



Bay Area Council Regional Water Project Prioritization

May 4, 2016

Between July and November 2015, the Bay Area Council worked with the Bay Area's eleven major water agencies to identify water supply and flood protection projects deserving of the highest prioritization for local, state and federal support. The \$3.6 billion worth of projects represent a diverse portfolio approach to meeting the Bay Area's water supply and flood protection challenges, and is the first step in a process to identify the region's needs in the face of climate change and continued economic growth.

Central to this effort is to ensure the Bay Area does its part to achieve the goals laid out in the California Water Action Plan, including increasing regional self-reliance, managing and preparing for dry periods, increasing flood protection, improving data management, and expanding water storage capacity. In addition, the Bay Area Council and water agencies are exploring alternative regional financing mechanisms to help fund those projects with the greatest potential regional impact.

The Sierra Nevada snowpack supplies approximately 66 percent of the Bay Area's freshwater, and about 60 percent of California's total freshwater supplies. The California Department of Water Resources estimates the Sierra snowpack will shrink by at least 25 percent by 2050. **Adapting to climate change will require the Bay Area to both create new freshwater, capture freshwater currently lost, and to better manage and conserve the freshwater it already has.**

In addition to water supply, climate change will also impact sea level rise and incidences of extreme storm-related flooding. According to a 2015 report, *Surviving the Storm*, from the Bay Area Council Economic Institute, AECOM and the California Coastal Conservancy, the Bay Area is currently vulnerable to approximately \$10.5 billion in flood-related economic damages during a 150-year storm event, a sum set to increase with sea level rise. **Adapting to climate change will also require the Bay Area to invest in the wetlands, levees and sea walls needed to defend the region's low-lying water, wastewater, power and transportation infrastructure.**

To address the region's climate-related water challenges, the Bay Area Council Water Committee, a collection of engineering, finance and technology companies and water agencies identified projects using five criteria:

1. **Climate Change:** Does the project address pressures created by climate change?
2. **New Water:** Does the project create new water supply? Is the project needed to convey or store newly created water supply?
3. **Capture:** Does the project capture storm runoff that would have ended up in the bay and utilize it for supply?
4. **Cost Benefit Analysis:** Are the costs justified by the projects benefit?
5. **Regional Impact:** Would the project benefit the Bay Area region? Would it support current and future interconnections?

This process identified a total of 23 water supply projects essential to improving the Bay Area's climate resiliency, and includes a diverse portfolio of recycling, brackish desalination, storage, conveyance and data infrastructure capable of completion by 2025.

Priority Water Supply Projects

Population served: 4 million across 9 counties
Water Created: 214,133 acre feet
Project types: Recycling (17):
Brackish Desalination (3):
Storage (2):
Data (1):

Estimated Cost: \$2.37 billion

Also identified were four flood control projects. These include the two phases of the South Bay Shoreline Study areas (ponds 1-11), and the two phases of the SFO Shoreline Protection Project. According to *Surviving the Storm*, Santa Clara County is the most economically vulnerable region in the Bay Area to flood damage, and could suffer more than \$6 billion in damages during a 150-year storm event. Likewise, delays at SFO from a similar storm could cost approximately \$164 million in delays and cancellations per day, not including the cost of probably infrastructure damage.

Priority Flood Protection Projects:

Projects: SFO Phases 1&2, South Bay Shoreline phases 1&2

Estimated Cost: \$1.23 billion

Regional coordination of Bay Area water projects is also being carried forward through the development of the Bay Area Regional Reliability Drought Contingency Plan (the BARR DC Plan), a joint effort by eight Bay Area water agencies collectively serving more than 6 million people in seven counties. The BARR DC Plan provides a regional approach to enhancing water supply reliability, leveraging existing infrastructure investments, facilitating water transfers during critical shortages, and improving climate change resiliency. The BARR DC Plan is funded by a grant from the U.S. Bureau of Reclamation and will culminate in a report to be finalized in early 2017.

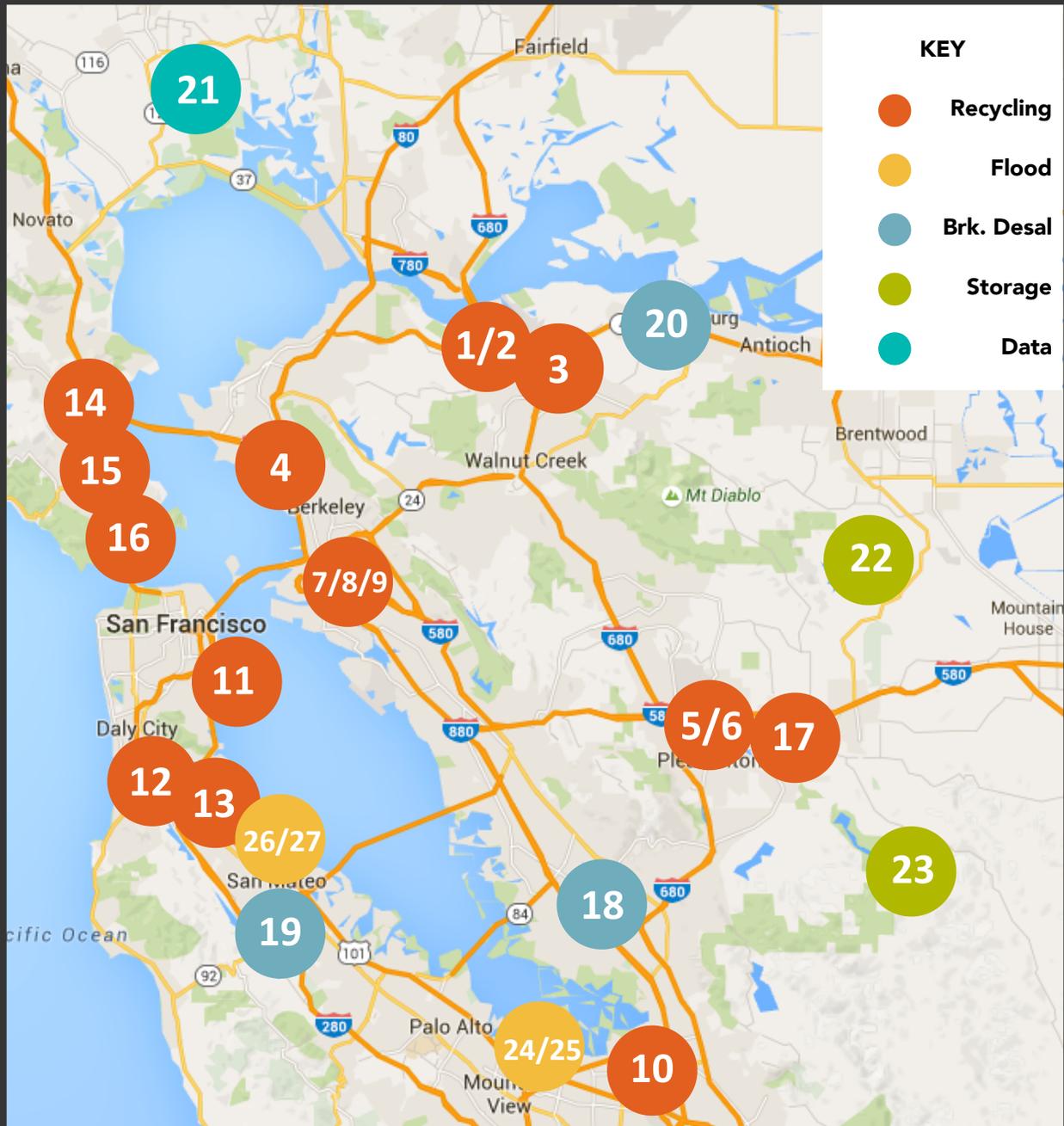
This summary is intended to educate policy makers and opinion leaders about the Bay Area's highest and most urgent water infrastructure needs, and to help start discussions involving the BARR DC Plan. The Bay Area Council will continue to advocate for state and federal matching funds, and explore alternative regional finance mechanisms.

For more information about the Bay Area Council Water Project Prioritization Effort, please contact:

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Bay Area Council Regional Priority Water Projects*



KEY

- Recycling
- Flood
- Brk. Desal
- Storage
- Data

*Numbers are for identification purposes only.

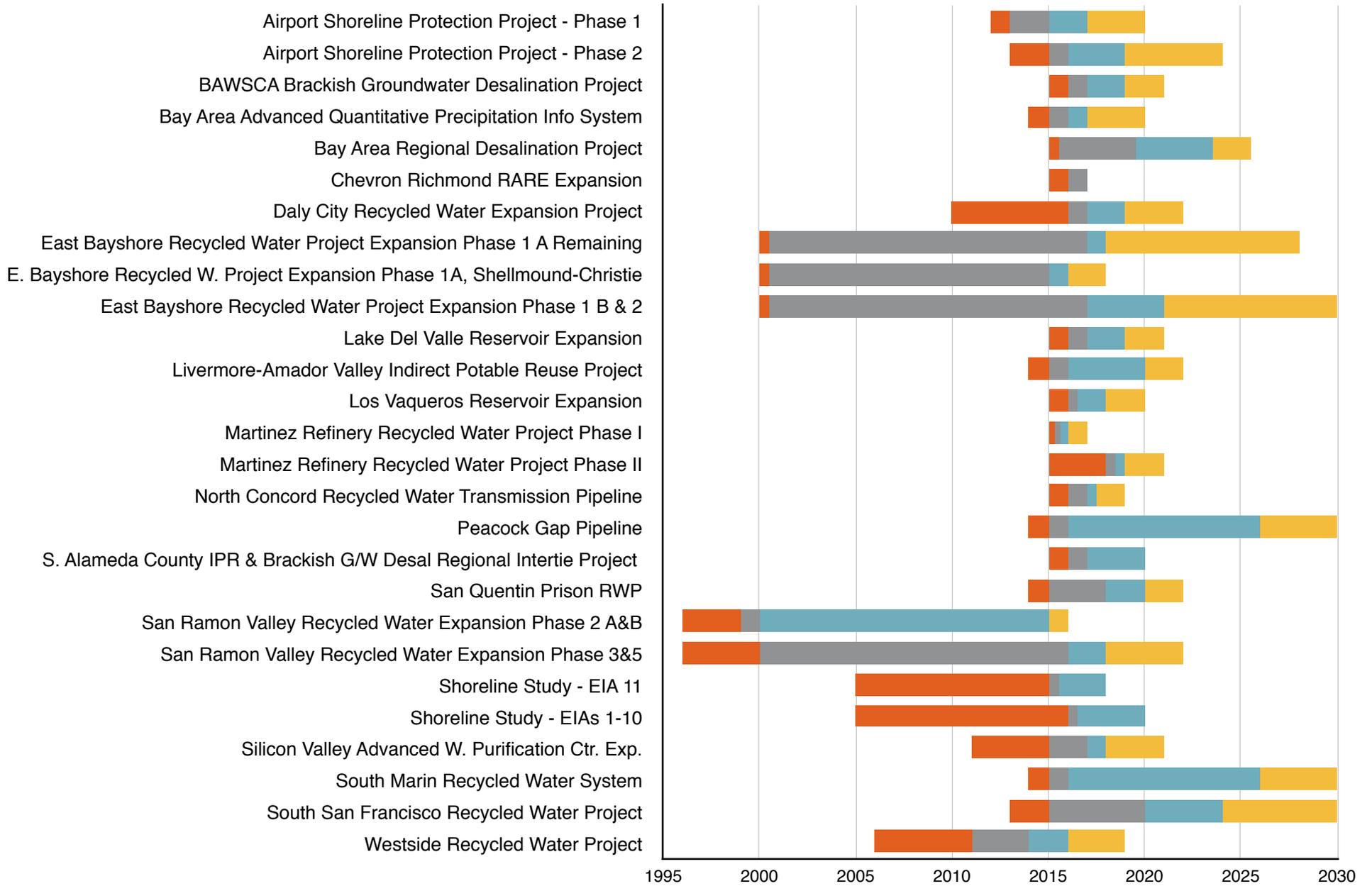
- 1/2. Martinez Refinery Rec. W. Project
- 3. N. Concord Rec. W. Trans Pipeline
- 4. Chevron Richmond RARE Expansion
- 5/6. San Ramon Rec. W. Expansion
- 7/8/9. E. Bayshore Rec. W. Expansion
- 10. Silicon Valley Advanced Water Purification Center Expansion
- 11. Westside Rec. W. Project

- 12. Daly City Rec. W. Expansion
- 13. S. San Francisco Rec. W. Project
- 14. Peacock Gap Pipeline
- 15. San Quentin Prison RWP
- 16. S. Marin Rec. W. System
- 17. Livermore-Amador Valley IPR
- 18. S. Alameda IPR, Brackish Desal
- 19. BAWSCA Brackish Desal

- 20. Bay Area Regional Desal
- 21. Bay Area Advanced Quantitative Precipitation Info. System
- 22. Los Vaqueros Reservoir Expansion
- 23. Lake Del Valle Expansion
- 24/25. S. Bay Salt Ponds A5-11 Project
- 26/27. SFO Shoreline Protection

■ Conceptualization
 ■ Feasibility
 ■ Permit/Deisgn
 ■ Construction

Priority Project Timelines*



*Assumes projects are fully funded. Timeline estimates are meant to demonstrate potential completion dates.

Bay Area Regional Priority Water Project List – Water Recycling

1. Martinez Refinery Recycled Water Project Phase I

Agency: Contra Costa Water District

Type: Recycling

Yield: 1,000 acre-feet per year

Cost: \$2m

Summary: Would provide up to 1,000 acre-feet to refineries located in Martinez, offsetting a like amount of potable diversions from Contra Costa Water District. In addition, this project predominately involves the rehabilitation and use of existing infrastructure to deliver recycled water, thus reducing construction related climate change impacts.

2. Martinez Refinery Recycled Water Project Phase II

Agency: Contra Costa Water District

Type: Recycling

Yield: 5,600 acre-feet per year

Cost: \$23m

Summary: Would provide up to 5,600 acre-feet per year (5 million gallons per day) to refineries located in Martinez, offsetting a like amount of freshwater diversions from Contra Costa Water District. In addition, this project predominately involves the rehabilitation and use of existing infrastructure to deliver recycled water, thus reducing construction related climate change impacts.

3. North Concord Recycled Water Transmission Pipeline

Agency: Contra Costa Water District

Type: Recycling

Yield: 5,000 acre-feet per year

Cost: \$30m

Summary: Would provide for deliveries of up to 5,000 acre-feet to offset demands for existing irrigation users in Concord and Walnut Creek and a major new development in Concord. This project is in the initial stages of development and is conceptual. Cost benefit analysis is ongoing.

4. Chevron Richmond RARE Expansion

Agency: East Bay Municipal Utility District

Type: Recycling

Yield: 1,680 acre-feet per year

Cost: \$17m

Summary: The Chevron Refinery in Richmond is a significant EBMUD customer of both potable and recycled water. EBMUD has constructed two major recycled water treatment facilities that serve the refinery over the past 20 years, using treated sewage effluent from West County Sanitary District as source water. Currently, up to 7.5 million gallons per day (MGD), which is about 60% of the water used at the refinery, is recycled water used in industrial processes. Much of the potable water normally used to operate equipment such as boilers and cooling towers used in the refining process has been replaced with recycled water. Microfiltration, reverse osmosis and chemical treatment are techniques used to produce the recycled water from the wastewater, preparing it for refinery operational use. This new expansion project is designed to further increase the supply of recycled water, using the refinery's own effluent as a source. This means the plant will effectively be reusing water multiple times, thereby

conserving as much as 2.5 additional MGD of potable water for more beneficial uses within the region. This project is currently in the feasibility study phase.

5. San Ramon Valley Recycled Water Expansion Phase 2 A&B

Agency: East Bay Municipal Utility District
Type: Recycling
Yield: 502 acre-feet per year
Cost: \$5.6m
Summary: Currently under construction: This project will extend recycled water pipelines from the Dublin-San Ramon Services District/East Bay Municipal Utility District Recycled Water Authority (DERWA) transmission system to the Bishop Ranch business park and surrounding areas of San Ramon, providing recycled water for irrigation to new customers. New infrastructure will include over 6,000 feet of 16-inch distribution pipe as well as well as over 10,000 feet of 6-inch and 8-inch pipeline.

6. San Ramon Valley Recycled Water Expansion Phase 3 & 5

Agency: East Bay Municipal Utility District
Yield: 960 acre-feet per year
Cost: \$12m
Summary: This project will include a pump station and 4.5 miles of pipeline to deliver recycled water for irrigation into Danville and Blackhawk.

7. East Bayshore Recycled Water Project Expansion Phase 1 A Under Construction (Shellmound-Christie Project)

Agency: East Bay Municipal Utility District
Yield: 50 acre-feet per year
Cost: \$3m
Summary: Currently under construction: this project will extend pipeline along Shellmound St. and Christie Ave. in Emeryville to provide recycled water for irrigation and commercial purposes. At completion, this segment will deliver 50 AFY of recycled water to customers, out of the 460 AFY total for East Bayshore Phase 1A (full project in row below).

8. East Bayshore Recycled Water Project Expansion Phase 1 A Remaining

Agency: East Bay Municipal Utility District
Yield: 410 acre-feet per year
Cost: \$4.8m
Summary: The next phase of this project will extend approximately 4 miles of 12-inch pipeline into Oakland, Emeryville, Berkeley and Albany.

9. East Bayshore Recycled Water Project Expansion Phase 1 B & 2

Agency: East Bay Municipal Utility District
Yield: 2,016 acre-feet per year
Cost: \$37m
Summary: Expansion of recycled waste system into Alameda and further expansion in Oakland to reach additional users.

10. Silicon Valley Advanced W. Purification Center Expansion

Agency: Santa Clara Valley Water District
Yield: 31,000 acre-feet per year
Cost: \$272m
Summary: Would expand existing facilities to create a total 45,000 acre-feet of potable water per year for commercial and landscape uses.

11. Westside Recycled Water Project

Agency: San Francisco Public Utilities Commission
Yield: 5,026 acre-feet per year
Cost: \$186m
Summary: The project would create an additional 4 million gallons of water per day, with room for expansion up to 5 million gallons per day.

12. Daly City Recycled Water Expansion Project

Agency: San Francisco Public Utilities Commission, City of Daly City, North San Mateo County Sanitation District
Yield: 3,800 acre-feet per year
Cost: \$186m
Summary: Create an additional 3.4 million gallons per day, and involves a new treatment facility that will take secondary effluent from the SFPUC's Oceanside Water Pollution Control Plant, and treat it with membrane filtration, reverse osmosis, and ultraviolet light disinfection. The project also includes the construction of a new recycled water storage reservoir and pump station, and approximately 8 miles of new recycled water pipeline.

13. South San Francisco Recycled Water Project

Agency: San Francisco Public Utilities Commission, City of South San Francisco, Golden Gate National Cemetery, City of San Bruno, California Water Services Company
Yield: 665 acre-feet per year
Cost: \$20.5m
Summary: Would serve recycled water only for irrigation needs, and would offset surface water imports by the SFPUC, and reduce groundwater pumping in the South Westside Basin, thereby freeing up groundwater for potable use.

14. Peacock Gap Recycled Water Pipeline

Agency: Marin Municipal Water District
Yield: 200 acre-feet per year
Cost: \$20m
Summary: Six miles of pipeline extension to serve Peacock Gap Golf Course and landscape and commercial uses in the surrounding area.

15. San Quentin Prison Recycled Water Project

Agency: Marin Municipal Water District, Central Marin Sanitation, San Quentin Prison
Yield: 120 acre-feet per year
Cost: \$8.5m
Summary: Treatment plant and pipeline to serve San Quentin Prison.

16. Southern Marin Recycled Water System

Agency: Marin Municipal Water District, Sewage Agency of Southern Marin, City of Mill Valley
Yield: 80 acre-feet per year
Cost: \$3.5m
Summary: Construction of 1 mile of pipeline and treatment facilities upgrade to connect 17 commercial users.

17. Livermore-Amador Valley Indirect Potable Reuse Project

Agency: Zone 7
Yield: 7,700 acre-feet per year
Cost: \$150m

Summary: Would create up to 6.9 million gallons of new drinking water (7,700 acre-feet per year) by utilizing existing former gravel mining pits to recharge highly purified recycled water into the Livermore-Valley Groundwater Basin for use in existing municipal water supply wells, or for direct treatment at the existing Del Valle Water Treatment Plant. The project would also consist of approximately 12.5 miles of pipeline ranging from 18 to 30-inches in diameter.

Bay Area Regional Priority Water Project List – Brackish Desal

18. South Alameda County Indirect-Potable Reuse & Brackish Ground Water Desalination Regional Intertie Project

Agency: Alameda County Water District
Yield: 8,000 acre-feet per year
Cost: \$148m
Summary: Wastewater from Union Sanitary District Union City wastewater plant would be treated to potable standards and piped to Alameda County Water District's Quarry Lakes groundwater recharge area for introduction into the Niles Cone Groundwater Basin.

19. Bay Area Water Supply & Conservation Agency (BAWSCA) Brackish Groundwater Desalination Project

Agency: Bay Area Water Supply & Conservation Agency, potential partners include San Francisco Public Utilities Commission, Santa Clara Valley Water District
Yield: 6,422 acre-feet per year
Cost: \$164m
Summary: Climate change is projected to impact the reliability of imported supplies. In addition, sea level rise will push saline aquifers inland. This project is designed to capture that additional saline water and may provide a benefit to potable inland aquifers by reducing inflow of saline water into terrestrial aquifers.

20. Bay Area Regional Brackish Desalination Project

Agency: Contra Costa Water District, East Bay Municipal Utility District, Santa Clara Valley Water District, San Francisco Public Utilities District, Zone 7
Yield: 19,000 acre-feet per year
Cost: \$175m
Summary: This proposed plant at Contra Costa Water District's existing Mallard Slough intake, under CCWD's existing water rights, is already too salty to use most of the year – with sea level rise, salinity at this western Delta location is projected only to increase from current levels. The Bay Area Regional Desalination Project is also an example of regional cooperation, which improves regional resiliency to climate change.

Bay Area Regional Priority Water Project List – Regional Data

21. Bay Area Advanced Quantitative Precipitation Info System

Agency: Sonoma County Water Agency
Yield: 12,000 acre-feet per year
Cost: \$58m
Summary: The Bay Area's current radar precipitation monitoring systems was designed in the 1990s to identify severe mid-west thunderstorms, not west coast atmospheric rivers. The AQPI system would install new radars and monitoring equipment, and develop state-of-the-art forecast models to improve forecast accuracy and resolution, and emergency planning and response, for the entire region.

Improved storm forecasting will allow water managers to optimize reservoir releases for improved conservation.

Bay Area Regional Priority Water Project List – Storage

22. Los Vaqueros Reservoir Expansion

Agency: Contra Costa Water District (With potential partners)
Yield: 85,000 acre-feet per year
Cost: \$800m
Summary: Creates regional storage, improving resilience to projected changes in hydrology due to climate change. More precipitation falling as rain rather than snow in the winter and more frequent and extreme drought events both mean that the Bay Area will need to be able to capture water when it is available, store it over multiple years, and reliably deliver it when it is needed. The project would also increase the pool of high quality water for blending to offset long-term projected increases in Delta salinity and to provide environmental benefits.

23. Lake Del Valle Reservoir Water Supply Storage Expansion

Agency: Alameda County Water District
Yield: 26,000 acre-feet per year
Cost: \$150m
Summary: The project will increase local and emergency water storage in the Bay region while maintaining necessary flood protection by modernizing the flood management rules for Del Valle Reservoir to a Forecast Informed Reservoir Operation (FIRO). Investments will primarily be in the potential relocation and enhancement of existing East Bay Regional Park District facilities to higher elevations or floatable structures in order to accommodate the water storage goals with an aim of improving recreational opportunities. The additional storage will increase water supply reliability for the 2.4 million customers of Alameda County Water District, Santa Clara Valley Water District, and Zone 7 Water District in the event of an extended Delta or South Bay Aqueduct outage.

Bay Area Regional Priority Water Project List – Flood Protection

24. Shoreline Study - EIAs 1-10

Agency: Santa Clara Valley Water District
Cost: \$700m
Summary: Protects shoreline communities and critical water and wastewater infrastructure against sea level rise and extreme storm events.

25. Shoreline Study - EIA 11

Agency: Santa Clara Valley Water District
Cost: \$174m
Summary: Protects shoreline communities and critical water and wastewater infrastructure against sea level rise and extreme storm events.

26. Airport Shoreline Protection Project - Phase 1

Agency: San Francisco International Airport
Cost: \$58m
Summary: The Airport Shoreline Protection Project (ASPP) is to address flood risks at SFO and affected communities west of SFO. This project will provide flood protection against extreme storm events and adaptation capacity to sea level rise by

constructing shoreline protection improvements. The project includes construction of seawalls, flood/tidal gates, pump stations, levee and embankment stabilization, pavement overlay and power enhancements. The improved shoreline protection system will meet FEMA's certification standards and be ready for sea level rise.

27. Airport Shoreline Protection Project - Phase 2

Agency: Santa Clara Valley Water District
Cost: \$300m
Summary: (Above)