Sustainable Water Infrastructure Project (SWIP)

City of Santa Monica

First of its Kind Stormwater Harvesting & Water Recycling Facility in California

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Local. Sustainable. Drought Resilient.

City of Santa Monica

93,000+ residents
2,700+ commercial customers

Drinking water and fire protection

groundwater (local)
surface water (MWD)

Sewer collection

Storm drains and catch basin

9 million gallons
of high-quality drinking water daily

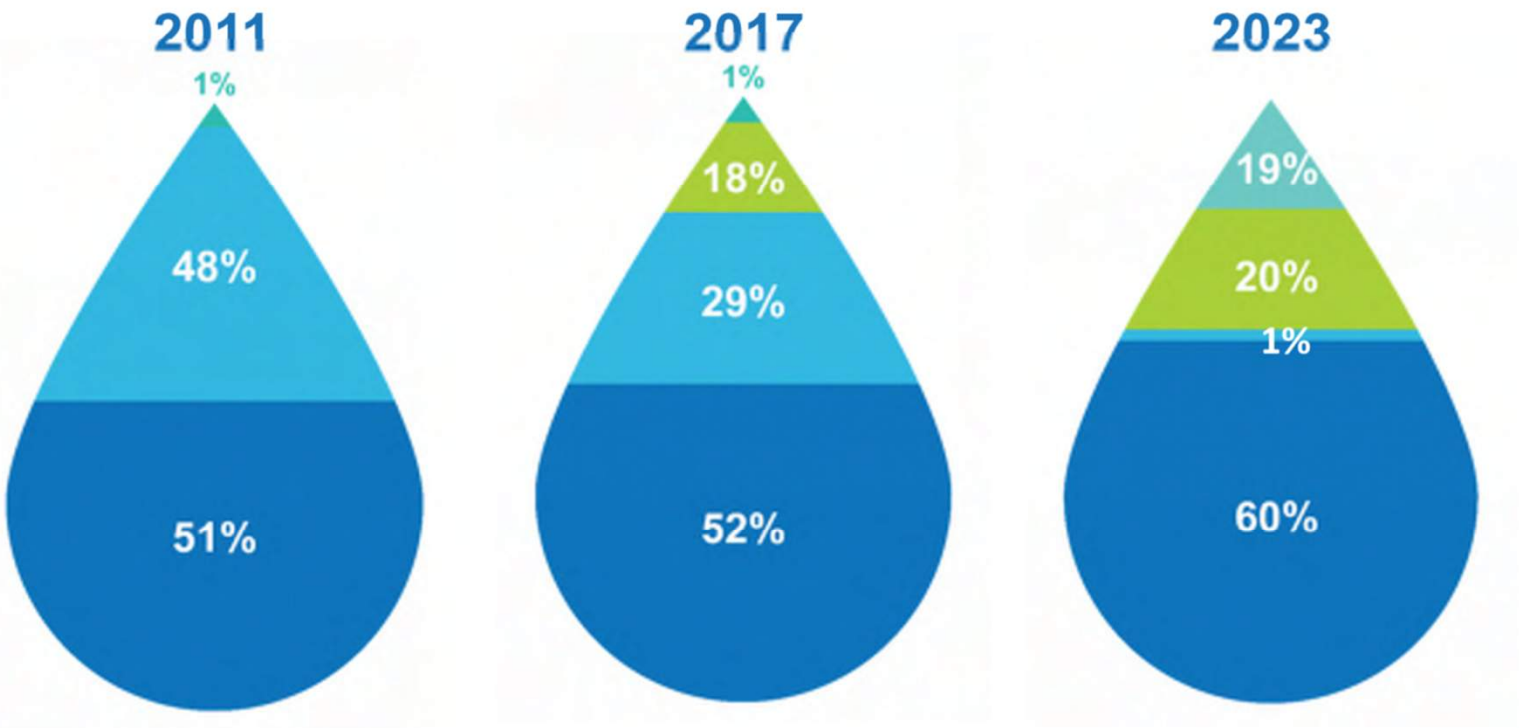
4 water storage reservoirs
totaling 40 million gallons

77,000 gallons
per day of recycled water

14 million gallons
of wastewater captured and delivered for treatment each day

5 ocean outfalls
millions of gallons of stormwater and urban runoff

Leveraging Alternative Water Supplies for a Sustainable Future



City of Santa Monica

Protect and improve water quality in the Santa Monica Bay by diverting stormwater and urban runoff away from the ocean.

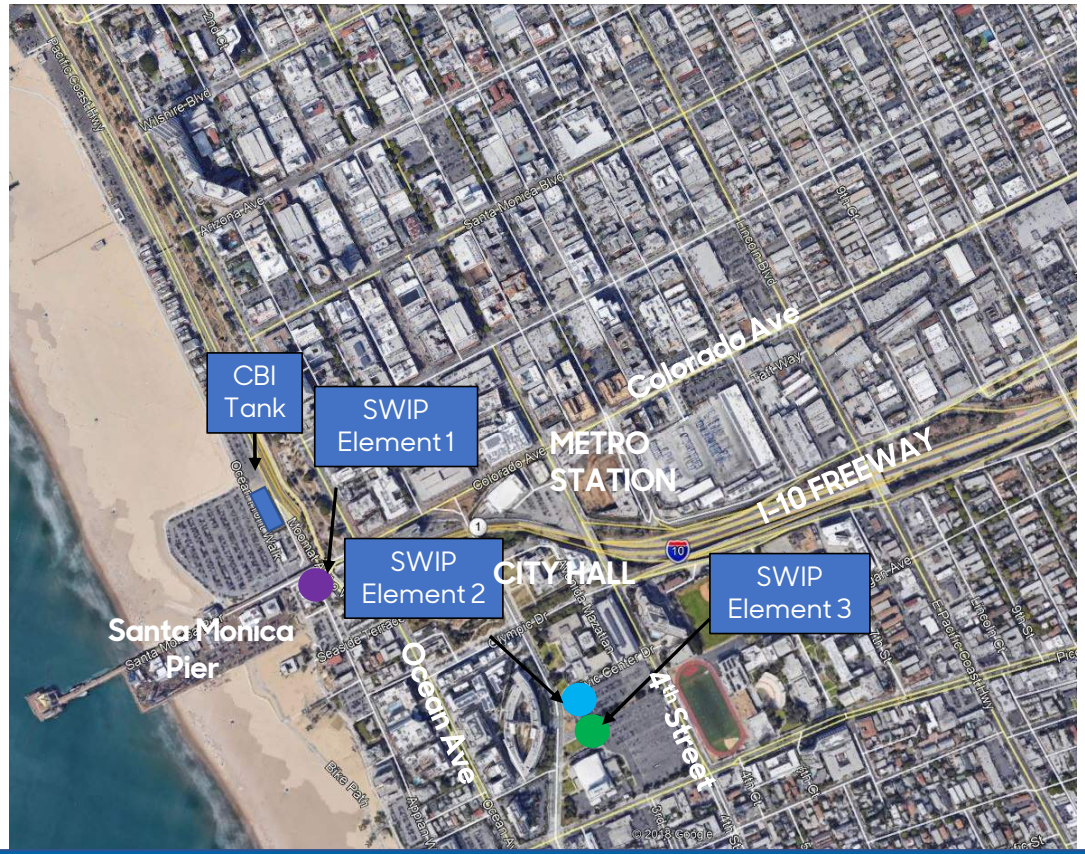
Purify enough water to support over 20% of the City's population each day.

Diversify our water supply portfolio and reduce the City's reliance on imported water.

Comply with State Municipal Separate Storm Sewer System (MS4) and Enhanced Watershed Management Plan (EWMP) stormwater nonpoint source pollution control measures for Santa Monica Bay.

Recharge the City's local groundwater supply with a sustainable, drought resilient source.

Sustainable Water Infrastructure Project (SWIP)



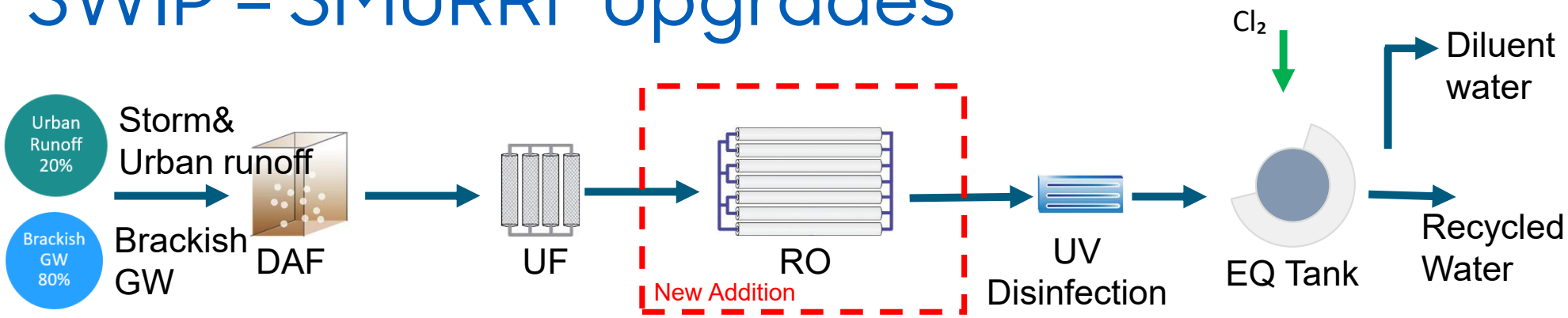
The SWIP consists of three integral elements working together to produce up to 1,680 acre-feet per year of high-quality purified water.

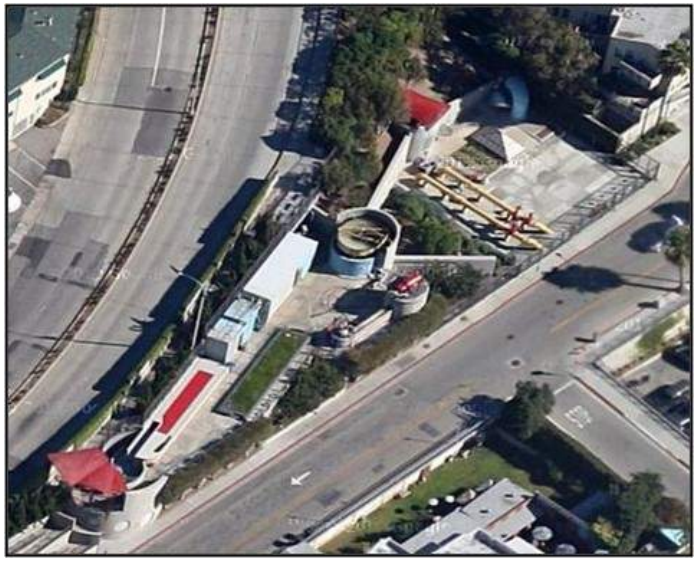
1 Million Gallon per Day Advanced Water Treatment Facility

1.5 Million Gallon Stormwater Harvesting Tank

Upgrades to the Santa Monica Urban Runoff Recycling Facility

SWIP – SMURRF Upgrades



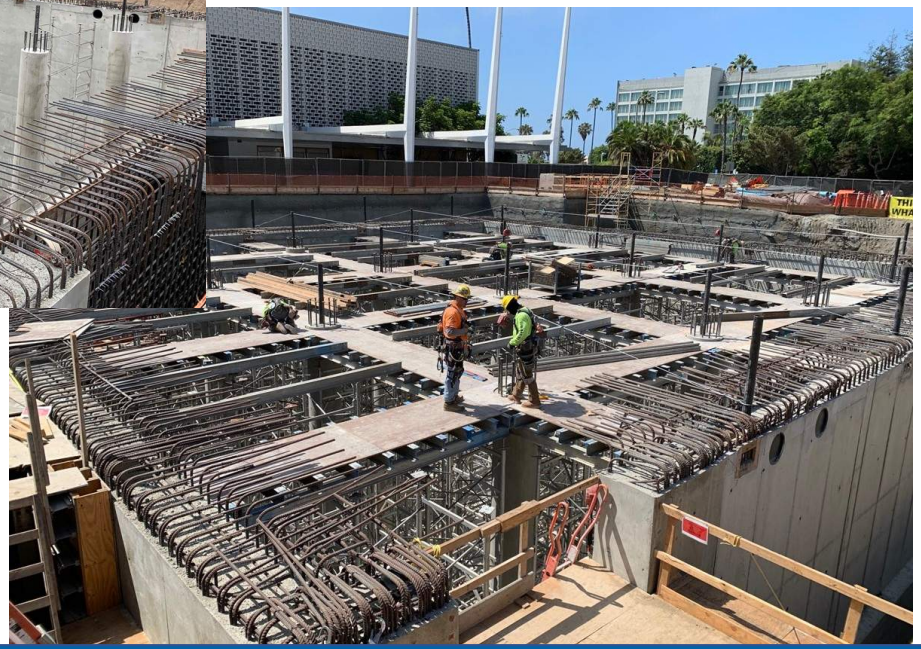


- Provides pollution control for Santa Monica Bay
- Source Water – Urban Runoff + Brackish GW
- Upgrade SMURRF to meet diluent water requirements for groundwater augmentation
- Produces up to 500 AFY of diluent water
- First stormwater direct injection project in CA

City of Santa Monica

Stormwater Harvesting Tank

- 1.5 million gallon harvesting tank
- Captures 85th percentile 24-hour volume and peak flow
- 88 acre Pico/4th Watershed
- Maximum storm water diversion capacity 5.5cfs



SWIP Advanced Water Treatment Facility

- Source Water - Wastewater with up to 30% stormwater contribution when available
- AWTF completely underground
- Ability to meet 12-10-10 log removal for a GRRP within AWTF
- Produces 1,100 AFY of purified water for non-potable and potable reuse

SWIP Advanced Water Treatment Facility

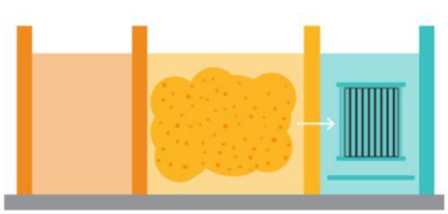
City of Santa Monica

STORMWATER
WASTEWATER

2mm Drum Screen

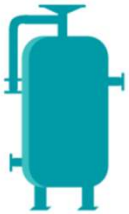
Stormwater, diverted away from the ocean to reduce pollution, and domestic wastewater are blended together and purified at the AWTF through a multi-barrier treatment system.

Biological Treatment – Anoxic – Aeration – Membrane Bioreactor



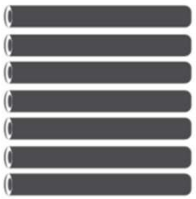
Membrane bioreactors combines biological treatment and membrane filtration into a single treatment process. The biological process uses microorganisms to remove organic pollutants and nitrogen compounds while the ultrafiltration membranes filter out viruses, bacteria, and tiny particles smaller than 1/100 of a grain of sand.

Cartridge Filters



Cartridge filters push water through pleated microfilters to remove particulates and pathogens.

Reserve Osmosis



Reverse Osmosis forces water molecules, under high-pressure, through semi-permeable membranes. The water molecules are small enough to pass through the membranes, while larger minerals and contaminants such as salts, pharmaceuticals, and viruses are removed by the membrane.

Ultraviolet / Advanced Oxidation Process

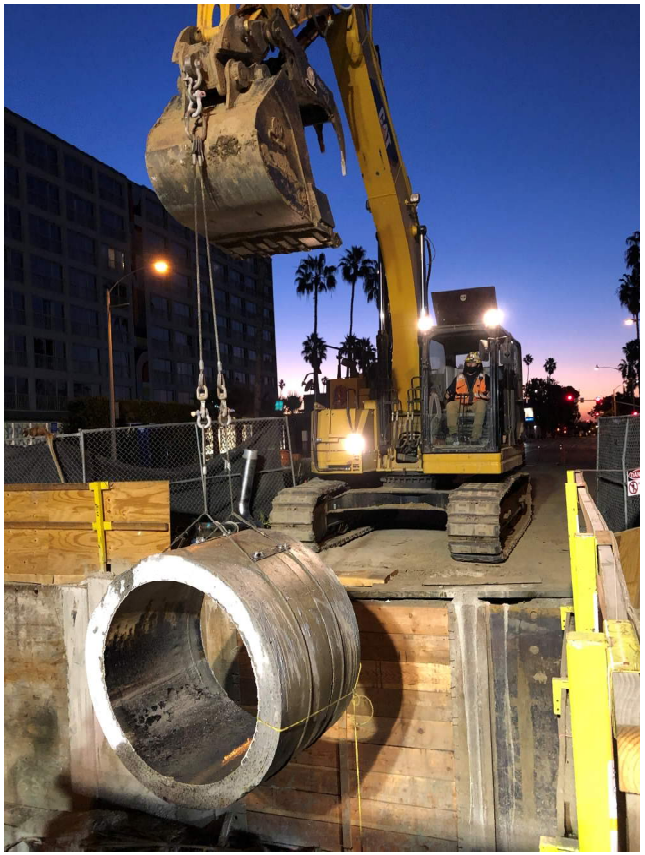
Advanced Oxidation using high-powered ultraviolet light and chlorine destroys industrial pollutants and removes trace organic compounds.

Free Chlorine Disinfection

Chlorine is added as the final treatment step to disinfect the purified water prior to distribution through the City's recycled water system.

SWIP Advanced Water Treatment Facility

City of Santa Monica



SWIP Advanced Water Treatment Facility

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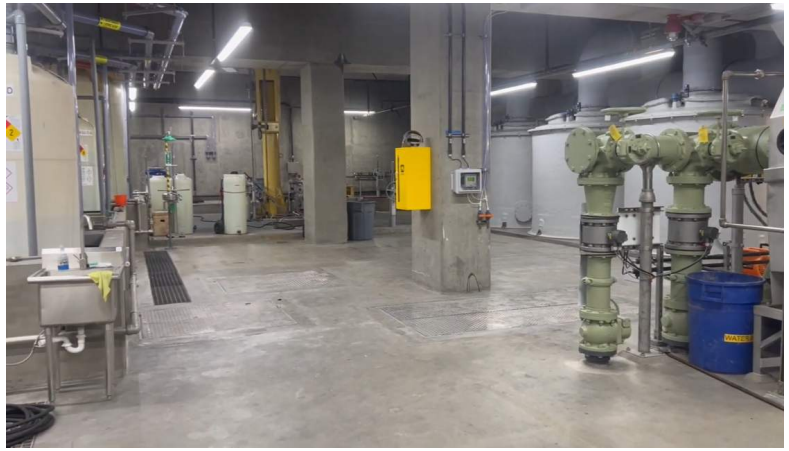


SWIP Advanced Water Treatment Facility

Project Costs and Funding

- **Total Project Budget $96 M**
- $55.7 M Clean Water State Revolving Funds (SRF) 30-year loan @ 1.8% low interest to be paid back by City municipal Funds
- $4 M SRF Principal Forgiveness for Green Infrastructure
- $8.77 M State Water Board Prop 1 Stormwater Grant
- $7.5 M Los Angeles County Safe Clean Water Program (Measure W)
- $20 M City municipal funds Wastewater fund & Stormwater (Local Measure V)
- **21% in grants, 58% in 30-year loan, 31% local cash**

Progressive Design-Build + Operate

- Info Sessions
- Contractor vs Designer Led Team
- Innovation
- Confidential Meetings
- Indicative Cost Estimate

LESSONS LEARNED

- Define Deliverables & Clear Expectations
- Look at Company Culture to Partner
- Mark-Ups/Fee – What's in it?
- "Real" Innovation – not just technology

PDBO Delivery – Preconstruction

PROCUREMENT

- Info Sessions
- Contractor vs Designer Led Team
- Innovation
- Confidential Meetings
- Indicative Cost Estimate

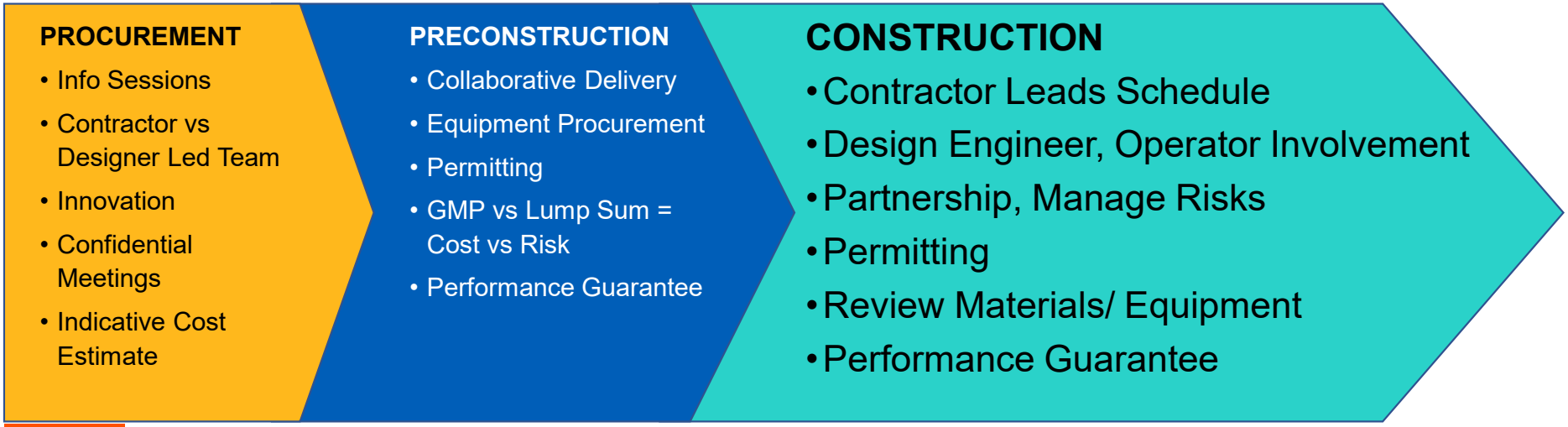
PRECONSTRUCTION

- Collaborative Delivery
- Equipment Procurement
- Permitting
- GMP vs Lump Sum = Cost vs Risk
- Performance Guarantee, Define Risks

LESSONS LEARNED

- Partnering
- Funding Uncertainty
- QA/QC vs Schedule
- Operator Input

PDBO Delivery – Construction



LESSONS LEARNED

- Partnering/Resolution Ladder
- Unresolved review comments
- Qualified Start-up Manager & IT Support
- Permitting
- Allowance

PDBO Delivery – Operations

PROCUREMENT
- Info Sessions
- Contractor vs Designer Led Team
- Innovation
- Confidential Meetings
- Indicative Cost Estimate

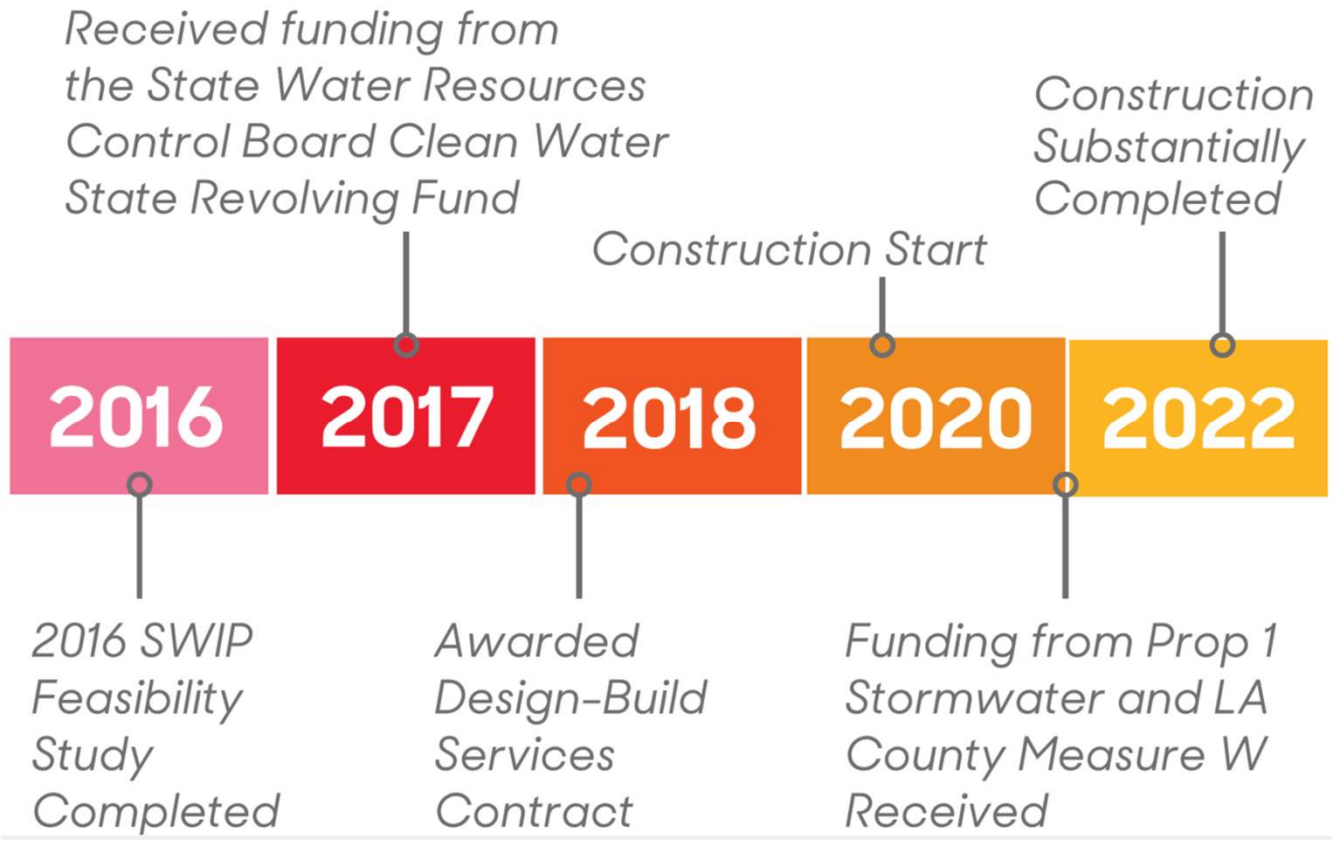
PRECONSTRUCTION
- Collaborative Delivery
- Equipment Procurement
- Permitting
- GMP = Cost vs Risk
- Performance Guarantee

CONSTRUCTION
- Contractor Leads Schedule
- Design Engineer, Operator Involvement
- Partnership, Manage Risks
- Permitting
- Review Materials/ Equipment
- Performance Guarantee

OPERATIONS
- Amount of Staffing
- Timing of Starting Operations
- Time & Material Not to Exceed Pricing
- Equipment & Maintenance Contracts

LESSONS LEARNED
- Qualified Licensed Operators
- Save Budget for Maintenance
- Lab/Monitoring Costs

SWIP Timeline



City of Santa Monica

1 *First stormwater harvesting project in California to meet potable reuse standards and directly inject the treated stormwater into the groundwater aquifer.*

1 *First membrane bioreactor and cartridge filter system in California to be granted pathogen removal credits for potable reuse applications.*

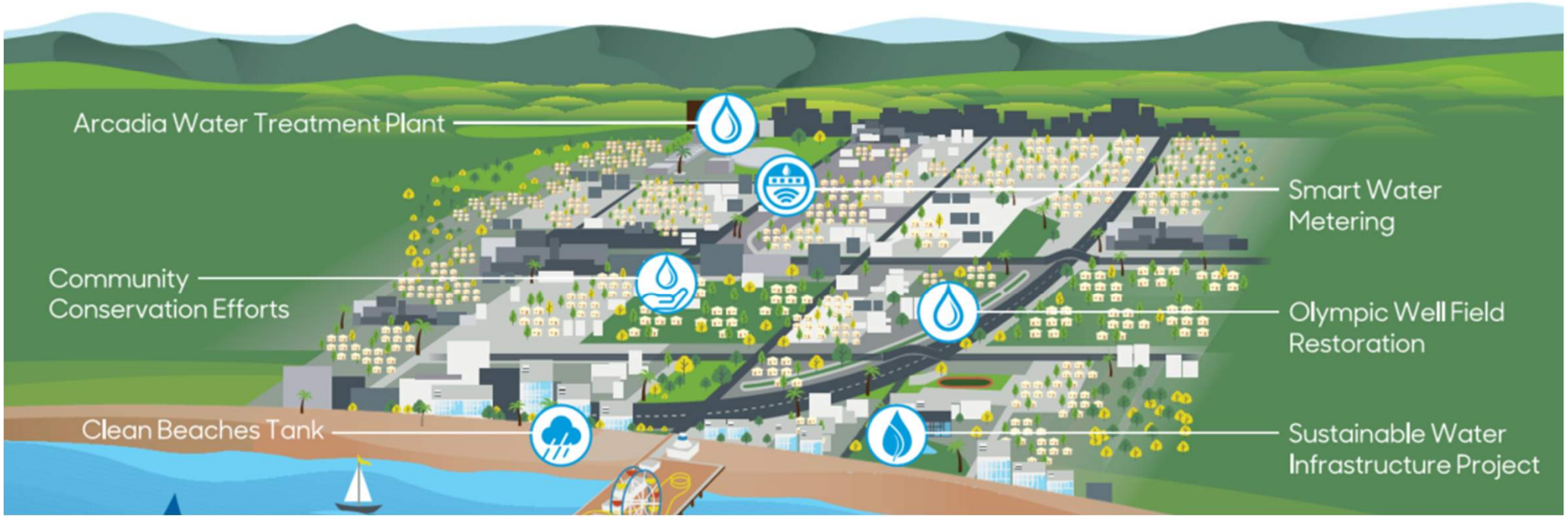
1 *First below-grade AWTF designed to treat raw wastewater and stormwater to groundwater recharge standards all within one facility.*

Celebration & Awards

- Ribbon Cutting Ceremony
- WateReuse National Innovation Award
- APWA SoCal Project Award
- ACEC California Project Award
- WateReuse National Innovation Award

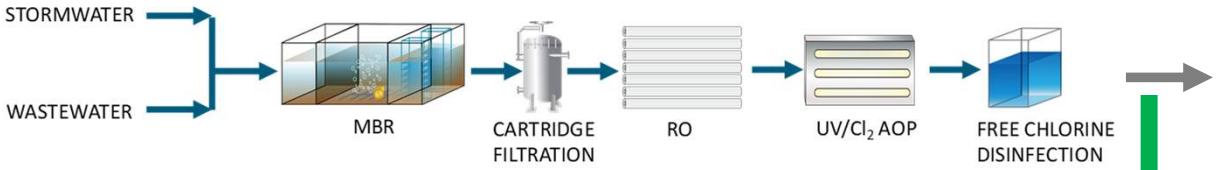
SUSTAINABLE WATER SUPPLY PROGRAM

City of Santa Monica



Local. Sustainable. Drought Resilient.

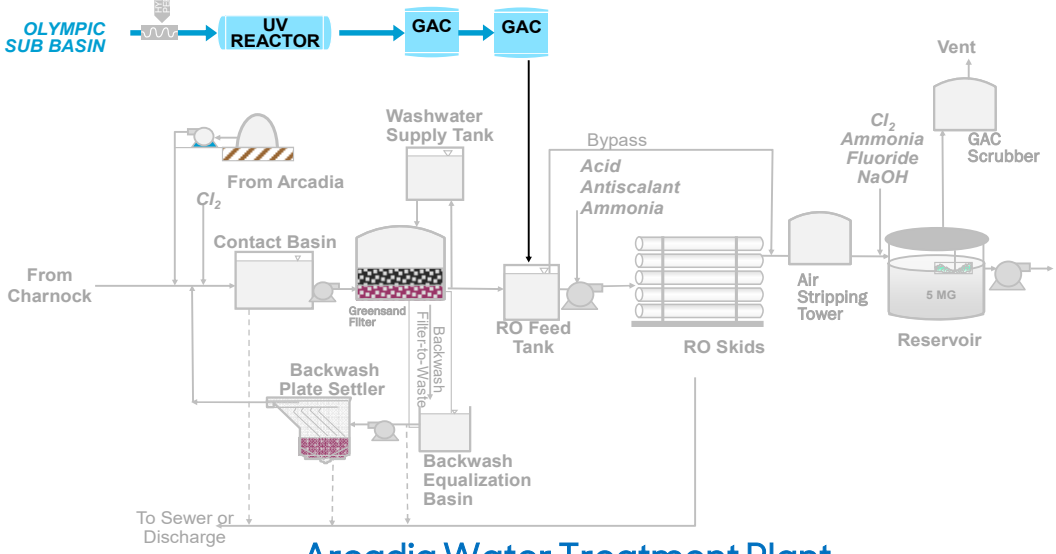
What is in Our PDB Future? DPR?



Groundwater Augmentation via Direct Injection at Olympic Well Field

Sustainable Water Infrastructure Project

Future Potable Reuse – Raw Water Augmentation?



Arcadia Water Treatment Plant

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https://youtu.be/mc1UglMYFh4
City of Santa Monica
Partners:
CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS
Clean Water State Revolving Fund
PROP 1
GOVERNOR GAVIN NEWSOM
WATER BOND 2014
RELIABILITY | RESTORATION | RESILIENCE
County of Los Angeles
lacounty.gov
KIEWIT PKS SINCE 1884
Kiewit
perc water
Stantec
ARCADIS
THANK YOU…