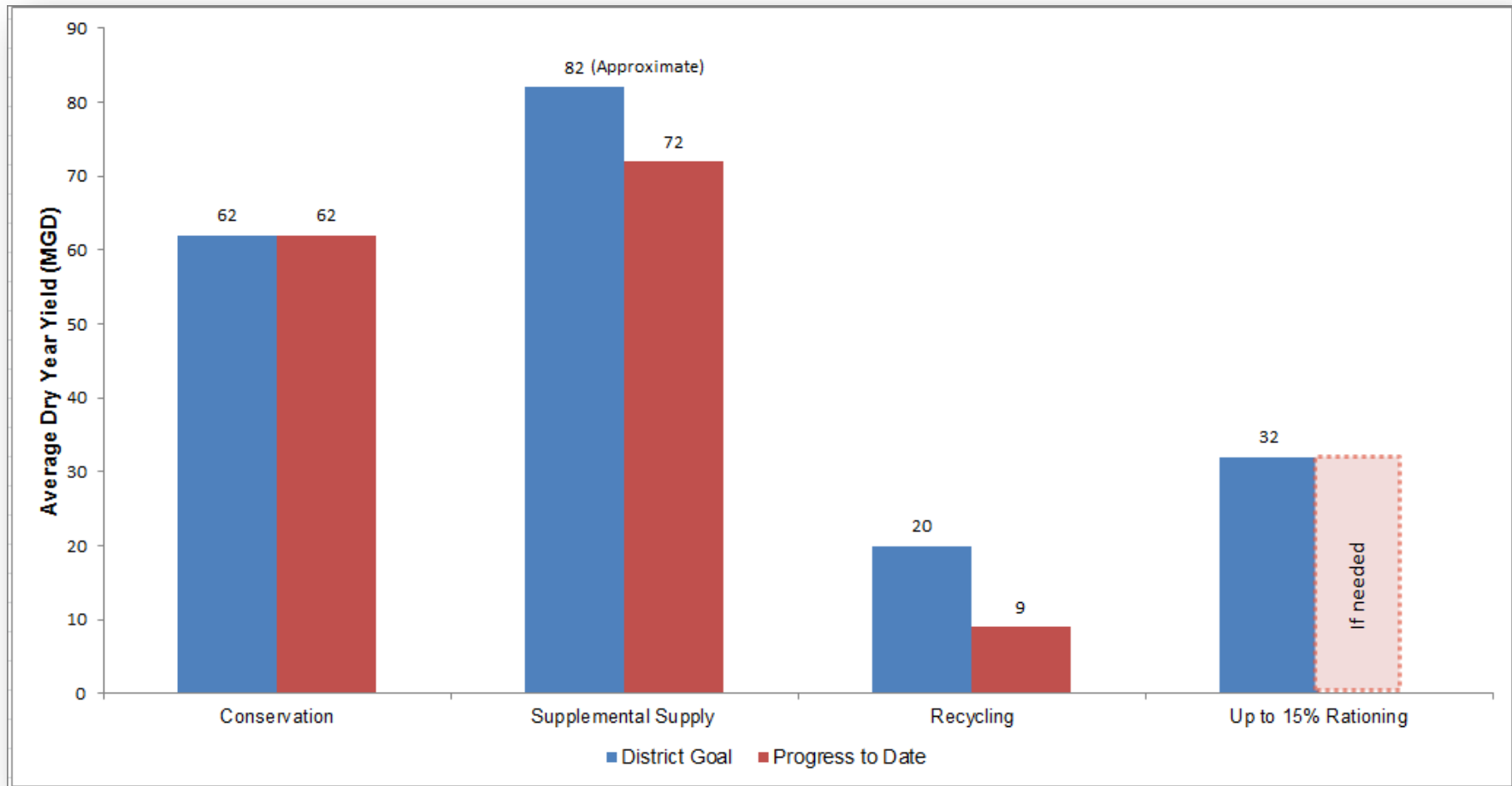


**2. Develop
Comprehensive List
of Alternatives
(Non-Potable and
Potable)**



**3. Evaluate
Alternatives &
Develop
Recommended
Strategy**

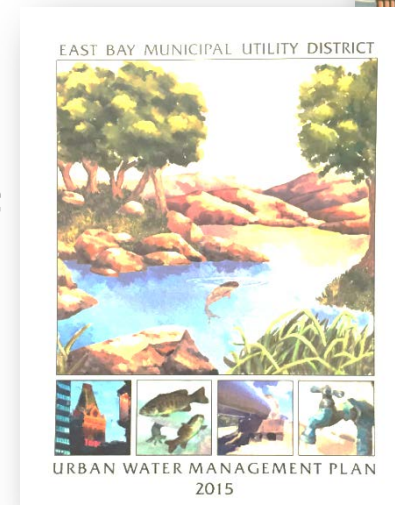
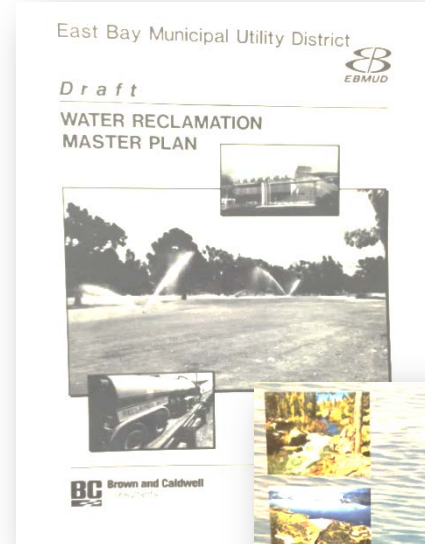
WSMP Portfolio Progress (Simplified)



Background



- 1991 - First Water Recycling Master Plan
- 1993 - Water Supply Management Program, water recycling goal of 14 MGD by 2020
- 2012 - Water Supply Management Program 2040, water recycling goal of 20 MGD by 2040
- 2018 - Recycled Water Master Plan Update to consider both non-potable & potable reuse



Approach: Current Recycled Water Program

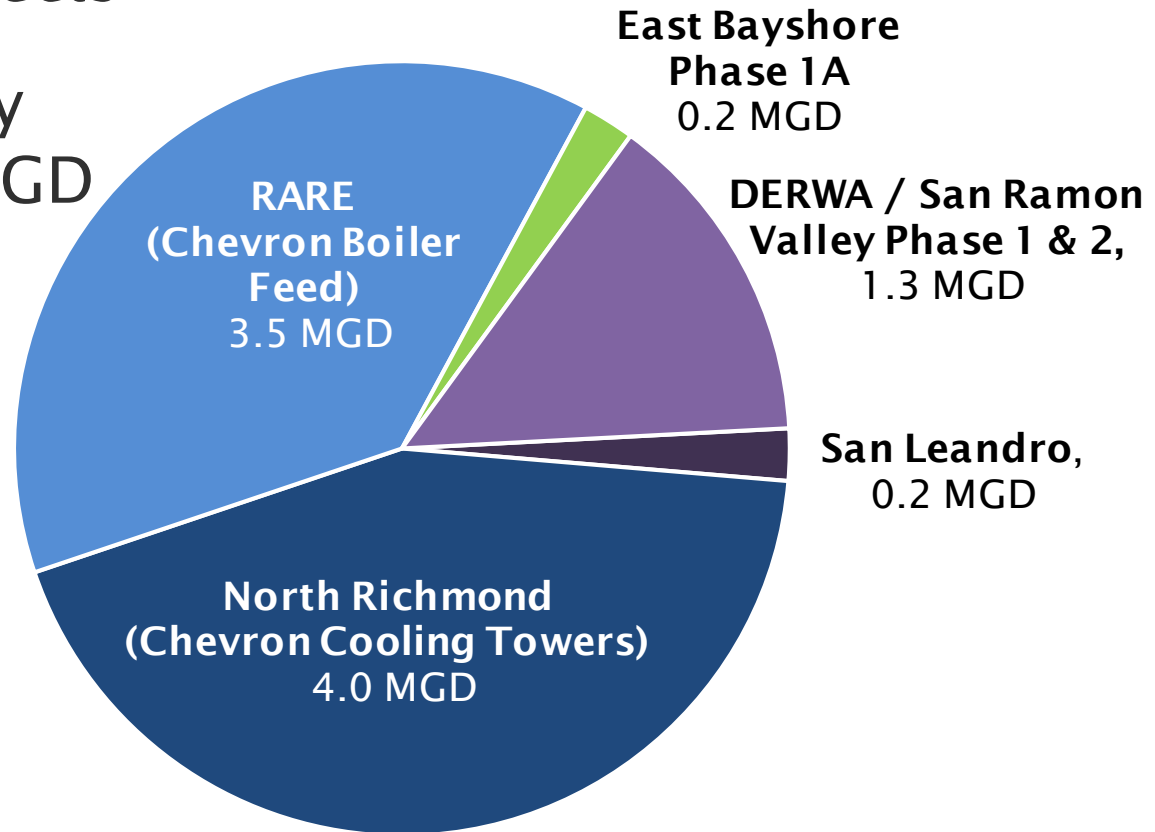


- Complete non-potable projects in progress
 - San Ramon Valley (DERWA) Phase 2A connections
 - East Bayshore Phase 1A from Emeryville to Albany
- Implement additional non-potable projects as determined by master plan update
- Support customer-funded satellite/onsite reuse
- Avoid stranded assets

Background: Current Recycled Water Program



- 5 non-potable projects
- Production capacity approaching 9.2 MGD
- Goal of 20 MGD by 2040
- Potential Projects *may* provide additional 10.8 MGD non-potable water



Lessons Learned



- Supply limitations
- Declining wastewater flows from water conservation success
- Water quality challenges
- Decreasing demands/less irrigation
 - Water use efficiency
 - On-site stormwater or groundwater use
 - Changing land uses
- Higher cost than supplemental supplies
- Dry-year benefits
- Local supply

Potable Reuse

This Recycled Water Master Plan Update is the first to consider potable reuse options

Non-Potable Uses



Industrial



Landscape
Irrigation



Recycled Water
Truck Program



Commercial

Possible Potable Reuse



Groundwater
Augmentation



Reservoir
Augmentation



Raw Water Augmentation
(to Water Treatment Plant)



Treated Water Augmentation
(to Distribution System)

Potable Reuse in California



- Key potable reuse projects:
 - Groundwater augmentation - Orange County (2008)
 - Groundwater augmentation - Pure Water Monterey (expected 2019)
 - Reservoir augmentation - Pure Water San Diego (expected 2021)
 - Bay Area - Santa Clara Valley Water District in planning stages for groundwater augmentation

Questions for Master Plan:

- How could Potable Reuse fit into the District's Recycled Water Program?
- Should Potable Reuse be added to the District's Recycled Water program at this time?

Potable Reuse Regulations



Groundwater
Augmentation

2014



Reservoir
Augmentation
Regulations

2018-2019



Raw Water
Augmentation
Regulations

2023
(as required
by AB 574)



Treated Water
Augmentation
Regulations

TBD

Overview of Master Plan Process



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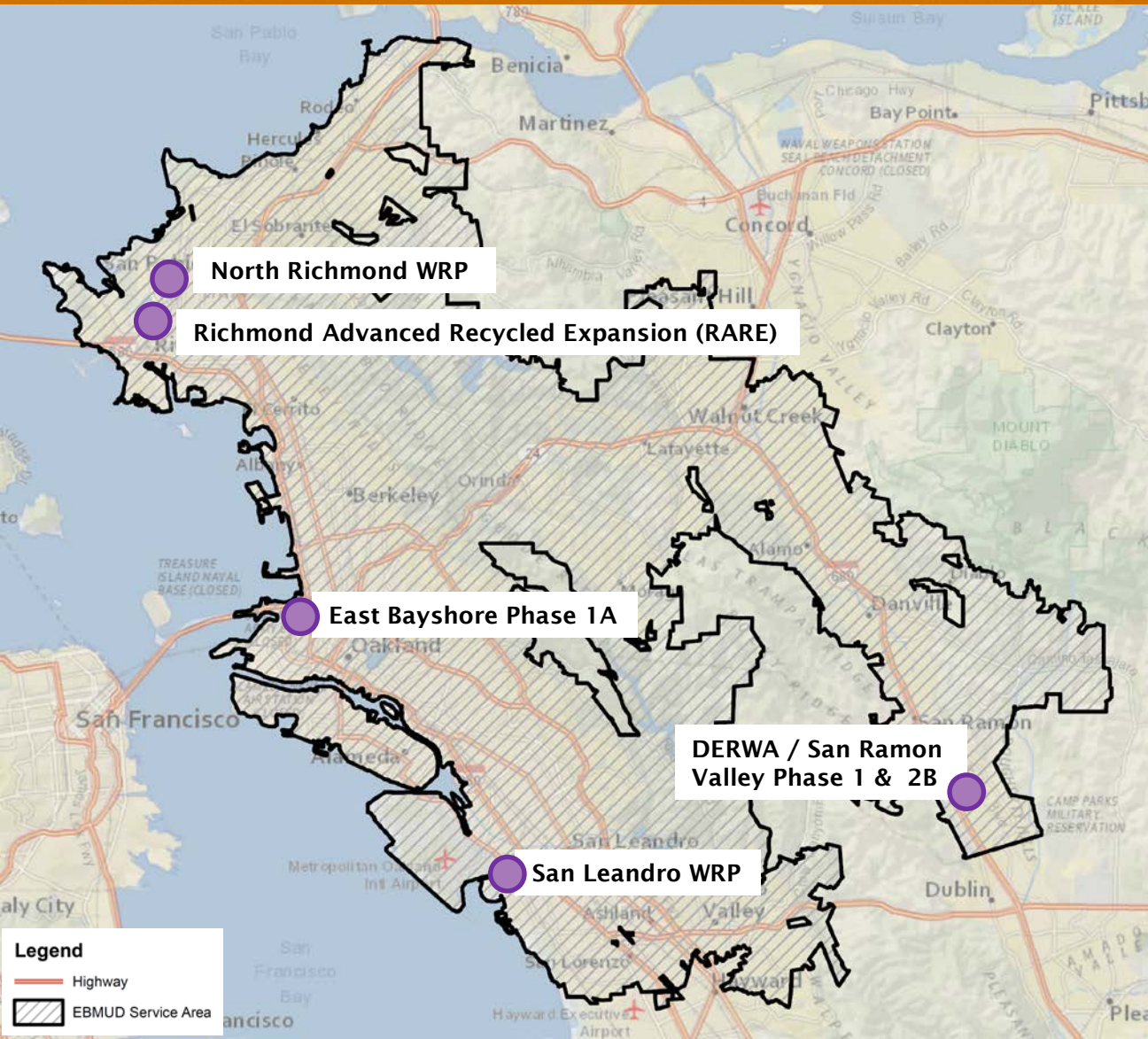


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Existing Recycled Water Projects



Non-Potable Projects

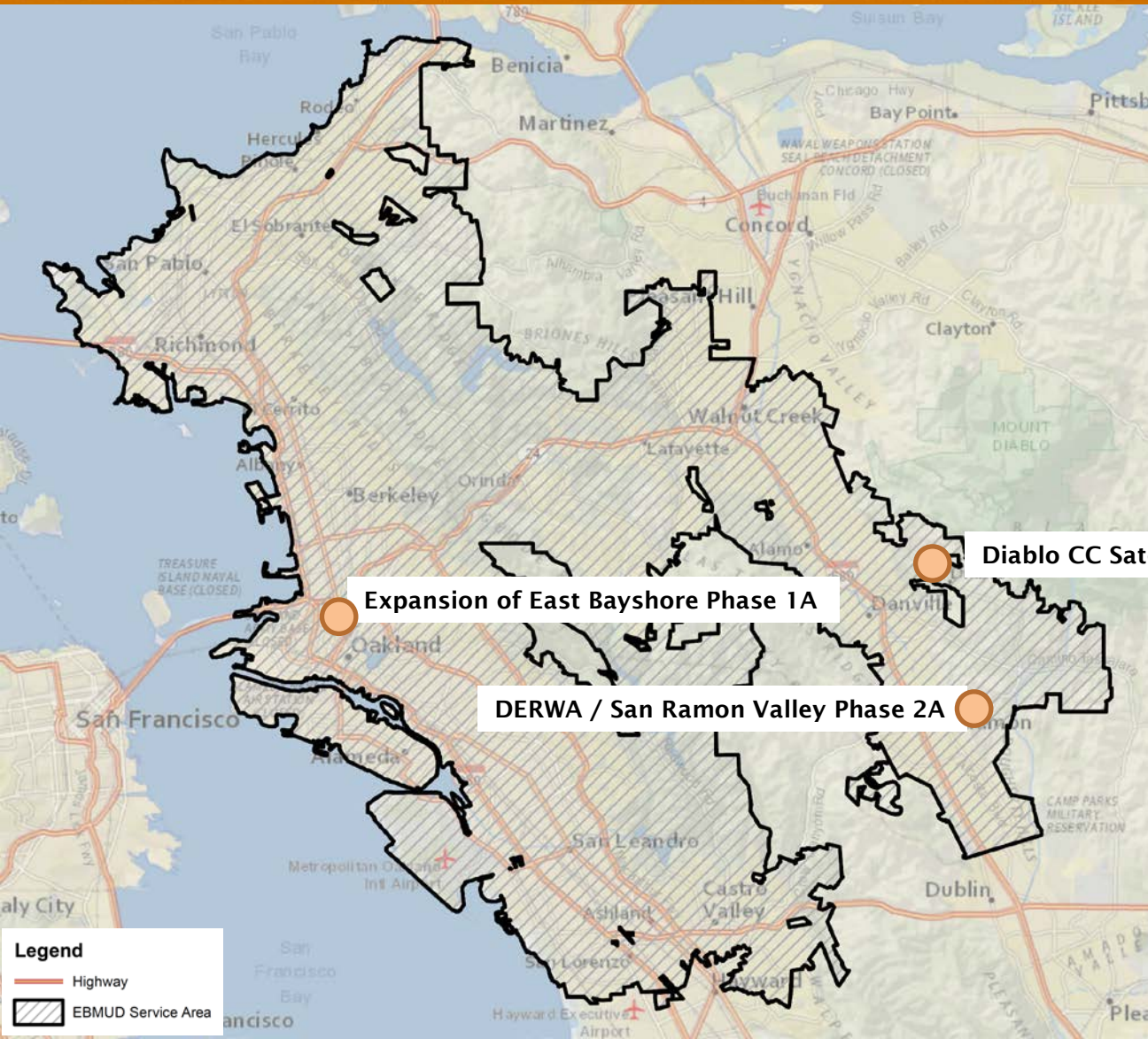
- Existing Projects
8.7 MGD Capacity

Current Non-Potable Projects In Progress



Non-Potable Projects

- Under Construction/In Progress
0.9 MGD Capacity

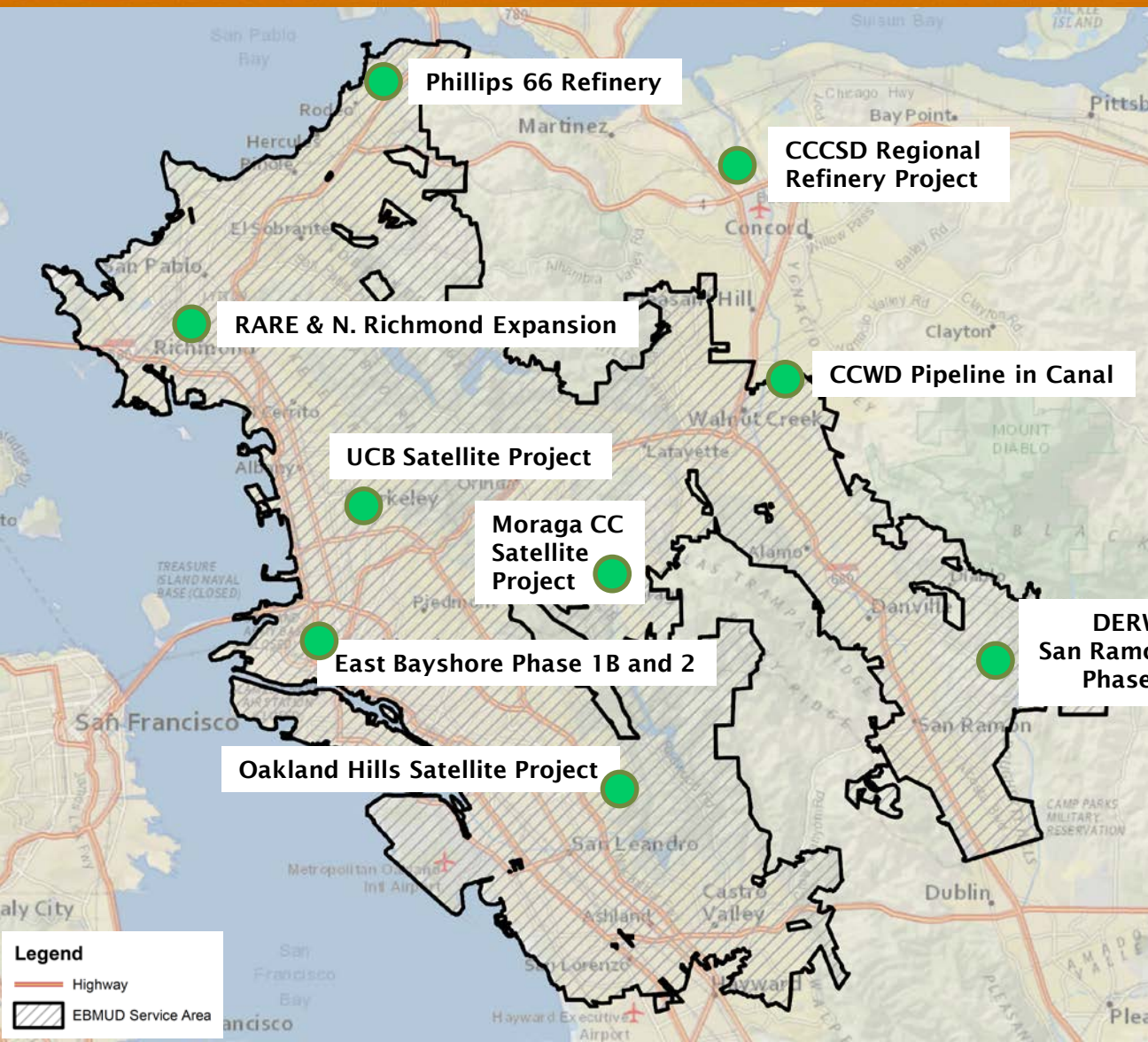


Expansion of East Bayshore Phase 1A

DERWA / San Ramon Valley Phase 2A

Diablo CC Satellite Project

Non-Potable Alternatives Identification

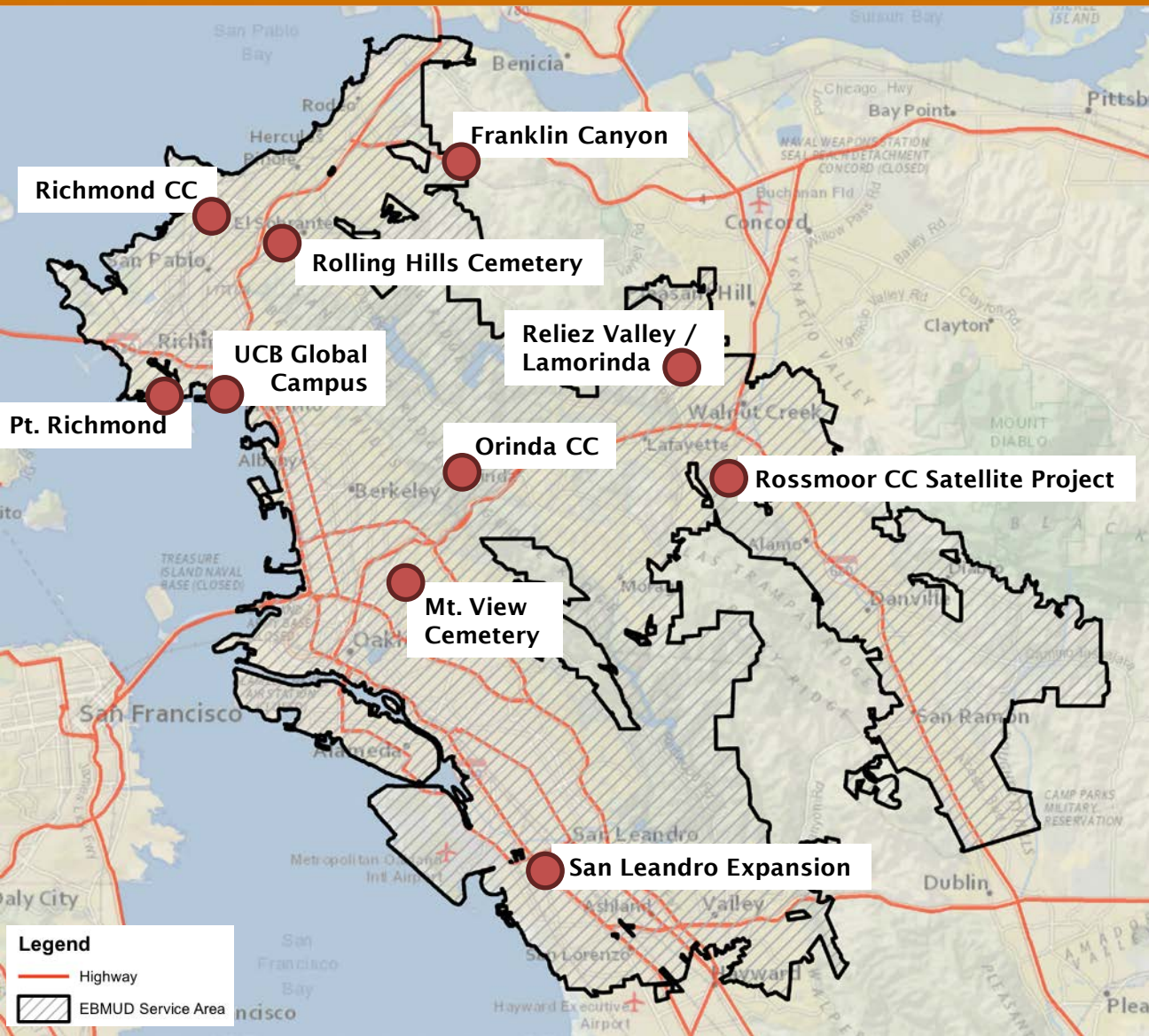


Non-Potable Projects

-  Potential Projects Evaluated for Master Plan Update

Total Estimated Demand = 34 MGD

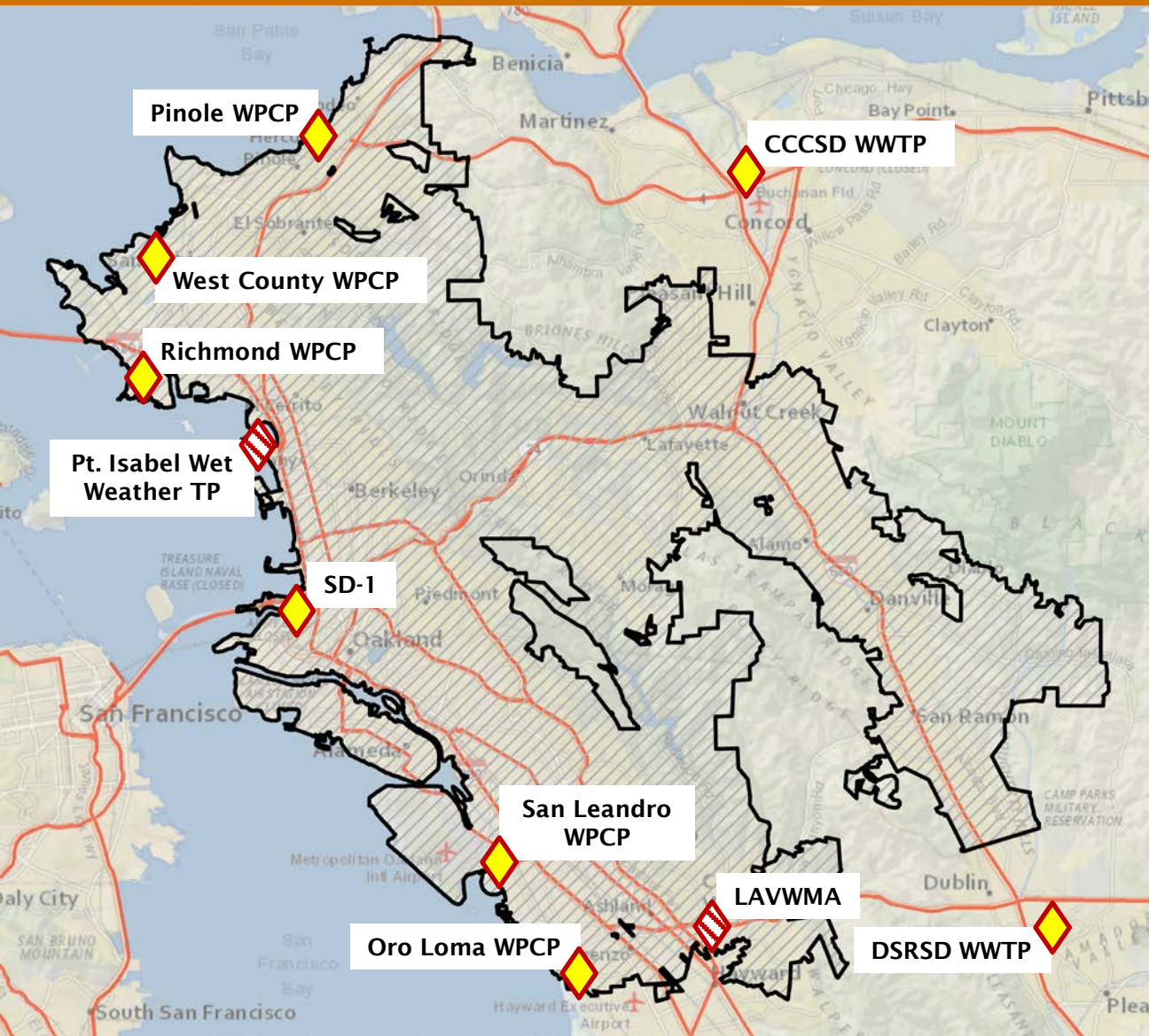
Screened Non-Potable Project Alternatives



Non-Potable Projects

- **Additional Potential Projects that were screened out due to:**
 - Small Size (<150 AFY)
 - Feasibility Concerns
 - Wastewater Supply Limits

Potential Sources for Potable Reuse



Potable Projects



Municipal WWTPs:

- > 1 MGD dry weather flow
- Inside or near District's water service area

- More than 80 MGD available in region



Satellite locations also considered

- Pt. Isabel
- LAVWMA Pipeline

Advanced Water Treatment



- Treatment trains for Potable Reuse are designed to provide a safe, highly purified water supply
 - Upgraded secondary treatment (nutrient removal)
 - Advanced treatment
 - Storage in a groundwater basin, reservoir, or storage tank



Membrane filtration



Reverse Osmosis



UV / Advanced Oxidation

Targets for Potable Reuse



Groundwater Augmentation:
East Bay Plain Groundwater Basin



Reservoir Augmentation:
Briones, San Pablo, & Upper San Leandro Reservoirs



Raw Water Augmentation:
Orinda WTP, Sobrante WTP, Upper San Leandro WTP, and Mokelumne Aqueduct to Walnut Creek WTP



Treated Water Augmentation:
Treated Water Distribution System

Potable Reuse Examples



Reservoir Augmentation

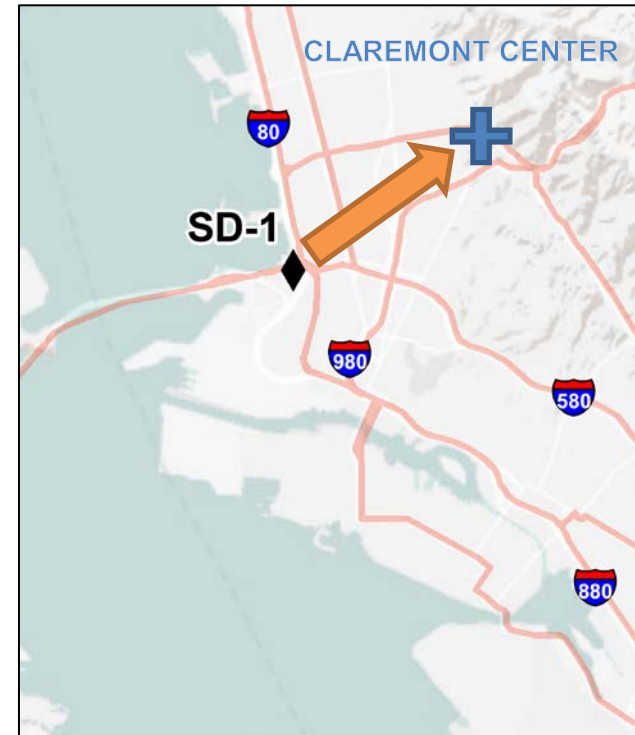
Oro Loma Wastewater Plant



Advanced Treatment



Upper San Leandro Reservoir



Treated Water Augmentation

EBMUD Main WWTP (SD-1) + Secondary Upgrades



Advanced Treatment and Storage



Treated Water Distribution at Claremont Center

Summary of Alternatives



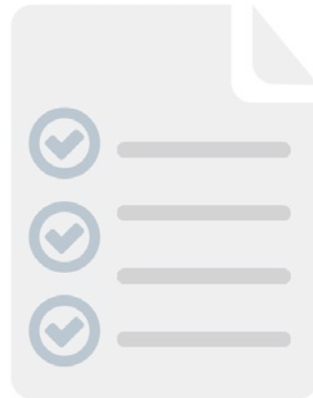
Recycled Water Project Alternatives carried forward for evaluation:

- 14 Non-Potable Alternatives
 - Compilation of previously identified potential projects
 - 9 centralized recycled water projects
 - 5 small satellite projects
- 36 Potable Alternatives
 - All are new for this Master Plan
 - 1 Groundwater Augmentation alternative
 - 19 Reservoir Augmentation alternatives
 - 9 Raw Water Augmentation alternatives
 - 7 Treated Water Augmentation alternatives
 - Some overlap of wastewater supply with non-potable alternatives

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Landscape



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Evaluation Process:

1. Capital Cost Development

2. Non-Cost Scoring

- Social and Environmental Considerations per District Policy 7.05 to balance environmental, social, and economic objectives
- Complexity/Risk

3. Economic Evaluation

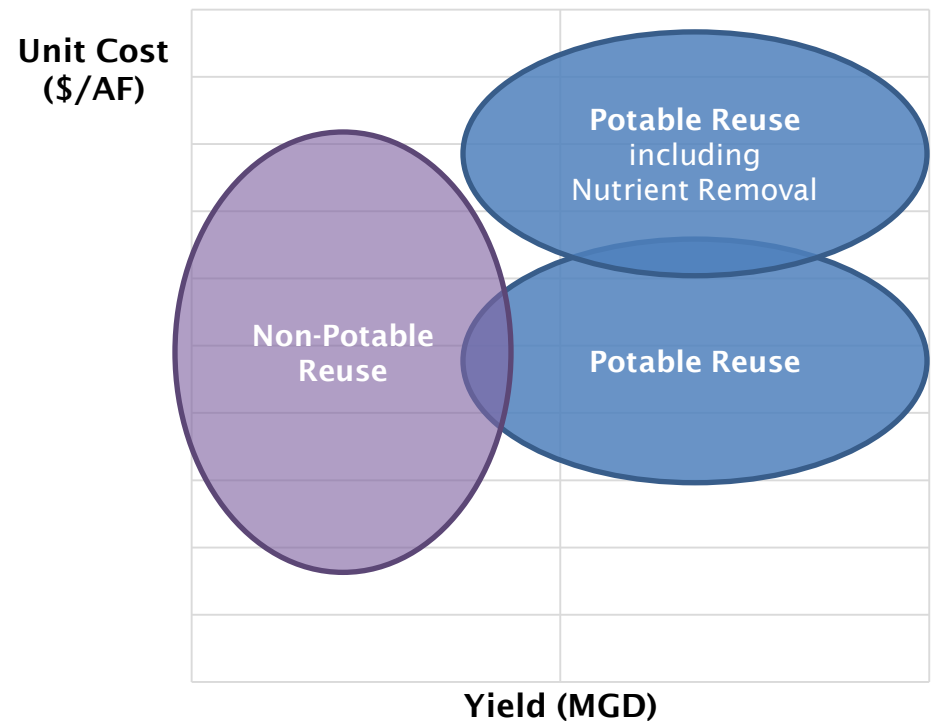
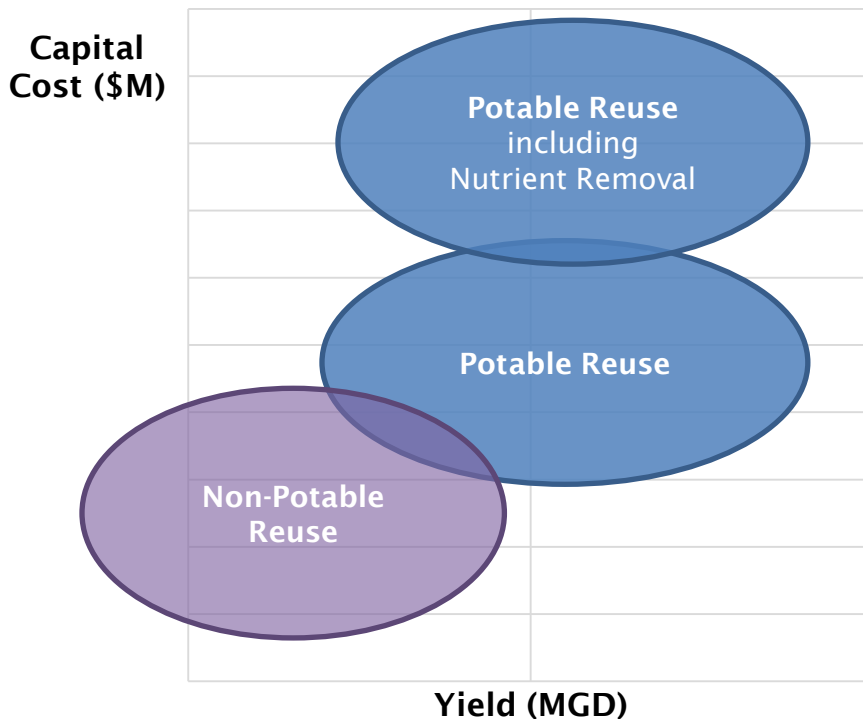
1. Capital Cost Development



- Life Cycle Cost Analysis over 30 years
- Non-Potable Reuse:
 - Mostly updates to previously estimated costs
- Potable Reuse:
 - Newly developed cost estimates
 - Cost of nutrient upgrades not included in cost estimates
- Identify capital costs and unit costs
 - \$ per Acre-Foot Delivered in Dry Years only (consistent with WSMP 2040 approach - this does not include wet year benefits)

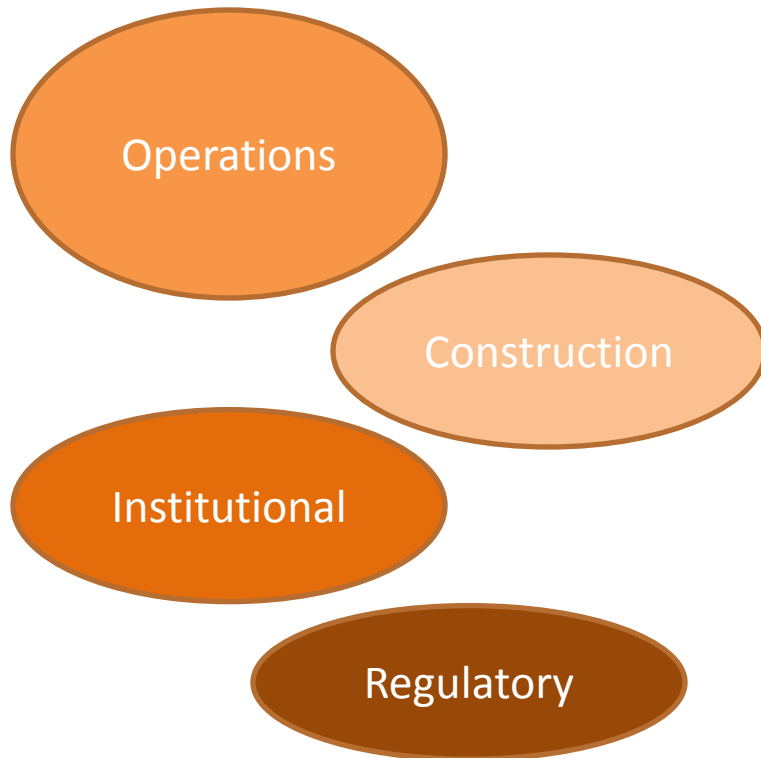
1. Capital Cost Development

- Potable reuse projects tend to be larger and more expensive but with potential for economies of scale

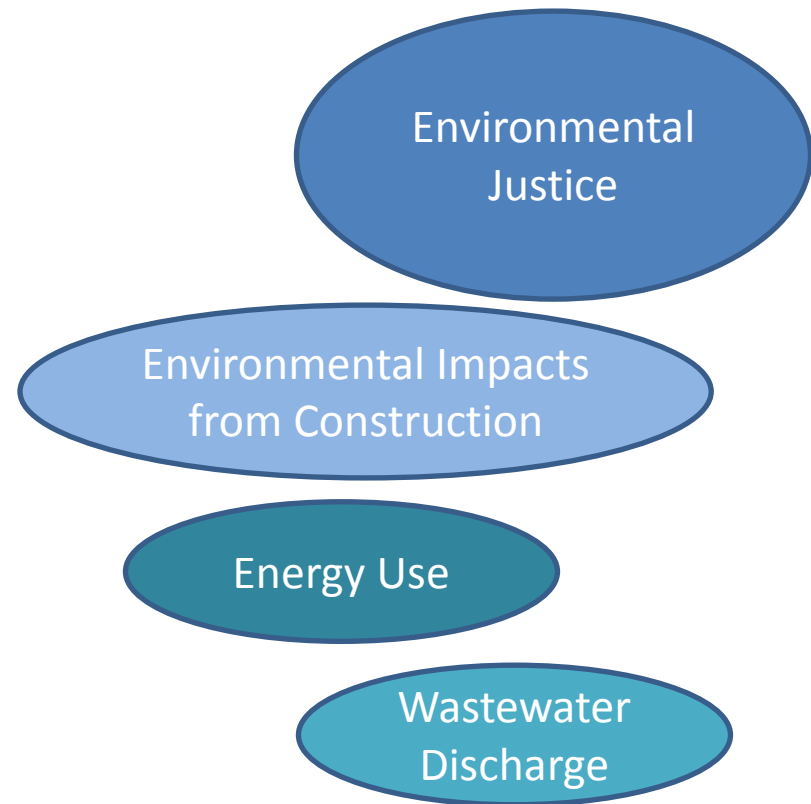


2. Non-Cost Criteria

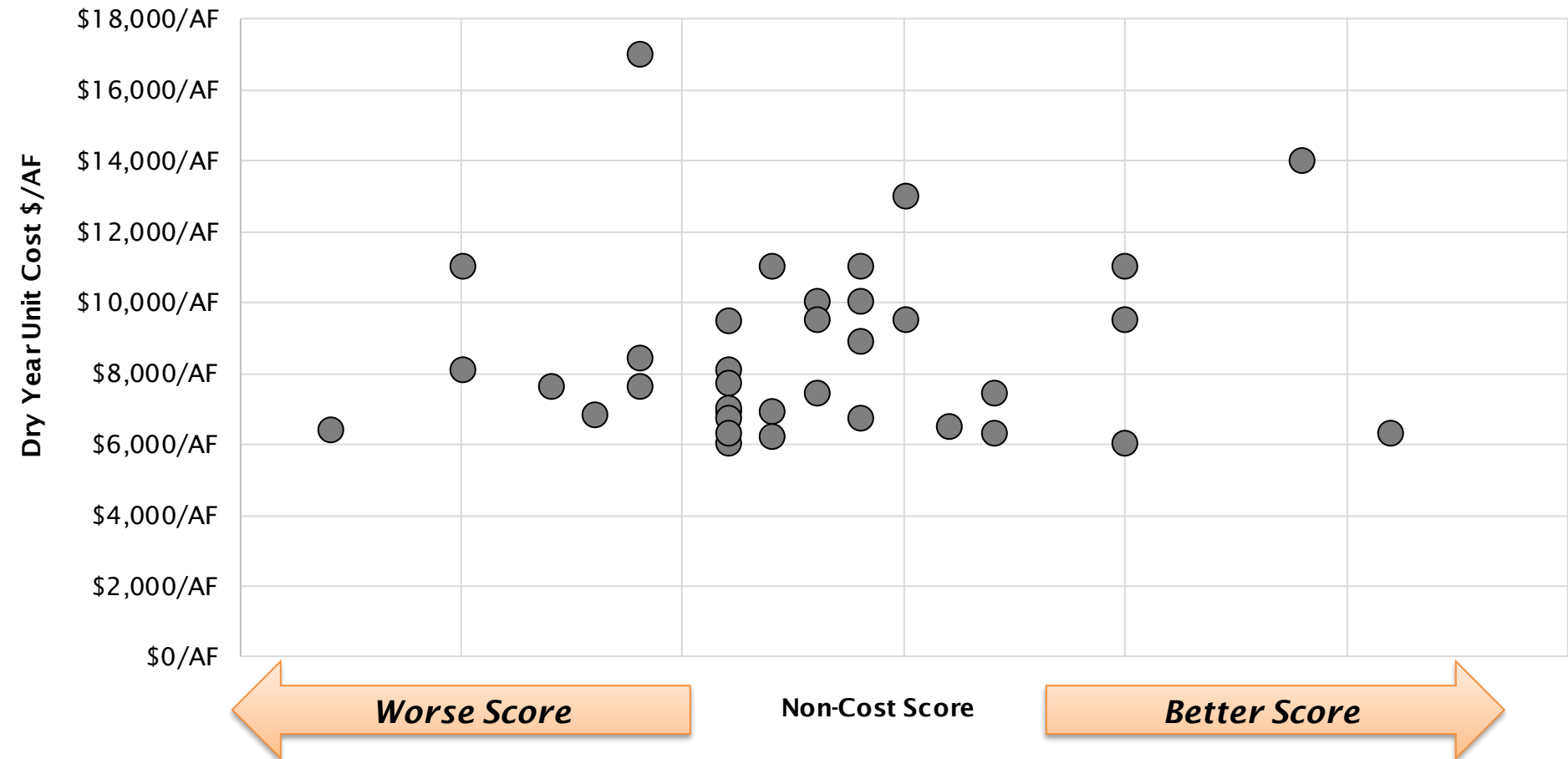
Complexity and Risk



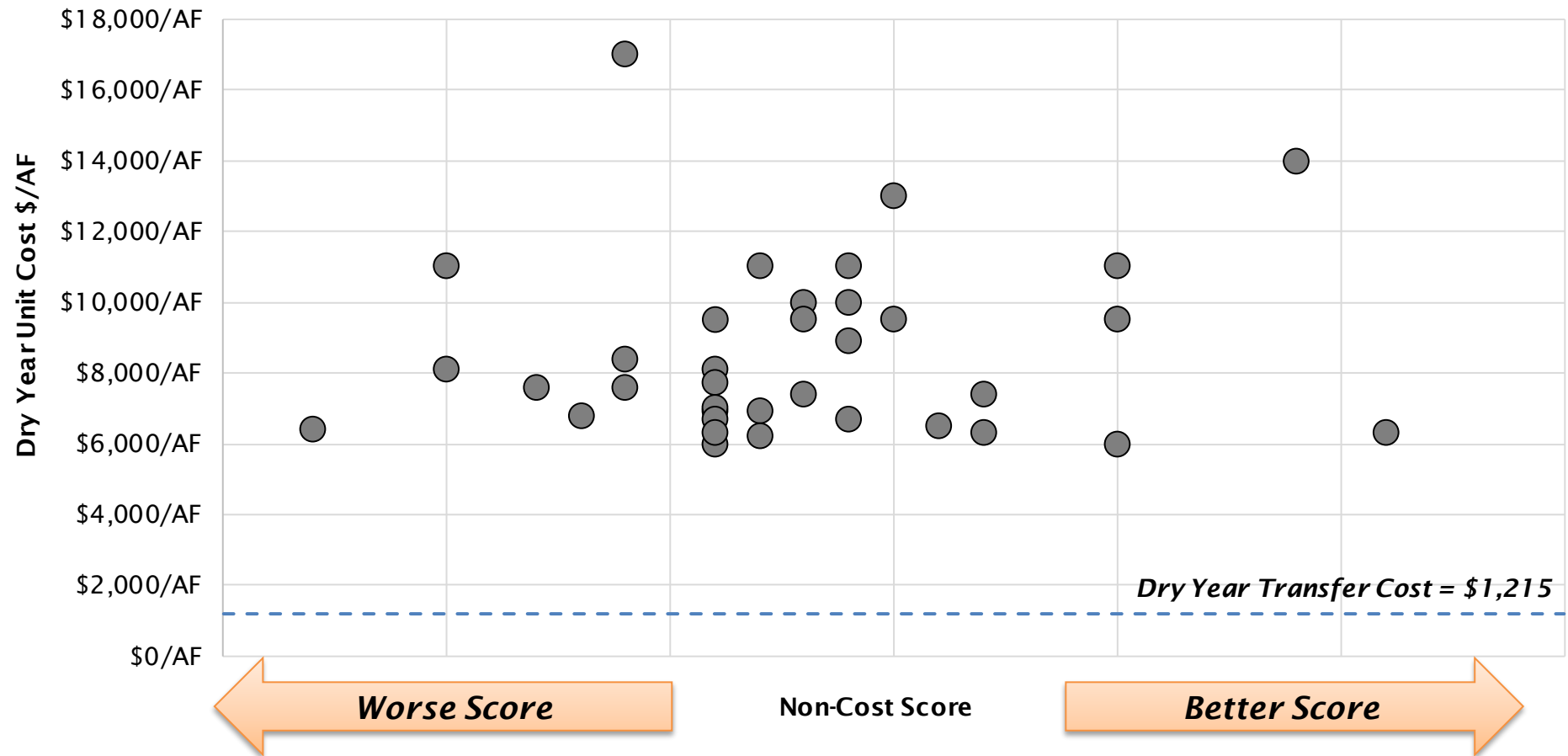
Environmental and Social Objectives



Potable Reuse Project Alternatives Results

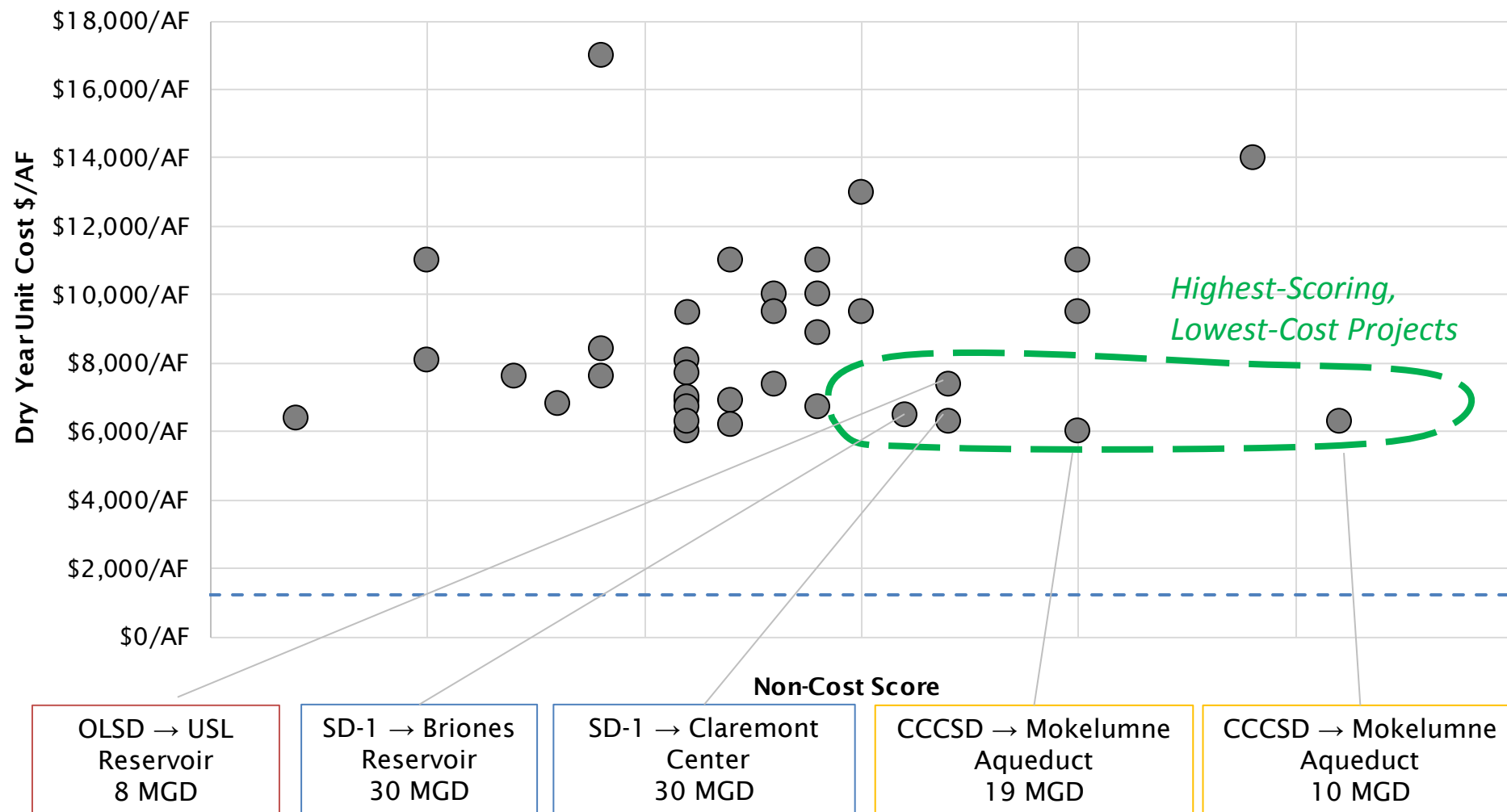


3. Economic Evaluation for Potable Reuse

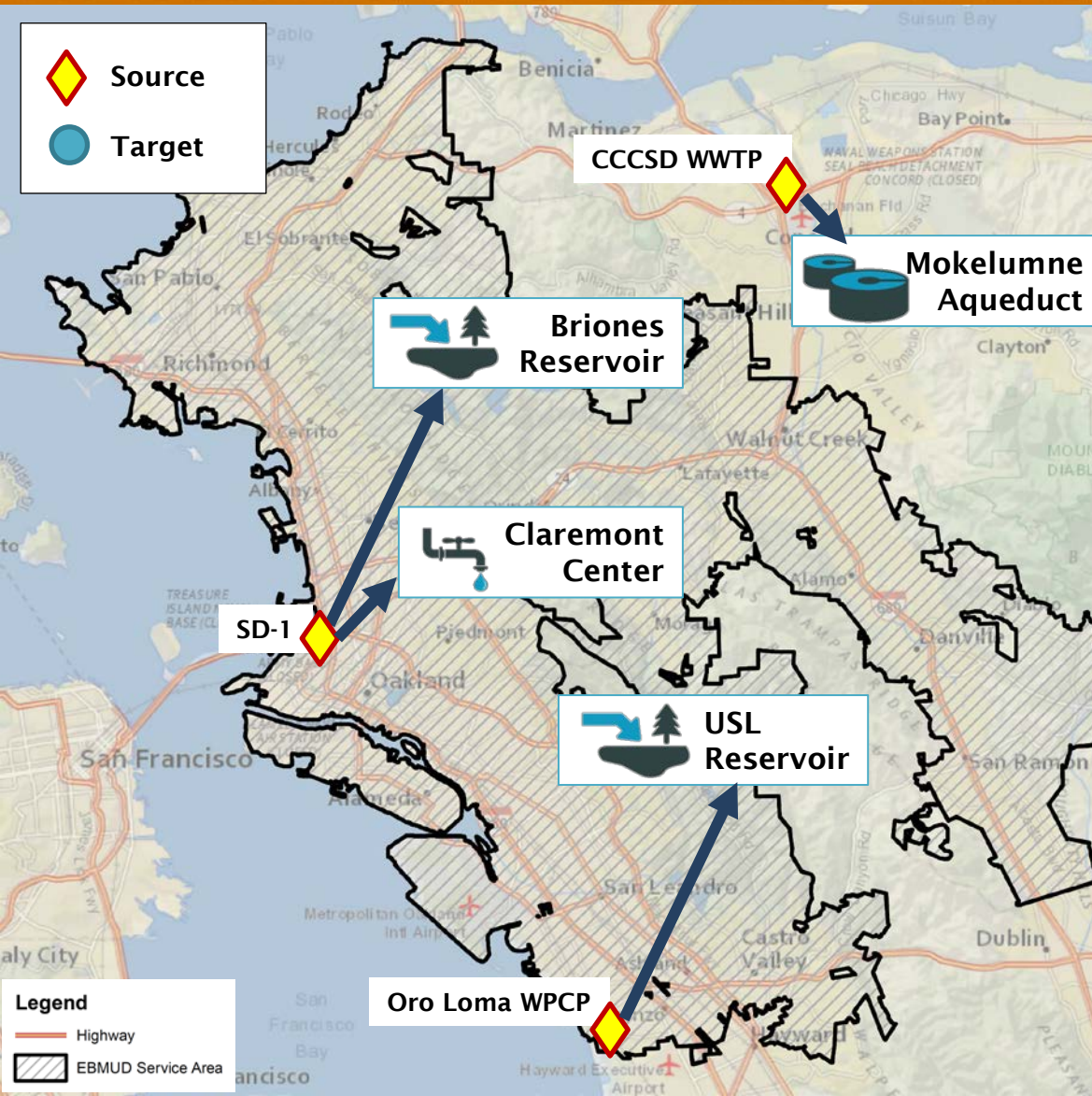


- Operated as a dry year supply, **all** unit costs exceed alternative supply costs

3. Economic Evaluation for Potable Reuse



Highest Scoring Potable Reuse Alternatives

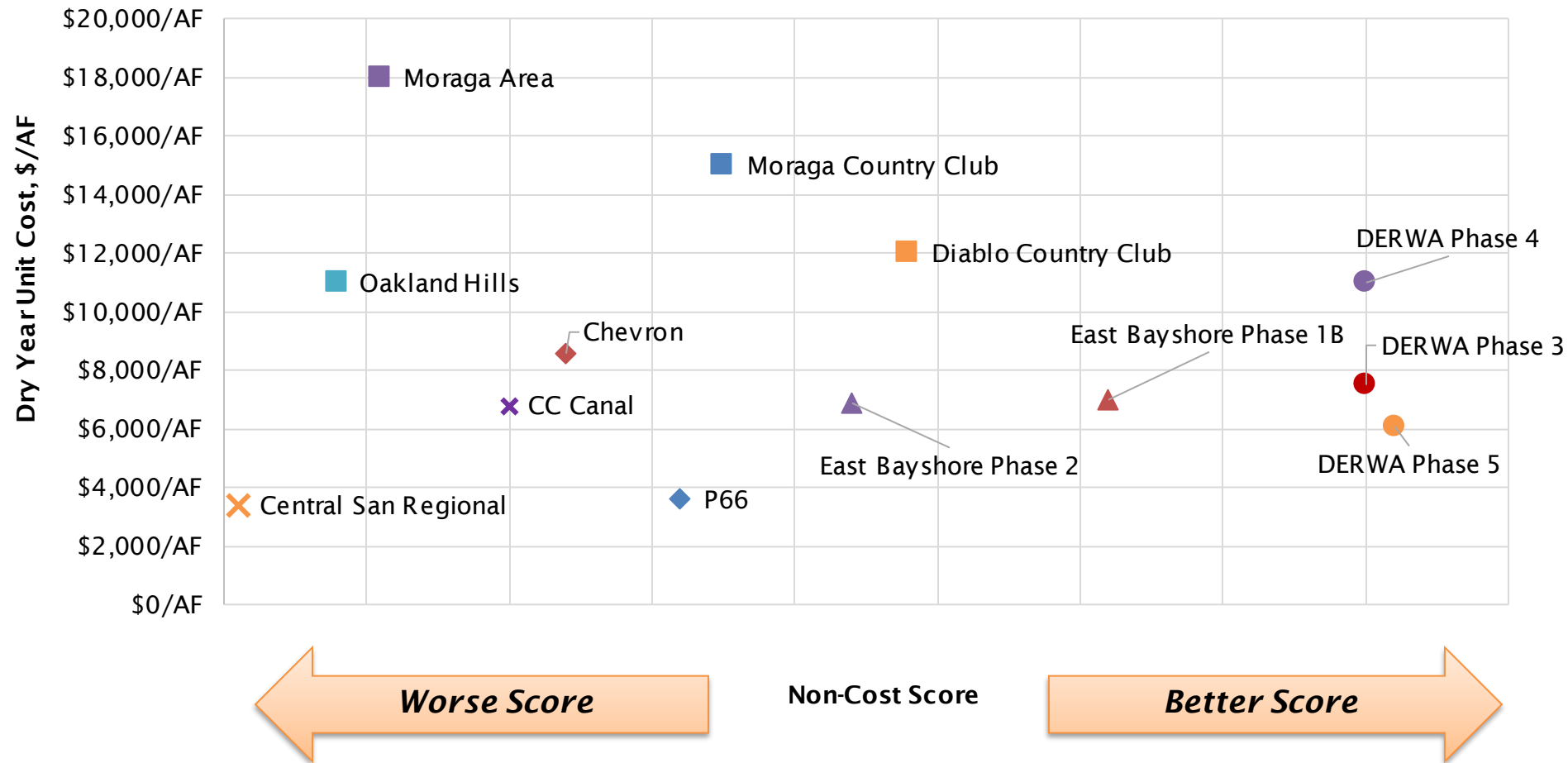


Summary

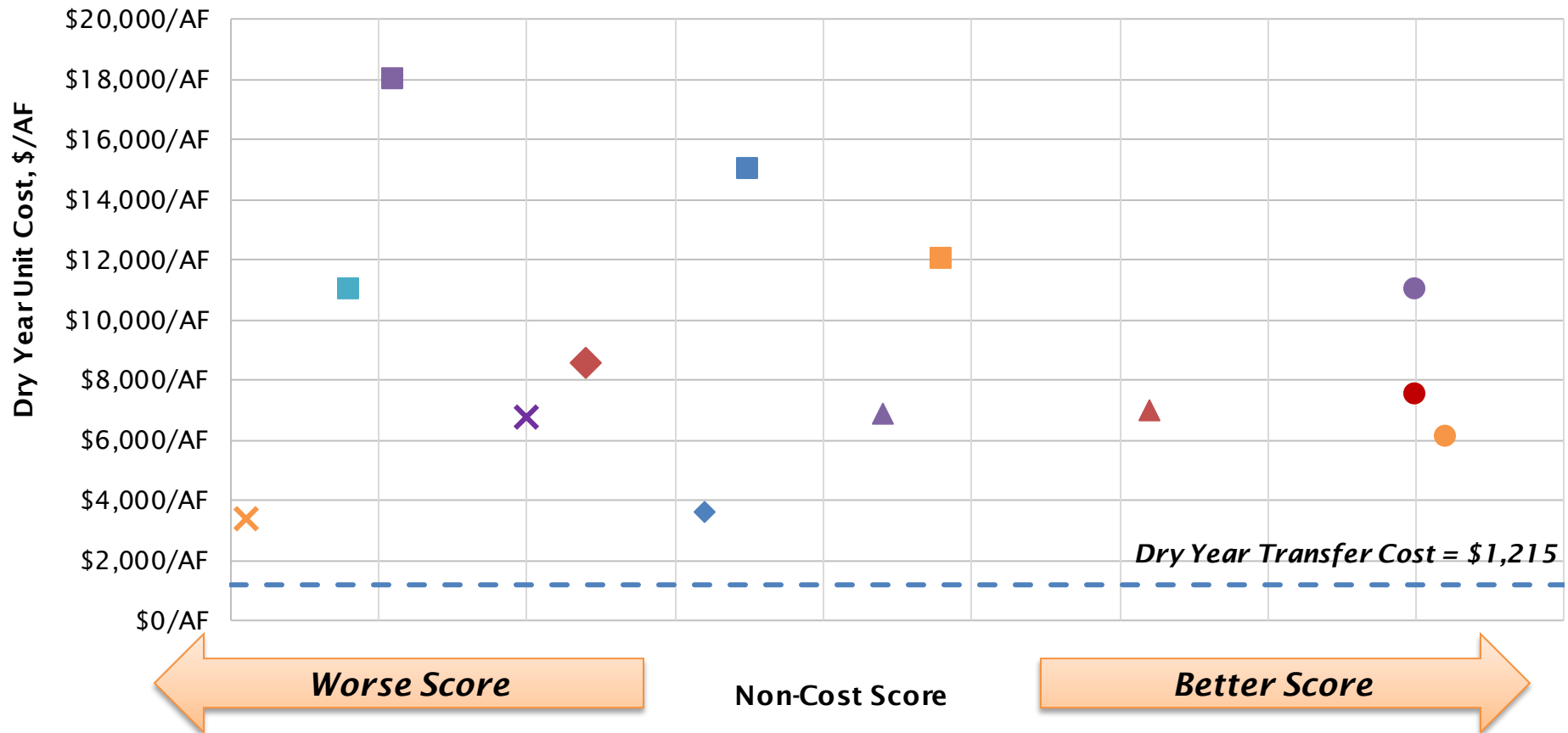
Potable Reuse will be more promising when:

- Other District supply options are limited
- WWTPs are planning upgrades for nutrient removal
- Statewide recycling criteria are adopted for raw and treated water augmentation
- Other potable reuse projects have demonstrated success

Non-Potable Reuse Project Alternatives Results

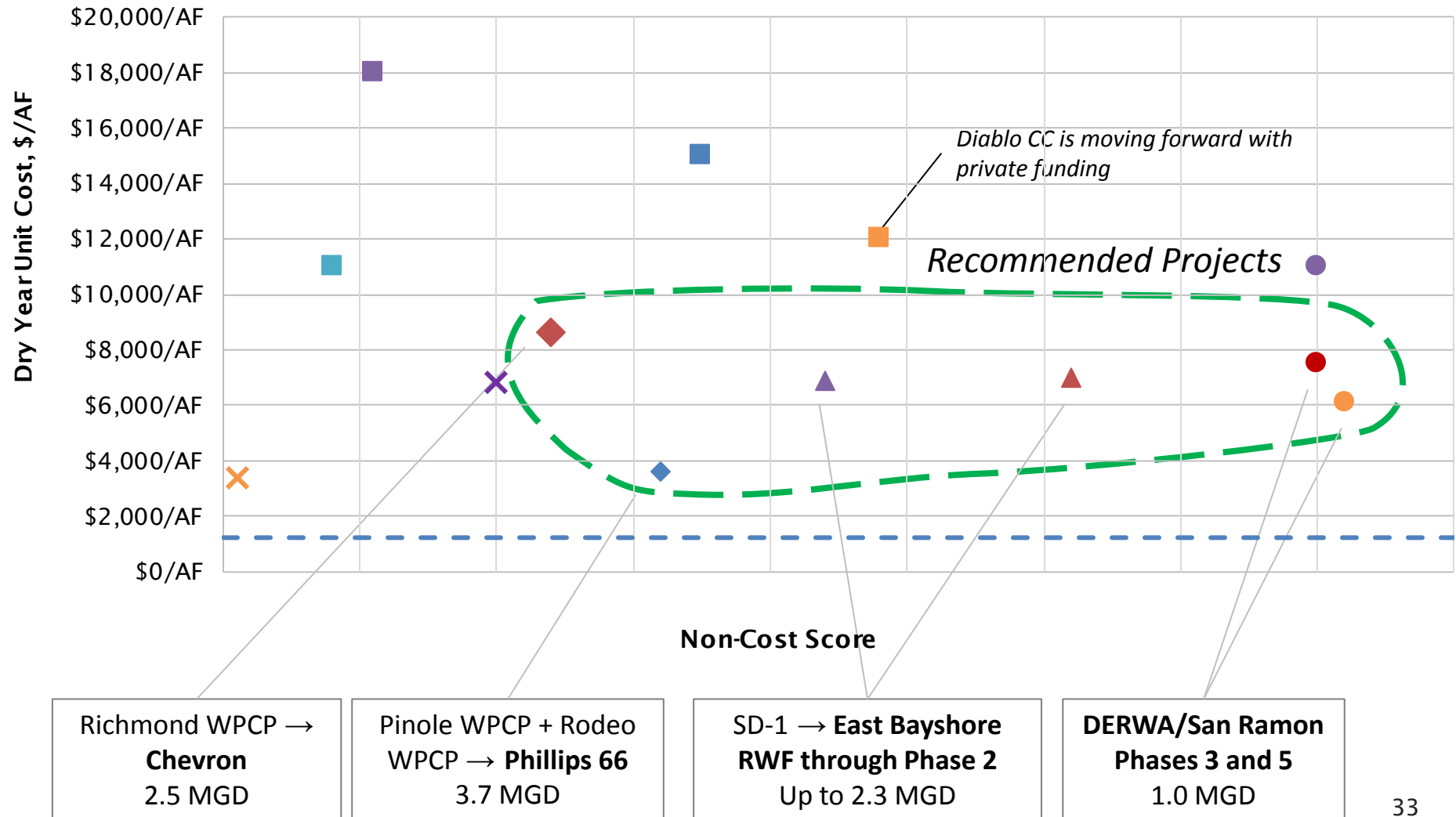


Economic Evaluation for Non-Potable Reuse



- Operated as a dry year supply, **all** unit costs exceed alternative supply costs

Economic Evaluation for Non-Potable Reuse



Evaluation Summary

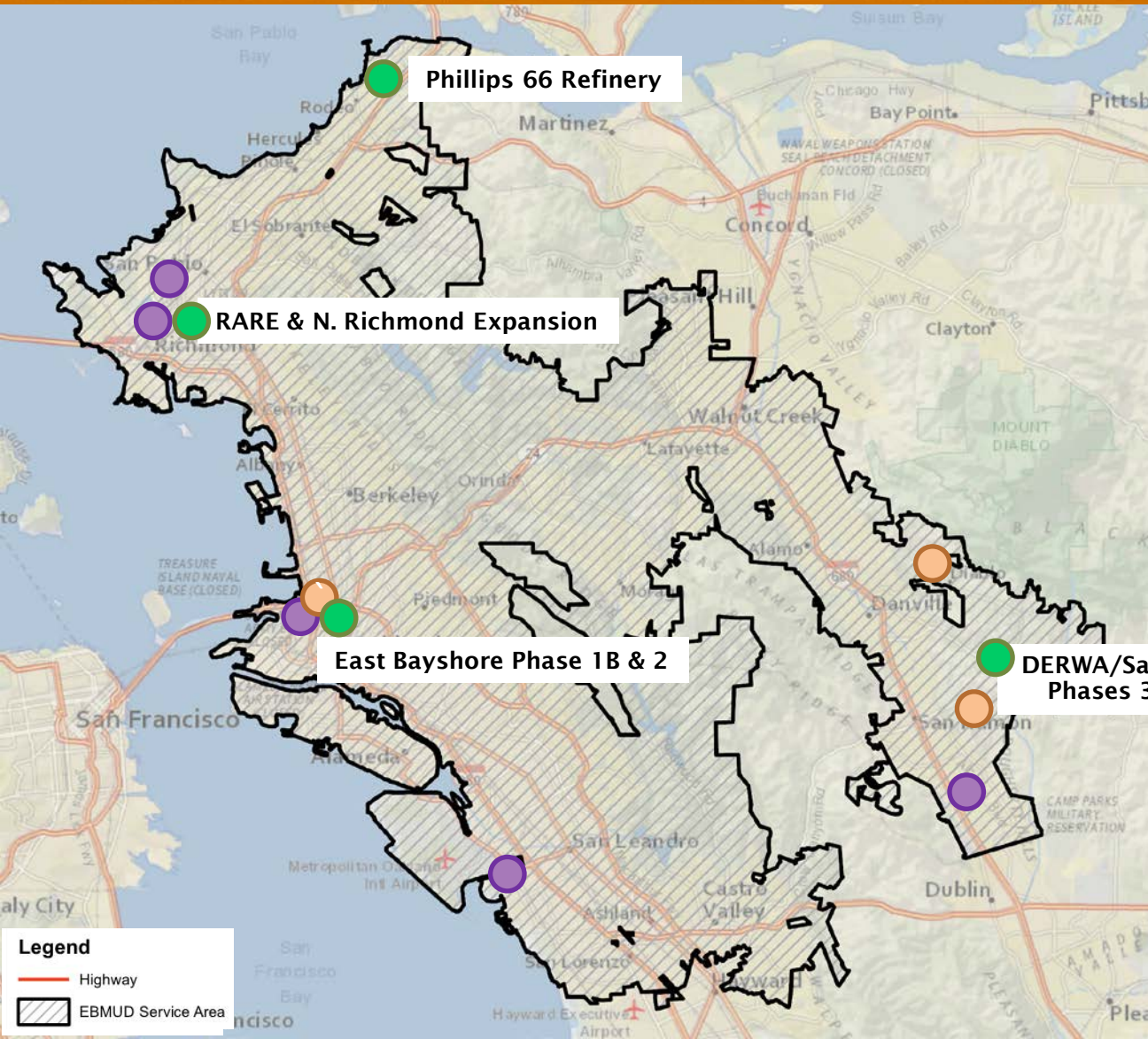


- No projects are economically better than the status quo
- No driver to augment current 20-MGD goal
 - Water supply needs can be met by less costly alternative sources
- District's Recycled Water Program driven by social and environmental more than economic factors

Recommendations

- Maintain 20 MGD goal for 2040
- Implement Recommended Non-Potable Reuse projects
- Continue to track regulations and other projects
- Re-Evaluate Potable Reuse in approximately 10 years

Recommended Projects



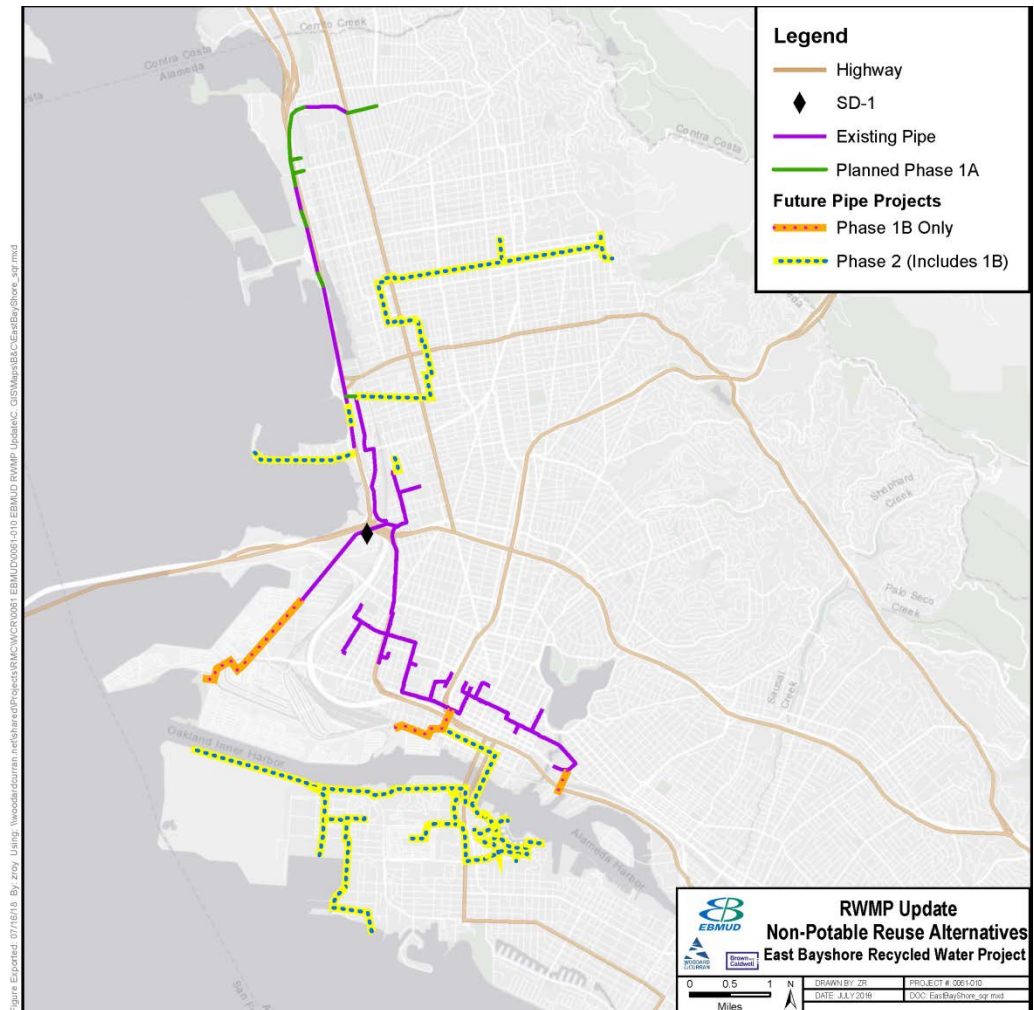
Non-Potable Projects

- Existing Projects
- Under Construction/In Progress
- Potential Projects Recommended as part of Master Plan Update
~9 MGD Capacity

East Bayshore



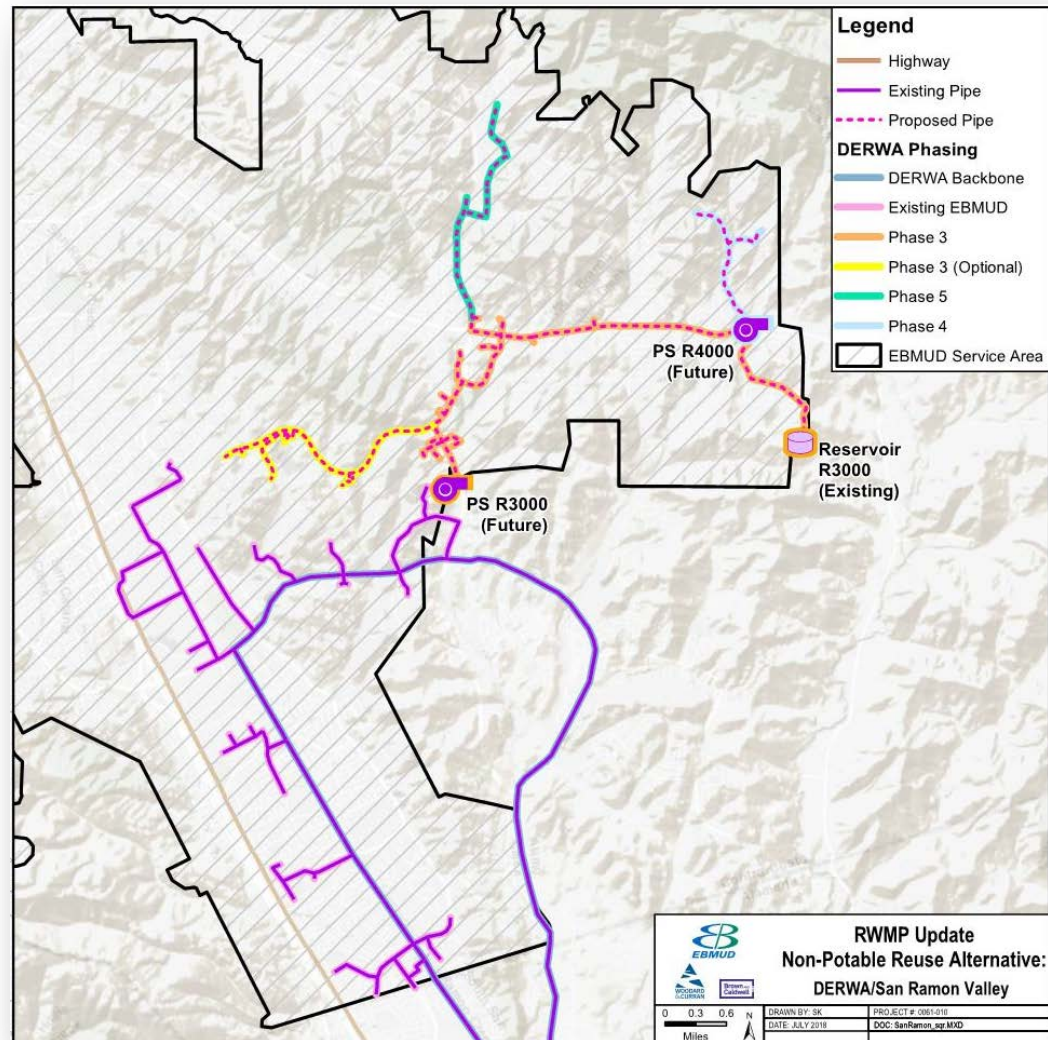
- Phase 1B
 - 0.2 mgd
 - Oakland expansion
 - Conveyance system
 - Treatment upgrades
- Phase 2
 - 1.7 mgd
 - Alameda, Emeryville, Berkeley
 - Conveyance system
 - Treatment upgrades



San Ramon Valley



- Phase 3
 - 0.7 mgd
 - San Ramon, Danville
 - Pump station, pipelines
- Phase 5
 - 0.3 mgd
 - Blackhawk west
 - Pipeline extension
- Need supplemental supplies



RARE & North Richmond



- RARE Expansion
 - 1.5 mgd
 - Boiler feedwater
- North Richmond Expansion
 - 1.0 mgd
 - 4th cooling tower
- Possible supply sources
 - Refinery effluent
 - City of Richmond effluent



Phillips 66 Refinery



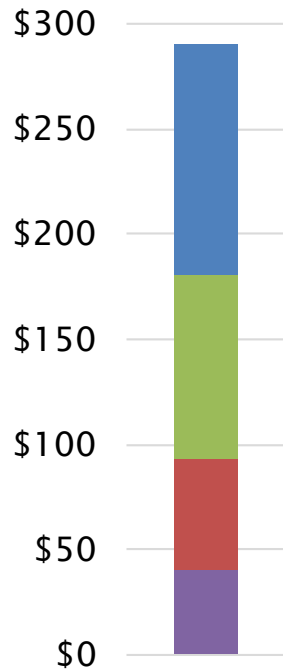
- 3.7 mgd
- Cooling towers and boilers
- Treatment and conveyance facilities
- Supply sources
 - Pinole-Hercules WPCP
 - Rodeo WWTP
 - Refinery effluent



Estimated Project Phasing

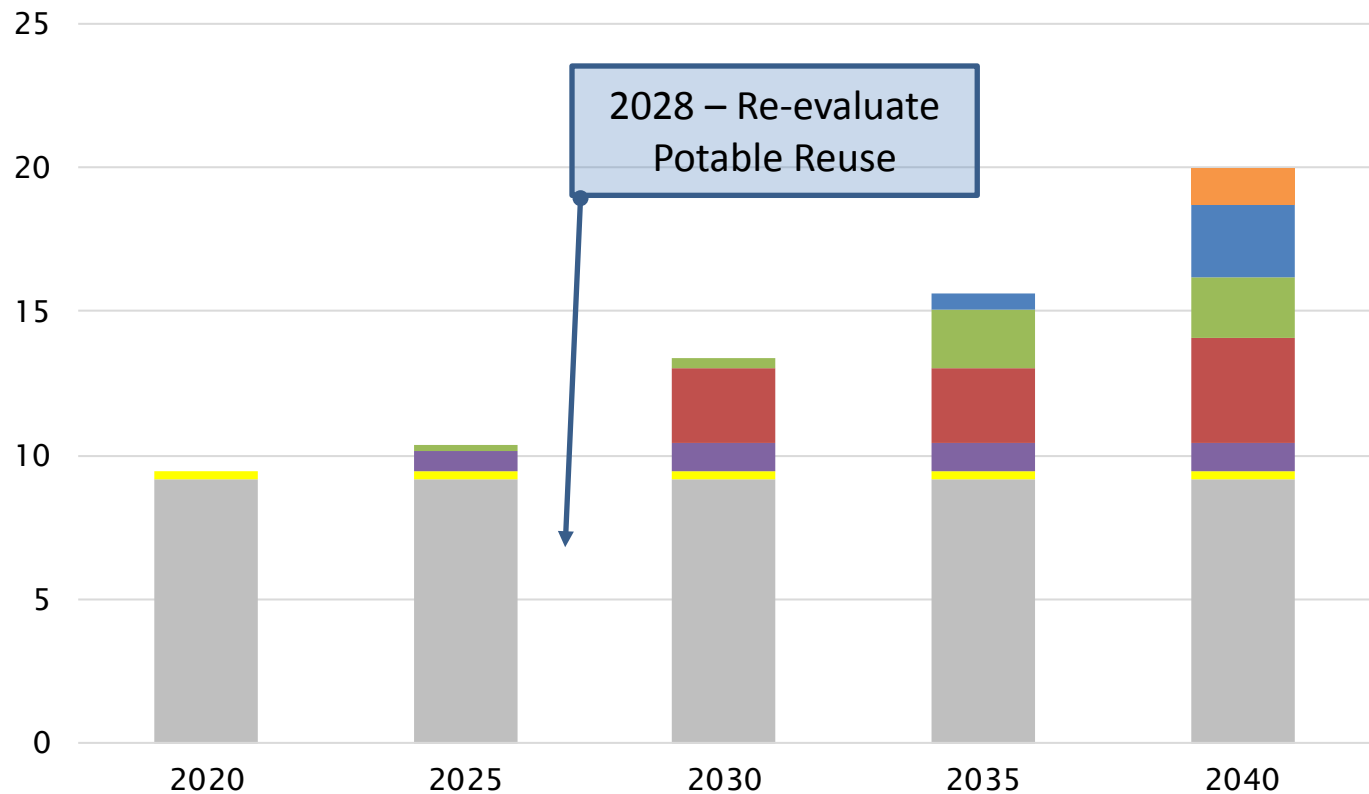


Capital Cost of Recommended Projects (\$M)



Existing Use Diablo CC DERWA Phillips 66 East Bayshore Chevron Other

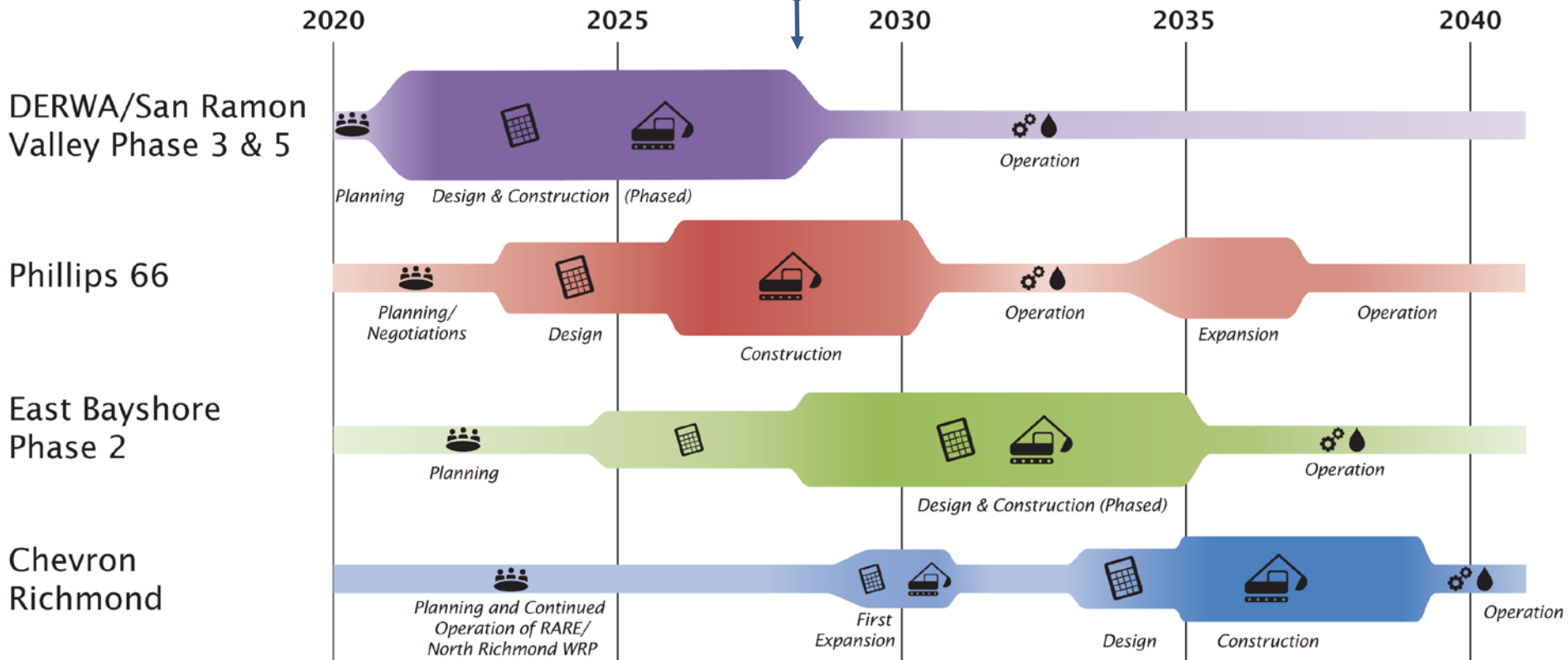
Planned Recycled Water Deliveries (Annual Average, MGD)



Estimated Project Phasing



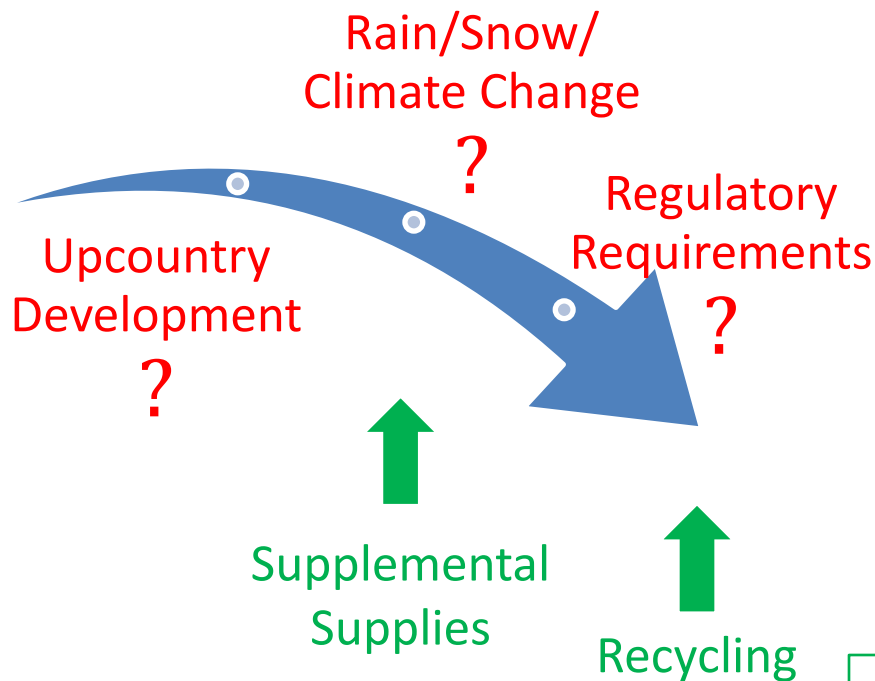
2028 – Re-evaluate
Potable Reuse



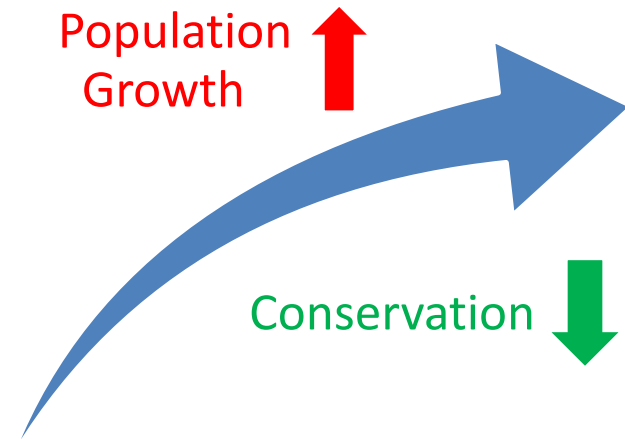
When could EBMUD use potable reuse? When it becomes a necessity.



Supply



Demand



*A future tool to provide
long-term water supply
reliability.*

Recommendations for Potable Reuse



- Monitor progress of potable reuse projects in CA (San Diego, etc.)
- Support development of potable reuse regulations
 - Raw water augmentation (currently targeted for 2023)
 - Treated water augmentation (no timeline)
- Develop long-term EBMUD strategy
 - Determine nexus between near-term non-potable investments and long-term potable investments
 - Make no-regrets non-potable investments

Recommendations for Recycled Water Program



- Maintain current program goal of 20 MGD by 2040
- Continue customer outreach and expansion
- Evaluate revised recycled water pricing strategy
- Continue planning and design of recommended non-potable projects
- Track potable reuse regulations, research, and developing projects
- Re-evaluate potable reuse in approximately 10 years

Next Steps for Master Plan Update



- Incorporate Board Feedback
- Meetings with stakeholders
- Publish Draft Report (Nov. 2018)
- Public Outreach/Workshop (Nov. 2018 - Jan. 2019)
- Finalize updated Recycled Water Master Plan (Feb. 2019)

Public Comments

Director Comments