



# Supplemental Water Supply Options

Webinar

October 21<sup>th</sup>, 2021



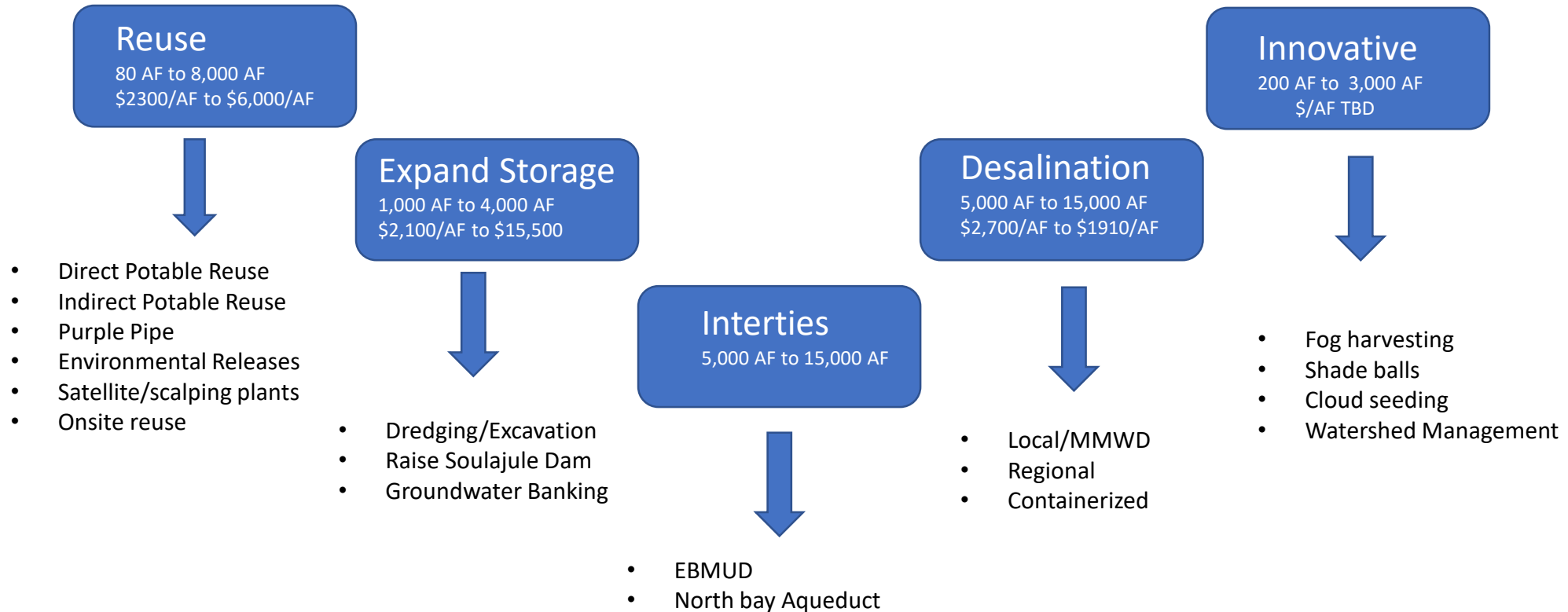
# Overview

- Short Term
- Long Term
- Detailed Review of Supplemental Supply Options
- Regional Opportunities
- Next Steps

# Summary of Short Term Options

- No ideal options exist
  - Continued demand management
  - Winter water - requires adequate precipitation, regulatory approval, collaboration with other contractors and regardless we plan to pursue this option
  - Desalination – Temporary facility, complex operation, requires near term commitment to reserve equipment, begin design and pre-purchases to continue as a viable back up option
  - Intertie project – infrastructure component is progressing very well and a lot of work to be done on water transfers and wheeling

# Long Term Water Supply Options



# Long Term Water Supply Options

- Innovative Concepts
  - Fog Harvesting – 1 gal/day/sq meter of mesh – pilot study to define yield and cost
  - Shade balls – reduces evaporation potential yield ~3600AF, environmental impacts to reservoir ecosystem, visual potential water quality
  - Watershed Management – 200 AFY yield, done in conjunction with BFFIP, cost depends on area and rate of thinning.
  - Cloud Seeding – 500 AF in dry years

# Long Term Water Supply Options

- Water Reuse
  - Purple Pipe – expansion of existing system
  - Indirect Potable Reuse (IPR) – highly treated water through reservoir
  - Direct Potable reuse (DPR) – highly treated water directly to customers
  - Environmental releases – highly treated water to watershed

	IPR			DPR			Purple Pipe			Environmental		
	Yield [AF]	Cost [M]	Cost/AF	Yield [AF]	Cost [M]	Cost/AF	Yield [AF]	Cost [M]	Cost/AF	Yield [AF]	Cost [M]	Cost/AF
SASM	1,600	\$80	\$3,600	1,600	\$63	\$3,100	80	\$5	\$3,000			
CMSA	2,300	\$87	\$3,000	2,300	\$70	\$2,600	200	\$8.60	\$,2800	2,300	\$87	\$3,000
LGVS	900	\$59	\$5,500	900	\$65	\$5,800	300	\$15	\$4,500			

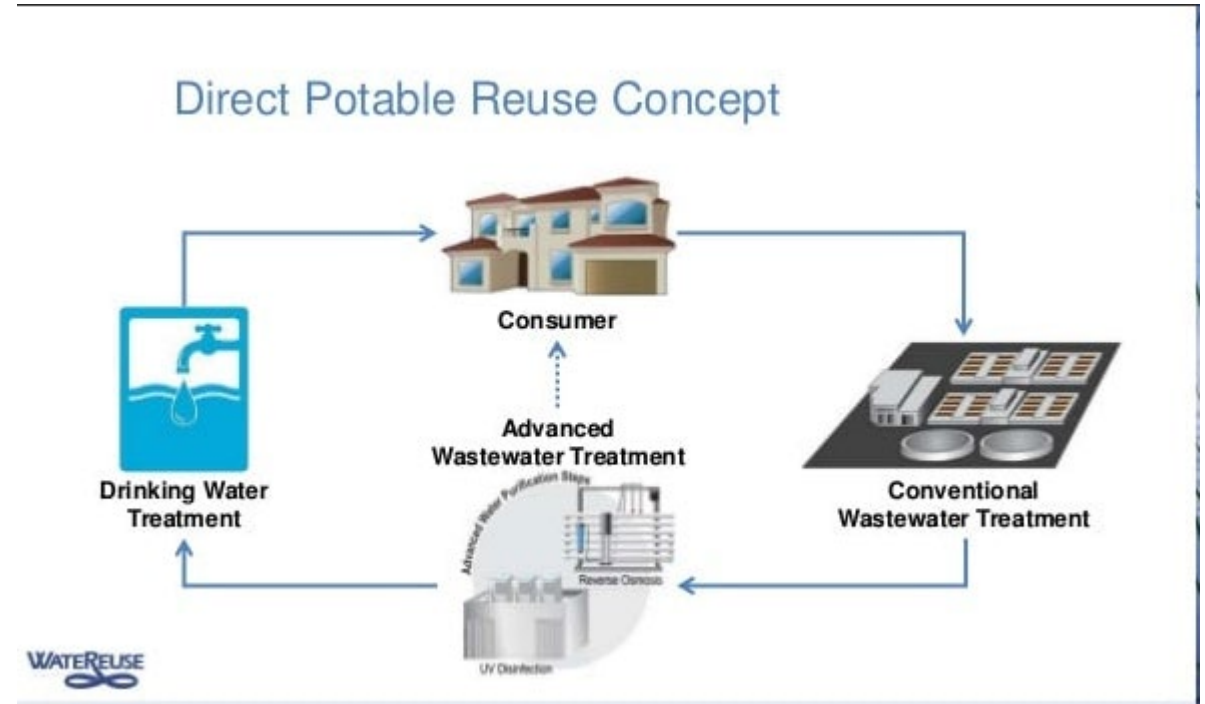
AF = acre-feet, 1 acre-foot = 325,851 gallons

Costs 2016

Source - Water Resources Plan 2040

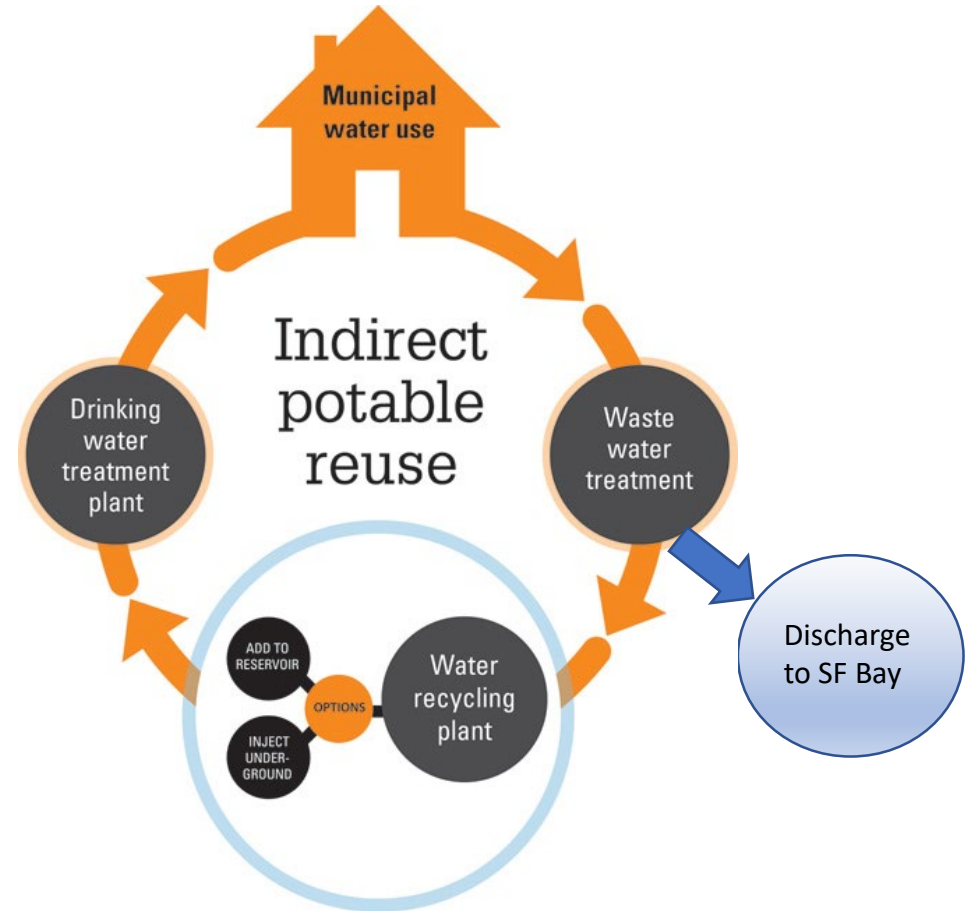
# Direct Potable Reuse – 2,200 AF

- Full Advanced Water treatment facility at CMSA
  - UF/RO/UV
  - Engineered buffer – 3 x 1-MGD tanks
- Pipeline conveyance - 5500 ft
- Max production 2-MGD (72% recovery)
- Capital \$45M
- Operating \$3M
- \$2,400/AF



# Regional Indirect Potable Re-use – 6,000 AF

- Full Advanced Water Treatment:
  - Ultra Filtration / Reverse Osmosis / UV
- Production – 8.8 MGD
- Capital - \$359M
- Operating - \$7.9M
- \$3,300/AF





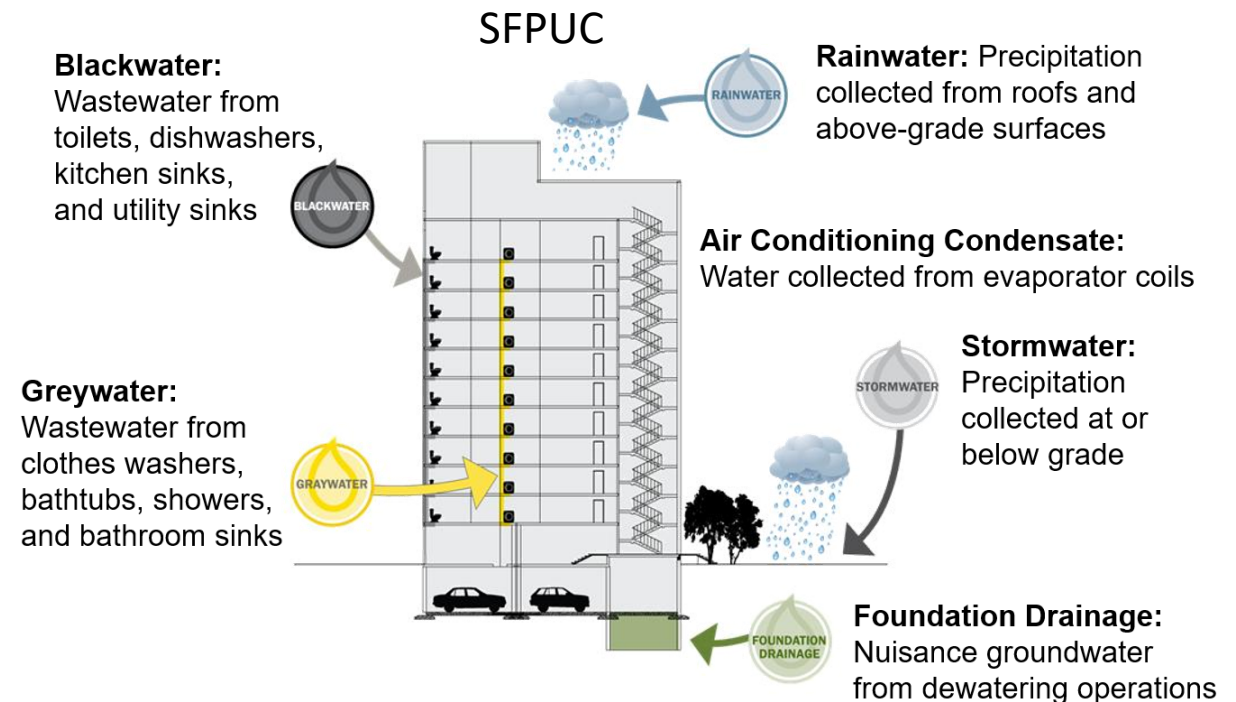
# Purple Pipe

Project	Total Offset [AF/Yr.]	Project Cost [M]	Cost/AF/Yr.
Lucas Valley Ext	21	\$2.7	\$8,095
Peacock Gap G.C. (Ph 8)	166	\$25.3	\$9,385
Mt. Tamalpais Cemetery	18	\$2.4	\$8,383
Circle Rd	8.3	\$1.8	\$13,144
MMWD/SASM	81	\$3.5	\$3,436
San Quentin	150	\$9.2	\$4,442

Limited volumes, high unit costs that may be addressed by grants

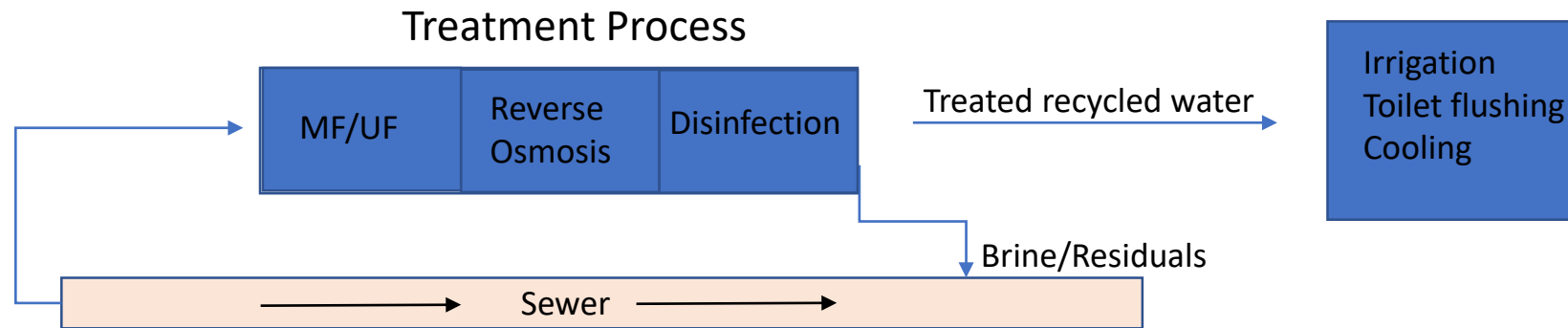
# Onsite Re-use

- On-Site Non-Potable Re-use (ONWS) - capture and treat water sources generated from within or surrounding a building, such as wastewater, greywater, storm water, or roof collected rainwater. The treated water is then reused onsite or locally.
- Suitable for large buildings or campus facilities
- SFPUC leader in this area and requires new development projects over 250,000 sf to use ONWS systems



# Satellite / Scalping Plants

- Scalping plants are **small wastewater treatment plants** that remove liquid from wastewater lines and treat the water to standards acceptable for irrigation.



Projects that have been evaluated have unit costs of \$6,000 / AF compared to centralized project costs of \$3000 / AF

# Environmental Reuse- Streamflow Augmentation

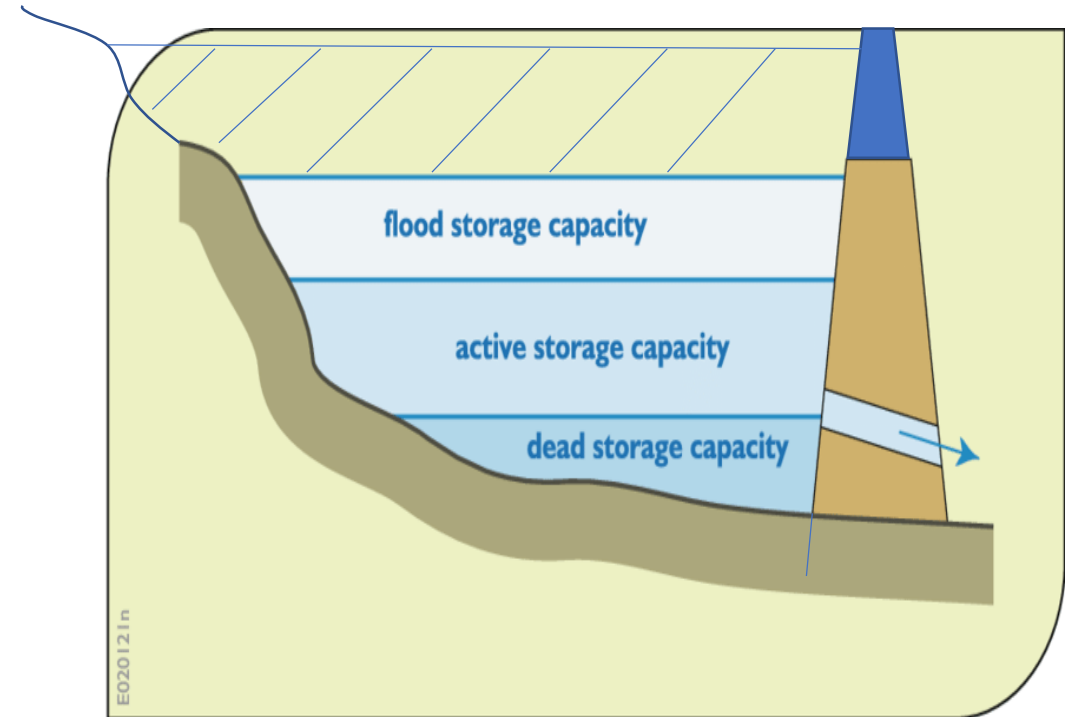
- Full Advanced Water Treatment:
  - Ultra Filtration / Reverse Osmosis / UV
- Move water from sea level to Kent
- Cooling of water may be needed
- Capital - \$359M
- Operating - \$7.9M
- \$3,300/AF



Streamflow depend on storage and may be impacted in drought conditions

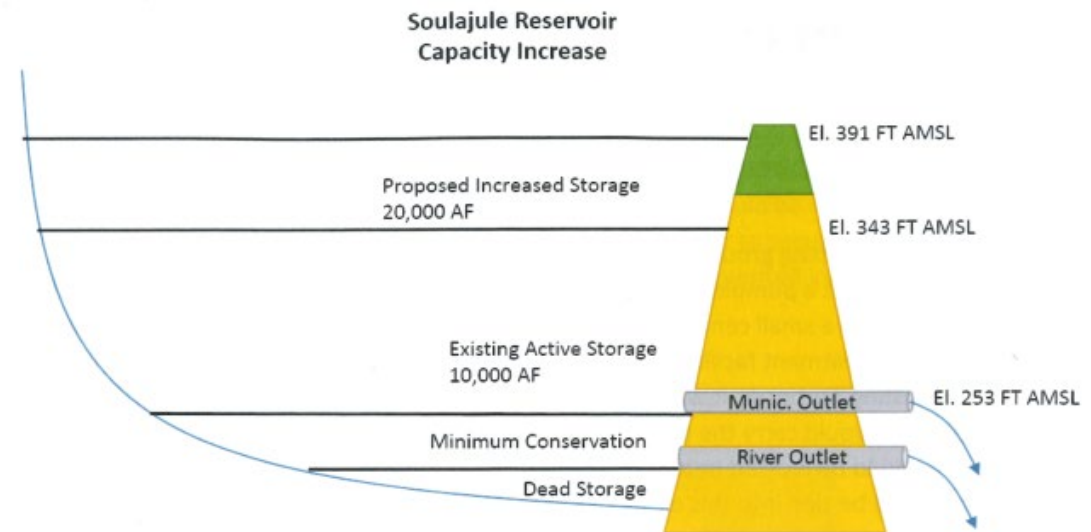
# Expanding Storage

- Excavation or Dredging
  - 1,000 AF capacity = 1.6 million cubic yards  
→ ~40,000 truck trips
  - Recent costs for excavation \$45/cubic yard
  - Estimate cost per 1,000 AF of capacity = \$72M
  - Capacity of reservoirs is typically in the top layers
  - Regulatory/environmental approvals for the dredging or excavation work itself
  - Requires new water rights



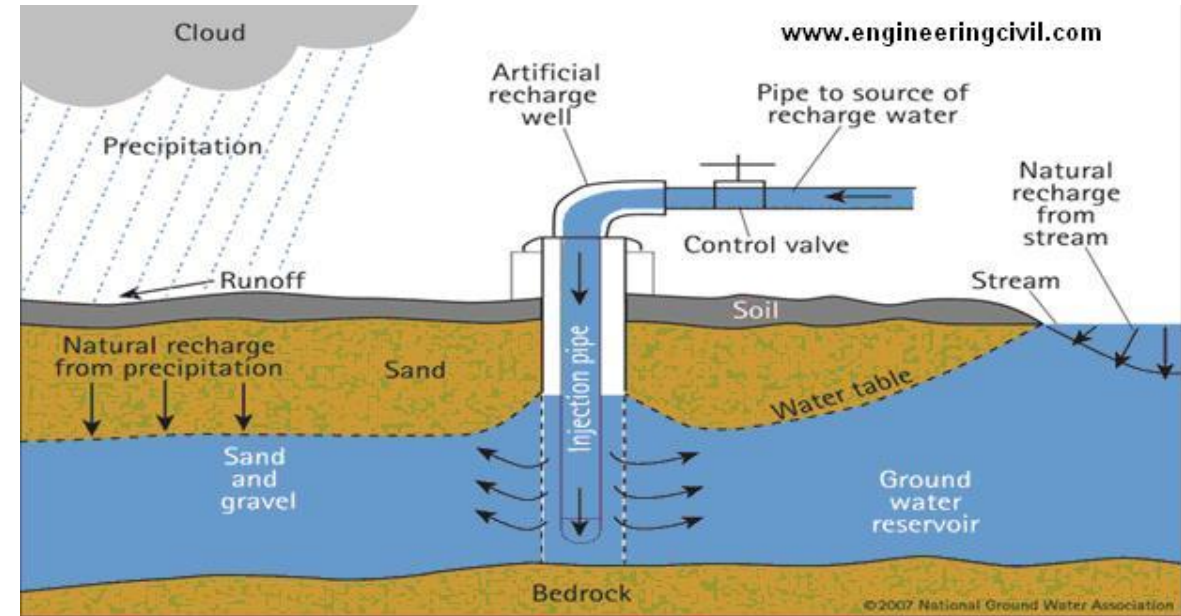
# Expand Storage

- Raise Soulaajule Dam
  - Existing capacity = 10,000 AF
  - Raise dam 48 feet
  - New Capacity = 30,000 AF
- Yield affected by
  - Water rights
  - Environmental releases



# Groundwater Storage (Banking)

- Santa Rosa Plain Conjunctive Use
- In wet years MMWD buys extra SCWA water to be used by groundwater agency in lieu of groundwater pumping
- In dry years MMWD has access to the groundwater less some losses
- Requires management of the basin to prevent over drafting
- Capacity of aquifer in wet or normal years to accept recharge is unknown
- SCWA flows may be subject to allocations



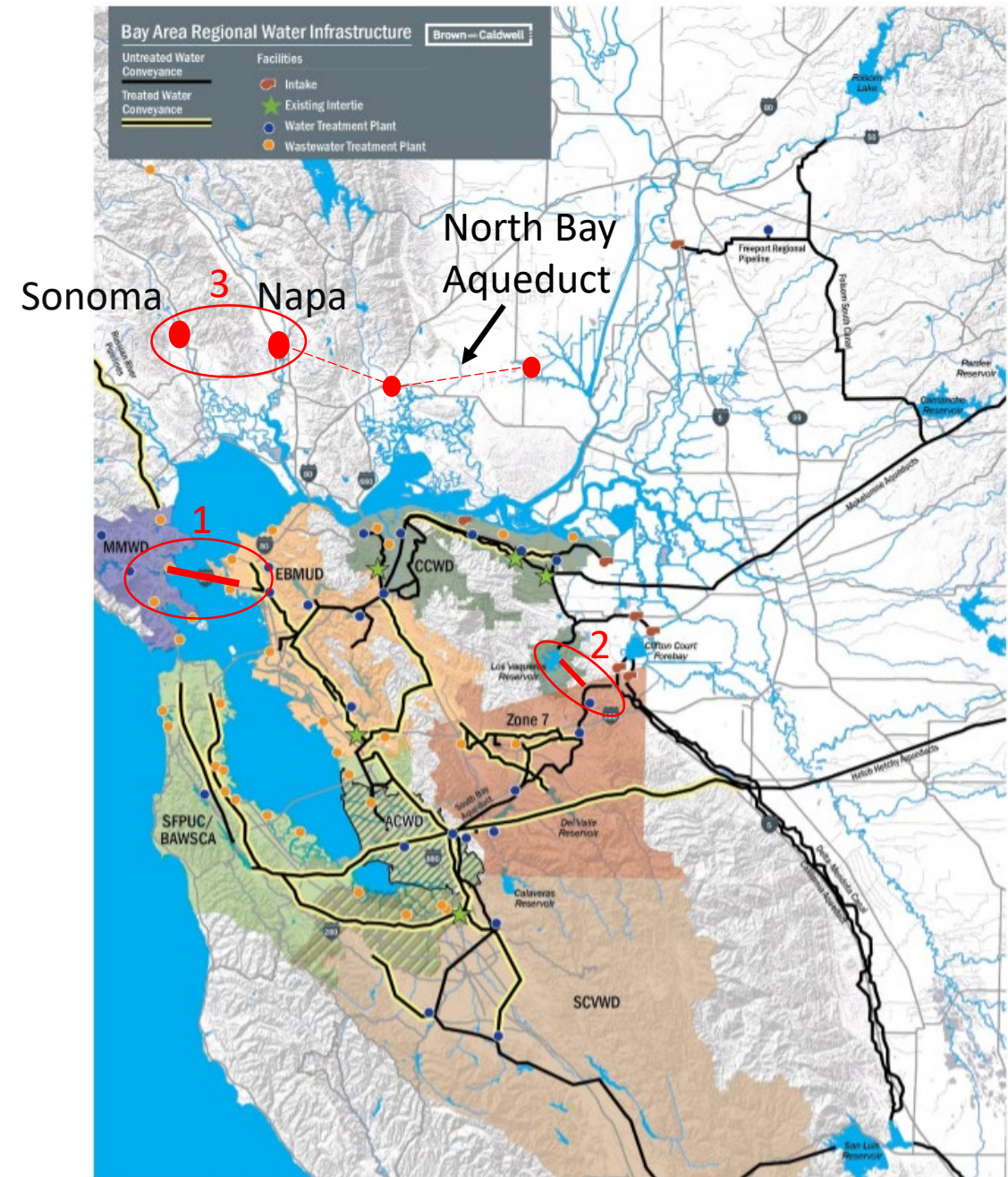
# Local Desalination Plant

- Capacity 5 to 15 MGD
  - Intake – 4500 ft of 48-inch HDPE pipe to 1-mm self cleaning screens
  - Pre-treatment - Ultra-filtration membrane system
  - Desalination – Reverse osmosis system
  - Treated water – disinfection, storage, pump station and pipeline
  - Brine – holding tank, pump station and 3500 ft of 30-inch pipeline to CMSA outfall
- Capital Cost
  - 5-MGD = \$152 M / cost per AF = \$2,710
  - 10-MGD = \$192 M / cost per AF = \$2,173
  - 15-MGD = \$222 M / cost per AF = \$1,962
- Annual Operating Cost for 15-MGD Desalination plant = ~\$20M
- Schedule to produce water likely greater than 48 months



# Interties

- Existing Interties:
  - MMWD - Sonoma
  - CCWD – East Bay MUD
  - Hayward – East Bay MUD
  - Hayward – ACWD
  - ACWD – Zone 7
  - SFPUC - ACWD
  - SFPUC – Valley Water
- Proposed Interties:
  - MMWD - East Bay MUD (1)
  - CCWD – South Bay Aqueduct (2)
- Potential Intertie
  - Sonoma – North Bay Aqueduct (3)



# Water Supply Project Example Prioritization

	Project	Priority	Yield [AF]	Cost	Cost/AF
→	Intertie	High	9000	\$100	TBD
	DPR	Med	2200	\$45	\$2,400
→	IPR	High	6000	\$359	\$3,300
	Purple Pipe	Med	150	\$9.20	\$4,400
	Environmental Releases	Low	6000	\$359	\$3,300
	Dredging/Excavation	Low	1,000	\$72M	\$7,200
	Raise SoulaJule Dam	Low	20,000	\$100M	\$2,100
→	Groundwater Banking	High	900	\$1M	\$1,400
	Regional Desalination	Low	5000	\$75M	\$1,825
	Local Desal	Low	5000	\$150M	\$2,710
	Containerized Desal	Low	2000	\$70M	\$3,510
→	Watershed Mangement	High	200	N/A	N/A
	Shade Balls	Med	3600	TBD	TBD
	Fog Harvesting	Low	10	\$5M	\$25,000
	Cloud Seeding	Low	500	\$0.50	\$7,400

## Ideal characteristics of water source:

- No environmental impacts
- Climate change resilient
- Low energy / carbon footprint
- High quality

# Next Steps

- Continue developing drought projects – (EIP/Desal/Winter Water)
- Based on board input further develop action/implementation plan for long term water supply opportunities