

# Containerized Brackish Water Treatment Plant and Conveyance System

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# Containerized Brackish Water Treatment Plant

## Overview

- Project Scope
- Delivery Team
- Selection
- Project Costs
- Rate Impacts

Eva Arnaiz Garcia – Aqualia / MDS  
Rebecca Marcucci – Aqualia / MDS  
Taylor Hecht – Garver Engineering  
Buddy Boysen – Garver Engineering



# Containerized Brackish Water Treatment Plant

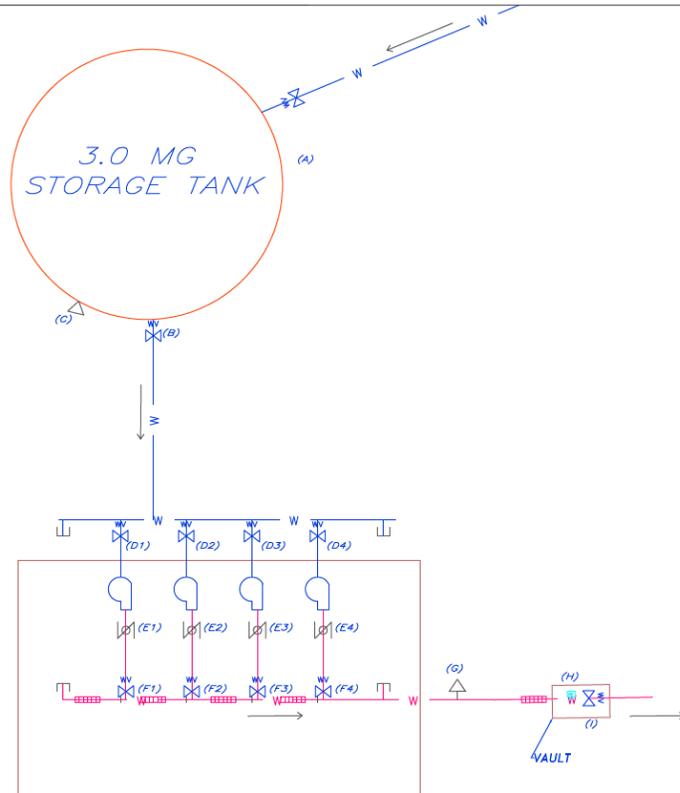
## Project Scope

- Western Well Field Pump Station
- Conveyance line from the Western Well Field to the O.N. Stevens Water Treatment Plant (ONSWTP)
- Brackish groundwater treatment plant



# Containerized Brackish Water Treatment Plant

## Project Scope – Western Well Field Pump Station



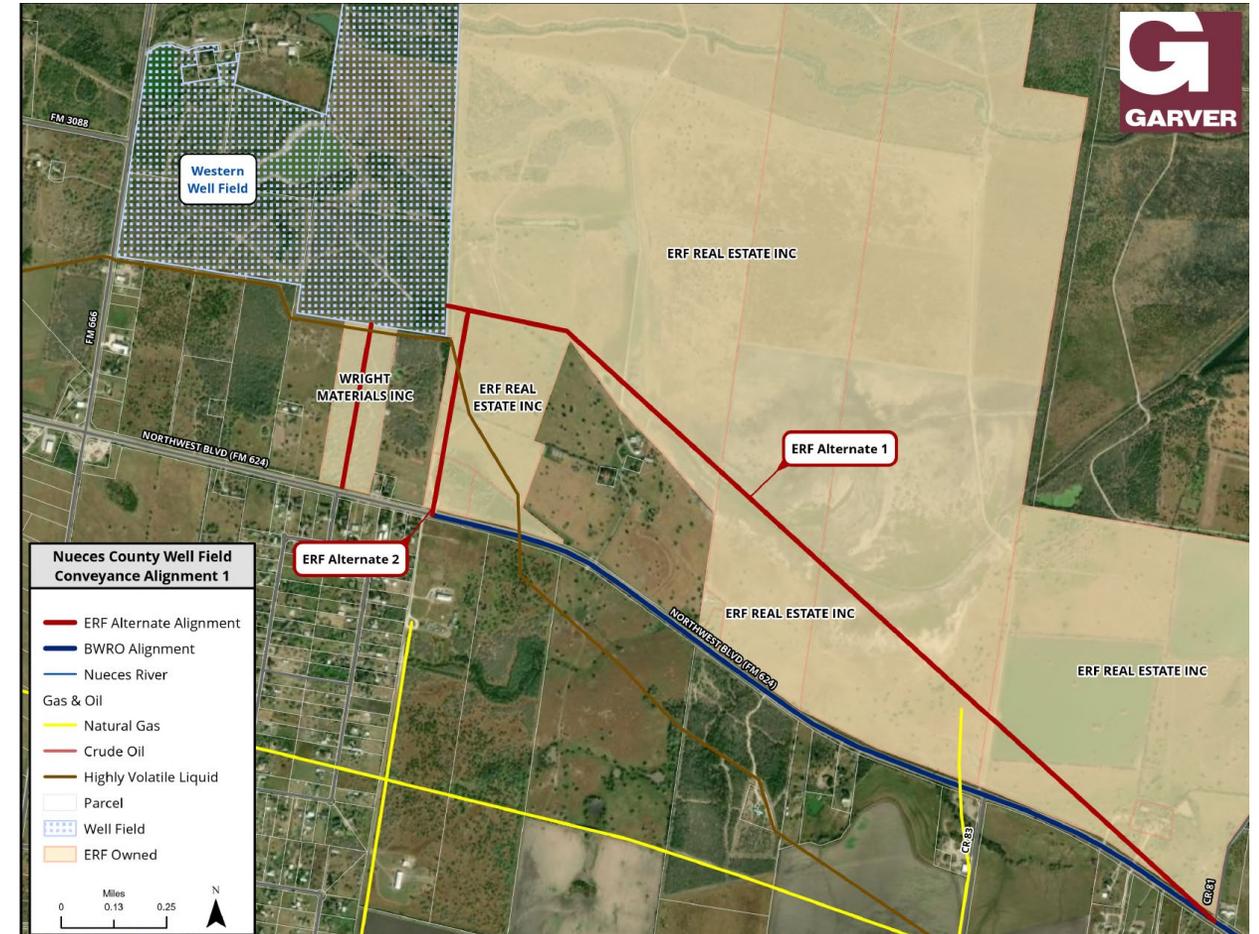
- 3 MG ground storage tank
- Pumps capable of 24 MGD, including redundancy
- Connection to new and existing wells

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# Containerized Brackish Water Treatment Plant

## Project Scope – Conveyance Line

- 36" PVC and HDPE
- Installed in Right of Way with TXDOT coordination
- Installation performed by CCW and multiple contractors



# Containerized Brackish Water Treatment Plant

Project Scope – Brackish Groundwater Reverse Osmosis

## Treated Water Delivery Schedule

- 3.91 MGD in 11 Months
- 9.24 MGD in 14 Months
- 14.56 MGD in 18 Months
- 21.3 MGD in 24 Months



# Containerized Brackish Water Treatment Plant

## Project Scope – Brackish Groundwater Reverse Osmosis



*\*Conceptual image*

Phase I begins with temporary equipment to provide treated water as soon as possible.

- Four Modular Containers with Controls
- Four Pre-treatment filters
- Treatment Capacity of 3.91 MGD
- Temporary Units to be utilized until the full plant is online
- Temporary Units are City assets and can be deployed as needed

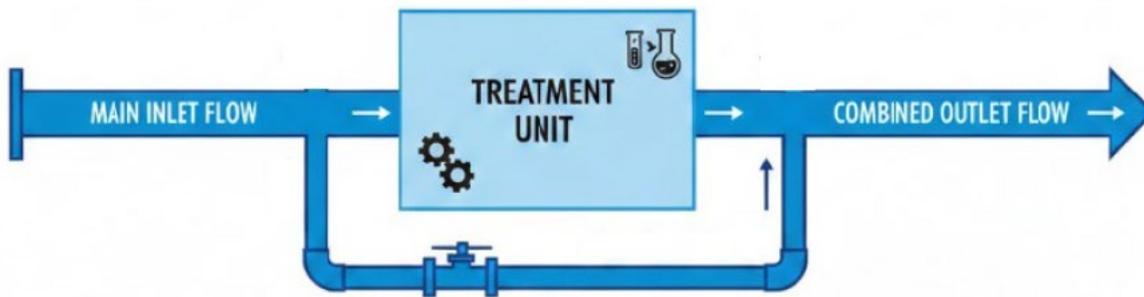
# Containerized Brackish Water Treatment Plant

## Project Scope – Brackish Groundwater Reverse Osmosis



Treatment of 24 MGD of raw water to produce 21.3 MGD of treated water

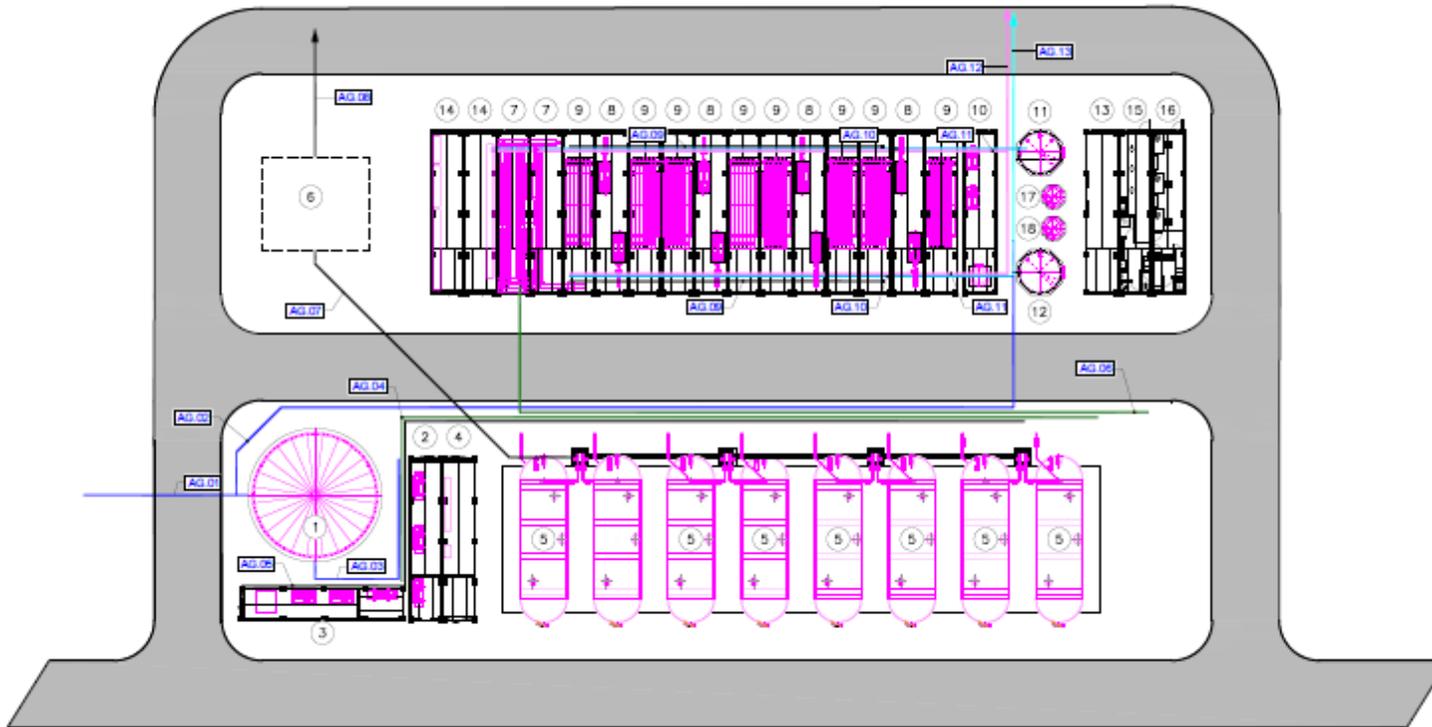
- Eight Reverse Osmosis racks with a production capacity of 1.76 MGD for a total of 14 MGD
- Bypass of 7.3 MGD to be blended with treated water
- Eight pressurized filters with Zeolite media to remove iron, manganese, arsenic, uranium
- Fifty-four cartridge filters for membrane protection
- Reverse Osmosis recovery is set at 85%



*\*Conceptual image*

# Containerized Brackish Water Treatment Plant

## Project Scope – ONSWTP Site Work



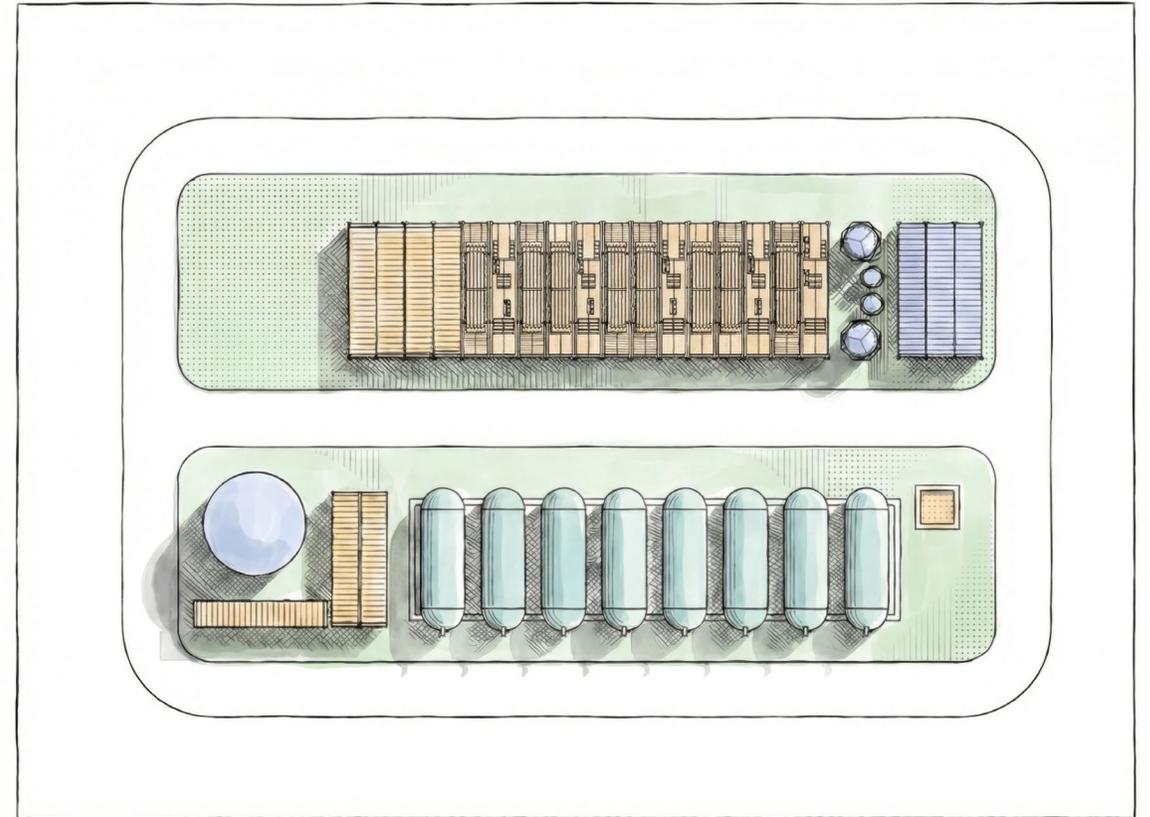
- Concrete foundation
- Power 3,130 kW demand load
- Raw Water tank
- Effluent disposal

# Containerized Brackish Water Treatment Plant

## Effluent Discharge

Phased production allows for review, evaluation, permitting, and implementation of multiple options, working with the TCEQ

- Evaporative ponds
- Injection well(s)
- TCEQ discharge permit
- Multiple options provide operational flexibility



# Containerized Brackish Water Treatment Plant

## Project Team

### **Garver Engineering**

- Design of conveyance line
- Design of effluent discharge
- TCEQ Permitting

### **Aqualia MDS**

- Design of Reverse Osmosis treatment
- Installation of equipment
- Operational startup
- Five-year operations

### **HDR**

- Electrical improvements at ONSWTP

### **CCW**

- Well Field Pump Station design
- Partial installation of conveyance line

### **Local Contractors**

- Conveyance line
- Concrete work
- Other upgrades at ONSWTP

# Containerized Brackish Water Treatment Plant

## Aqualia Qualifications



**44.8 millions**  
Population served



**18**  
Countries present



**14,040**  
Employees



**2,347**  
Municipalities served



**57,418**  
Miles of networks



**291**  
Drinking Water Treatment Plants (DWTP)



**996**  
Wastewater Treatment Plants (WWTP)



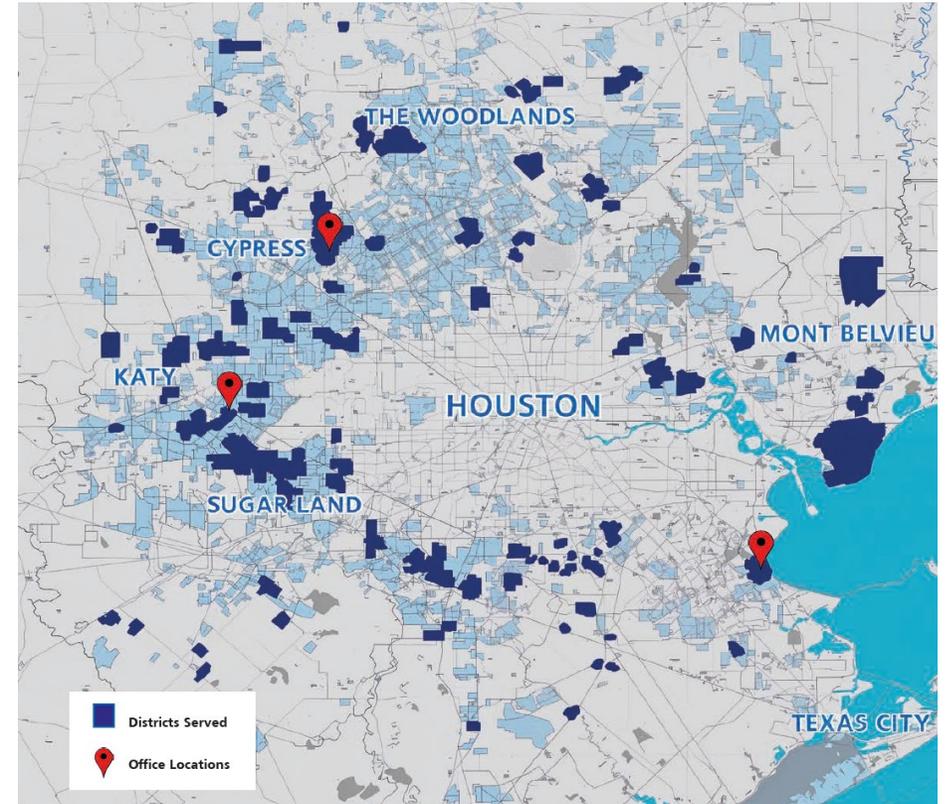
**48**  
Brackish and Seawater Desalination Plants (BWTP/SWTP)

# Containerized Brackish Water Treatment Plant

## Aqualia Qualifications



- 270 Employees in Texas
- Operating a Brackish RO Plant in Brazoria County
- Operation 100 Drinking Water Plants in Texas



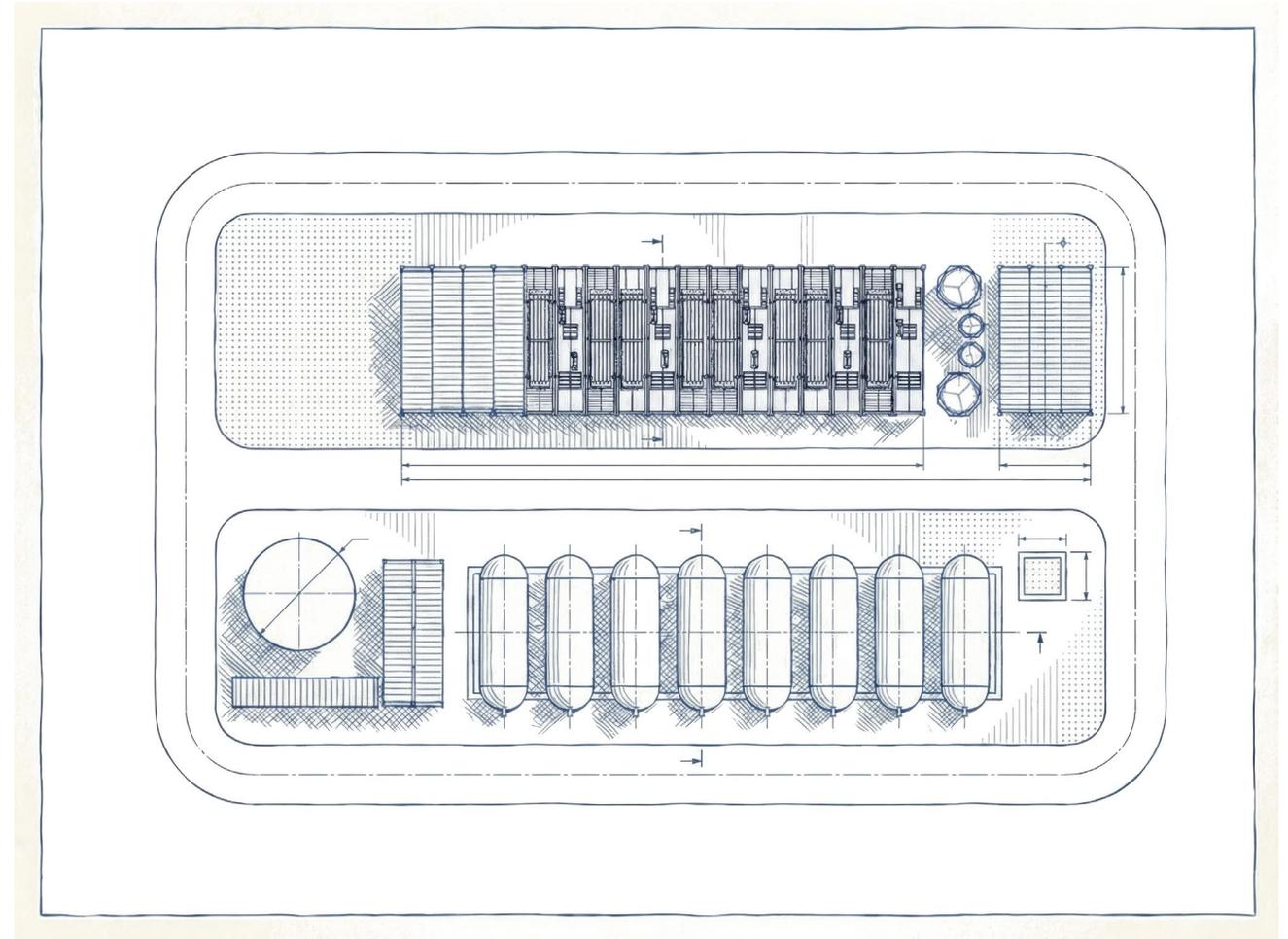
# Containerized Brackish Water Treatment Plant

## Fiscal Impact

- \$43,548,474 for Aqualia's design, procurement, assembly, and commissioning activities
- \$11,451,526 required civil and site improvements, including container foundations, filter pedestals, effluent sump, tank foundations, site access, electrical interconnections, brine and backwash management infrastructure, and associated permitting
- Pump Station and conveyance system from the Western Well Field to ONSWTP in an amount up to \$120,000,000
- To support this project, the adopted Capital Budget will be amended by \$175,000,000, and Project 26155/26160, CCW Containerized Brackish Water Treatment Plant and Conveyance System, will be added to the Capital Improvement Plan
- Payments will follow defined milestones across engineering, fabrication, and shipment, and on-site commissioning phases

# Containerized Brackish Water Treatment Plant Operations

- Five-year operations agreement
- Licensed TCEQ Operators
- Training for CCW personnel
- Maximum energy consumption guarantee
- Final water quality guarantee



# Containerized Brackish Water Treatment Plant

## Fiscal Impact – Operations

YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
\$224,830	\$4,197,040	\$6,413,094	\$6,573,422	6,737,757	6,906,201	7,078,856
\$1.92 per 1,000 gal	\$1.04 per 1,000 gal	\$0.82 per 1,000 gal	\$0.85 per 1,000 gal	\$0.87 per 1,000 gal	\$0.89 per 1,000 gal	\$0.91 per 1,000 gal

- Phased with partial operations for two years
- Five years with full treatment capacity
- Including chemical and operations costs
- Training for CCW personnel
- Maximum energy consumption guarantee
- Final water quality guarantee
- Licensed TCEQ Operators
- Training for CCW personnel

# Containerized Brackish Water Treatment Plant

## Project Costs and Rate Impact

Project	Water Rights Purchase	CAPEX	Total CAPEX / Water Rights	Annual OPEX	Cost of Water per 1,000 gal.	Current Raw Water Rate per 1,000 gal.	New Raw Water per 1,000 gal.	Raw Water Rate Increase per 1,000 gal.
<b>CCW Brackish R.O. and Western Extension</b>	\$28M	\$175.2M	<b>\$203.2M</b>	\$8.4M	\$3.94	\$1.18	\$1.74	\$0.56

Potential for an HB 500 grant of \$25MM, with staff pursuing additional grants.

# Containerized Brackish Water Treatment Plant

## Estimated Monthly Water Bill Impact

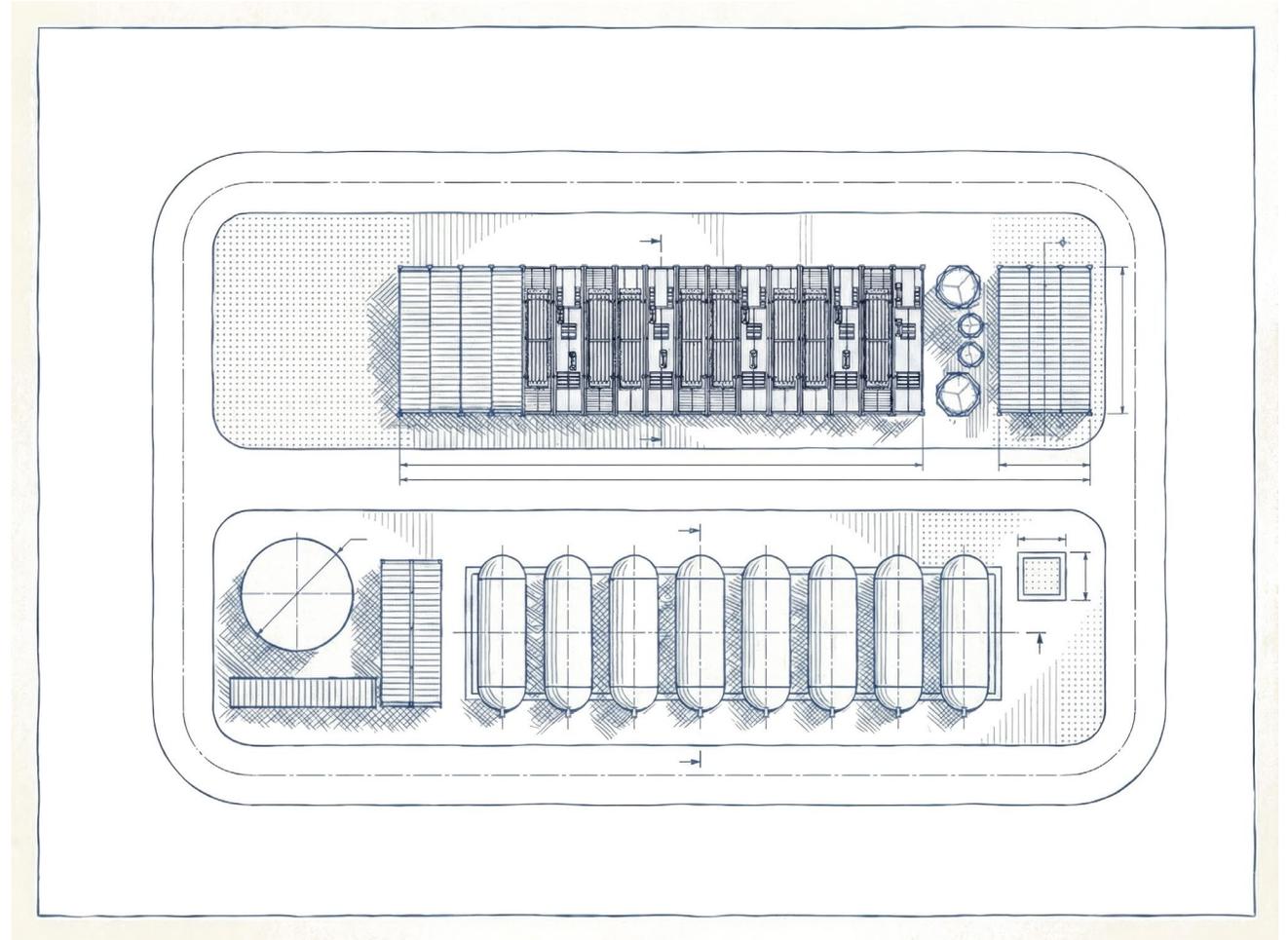
Project	Monthly Bill Increase for Average Residential (6,000 gallons)	Monthly Bill Increase for Average Commercial (20,000 gallons)	Monthly Bill Increase for Average Large Volume (90,000,000 gallons)
CCW Brackish R.O. and Western Extension	\$3.38	\$11.26	\$50,687.38

Potential for an HB 500 grant of \$25MM, with staff pursuing additional grants.

# Containerized Brackish Water Treatment Plant

## Project Benefits

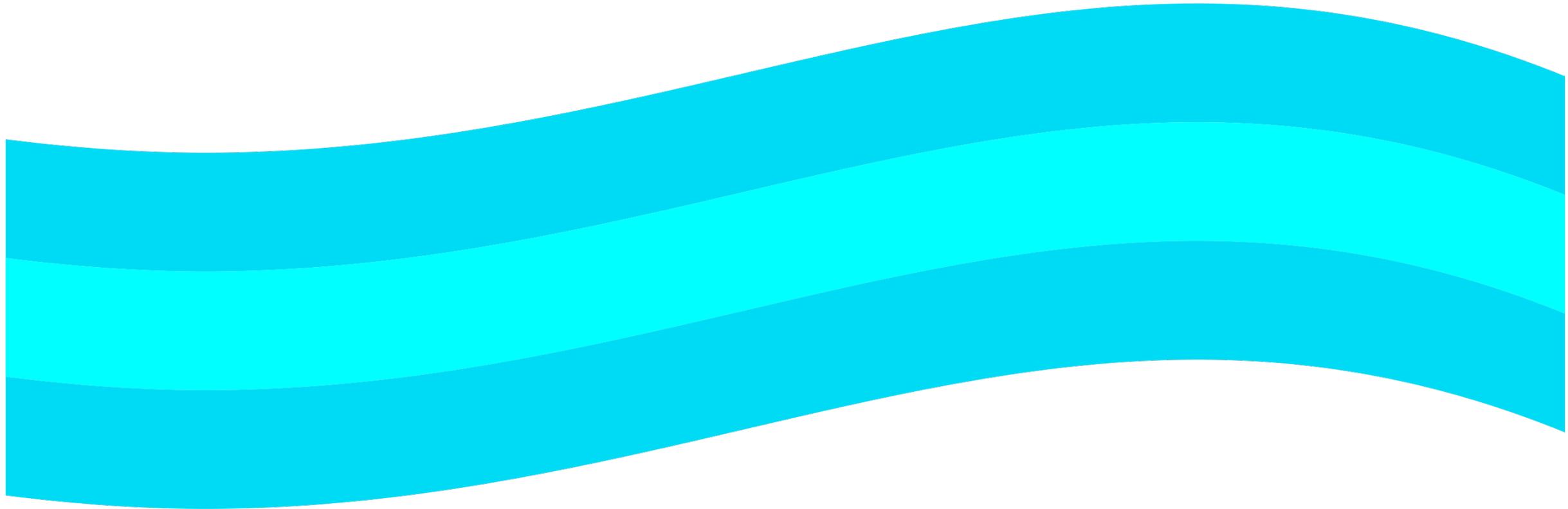
- Second Water Treatment Plant
- Guaranteed operational expense for partial delivery for two years and for full delivery for five years
- Shifting operational risk to the contract operator
- Efficient use of groundwater resources
- Temporary Units remain City property and can be deployed as needed
- Project Cost and Value



# Containerized Brackish Water Treatment Plant

## Staff Recommendations

Staff recommendation is for City Council to authorize negotiation and execution of an agreement with Aqualia to deliver a modular containerized Reverse Osmosis System, and for authorization of emergency contracts for Pump Station, Conveyance line, Storage tanks, Effluent disposal, and Ancillary site work.



**Thank you**

