PNWS-AWWA Annual Conference

The Cascade Groundwater Alliance::Groundwater Development Project Program Overview Update and Package 1 Construction

May 4, 2023

CITY OF GRESHAM

Rockwood Water People's Utility District

consor

Presenters Introduction

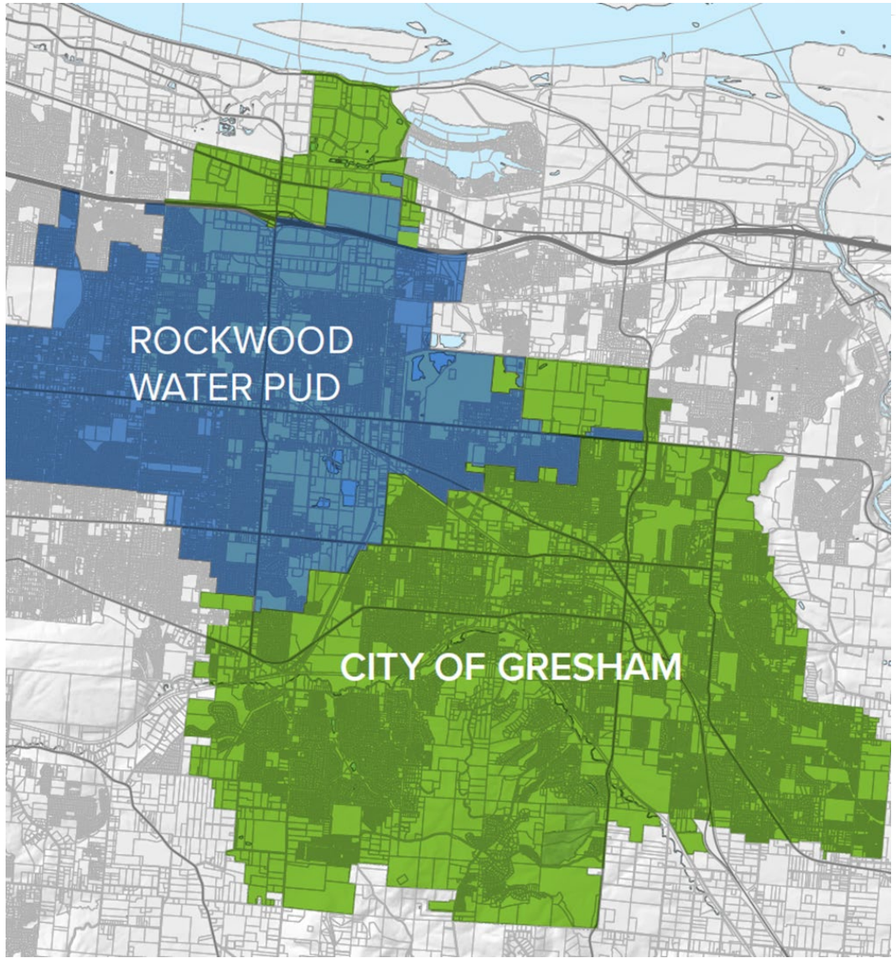
Jason Branstetter, PE
Senior Engineer
City of Gresham

Jeremy Hudson, PE
District Engineer
Rockwood Water PUD

Brian Ginter, PE
Principal Engineer
Consor

What is the CASCADE GROUNDWATER ALLIANCE

GRESHAM • ROCKWOOD



- **Rockwood Water PUD:**
  - 65,000 Customers
  - 13,622 Service Connections
  - 2026 MDD = 11.0 MGD
  - 2045 MDD = 16.2 MGD
- **City of Gresham:**
  - 72,000 Customers
  - 17,000 Service Connections
  - 2026 MDD = 10.7 MGD
  - 2050 MDD = 15.4 MGD
- Current Total Groundwater System Capacity (3 wells) is only 15.1 MGD

Cascade Groundwater Alliance History of Groundwater Development

Rockwood Water
People's Utility District

CITY OF GRESHAM

- **1925** - Became a water district and drilled first well
- **1943** - first purchase agreement w/City of Portland
- **1990** - Became a PUD to secure water system boundaries
- **Early 2000's** – Developed Cascade Well #3 and #4
- **1912** - First municipal wholesale purchaser from Portland
- **2003** - Partnered with Rockwood to purchase half of the facilities at Rockwood
- **2008** - Drilled first well - Cascade Well #5

Agency Partnership

Groundwater Development Master Plan was completed in 2020 and led to expanding the IGA between Gresham and Rockwood

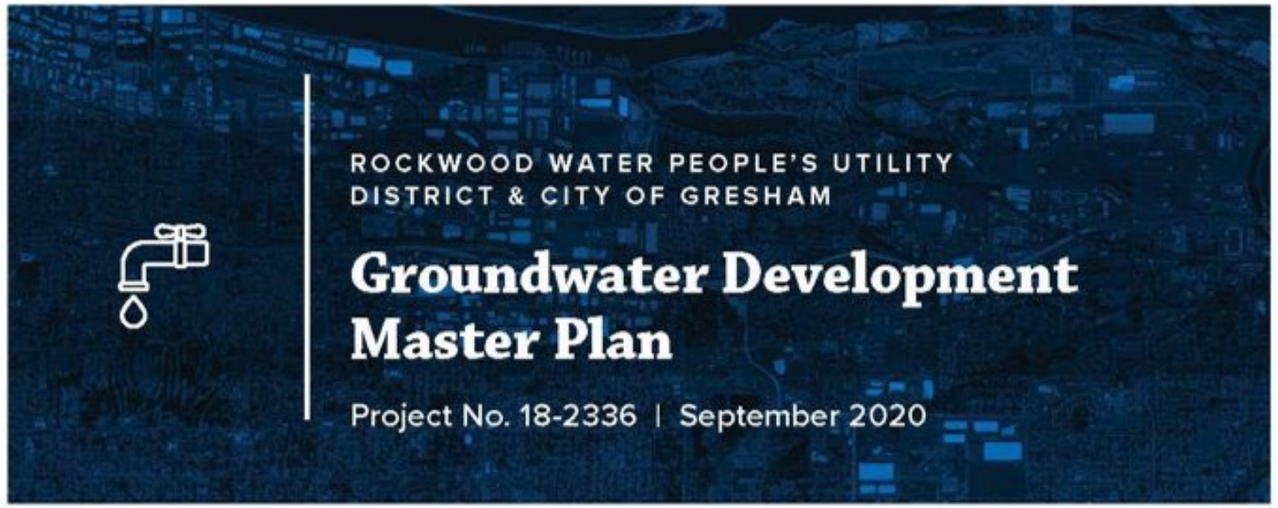
Outlines design, construction, and O&M responsibilities for existing/future groundwater infrastructure

Includes a commitment for Rockwood to share its groundwater rights with Gresham

Will reduce long-term water rate impacts, provides local control

By 2026 will supply all demand through groundwater supply system

Groundwater Supply Development Master Plan



Groundwater Supply Development Master Plan

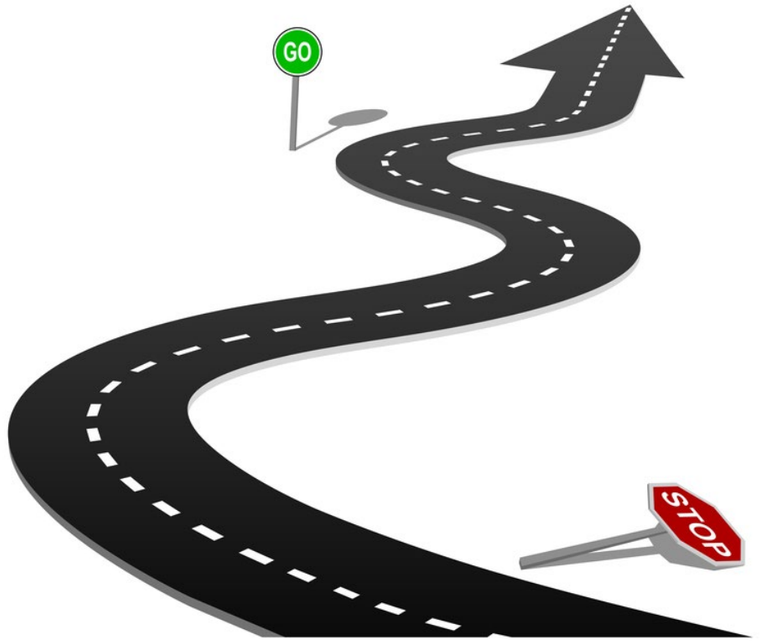
Purpose and Focus Areas

- *To position the District and City to avoid or weather future wholesale water purchase cost increases from the City of Portland*

- Portland Water Bureau Wholesale Water Supply Agreement expires in 2026

- Decision point – June 2021 (5-year notice)
  - Renew PWB Contract?
  - **Develop Expanded Groundwater?**
  - Develop Surface Water Supply?

- Feasibility. Cost. Schedule. Implementation Plan.



Groundwater Supply Development Master Plan

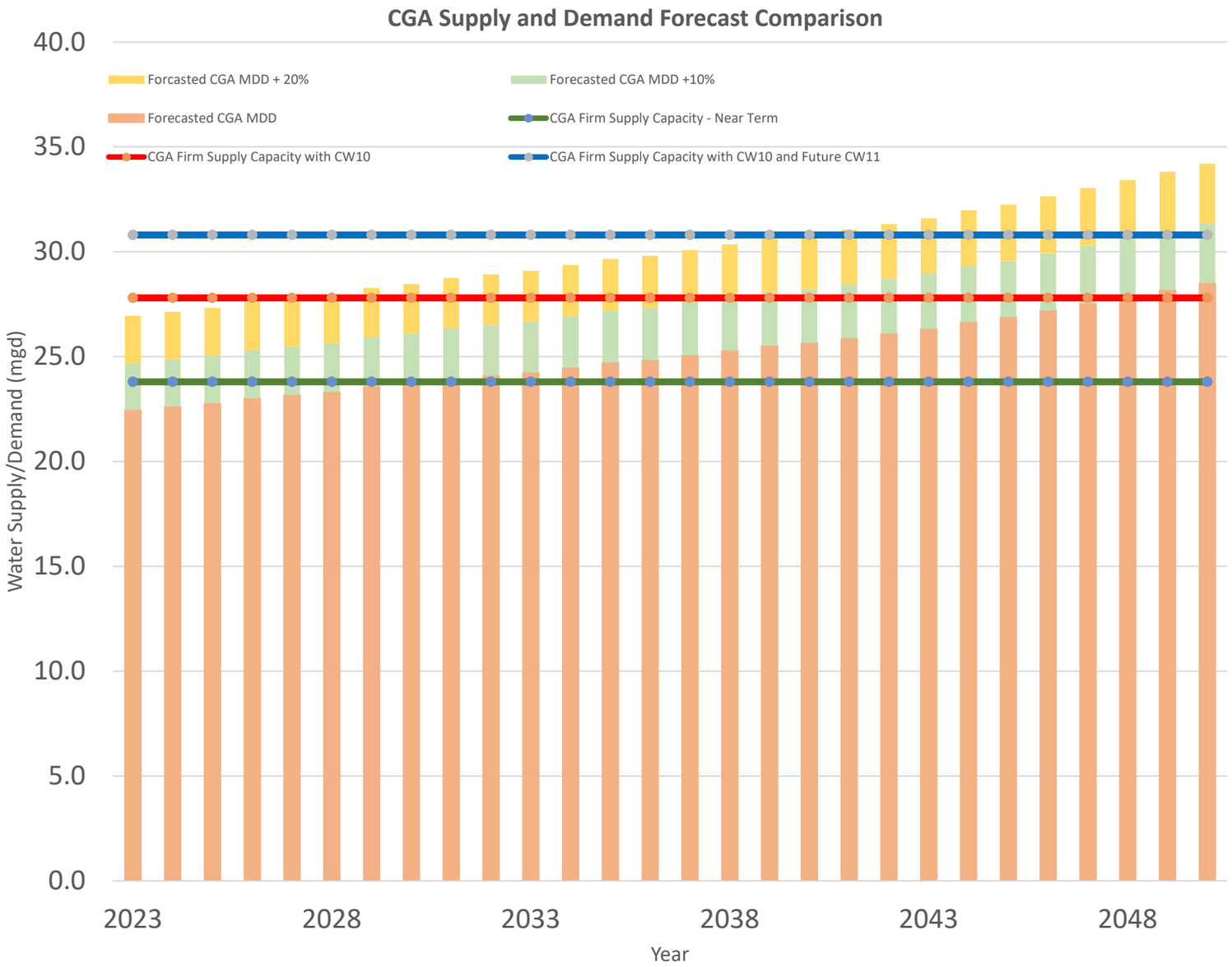
Criteria

Maintain Current Level of Performance and Reliability

- *Firm Groundwater Supply*
- *Consideration of Interference Impacts*
- *Planning for Regional Emergencies*
- *Multiple Supply Points*

Groundwater Supply Development Master Plan

Water Supply Need



Groundwater Supply Development Master Plan

Program Development

3 Groundwater treatment plants

1 New 6.0 MG water tank

5 Wells & wellhouses

2 Water storage tank rehabilitations

By the Numbers

57K

Feet of water transmission piping

Groundwater Context

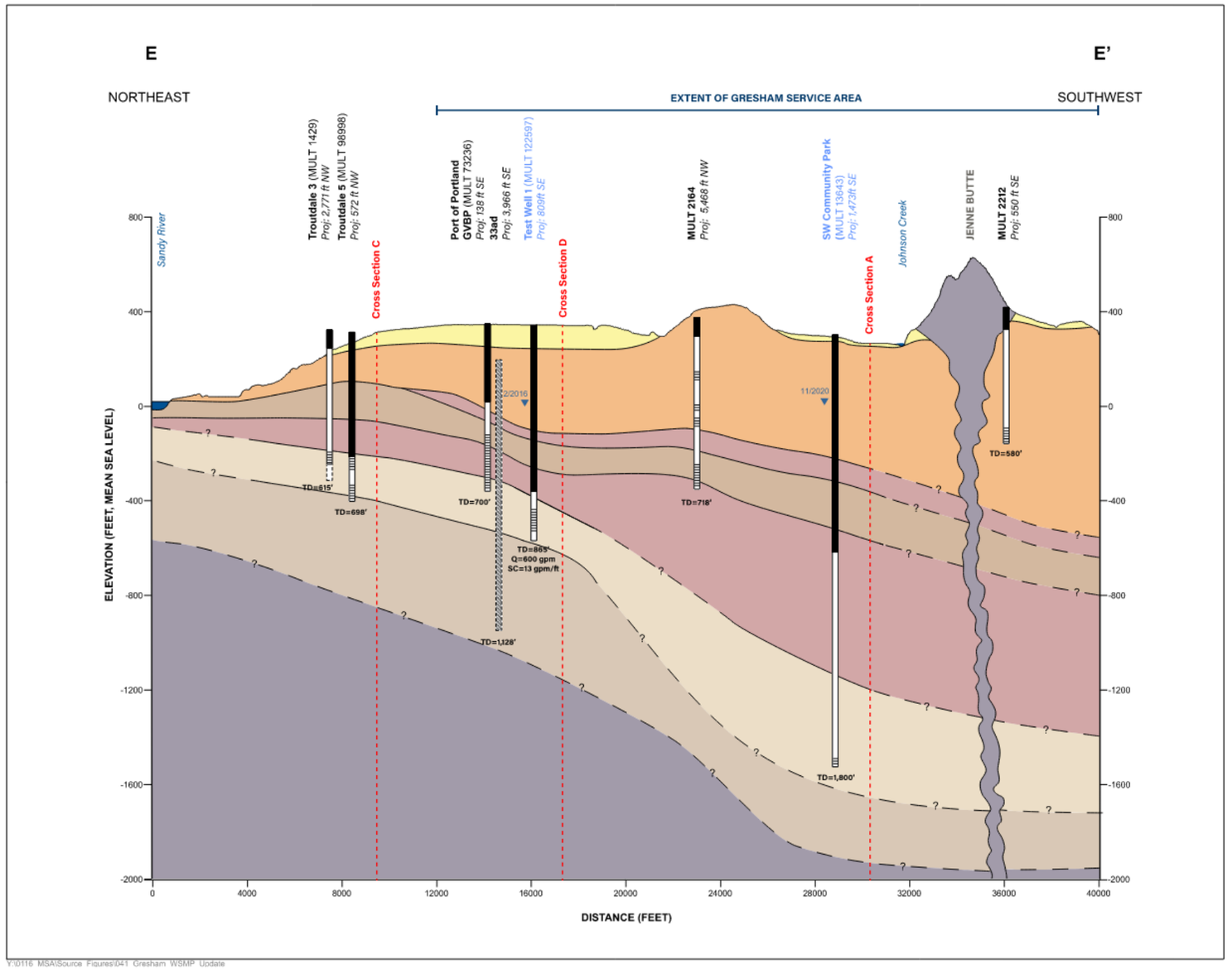


FIGURE 6

Cross Section E-E'

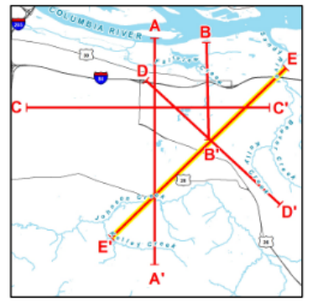
City of Gresham
WSMP Update

GEOLOGY LEGEND

- Unconsolidated Sediments (USA)
- Troutdale Gravel Aquifer (TGA)
- Confining Unit 1 (CU1)
- Troutdale Sandstone Aquifer (TSA)
- Confining Unit 2 (CU2)
- Sand and Gravel Aquifer - Coarse grained facies (SGAc)
- Sand and Gravel Aquifer - Fine grained facies (SGAf)
- Older Rocks (OR)

WELL LEGEND

- Seal
- Blank Casing
- Screen
- Open Borehole
- Backfilled Borehole
- Static Water Level (only shown for SGA wells)



NOTES

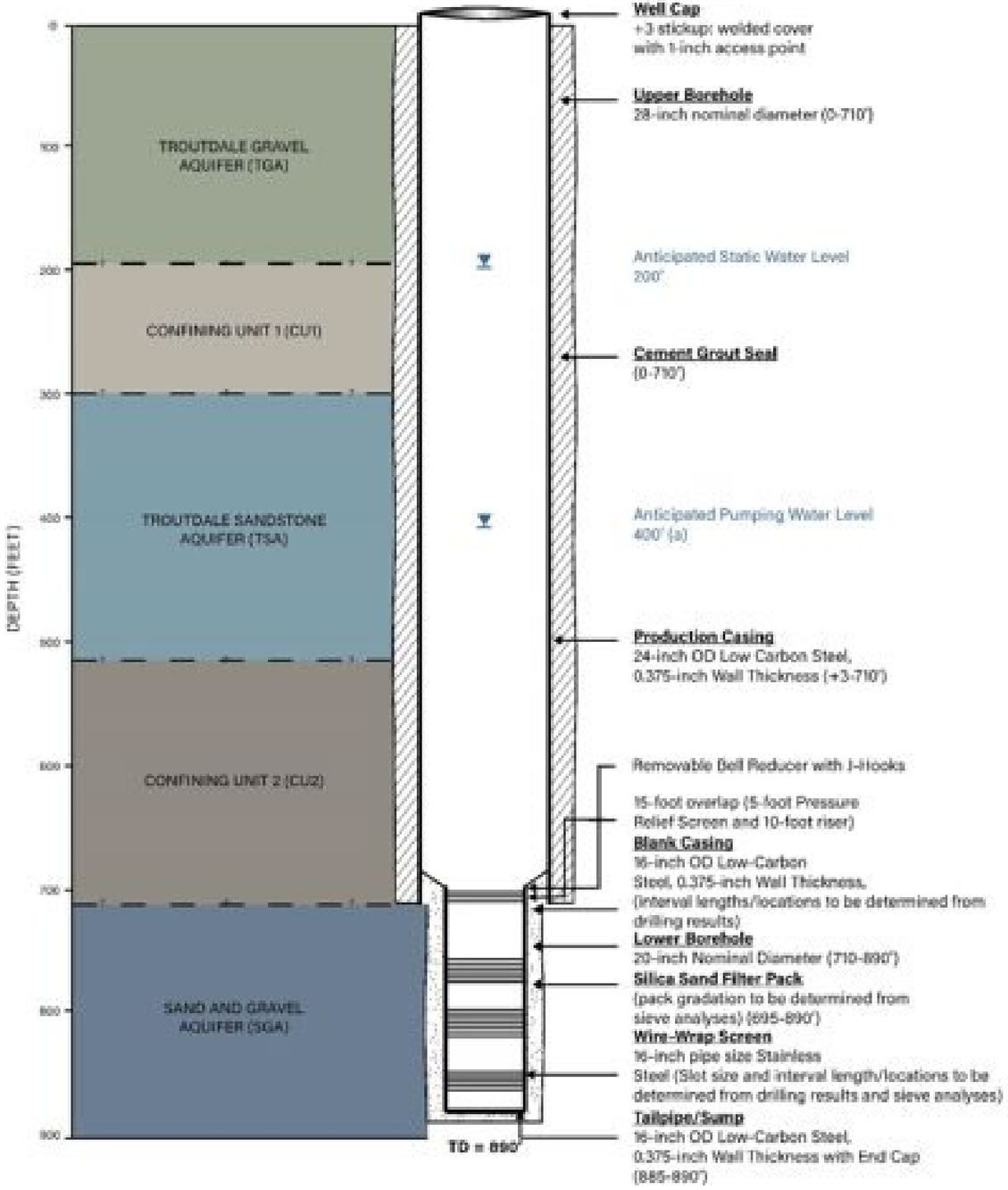
Vertical Exaggeration: 10x
SC: specific capacity (gpm/foot of drawdown)
Q: gallons per minute (gpm)
TD: total depth

GSI Water Solutions, Inc.

Y:\0116 MSA\Source Figures\041 Gresham WSMP Update

Groundwater Supply

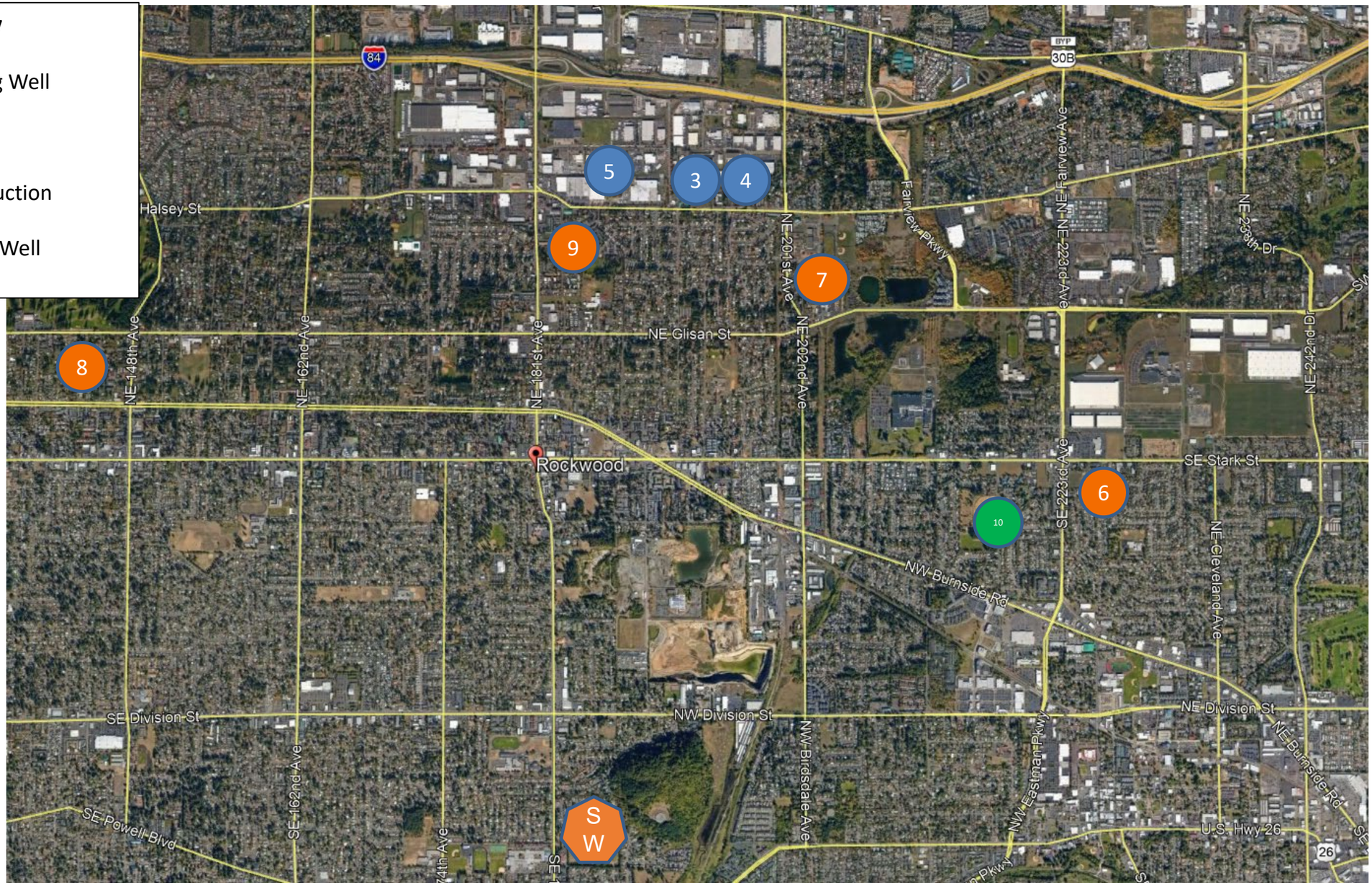
Well Cross-section



Groundwater Supply Development

Key

- 5 — Existing Well
- 8 — Well Under Construction
- 6 — Future Well

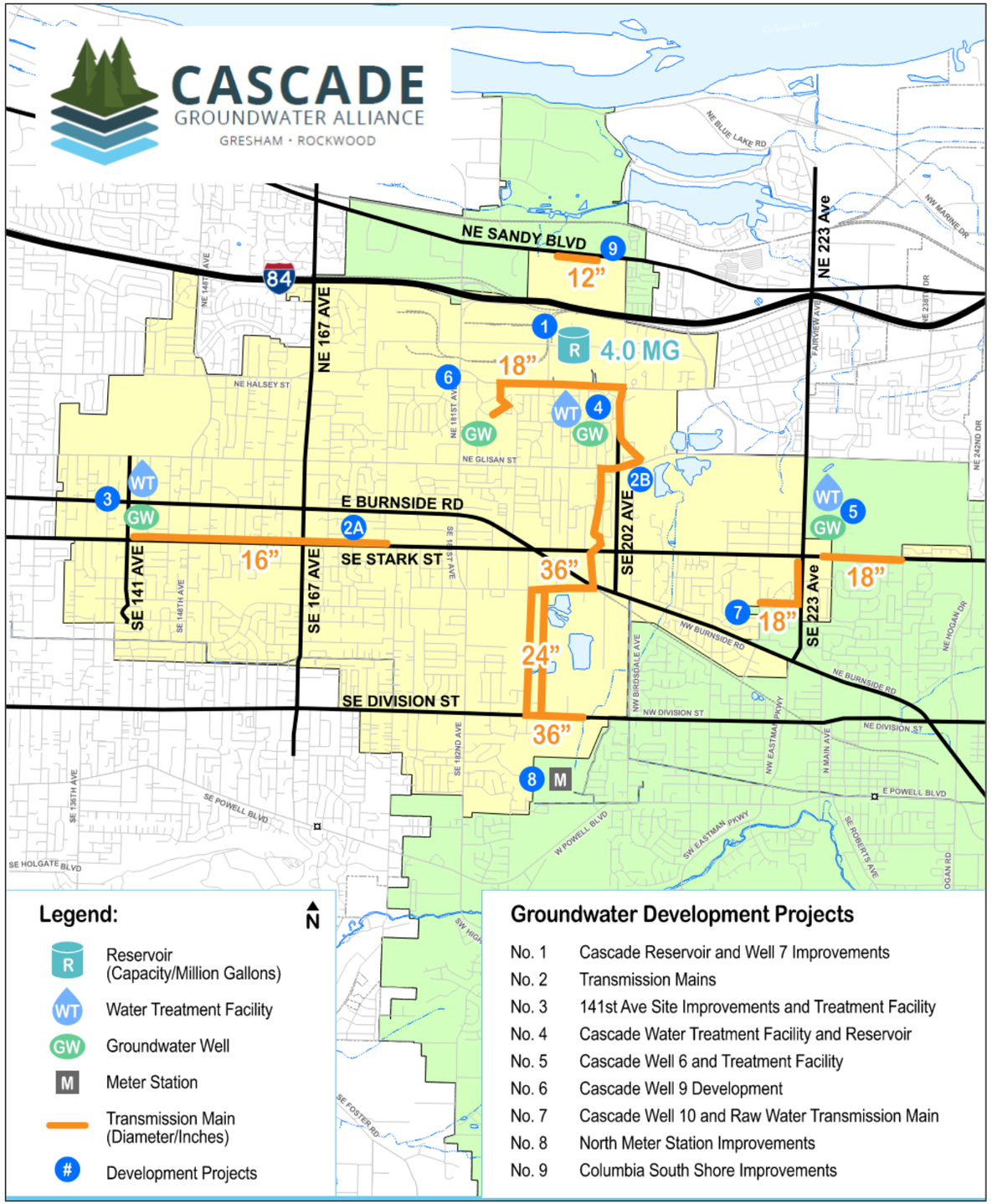


Groundwater Supply

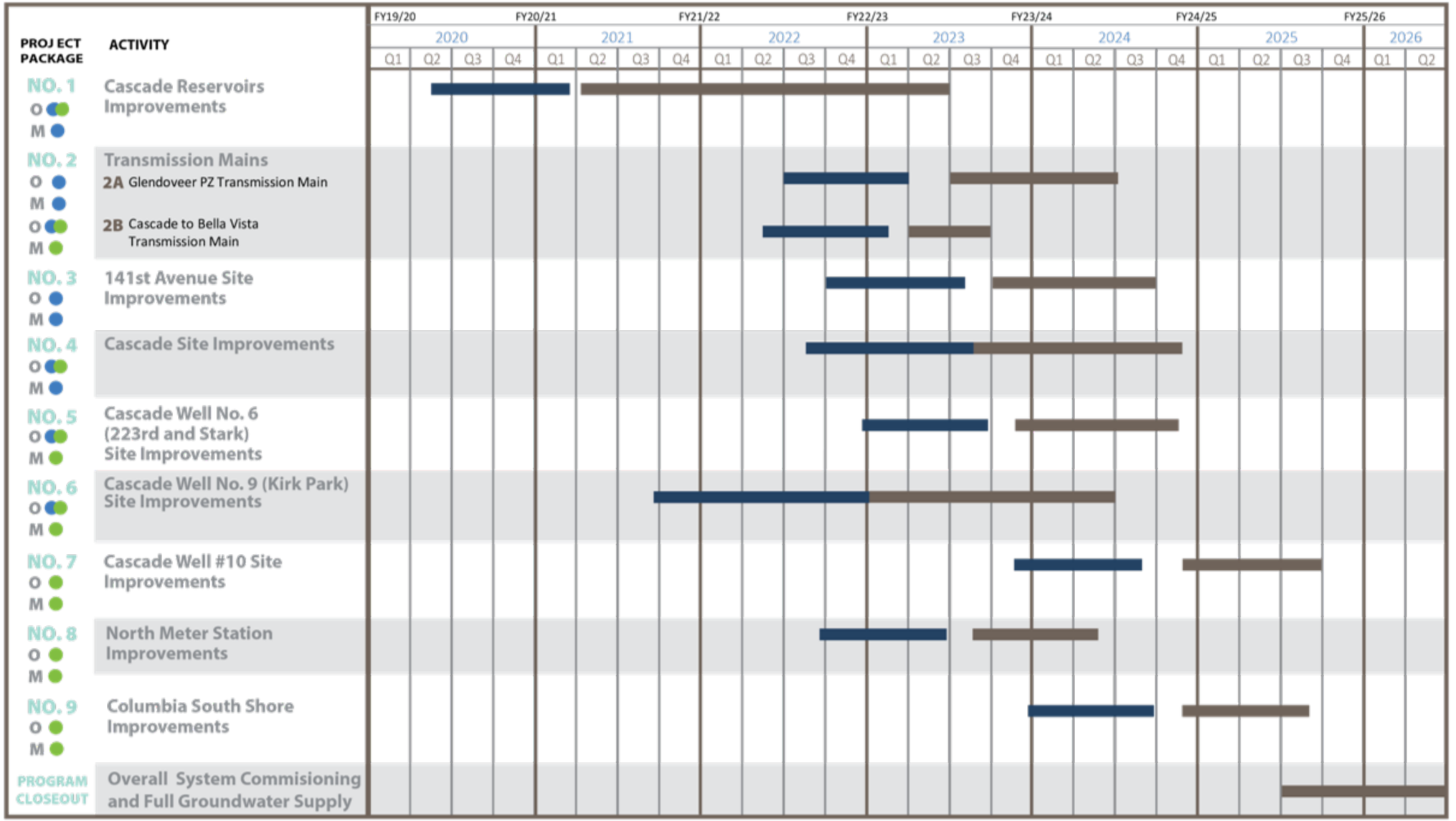
Groundwater Protection Program

- Gresham and Rockwood have collaborated to fund a Groundwater Protection Program since 2011
- The program won the 2021 AWWA Exemplary Source Water Protection Award

Overview


CASCADE
GROUNDWATER ALLIANCE
GRESHAM · ROCKWOOD
NE SANDY BLVD
12"
9
84
NE 167 AVE
NE 223 Ave
1
R
4.0 MG
18"
6
WT
4
GW
GW
NE HALSEY ST
NE GLISAN ST
2B
3
WT
GW
E BURNSIDE RD
2A
SE 202 AVE
WT
5
GW
16"
SE STARK ST
36"
18"
SE 141 AVE
SE 167 AVE
SE 223 Ave
7
18"
24"
NW BURNSIDE RD
NE BURNSIDE RD
SE DIVISION ST
NW DIVISION ST
NE DIVISION ST
36"
8
M
SE POWELL BLVD
E POWELL BLVD
W POWELL BLVD
SE HOLGATE BLVD
SW EASTMAN PKWY
Legend:
N
Reservoir (Capacity/Million Gallons)
Water Treatment Facility
Groundwater Well
Meter Station
Transmission Main (Diameter/Inches)
Development Projects
Groundwater Development Projects
No. 1 Cascade Reservoir and Well 7 Improvements
No. 2 Transmission Mains
No. 3 141st Ave Site Improvements and Treatment Facility
No. 4 Cascade Water Treatment Facility and Reservoir
No. 5 Cascade Well 6 and Treatment Facility
No. 6 Cascade Well 9 Development
No. 7 Cascade Well 10 and Raw Water Transmission Main
No. 8 North Meter Station Improvements
No. 9 Columbia South Shore Improvements

Overview of Program *(Cont.)*



Overview of Program *(Cont.)*

Project Package No.	Project Description	CIP Schedule and Project Cost Summary								Preliminary SDC Eligibility
		FY 2019 / 2020	FY 2020 / 2021	FY 2021 / 2022	FY 2022 / 2023	FY 2023 / 2024	FY 2024 / 2025	FY 2025 / 2026	TOTAL	
Project Package No. 1 - Cascade Reservoir Improvements	6.0 MG Cascade Reservoir No. 2		$960,000	$3,370,000	$9,530,000				$13,860,000	100%
	Cascade Reservoir No. 1 Improvements		$470,000	$1,450,000	$1,450,000				$3,370,000	32%
	Cascade Well No. 7 Wellhouse and Site		$440,000	$2,710,000					$3,150,000	100%
	Raw Water Transmission Main (Cascade 7) Improvements		$310,000	$1,940,000					$2,250,000	100%
	Subtotal	$0	$2,180,000	$9,470,000	$10,980,000	$0	$0	$0	$22,630,000	
Project Package No. 2 - Transmission Mains	Glendoveer Pressure Zone Transmission Main (30")		$470,000	$4,360,000	$1,920,000				$6,750,000	32%
	Cascade to Bella Vista Transmission Main			$1,030,000	$6,650,000	$8,440,000			$16,120,000	100%
	Subtotal		$470,000	$5,390,000	$8,570,000	$8,440,000			$22,870,000	
Project Package No. 3 - 141st Avenue Site Improvements	Cascade Well No 8 Wellhouse			$100,000	$610,000	$760,000			$1,470,000	100%
	141st Avenue Reservoir Improvements & Interim Zone Improvements			$190,000	$1,140,000	$1,430,000			$2,760,000	32%
	141st Avenue Pump Station Expansion			$120,000	$730,000	$910,000			$1,760,000	100%
	141st Avenue Water Treatment Facility (2 mgd)			$210,000	$1,270,000	$1,590,000			$3,070,000	32%
	NW Glendoveer PRV Vault					$150,000			$150,000	32%
	Demolition/Removal of Glendoveer Pump Station & Zone Expansion					$200,000			$200,000	0%
	Subtotal	$0		$620,000	$3,750,000	$5,040,000			$9,410,000	
Project Package No. 4 - Cascade Site Improvements	Cascade Water Treatment Facility				$1,800,000	$9,130,000	$17,100,000		$28,030,000	32%
	Cascade Pump Station Expansion				$200,000	$1,020,000	$1,900,000		$3,120,000	100%
	Yard Piping/Site Improvements				$50,000	$260,000	$480,000		$790,000	100%
	Cleveland Pump Station Improvements						$200,000		$200,000	0%
	Subtotal	$0	$0	$0	$2,050,000	$10,410,000	$19,680,000	$0	$32,140,000	
Project Package No. 5 - Cascade Well 6	Wellhead, Wellhouse and Site Improvements				$270,000	$1,500,000	$1,360,000		$3,130,000	100%
	Treatment Facility				$740,000	$4,130,000	$3,760,000		$8,630,000	100%
	Transmission (Gresham) to Stark and Cleveland				$210,000	$1,150,000	$1,050,000		$2,410,000	100%
	Subtotal	$0	$0	$0	$1,220,000	$6,780,000	$6,170,000	$0	$14,170,000	
Project Package No. 6 - Cascade Well 9	Wellhead, Wellhouse and Site Improvements					$400,000	$2,720,000		$3,120,000	100%
	Raw Water Transmission					$300,000	$2,040,000		$2,340,000	100%
	Subtotal	$0	$0	$0	$0	$700,000	$4,760,000	$0	$5,460,000	
Project Package No. 7 - Cascade Well 10	Wellhead, Wellhouse and Site Improvements					$240,000	$1,750,000		$1,990,000	100%
	Treatment Facility					$420,000	$3,020,000		$3,440,000	100%
	Transmission to Distribution					$120,000	$840,000		$960,000	100%
	Subtotal	$0	$0	$0	$0	$780,000	$5,610,000	$0	$6,390,000	
Project Package No. 8 - North Meter Station	North Meter Station Upgrades Transmission Main Upgrades (NM to GB Reservoir)				$498,400	$2,920,624			$3,419,024	21%
	Subtotal	$0	$0	$0	$498,400	$2,920,624	$0		$3,419,024	
Project Package No. 9 - Columbia South Shore	Sandy Boulevard Waterline and Connections Master Meter to Rockwood					$404,640	$2,949,826		$3,354,466	21%
	Subtotal	$0	$0	$0	$0	$404,640	$2,949,826		$3,354,466	
		$0	**$2,650,000**	**$15,480,000**	**$27,068,400**	**$35,475,264**	**$39,169,826**	**$0**	**$119,843,490**	

Costs *(Cont.)*

The impacts of a pandemic, supply chain issues and inflation…

					Built in X year(s)				
(A)	(B)	(C)	(D)	(E)	(F)			(G)	(G) minus (D) (H)
Notes	Package	Projected Year to be Built	Original Total Project Cost (February 2020)	Inflated to Current Cost (August 2022)	2023	2024	2025	Adjusted Future Total Project Cost	Difference from Original to projected
i, v	1	Current	$ 22,510,171	$ 23,572,186				$ 23,572,186	$ 1,062,015
	2A	2023	$ 6,729,375	$ 8,260,019	$ 9,292,522			$ 9,292,522	$ 2,563,147
ii	2B	2023	$ 16,111,450	$ 20,092,926	$ 22,604,542			$ 22,604,542	$ 6,493,092
iii, v	3	2024/2025	$ 9,352,875	$ 11,480,253		$ 7,200,415	$ 7,230,906	$ 14,431,321	$ 5,078,446
iii	4	2024/2025	$ 32,104,675	$ 39,407,113		$ 24,716,141	$ 24,820,806	$ 49,536,947	$ 17,432,272
iii, v	5	2024/2025	$ 14,115,853	$ 17,326,605		$ 10,867,246	$ 10,913,266	$ 21,780,512	$ 7,664,659
iv, v	6	2023	$ 5,447,750	$ 8,754,758	$ 9,849,102			$ 9,849,102	$ 4,401,352
v	7	2024	$ 6,369,373	$ 7,818,132		$ 9,807,065		$ 9,807,065	$ 3,437,692
	8	2023	$ 3,419,024	$ 4,196,705	$ 4,721,294			$ 4,721,294	$ 1,302,270
	9	2024	$ 3,354,466	$ 4,117,463		$ 5,164,945		$ 5,164,945	$ 1,810,480
		Total Program:	**$ 119,515,011**	**$ 145,026,160**				**$ 170,760,437**	**$ 51,245,426**

Funding

WIFIA PROGRAM

The Water Infrastructure Finance and Innovation Act (WIFIA) program accelerates investment in our nation's water infrastructure by providing long-term, low-cost supplemental loans for regionally and nationally significant projects.

CASCADE GROUNDWATER DEVELOPMENT PROJECT

BORROWER: Rockwood Water People's Utility District and City of Gresham

LOCATION: Multnomah County, Oregon

WIFIA LOAN AMOUNTS: $30,419,935 (Rockwood), $34,078,873 (Gresham)

TOTAL WIFIA PROJECT COSTS: $131,942,784

POPULATION SERVED BY PROJECT: 136,000

NUMBER OF JOBS CREATED: 422

Photo credit: Rockwood Water People's Utility District

PROJECT DESCRIPTION

The Cascade Groundwater Development Project will enable the Rockwood Water People's Utility District and the City of Gresham, Oregon to jointly provide reliable, high quality potable water to their customers. The project will expand the existing groundwater infrastructure to develop an independent regional groundwater system. By increasing groundwater treatment capacity, it will mitigate rapid water quality changes caused by extreme weather. Additionally, the project offers increased resiliency against earthquakes by implementing alerts and seismically hardened construction techniques. Establishing an independent groundwater system will provide significant long-term cost benefits to residents by reducing reliance on imported surface water.

PROJECT BENEFITS

- Increases the system's resiliency to regional emergency events, including seismic activity.
- Helps mitigate the effects of extreme weather events on system caused by climate change.
- Saves Rockwood Water People's Utility District approximately $7.9 million and City of Gresham approximately $10.4 million by financing with WIFIA loans.

EPA United States Environmental Protection Agency

WEBSITE: www.epa.gov/wifia
EMAIL: wifia@EPA.gov

- Bond sale proceeds, WIFIA Financing and Operating and SDC funds.
- Exploring SRF and BIL options to cover the current funding gap.
- Additional Bond sales may be used.




Package 1

Cascade Reservoir Improvements & Well No. 7

Package 1 - Overview *(Cont.)*

1 Package, 4 Schedules

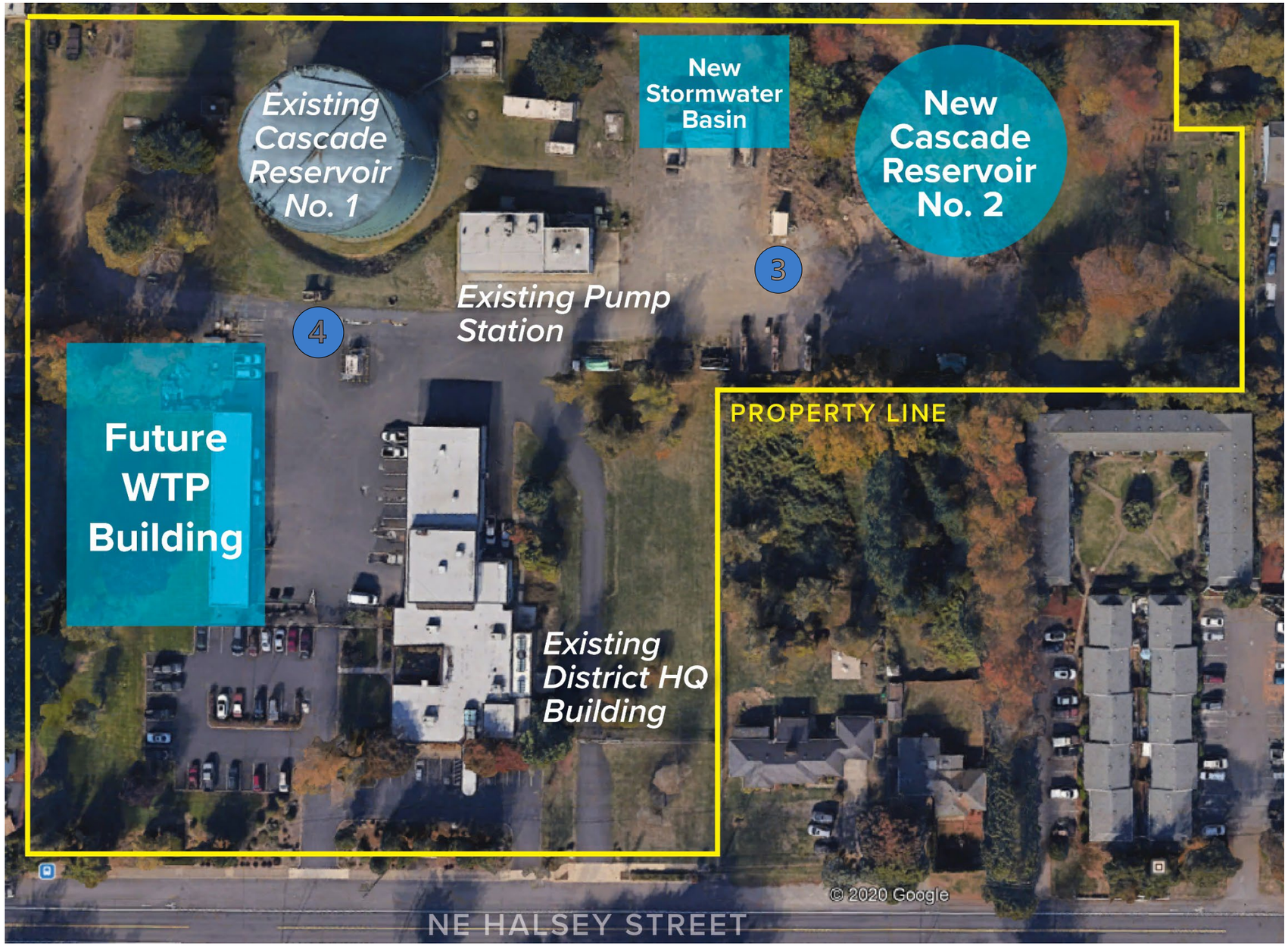
Schedule A: **Existing Water Storage Tank Rehabilitation**

Schedule B: **New Concrete Water Storage Tank & Site Development**

Schedule C: **New Well No. 7**

Schedule D: **Off-site Pipelines in Right-of-Way in an approximately one mile corridor**

Package 1 - Overview *(Cont.)*



Package 1 – Seismic Upgrades

Reservoir No. 1 Rehabilitation

- 4.0 MG welded steel reservoir
- Heavy corrosion in interior headspace
- 36-inch stainless steel inlet pipe acts as a cathode
- Addition of passive mixing

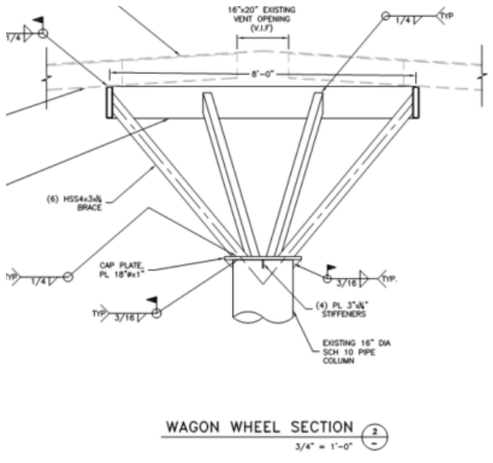
Package 1 – Seismic Upgrades

Reservoir No. 1 Rehabilitation

Seal welding & protective coatings

Remove problematic appurtenances & piping

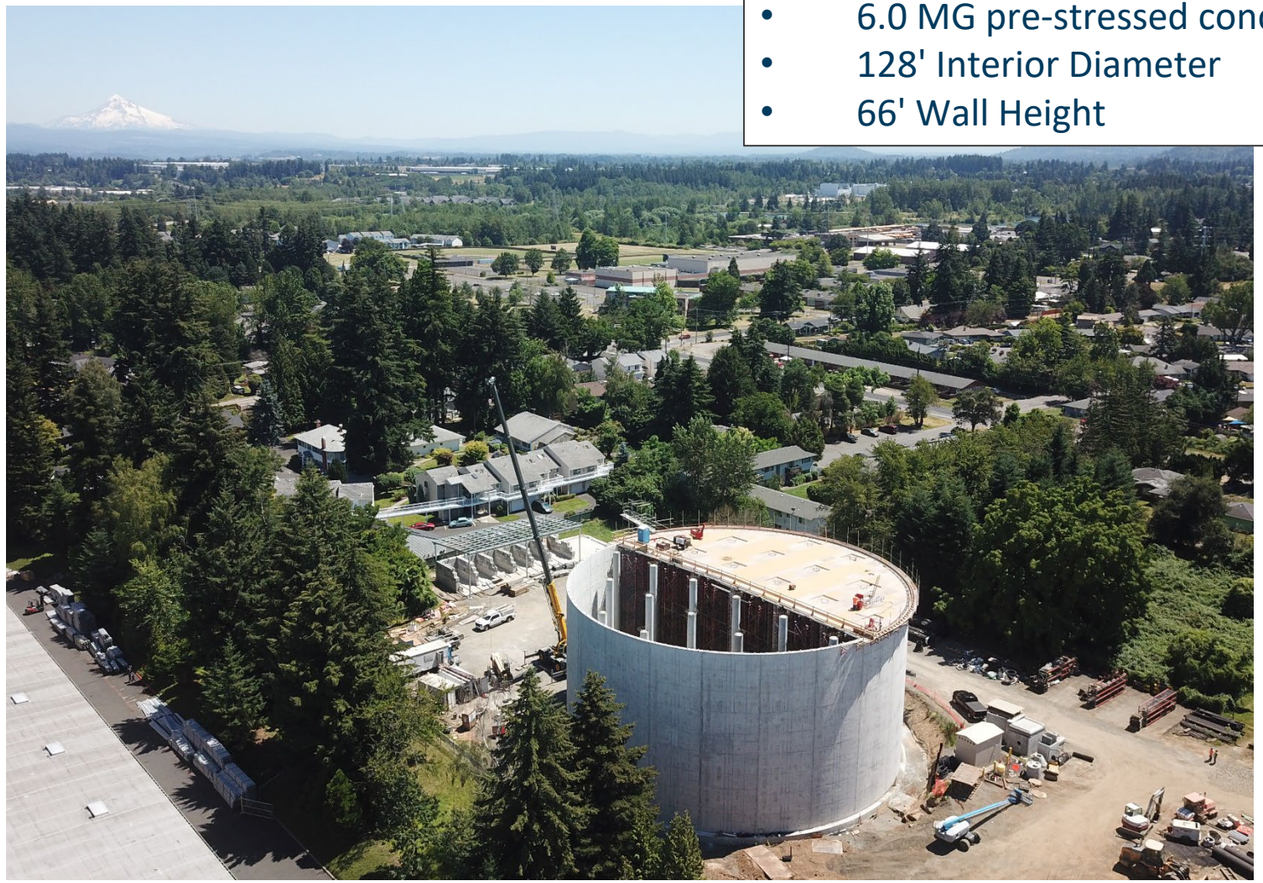
Replace dollar plate with "wagon wheel"

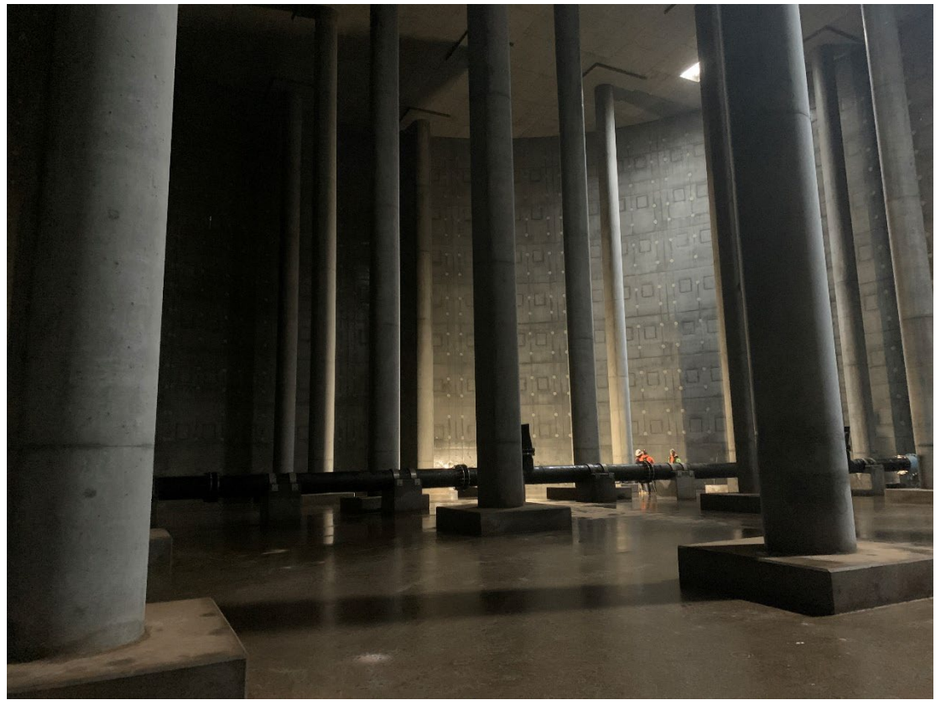


Package 1 – New Storage

Cascade Reservoir No. 2

- 6.0 MG pre-stressed concrete reservoir
- 128' Interior Diameter
- 66' Wall Height





Package 1 – New Storage

Design Features – Seismic Resilience

AWWA D110 Type I Prestressed Concrete

- Most resilient tank style available
- Flexible connection between walls and base
- Post-tensioned threadbars in walls and pre-stressed strand wrapping

Double-Ball Flexible Expansion Joints for piping connections to both tanks –

* allows for differential settlement between piping entering a structure and the structure settling over time or in a seismic event *

Seismic Valves to tank outlets – SCADA will close after a seismic event

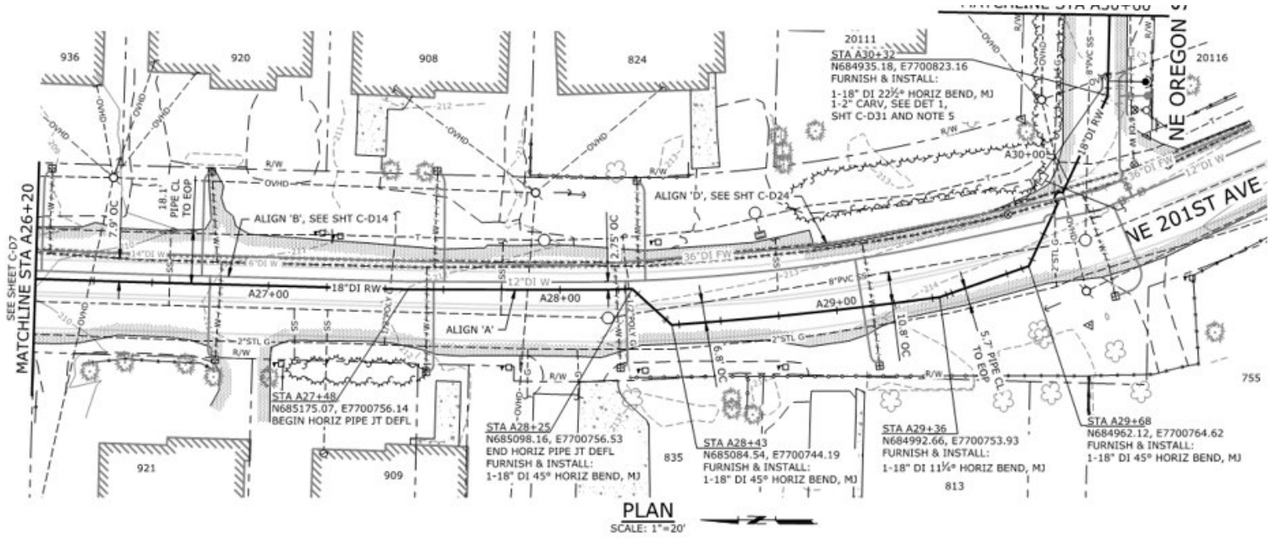
Package 1 – New Storage

Construction Photos

Package 1 – New Storage

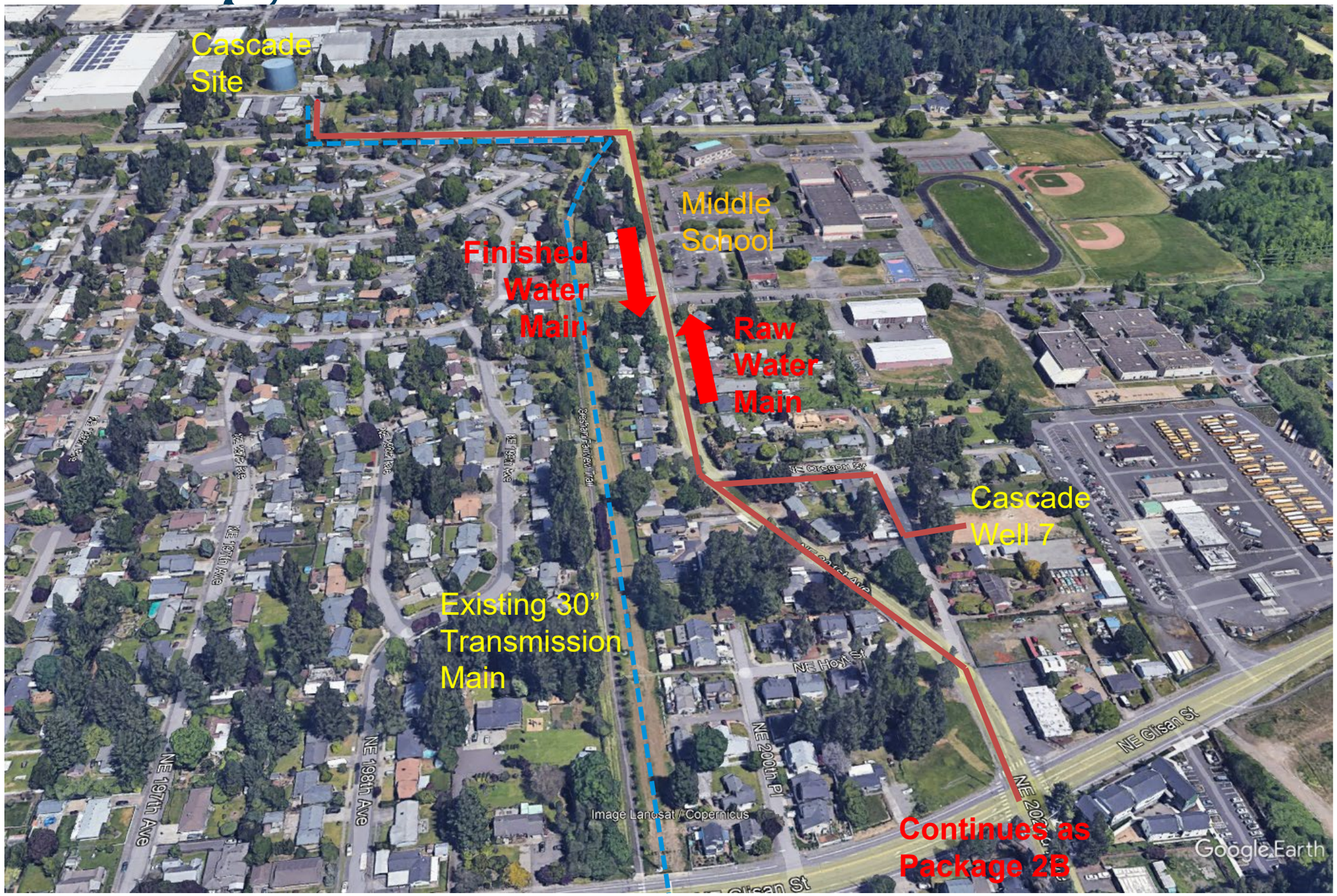
Package 1 – Transmission

Design Features



- Distribution main on NE 201st – 2,500 LF of 12" DIP
- Finished Water Trans. Main – 4,200 LF of 36" DIP
- Raw Water Trans. Main – 4,000 LF of 18"/24"/36" DIP
- Residential neighborhood – Traffic Control key
- Air release valves, blow-offs, services
- Congested Corridor

Package 1 – Transmission



Package 1 – Transmission

Construction Photos

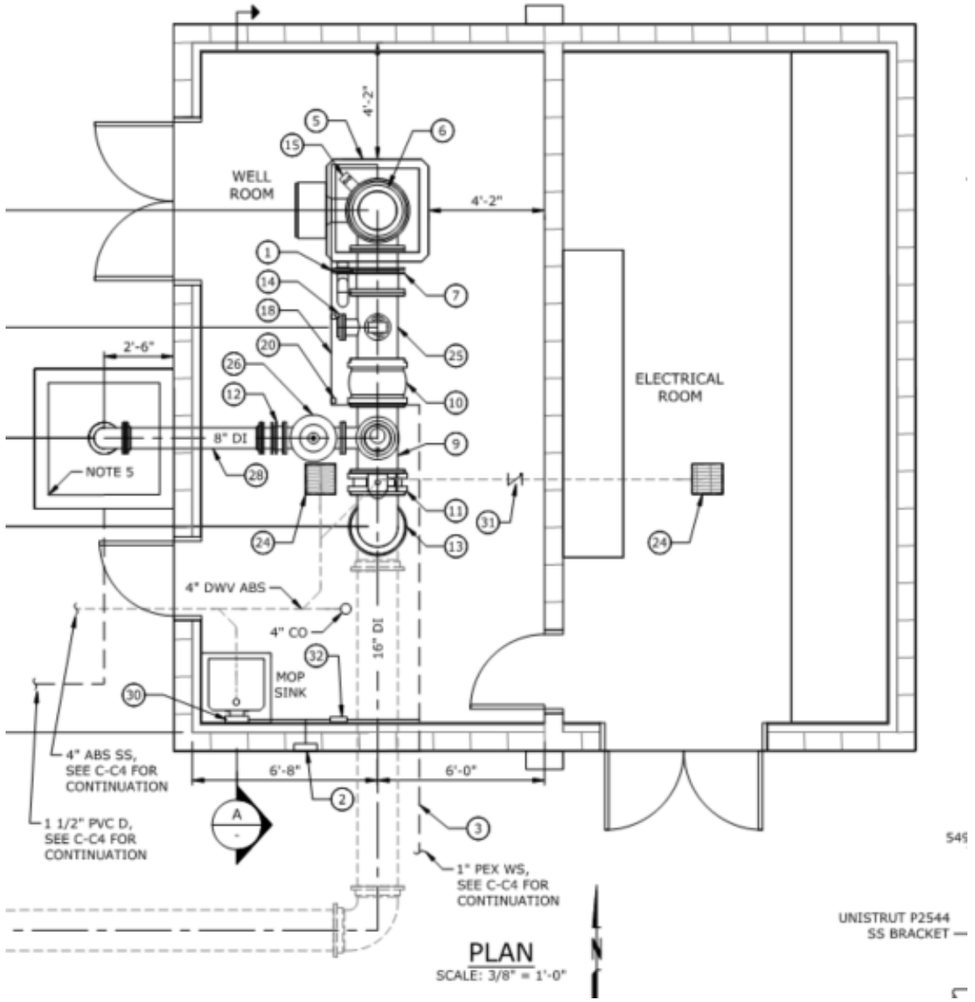
Package 1 – Well No.7

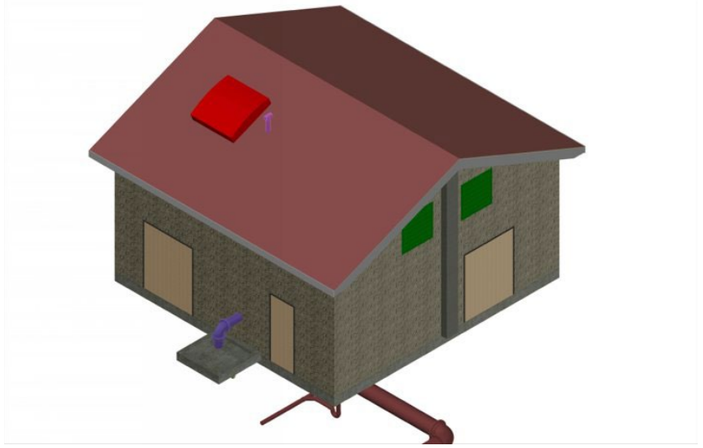
Design Features

- Greenfield
- Residential neighborhood
- Design to match existing Cascade Well No. 5

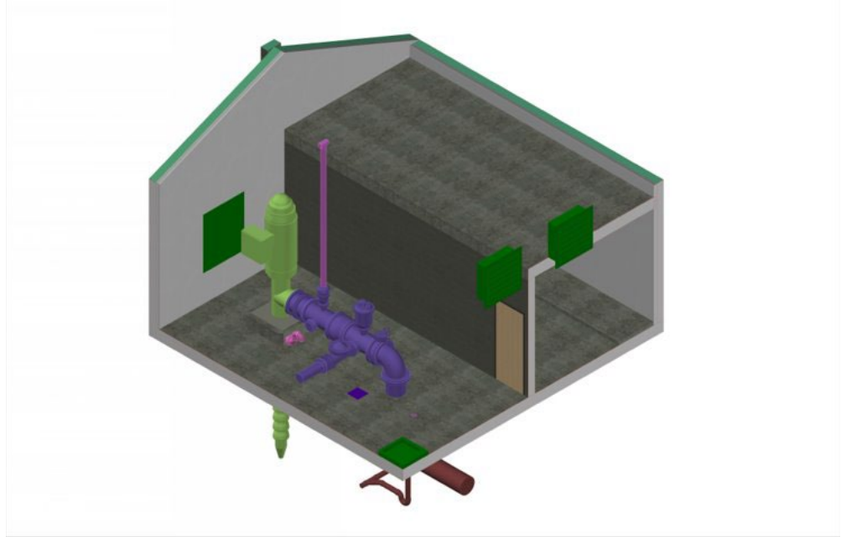
Package 1 – Well 7

Design Features





- 4,000 GPM
- 900 HP VT Pump
- 1 MW Standby Generator



Package 1

Integration with Other Project Packages

Design and Construction while Program Planning Advances…

Exploratory Well Drilling

Theoretical versus Actual Well Capacities

Transmission Main Routing

Future WTP Design On-site

Maintaining Existing Operations

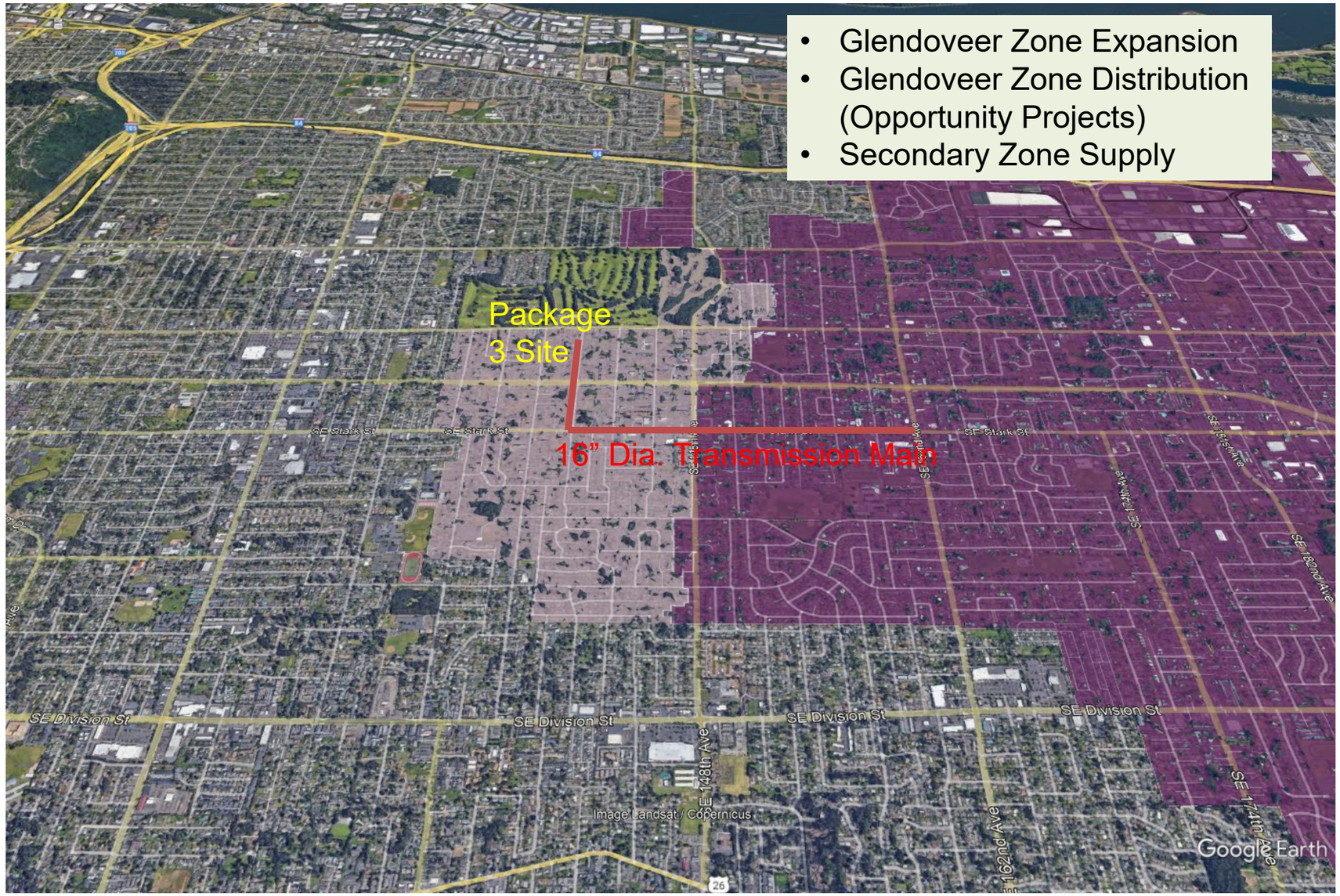
Package 1

Potential Challenge – Utility Undergrounding

Package 1 *(Cont.)*

Lessons Learned – Balancing Opportunity Projects with Program Funding... What happens to your annual CIP budget when you fund a major program of work

Status of Other Packages



Package 2A

Glendoveer Zone Transmission

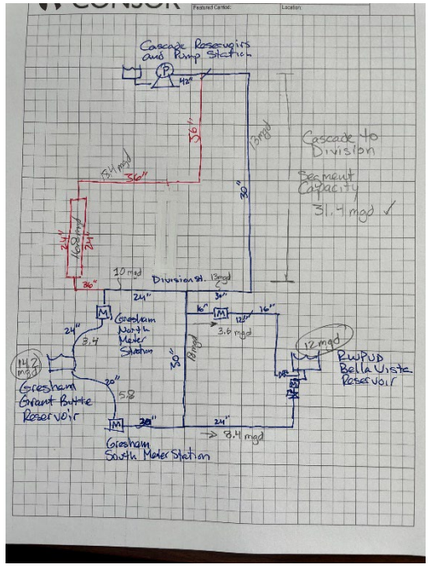
Status of Other Packages

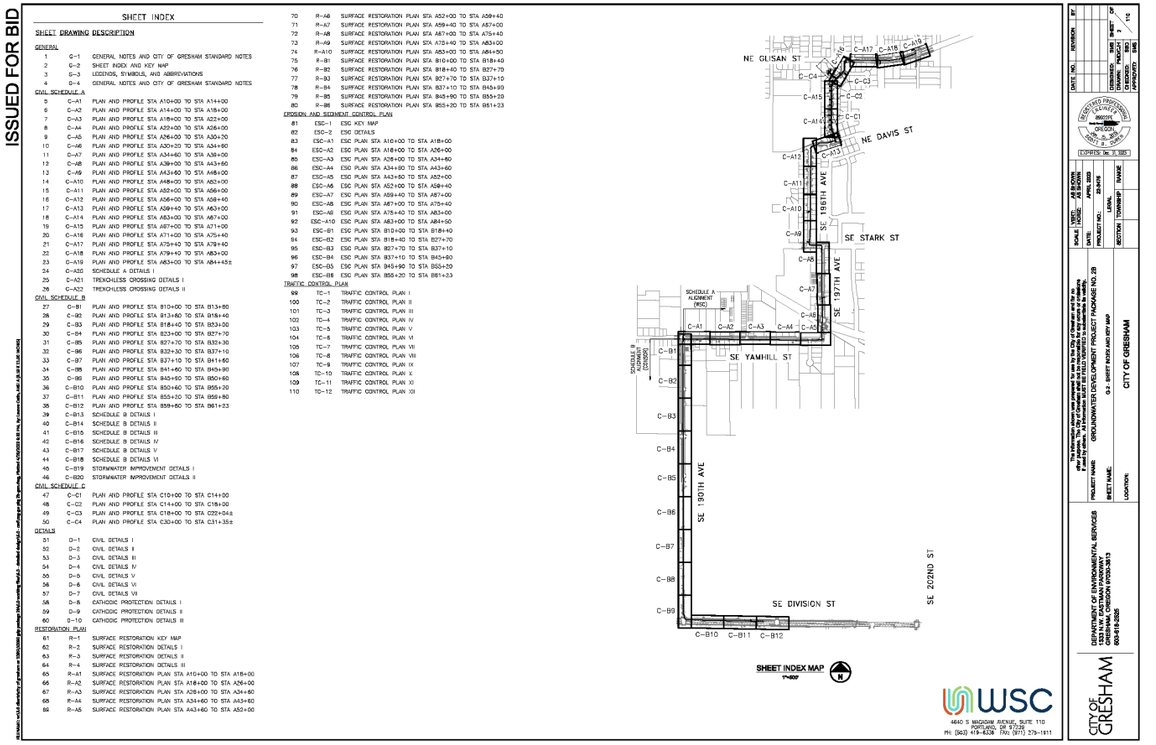
Package 2B

Finished Water Transmission

- 7,400 LF x 36-inch DI
- 5,100 LF x 24-inch DI

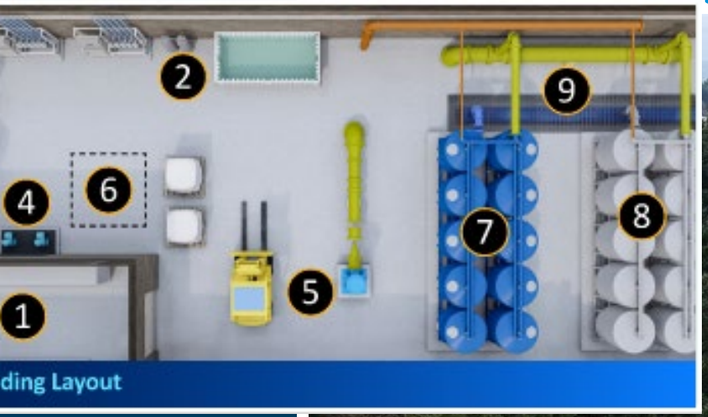
- 1,300 LF RW Distribution

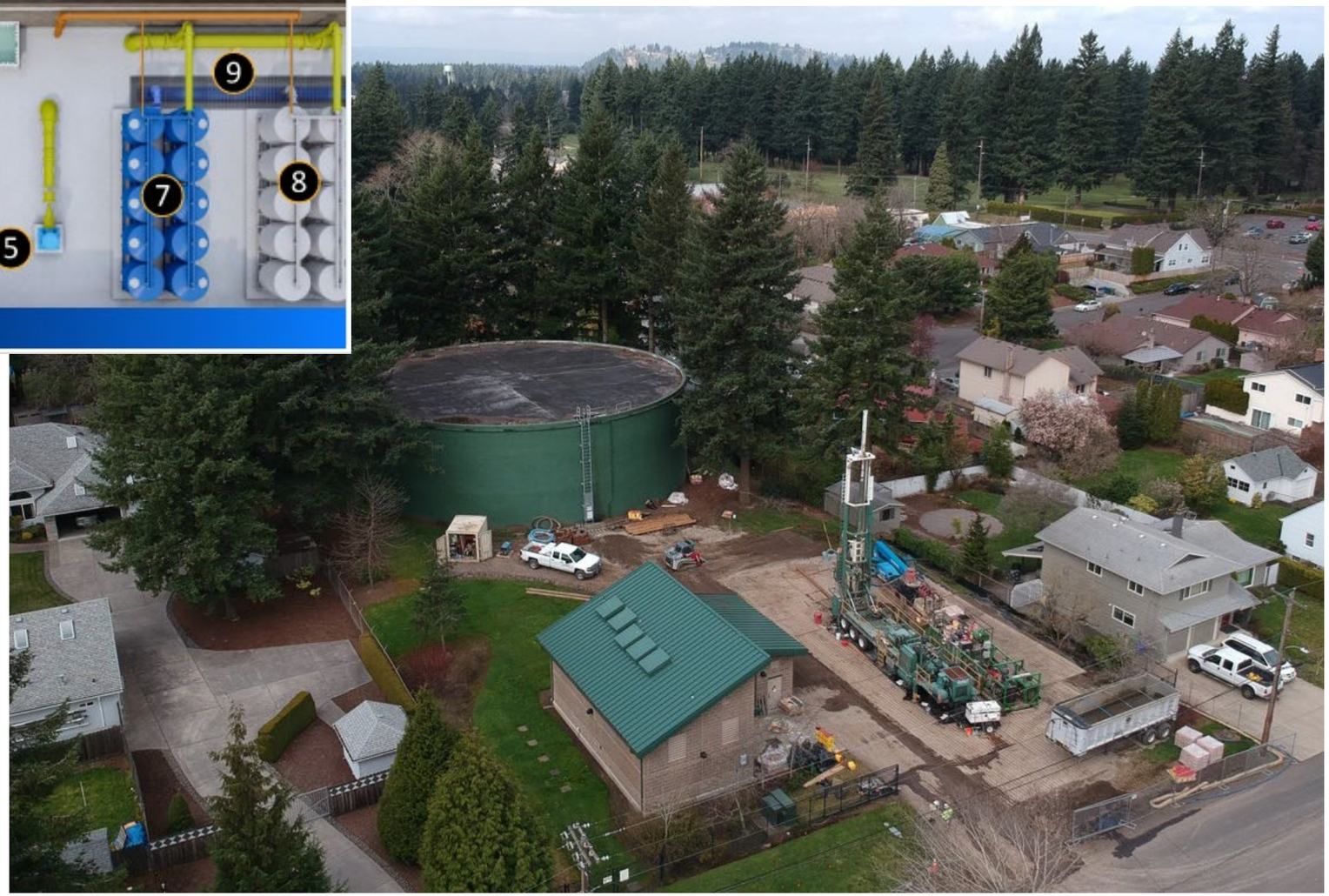




Status of Other Packages *(Cont.)*

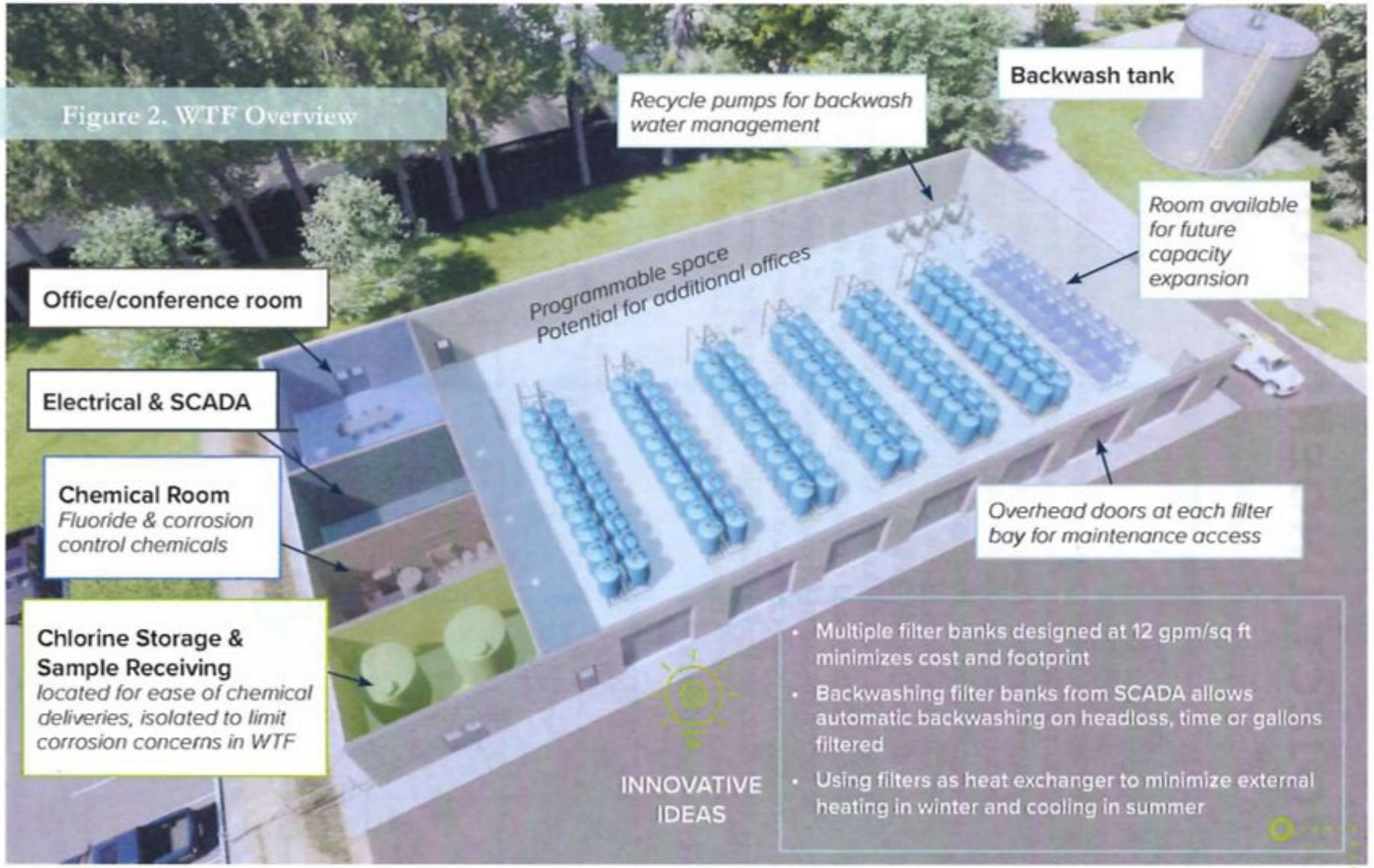
Package 3 - 141st Avenue Site (Rockwood)





1. Reservoir
2. Pump Station
3. Phase 1 - Laydown for Reservoir Rehab
   Phase 2 - Water Treatment Facility Construction
4. Backwash Tank
5. Proposed Stormwater Facility
6. Proposed Energy Gate

Status of Other Packages *(Cont.)*

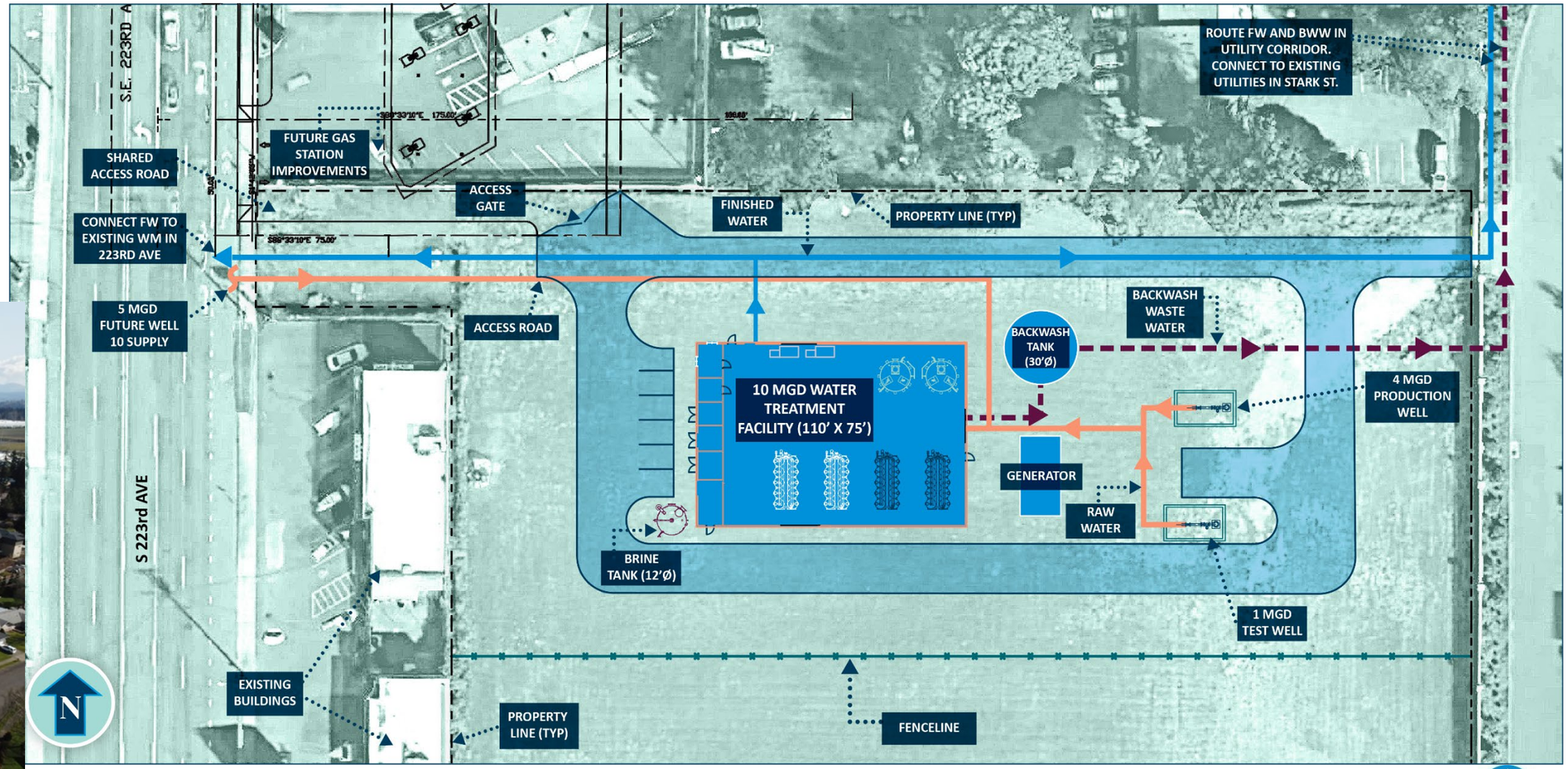


Package 4

Cascade Treatment Facility

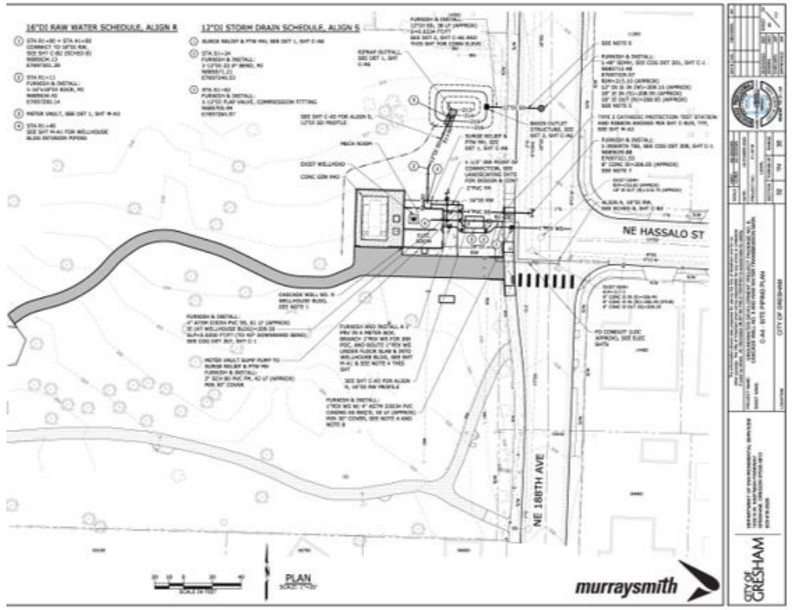
Status of Other Packages *(Cont.)*

Package 5 – CW6 and Water Treatment Facility



Status of Other Packages *(Cont.)*

Package 6



- Well house and associated facilities
- 1,100 LF x 30-inch DI
- 1,400 LF x 18-inch DI

- 825 LF RW Distribution

Status of Other Packages *(Cont.)*

Package 7

Well 10

North Gresham Elementary

Status of Other Packages *(Cont.)*

Package 8

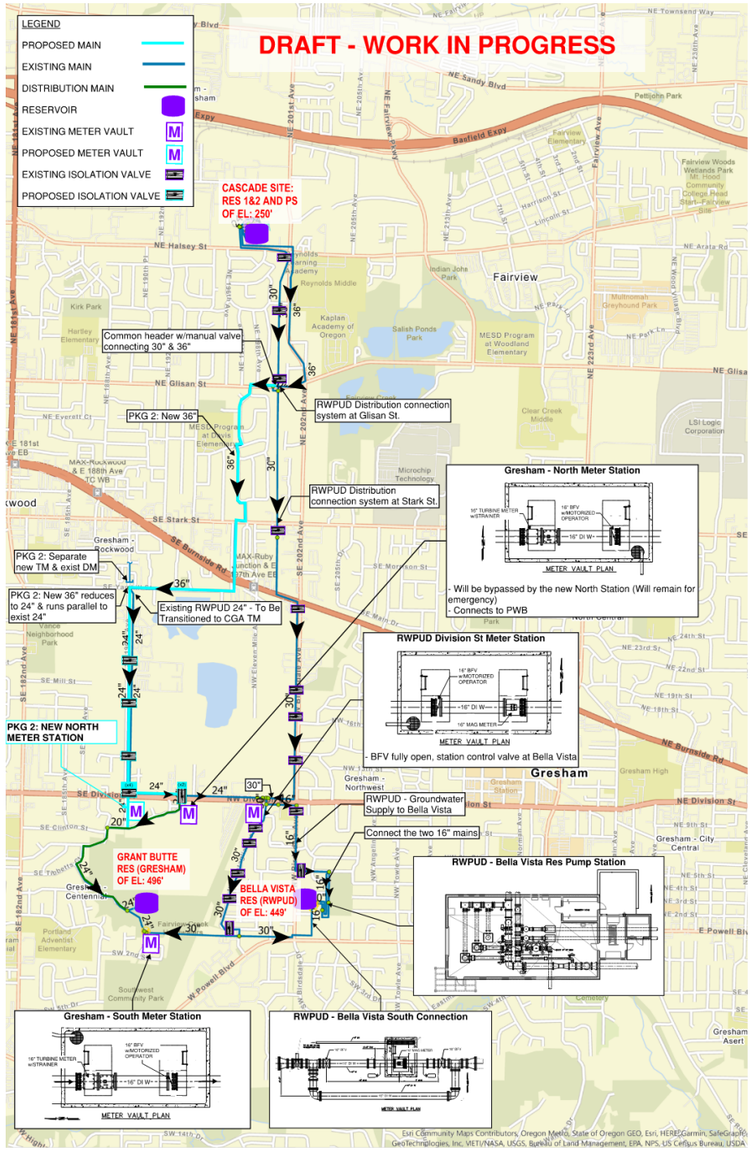
North Meter Station (Gresham)

Status of Other Packages *(Cont.)*

Package 9

Columbia South Shore Service Area

Changes in Operations



New Primary Source Reliability

Water Quality Changes

Free Chlorine

Lead and Copper Rule Compliance

Flushing Program

Seasonal Operations Management

Emergency Supply Strategy

Summary

- Additional groundwater development of the SGA will meet all water needs for Rockwood and Gresham
- Use of the SGA is sustainable for the volumes required
- There is influence among the users, so well siting is critical
- Water affordability goals are met by investment in groundwater
- Water quality goals are met by installing treatment for Manganese and Iron

CASCADE
GROUNDWATER ALLIANCE
GRESHAM • ROCKWOOD

CITY OF
GRESHAM

Rockwood Water
People's Utility District

Questions?