CITY OF NORWALK
A Connected Community

March 13-15, 2024

GROUNDWATER, WATER RESILIENCY AND THE CHALLENGES... DO THEY REALLY MIX?

City of Norwalk
Glen W.C. Kau, P.E., QSP/QSD
Public Services Director/City Engineer

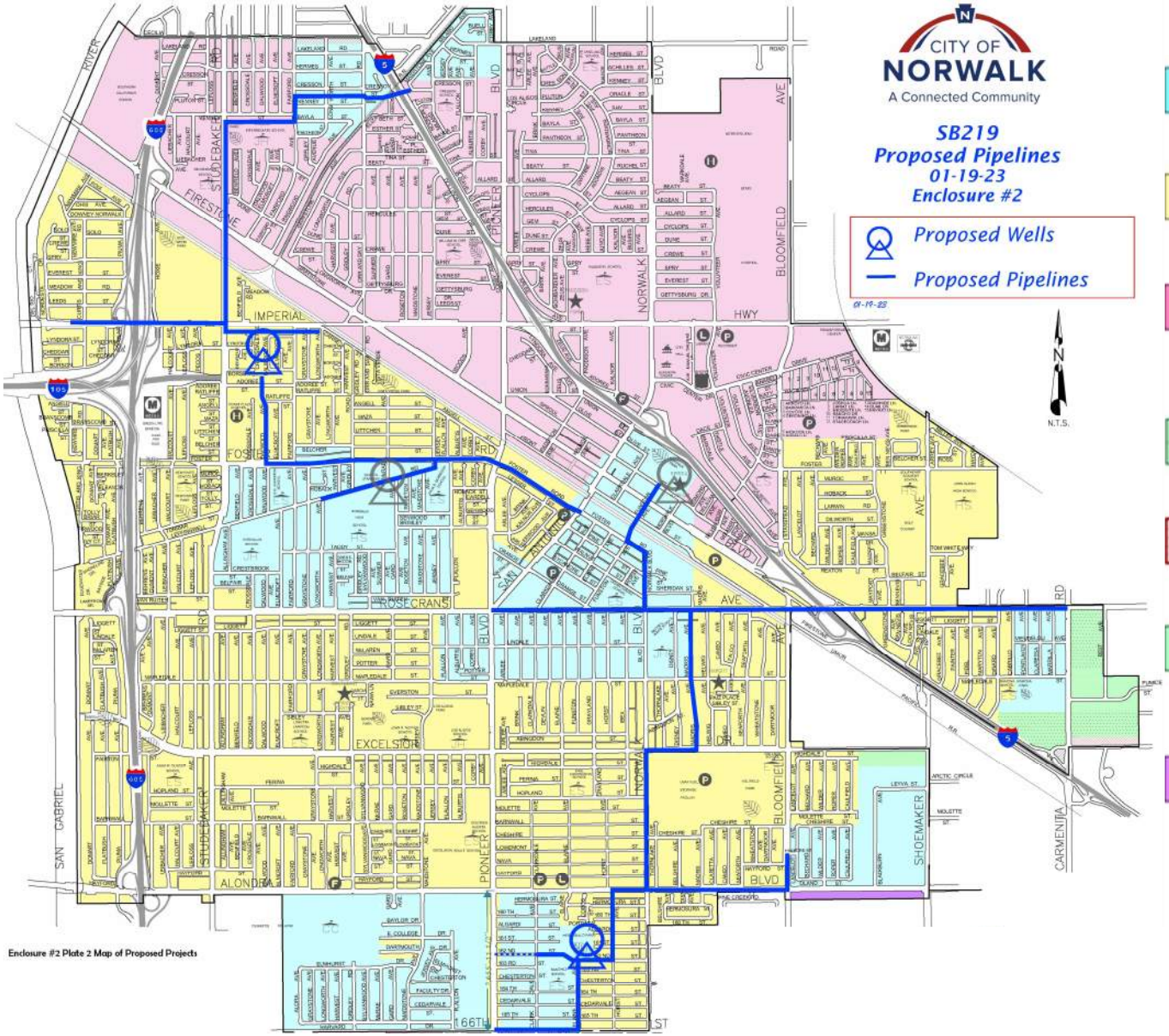
CITY OF NORWALK **Population:** 102,773

Figure 1: City of Norwalk Water Tower

- City Water system serves 20,228 population
- Water consumption of 1,900-2,100 acre-feet annually (91.1 gallons/capita/day)
- Approx. 291,800 feet (55.3 miles) distribution mains, 2 to 16 inches; mainly constructed in 1940's & 1950's
- 3 operating wells (Well 4 Leffingwell, Well 5 Taddy, & Well 10)
- 2 – 10,000 gallon hydropneumatics tanks for Well 4 & Well 5)
- 4 interconnects – Cities of Santa Fe Springs & Cerritos
- 4 interconnects - City of Cerritos
- 2 interconnects - Golden State Water Company (Artesia & Norwalk)
- 2 interconnects - Liberty Utilities Bellflower/Norwalk
- 1 imported water connection - Metropolitan Water District Turnout No. 16
- 9 emergency interconnections
- 5 pressure regulating stations
- 5,362 service connections

CITY OF NORWALK
A Connected Community

NORWALK WATER SERVICE AREAS & PROJECTS



Norwalk Municipal Water (562) 929-5766
12700 Norwalk Blvd, Norwalk, CA 90650

Liberty Utilities (562) 923-9671
9750 Washburn Ave, Downey CA 90241

Golden State Water Co. (562) 864-8214
11469 Rosecrans Ave, Norwalk, CA 90650

Potential Areas to be Billed by Norwalk

Served by Santa Fe Springs Facilities Meter Read and Billing by Norwalk

Santa Fe Springs (562) 868-0511
11710 Telegraph Rd, Santa Fe Springs, CA 90670

Cerritos Water Co. (562) 860-0311
18125 Bloomfield Ave, Cerritos, CA 90703

Figure 2: City of Norwalk USACE WRDA Section 219 Projects

CITY OF NORWALK
A Connected Community

USACE WRDA SECTION 219 PROPOSED WATER IMPROVEMENTS

PHASE 1 PROJECTS – 10 YEAR PROGRAM	TOTALS
FUNDING ADJUSTMENT FROM PRIOR FY23	$ 1,136,368
CORPS ENVIRONMENTAL INFRASTRUCTURE PROJECT PARTNERSHIP AGREEMENT, NEPA	$ 473,500
WELL NO. 9 DRILLING – HERMOSILLO PARK, DESIGN, CONSTRUCTION	$ 1,050,000
WELL NO. 9 EQUIPPING – HERMOSILLO PARK, TRANSMISSION MAINS, DESIGN, CONSTRUCTION	$ 2,500,000
2023 WATER SYSTEM ANALYSIS	$ 160,000
NORWALK PARK – RESERVOIR, PUMP STATION, DESIGN, CONSTRUCTION	$ 4,373,862
NORWALK BLVD. TRANSMISSION MAIN WELL 9 TO NORWALK PARK RESERVOIR	$ 3,064,500
NORDESTA – IMPERIAL GROUNDWATER RECOVERY PROJECT, PREDESIGN	$ 1,430,000
NORDESTA – IMPERIAL GROUNDWATER RECOVERY PROJECT, DESIGN, CONSTRUCTION	$ 2,700,000
DISTRIBUTION MAIN REPLACEMENT PROGRAM	$ 1,272,000
SCADA SYSTEM INSTALLATION PHASES A, B, C	$ 4,823,862
166TH STREET TRANSMISSION MAIN PIONEER BLVD. TO EAST CITY LIMITS	$ 880,000
AUTOMATIC METER READING PROGRAM	$ 500,000
NORTH SERVICE AREA TRANSMISSION MAIN, DESIGN, CONSTRUCTION	$ 2,586,666

$26.95M
TOTAL

25%
MATCH

$20.21M
FEDERAL

$6.74M
CITY

CITY OF NORWALK
A Connected Community

NORWALK WATER SOURCES

GROUNDWATER

CITY OF NORWALK
A Connected Community

WRD
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Supplied By Central Groundwater Basin

IMPORTED WATER

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Central Basin
Municipal Water District

Supplied By Metropolitan Water District of Southern CA Via Central Basin Municipal Water District

INTERTIES

CITY OF CERRITOS - INCORPORATED APRIL 24, 1956

CITY OF SANTA FE SPRINGS

Supplied By Neighboring Cities

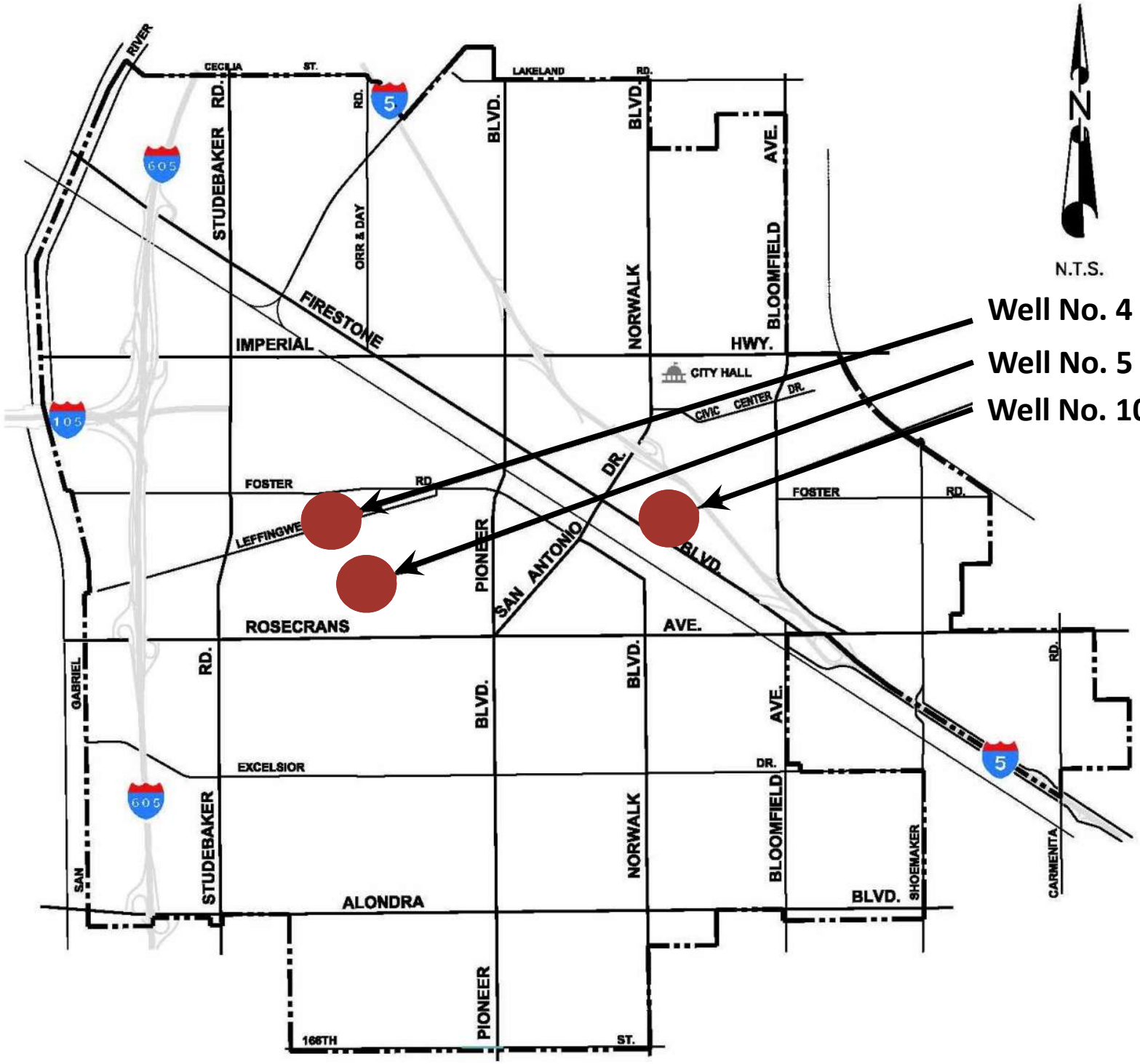


Figure 3: City of Norwalk – Groundwater Well Map

CITY OF NORWALK
A Connected Community

CITY OF NORWALK WELL PRODUCTION

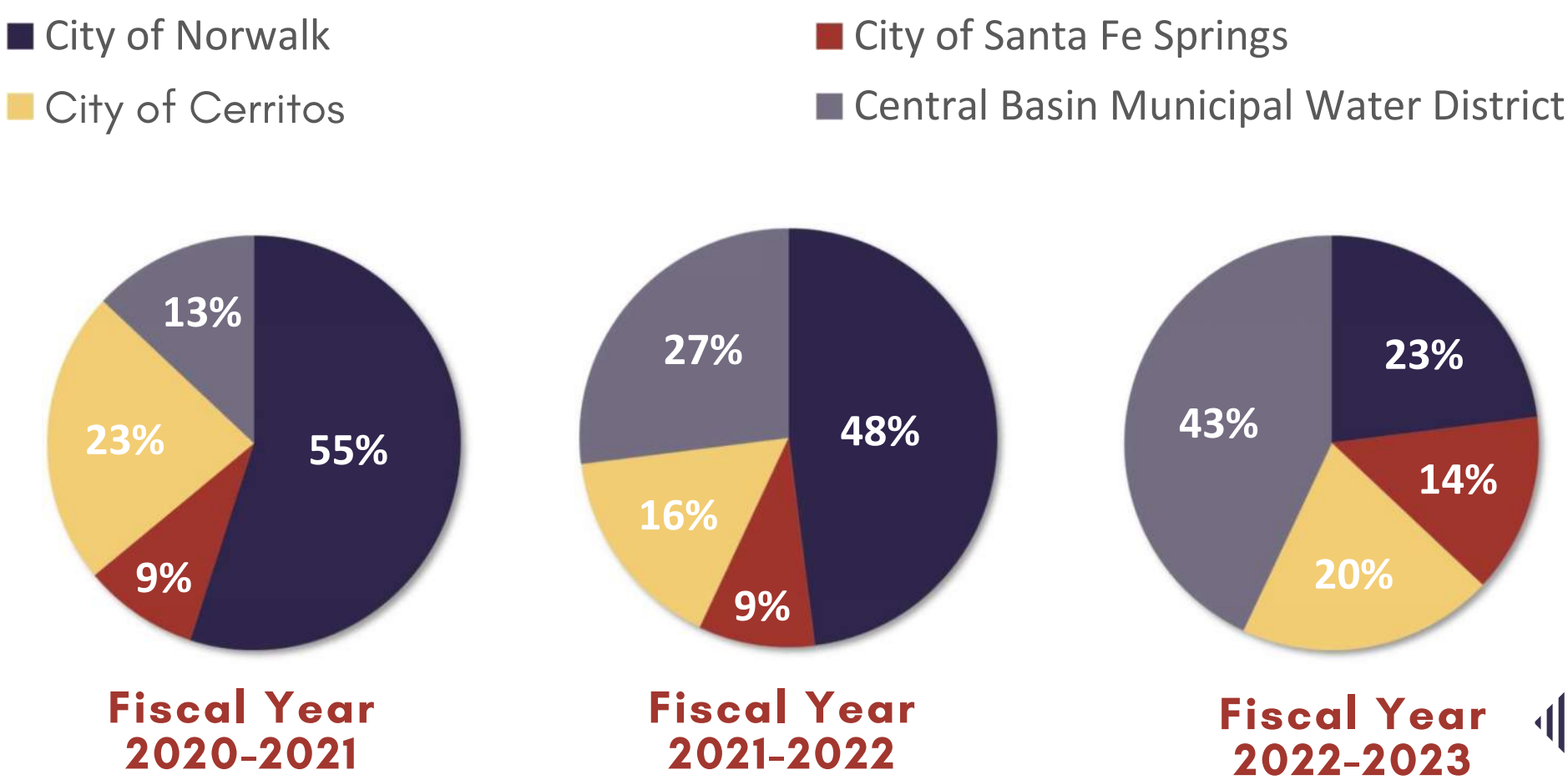
Description	Production Capacity (GPM)	2020-2021 Production (AFY)	2021-2022 Production (AFY)	2022-2023 Production (AFY)	3-Yr Average Production (AFY)
Well No. 4 (Leffingwell Rd.)	680	6	21	21	16
Well No. 5 (Taddy St.)	680	341	383	379	367
Well No. 10 (Sproul St.)	2,000	535	778	209	507
All City of Norwalk Wells	-	882	1,182	609	891

*Well No. 10 Offline Fiscal Year 2022-2023

*2,273 AFY of Groundwater Adjudicated Rights

*1,900-2,100 AFY Annual Consumption

CITY OF NORWALK
A Connected Community

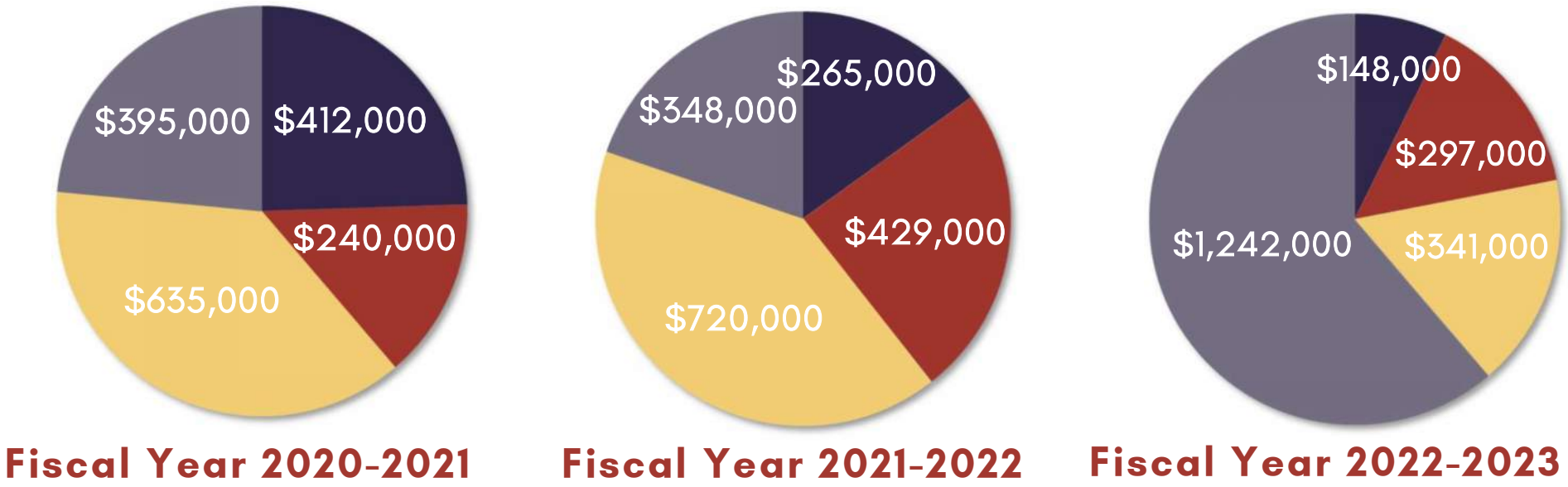


ANNUAL WATER SUPPLY SOURCES

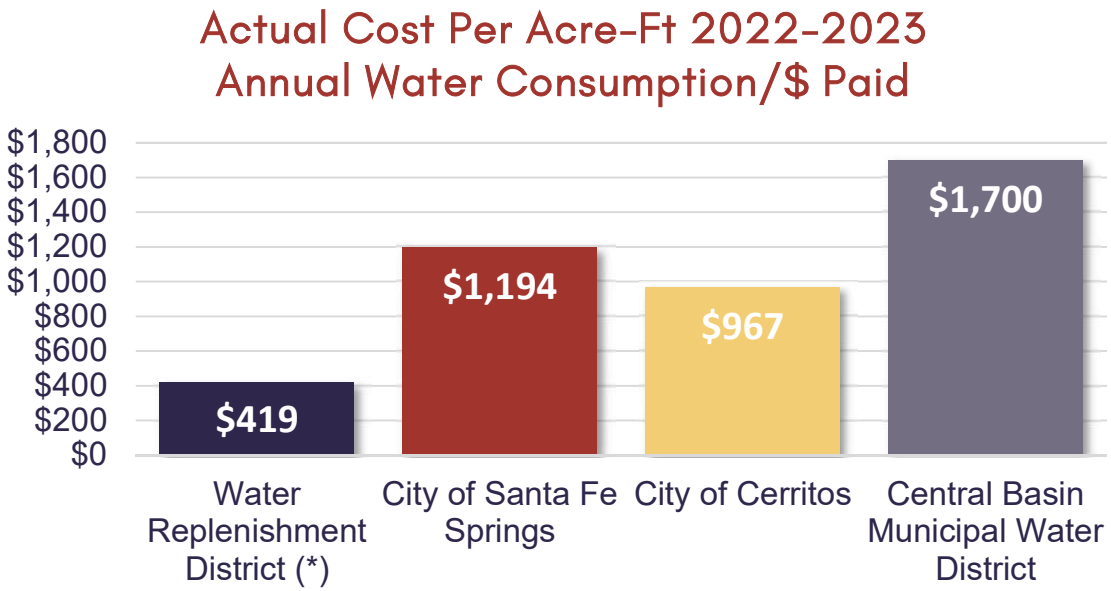
*Well No. 10 Offline Fiscal Year 2022-2023

Figure 4: Annual Water Supply Pie Charts

CITY OF NORWALK
A Connected Community



Fiscal Year 2020-2021 **Fiscal Year 2021-2022** **Fiscal Year 2022-2023**



(*) RA Does Not Include Energy Costs

ANNUAL WATER COSTS

Figures 5 & 6: Annual Water & Per Acre-Ft Costs

CITY OF NORWALK
A Connected Community

VOLATILE ORGANIC CARBONS (VOCS) IN NORWALK WATER SOURCES

*Notification Level (NL)
*Response Level (RL)

Well No. 4

PFAS above NLs
Below RLs

Well No. 10

Benzene above RL

Well No. 5

PFAS above NLs
Below RLs

CITY OF NORWALK
A Connected Community

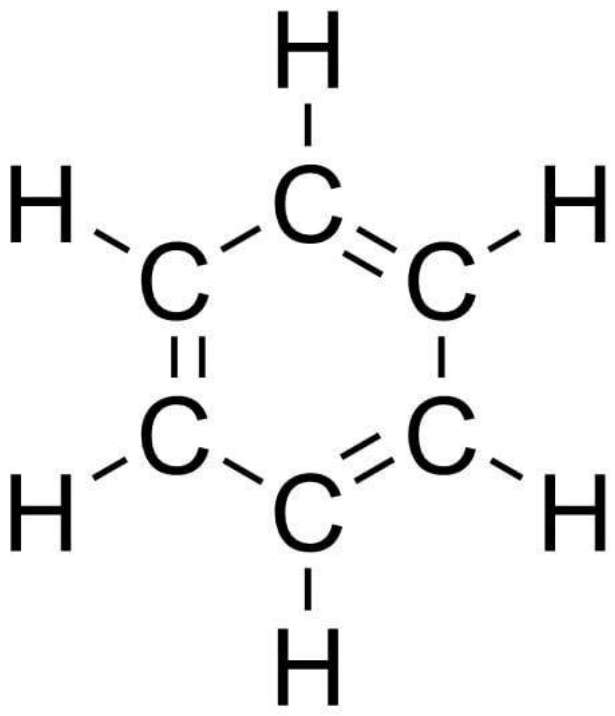
BENZENE REGULATIONS

Type	Agency	Concentration
Federal Maximum Containment Level (MCL)	EPA*	5 µg/L
State MCL	SWRCB**	1 µg/L
Detection Limit for Purposes of Reporting (DLR)	SWRCB**	0.5 µg/L
Public Health Goal (PHG)	OEHHA***	0.15 µg/L
Cancer Potency Factor ($1/10^6$ cancer risk)	OEHHA***	0.35 µg/L

Benzene Contamination Well No. 10: 1.1 – 5.3 µg/L

**EPA: United States Environmental Protection Agency*
***SWRCB: California State Water Resource Control Board*
****OEHHA: California Environmental Protection Agency's Office of Environmental Health Hazard Assessment*

CITY OF NORWALK
A Connected Community



C_6H_6

Figure 7: Benzene Structure & Molecular Formula

WATER QUALITY CHALLENGES

- Benzene Sources:
  - Found in Motor Fuels, Chemical Solvents, and Refineries
  - Enters water sources through industrial discharge, runoff from roads, and leaching from gas storage tanks and landfills
- Environmental Concerns:
  - Negatively affects aquatic life, disrupting ecosystems and harming biodiversity
- Health Concerns:
  - Anemia
  - Decrease in blood platelets
  - Increased risk of cancer

CITY OF NORWALK
A Connected Community

NORWALK WELL NO. 10

How can we remove Benzene?

Figure 8: Norwalk Well No. 10

CITY OF NORWALK
A Connected Community

WATER TREATMENT OPTIONS

REVERSE OSMOSIS

Pros:

Effective Benzene Removal

No Chemical Requirement

Removes salts

Cons:

Expensive Initial/Maintenance Cost

Requires Electricity

Produces Wastewater

NANOFILTRATION

Pros:

Effective Benzene Removal

No Chemical Requirements

Cons:

Expensive Initial/Maintenance Cost

Requires Electricity

Produces Wastewater

GAC FILTRATION*

Pros:

Effective Benzene Removal

Affordable

Versatile and Simple

Cons:

Media Replacement

UV AOP**

Pros:

Effective Benzene Removal

Environmentally friendly

Cons:

Requires Electricity

Requires Lamp Maintenance

*Granular Activated Carbon

**Advanced Oxidation Process

CITY OF NORWALK
A Connected Community

GRANULAR ACTIVATED CARBON FILTRATION

Figure 9: Granular Activated Carbon (GAC)

Figure 10: Typical GAC Vessels

- Granular Activated Carbon (GAC) filtration effectively removes benzene and PFAS contaminants from water sources
- GAC adsorbs benzene molecules onto its porous surface, trapping them within the filter media
- GAC filtration targets Per and Polyfluoroalkyl Substances (PFAS), such as PFOA and PFOS, by capturing them on the carbon surface
- GAC's versatility and efficiency make it a preferred method for remediation efforts against benzene and PFAS contamination in water treatment systems
- Although GAC is particularly efficient for longer-chain PFAS like PFOA and PFOS, but less so for shorter-chain PFAS like PFBS and PFBA

CITY OF NORWALK
A Connected Community

WATER TREATMENT CHALLENGES

Project Layout

Permitting

Construction & Maintenance

Cost

CITY OF NORWALK
A Connected Community

PRELIMINARY PROJECT LAYOUTS

Figure 11: Well No. 10 – Potential Area for GAC Vessels

CITY OF NORWALK
A Connected Community

Figure 12: Well No. 10 SCE and Caltrans Easements

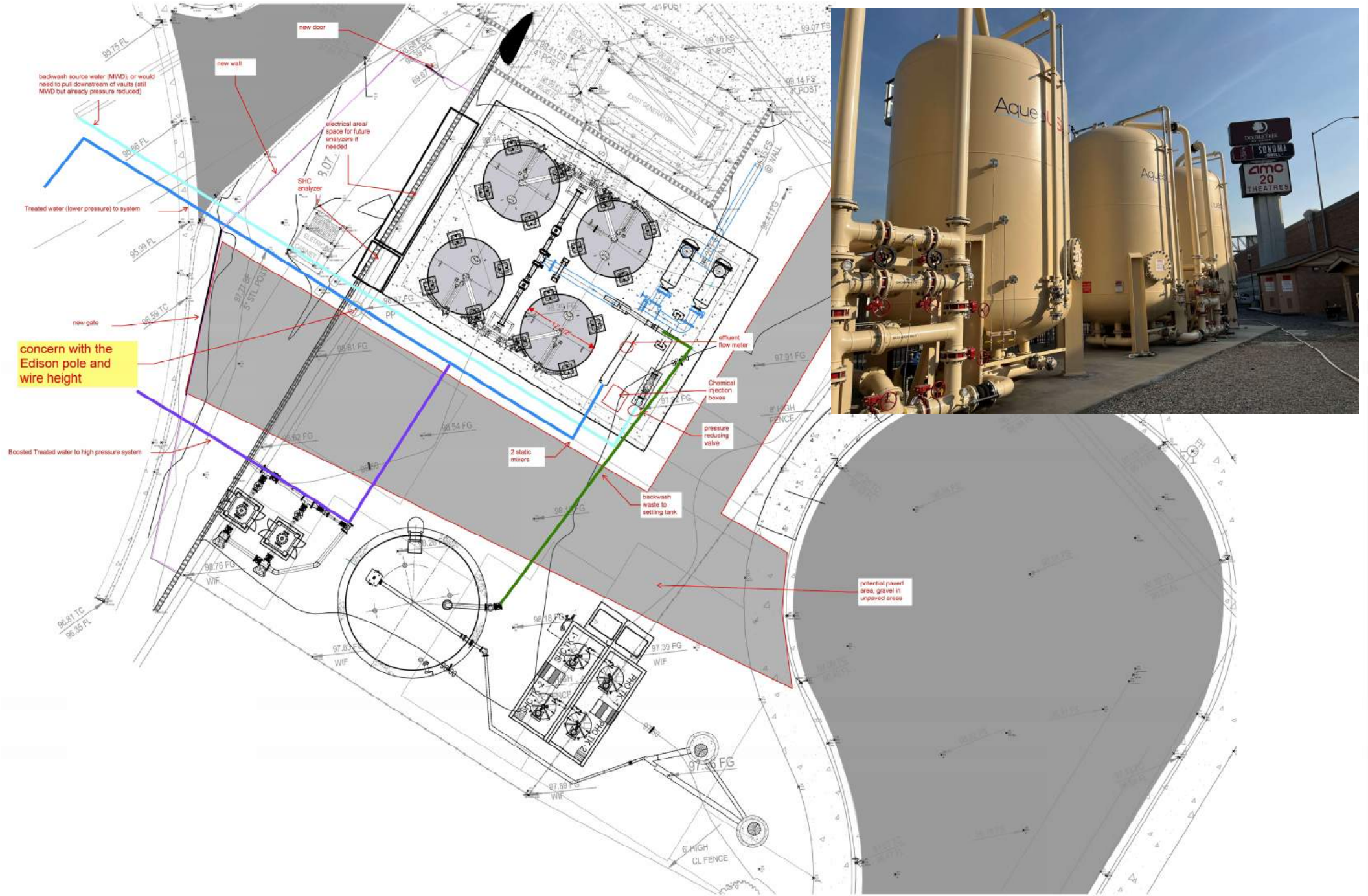
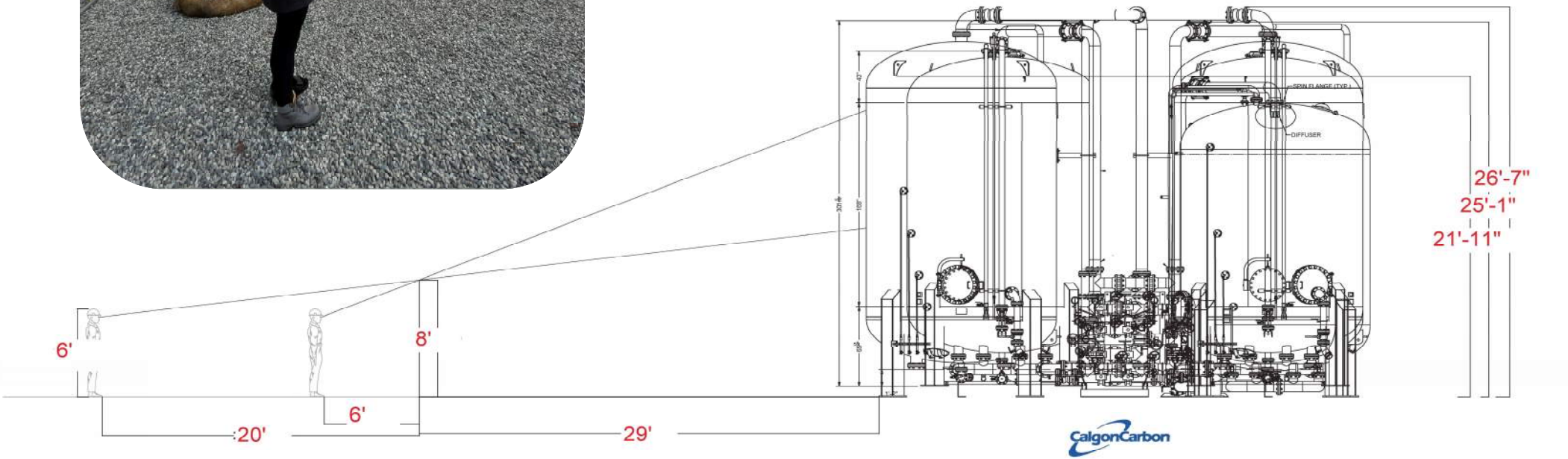


Figure 13: Well No. 10 Rough Preliminary Design

CITY OF NORWALK
A Connected Community

Benzene & PFAS… YAY!!!

But will it fit the budget… mmm



CalgonCarbon
evoqua WATER TECHNOLOGIES
AqueoUS VETS

Figure 14: Larger GAC Vessel Comparison

CITY OF NORWALK
A Connected Community

NEXT STEPS...

DESIGN

- Site/Conditions Assessment
- PCC Foundation(s)
- Site Work/Pipe Layout
- Electrical & Controls
- GAC Vessel Sizing

CEQA

- Initial Study
- Mitigated Negative Declaration

CONSTRUCTION

- Early Procurement of GAC Vessels (long lead time)
- Relocation of SCE XFMR & electrical work
- Upgrade chemical facilities & storage
- Yard Piping

ETC

- Project Management
- Constructability
- Permitting

CITY OF NORWALK
A Connected Community

PROJECT SITE CHALLENGES

AVAILABLE SPACE

- Limited space for GAC vessels and backwash tank especially on existing well pump sites
- Chemical deliveries

CALTRANS/SCE EASEMENTS

- Acquiring access rights requires considerable amount of time and coordination
- SCE infrastructure (transformer, electrical pole, and guy wire)

ETC

- Yard Piping Configuration
- MWD chloramine vs City sodium hypochlorite
- No storage facilities

CITY OF NORWALK
A Connected Community

PERMIT AMENDMENT PROCESS

IDENTIFY NEED

Why do we need an amendment?

DESIGN SYSTEM

Submit PDR and Permit Amendment Application Package to Department of Drinking Water (DDW)

REVIEW/REVISE

Submit OMMP to DDW for review and revise as needed. Site walk with DDW Engineer

CONSTRUCTION

Draft Operation Maintenance Manual and Plan (OMMP)

PERMIT ISSUED

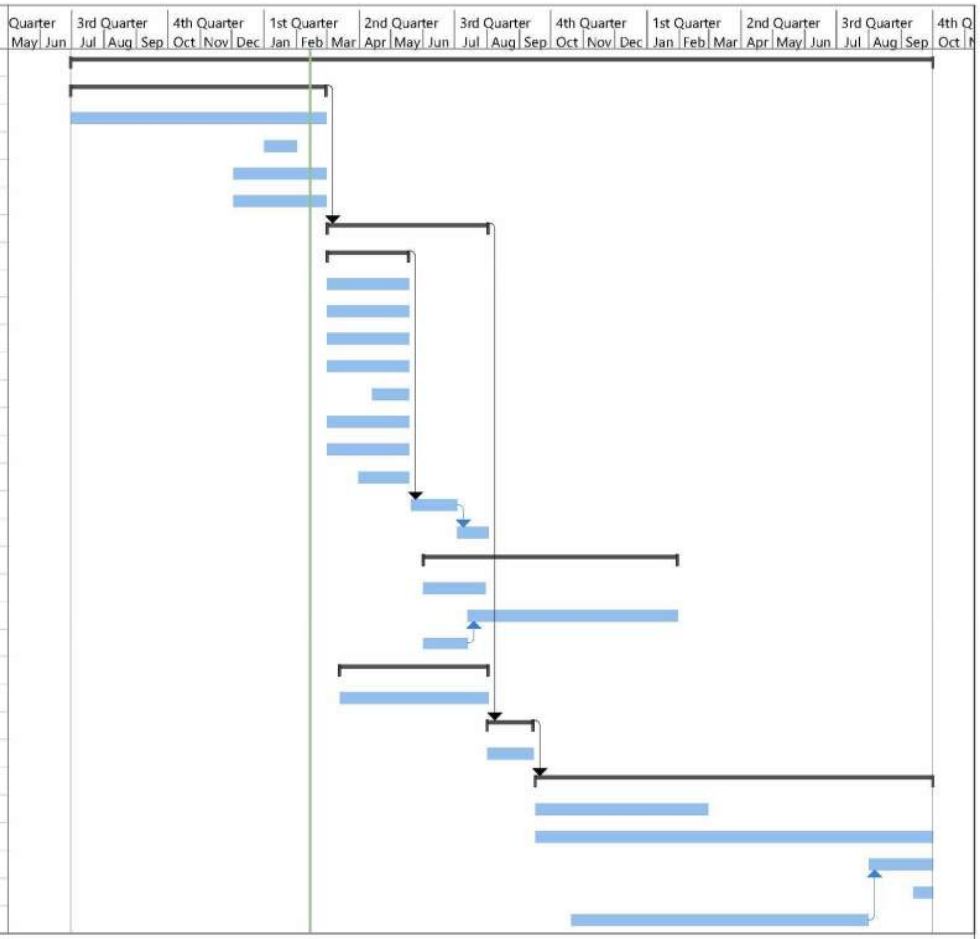
Challenges?

24-36 Months

CITY OF NORWALK
A Connected Community

PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish	Predecessors
1	**WO1 Well 10 GAC Upgrades**	**583 days**	**Fri 6/30/23**	**Tue 9/30/25**	
2	**Preliminary Design Report**	**169 days**	**Fri 6/30/23**	**Wed 2/28/24**	
3	Preliminary Design Report	169 days	Fri 6/30/23	Wed 2/28/24	
4	Geotechnical	23 days	Mon 1/1/24	Wed 1/31/24	
5	Hydraulic, Hydrology and Process Calcs	61 days	Sat 12/2/23	Wed 2/28/24	
6	Vendor Analysis and Report	61 days	Sat 12/2/23	Wed 2/28/24	
7	**System Final Design**	**110 days**	**Fri 3/1/24**	**Thu 8/1/24**	**2**
8	**60 % Design**	**56 days**	**Fri 3/1/24**	**Fri 5/17/24**	
9	Electrical, Earthwork & Structural Calcs	56 days	Fri 3/1/24	**Fri 5/17/24**	
10	Meetings and Project Management	56 days	Fri 3/1/24	**Fri 5/17/24**	
11	General Drawings	56 days	Fri 3/1/24	**Fri 5/17/24**	
12	Civil	56 days	Fri 3/1/24	**Fri 5/17/24**	
13	Instrumentation	25 days	Sat 4/13/24	**Fri 5/17/24**	
14	Structural	56 days	Fri 3/1/24	**Fri 5/17/24**	
15	Process	56 days	Fri 3/1/24	**Fri 5/17/24**	
16	Electrical	35 days	Sun 3/31/24	**Fri 5/17/24**	
17	90% Design	32 days	Mon 5/20/24	Tue 7/2/24	8
18	100% Design	22 days	Wed 7/3/24	Thu 8/1/24	17
19	**Permitting**	**173 days**	**Sat 6/1/24**	**Wed 1/29/25**	
20	WQMP	41 days	Sat 6/1/24	Mon 7/29/24	
21	DDW	143 days	Sat 7/13/24	Wed 1/29/25	22
22	OMMP	30 days	Sat 6/1/24	Fri 7/12/24	
23	**CEQA**	**102 days**	**Wed 3/13/24**	**Thu 8/1/24**	
24	CEQA Meetings, Research & Document Prep	102 days	Wed 3/13/24	Thu 8/1/24	
25	**Bidding Services & Contractor Selection**	**32 days**	**Thu 8/1/24**	**Fri 9/13/24**	**7**
26	Bidding Services & Contractor Selection	32 days	Thu 8/1/24	Fri 9/13/24	
27	**Construction Support**	**272 days**	**Mon 9/16/24**	**Tue 9/30/25**	**25**
28	Shop Drawing	119 days	Mon 9/16/24	Thu 2/27/25	
29	Meetings	272 days	Mon 9/16/24	Tue 9/30/25	
30	As-Builts	43 days	Fri 8/1/25	Tue 9/30/25	32
31	Punchlist and Job Walk	13 days	Fri 9/12/25	Tue 9/30/25	
32	RFIs	203 days	Sun 10/20/24	Wed 7/30/25	



Project: Project1
Date: Wed 2/14/24

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

CITY OF NORWALK
A Connected Community

PROJECT COSTS BREAKDOWN

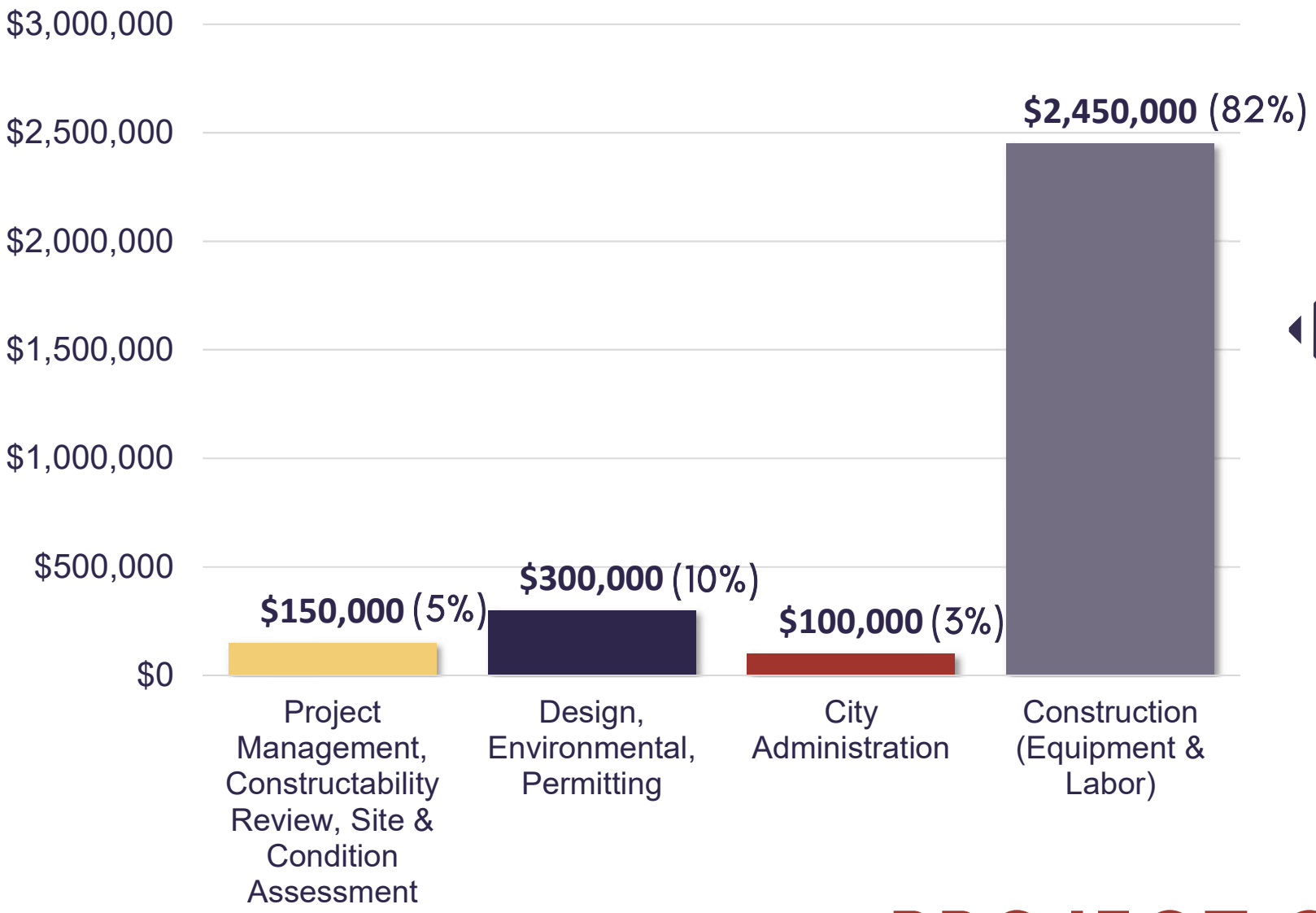


Figure 15: Well No. 10 Cost Estimate

CITY OF NORWALK
A Connected Community

PROJECT PARTNERSHIPS AND FUNDING

WRD - $2,000,000 Grant Funding

67%

PROJECT PARTNERSHIPS AND FUNDING

City of Norwalk - $1,000,000 Remainder

33%

CITY OF NORWALK
A Connected Community

OTHER INVOLVED AGENCIES

- METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
- SWRCB DIVISION OF DRINKING WATER
- SOUTHERN CALIFORNIA EDISON
- CALTRANS
- CALIFORNIA STATE WATER RESOURCES CONTROL BOARD
- CENTRAL BASIN MUNICIPAL WATER DISTRICT
- WATER REPLENISHMENT DISTRICT

CITY OF NORWALK
A Connected Community

CAPITAL IMPROVEMENT PROJECTS – THE 3 YEAR PLAN

FY 2024-2025

Transmission Main – 8", 12", & 16" Central and South Loop

Transmission Main – 12" Northwest and Northeast Loop

Pressure Regulating Station

FY 2026-2027

Well No. 9 (at Hermosillo Park)

Reservoir (1 million gallons)

Booster Pump Station

CITY OF NORWALK
A Connected Community

Figure 16: City of Norwalk, Norwalk Square Sign

CITY OF NORWALK
A Connected Community

Thank you.

Glen W.C. Kau, P.E., QSP/QSD
Public Services Director
City Engineer

gkau@norwalkca.gov
www.norwalkca.org

CITY OF NORWALK
A Connected Community