



Examples from the Cascade Groundwater Alliance Project

# Transmission Main 101

AWWA-PNWS May 8<sup>th</sup>, 2025

# Agenda

1

Introduction

2

Planning

3

Design

4

Construction

5

Questions?



# CASCADE

GROUNDWATER ALLIANCE

GRESHAM • ROCKWOOD

- Formed in 2020 by Gresham City Council and Rockwood Water
- Historic partnership to build and operate an independent, safe, and reliable water system
- Signed IGA for design, construction, and O&M of existing and future groundwater infrastructure
- Local ownership and control of groundwater system
- More cost-effective



# By the Numbers



**1**

Water storage  
tank  
rehabilitation



**2**

New  
water tanks



**3**

Groundwater  
treatment  
plants



**5**

Wells



**10**

Miles of  
large diameter  
water pipe





**CASCADE**  
GROUNDWATER ALLIANCE  
GRESHAM • ROCKWOOD

COLUMBIA RIVER



## GROUNDWATER SYSTEM IMPROVEMENTS

### Groundwater Projects

- 1 Cascade Reservoirs 1 & 2 and Well 7
- 2 Water Transmission Pipes
- 3 Cascade Well 8, Reservoir and Treatment Facility
- 4 Cascade Water Treatment Facility and Pump Station
- 6 Cascade Well 6 and Treatment Facility
- 6 Cascade Well 9
- 7 Cascade Well 10 and Water Transmission Pipe
- 8 Water System Meter Connection
- 9 Water System Meter Connection

### Legend

- Rockwood Water Service Area
- Gresham Service Area
- R Reservoir
- WT Water Treatment Facility
- GW Groundwater Well
- M Meter Connection
- PS Pump Station
- Water Transmission Pipe



# Transmission vs Distribution – How are they different?

Transmission	Distribution
Convey water over longer distances	Deliver water to homes and businesses
16-inch diameter or greater	12-inch diameter or less
No direct service connections or hydrants	Services and hydrants directly connected to pipe
Infrequent isolation valves	Isolation valves at every intersection
Require combination air and vacuum relief valves to provide air movement	Air relief valves at high points only
Blow-offs needed for drainage of large water volume during maintenance	Blow-offs not typically included



Key Considerations

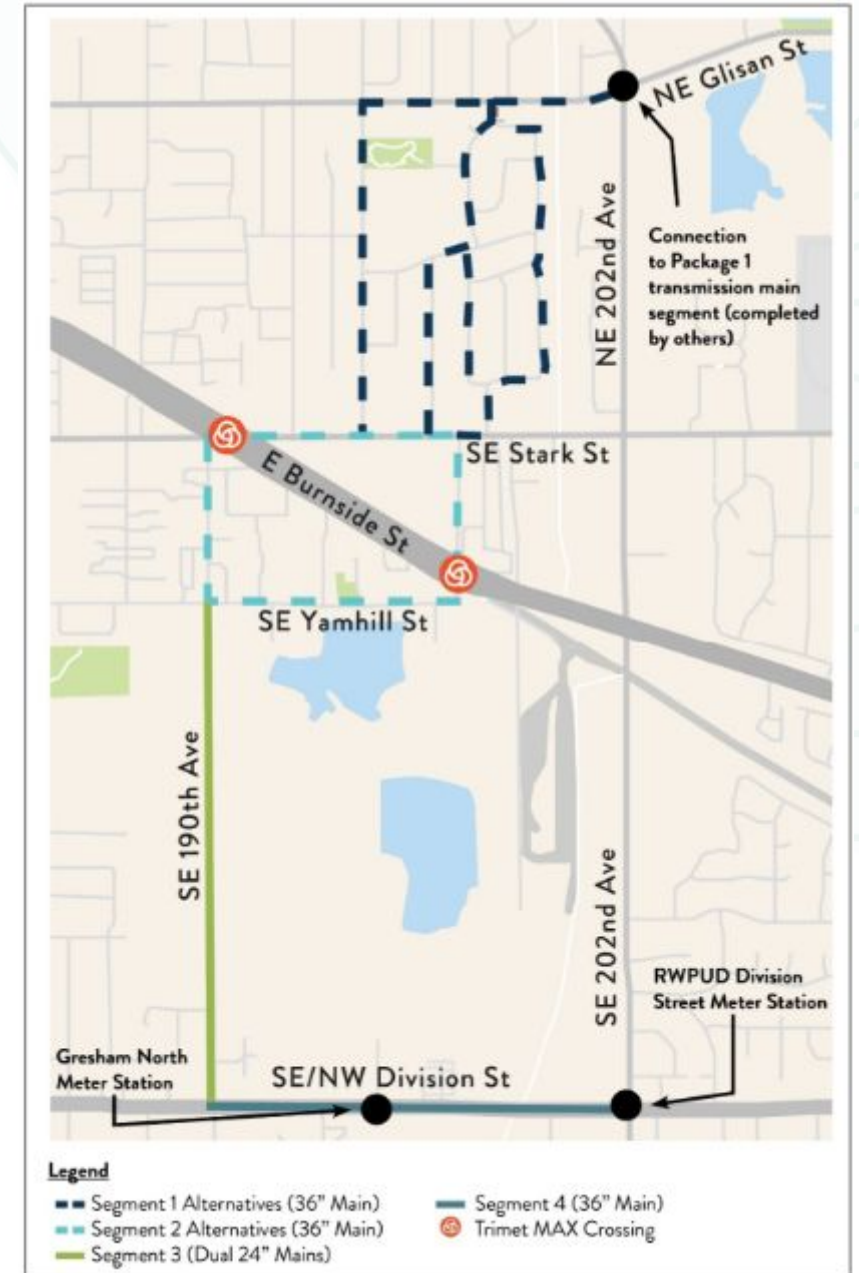
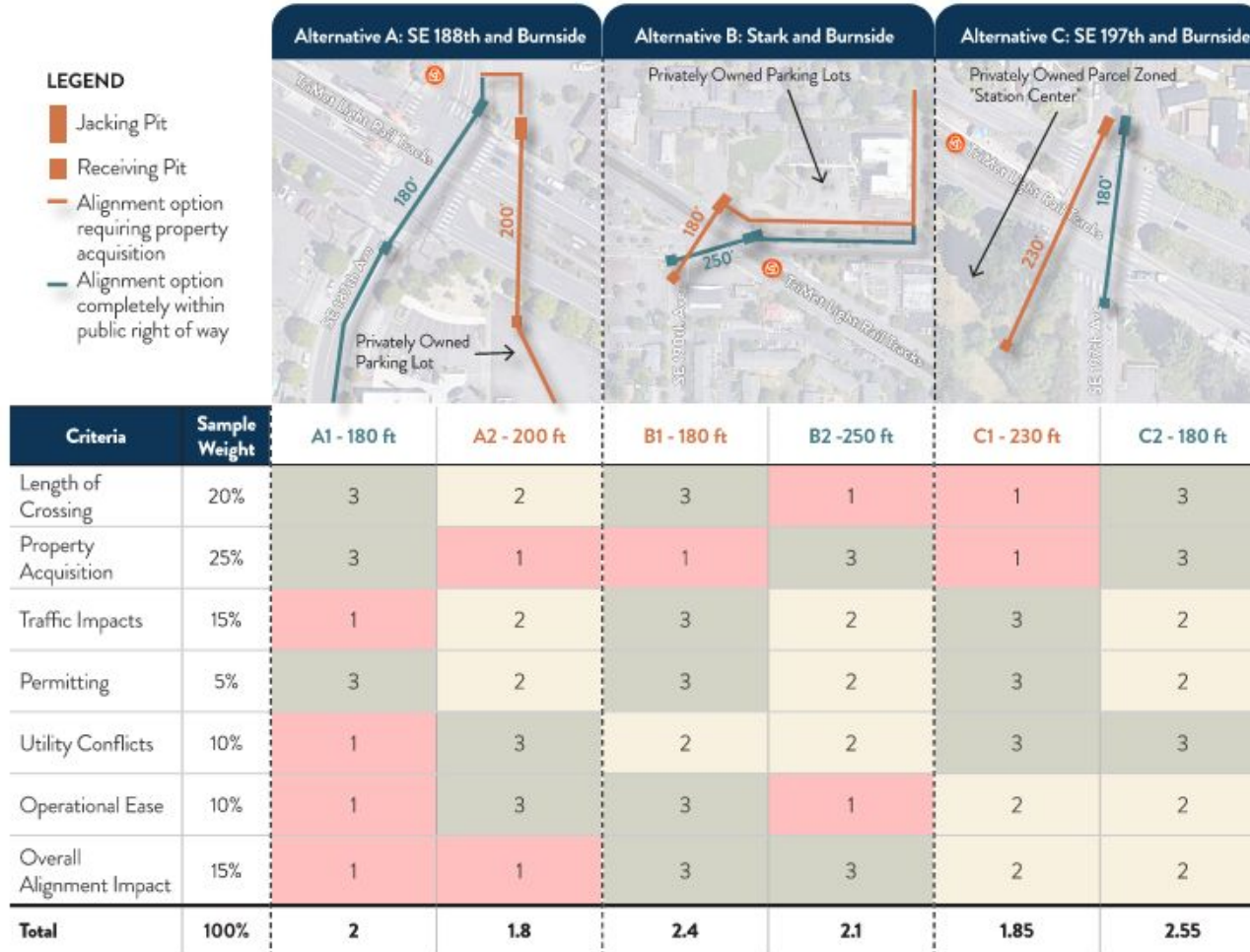
# Transmission Main Planning





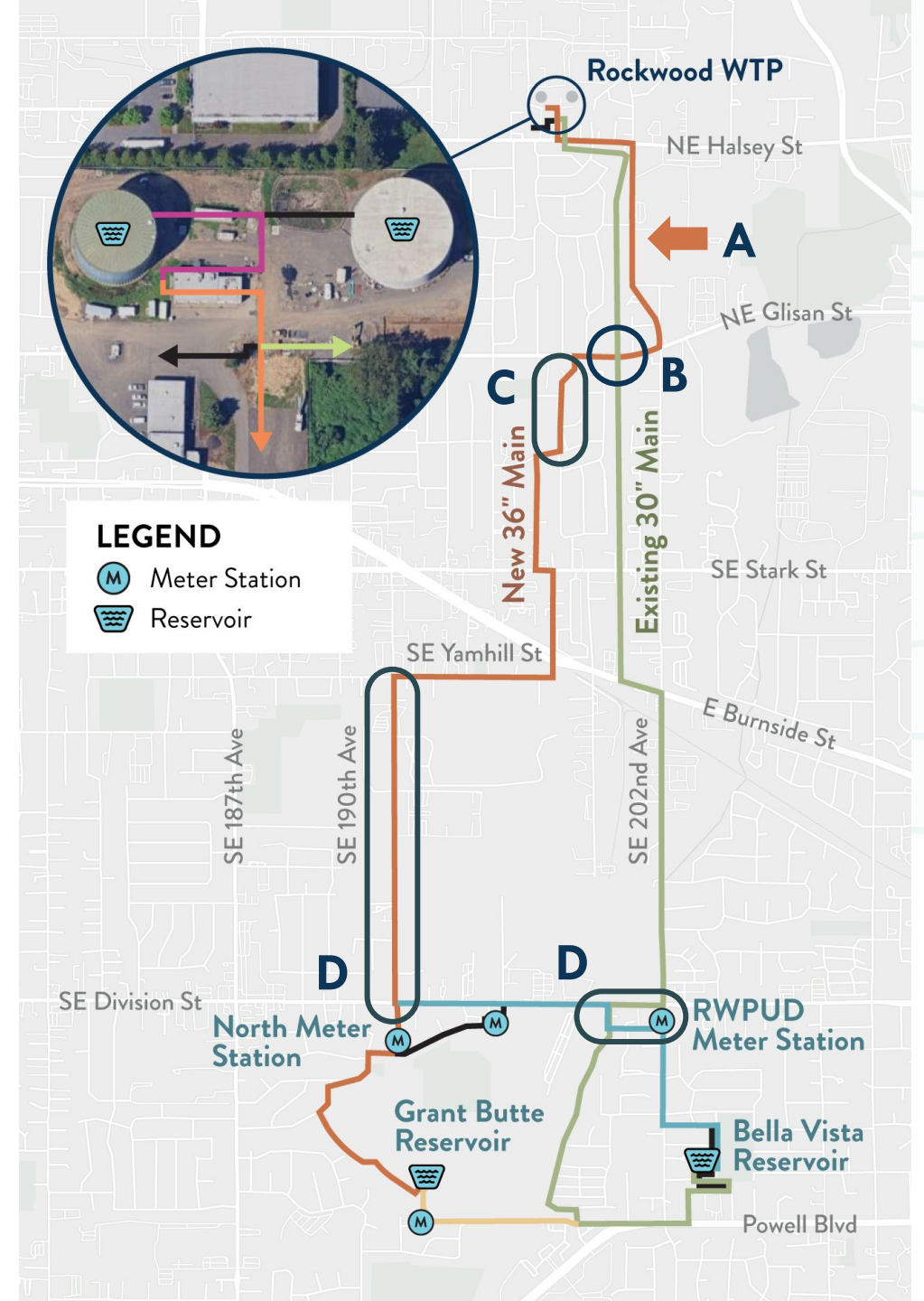
# Alignment Selection

FIGURE 3: TRIMET CROSSING ALTERNATIVES



# Opportunities

- A. Install new fiberoptic communications
- B. Interties with existing transmission main to provide flexibility
- C. Replace old cast iron distribution mains
- D. Use existing infrastructure to reduce costs
  - Existing RWPUD 24-inch transmission main
  - Bella Vista modifications





# Traffic – Arterials vs Residential





Key Considerations

# Design

WASC



# Utility Conflicts – Pipe Depth vs Sewer

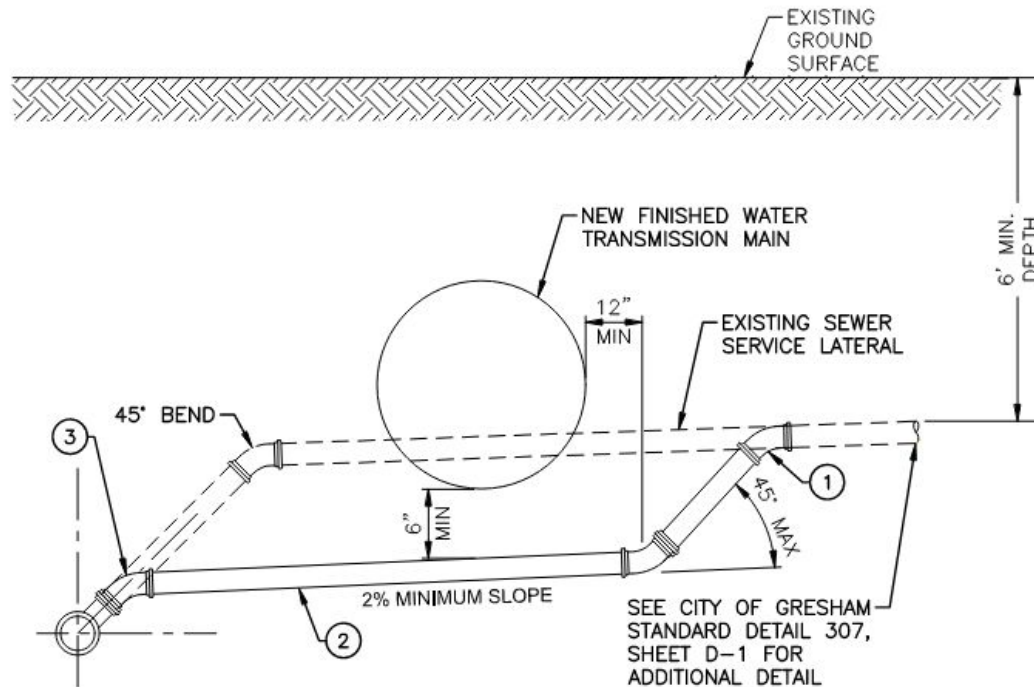


TABLE 1

STATION	SEWER LATERAL PIPE MATERIAL
A10+00 TO A62+00	ASTM D3034 SDR-35 PVC
A62+00 TO A74+00	ASTM D3034 SDR-35 PVC
A74+00 TO A84+50	ASTM D3034 SDR-35 PVC

## KEY NOTES

- 1 CUT EXISTING SEWER LATERAL UPSTREAM OF TRANSMISSION MAIN CROSSING AND CONNECT NEW PIPING WITH 45 DEGREE BEND.
- 2 INSTALL NEW SANITARY SEWER LATERAL PIPING PER TABLE 1, THIS SHEET, TO CROSS BELOW NEW TRANSMISSION MAIN. PROVIDE VERTICAL CLEARANCE AS SPECIFIED BY THE DRAWING.
- 3 CUT EXISTING SEWER LATERAL UPSTREAM OF THE SEWER MAIN CONNECTION AND CONNECT TO NEW SANITARY SEWER LATERAL PIPING.
- 4 PERFORM HYDROSTATIC PRESSURE TEST AND PLACE NEW SERVICE LATERAL INTO SERVICE.

## GENERAL NOTES:

1. EACH SEWER LATERAL SHALL BE POTHOLED AND POSITIVELY LOCATED TO CONFIRM A CONFLICT WITH PROPOSED TRANSMISSION MAIN EXISTS BEFORE MAKING ANY MODIFICATIONS.
2. COORDINATE WITH CITY OF GRESHAM TO NOTIFY HOMEOWNERS A MINIMUM OF 72 HOURS PRIOR TO OUTAGE OF SEWER LATERAL.
3. ALL WORK SHALL BE COORDINATED SUCH THAT NO HOMEOWNER EXPERIENCES A SEWER OUTAGE OF MORE THAN 8 HOURS.

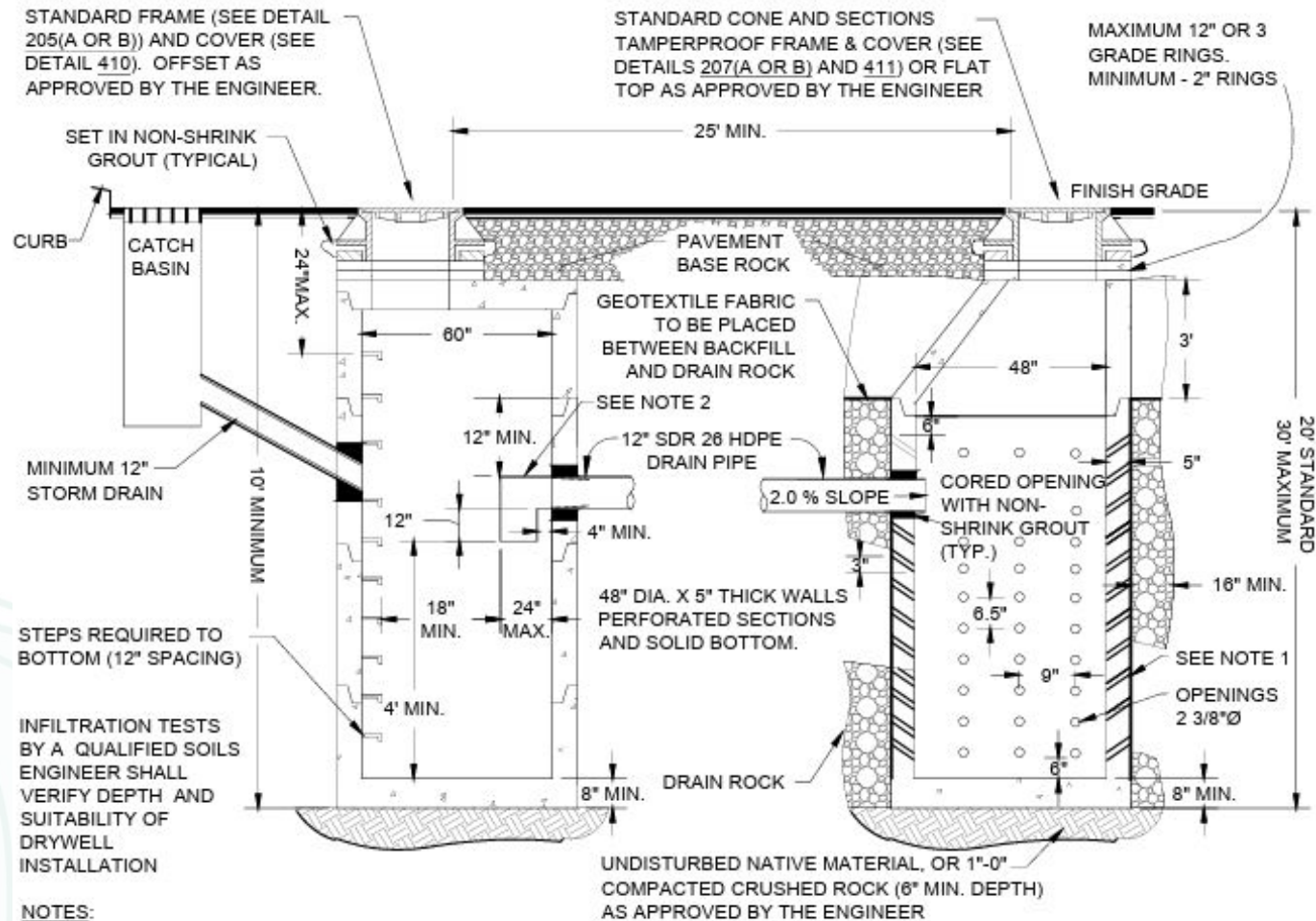


# Utility Conflicts – Locates & Relocates





# Utility Conflicts – Drywells

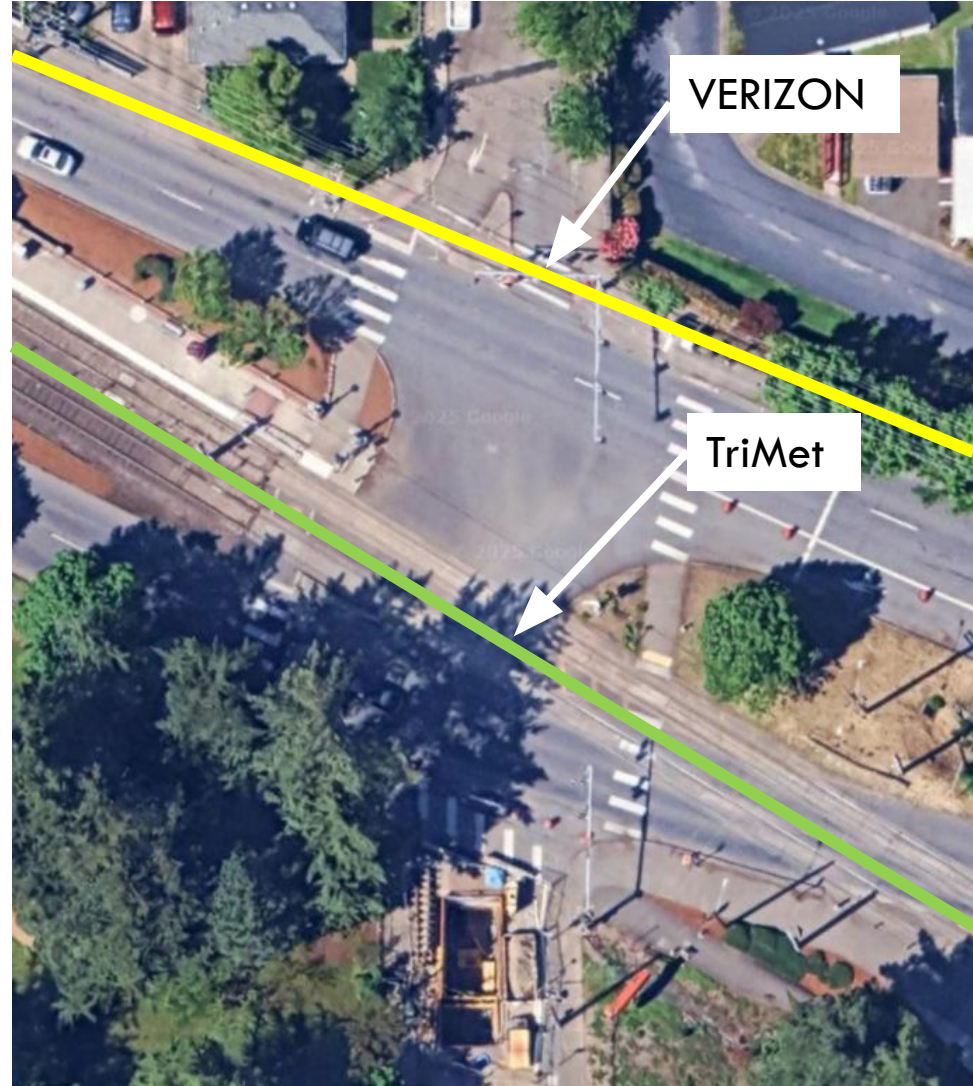


## NOTES:

- ① HDPE WRAP AROUND THE OUTSIDE OF THE PERFORATED SECTIONS SHALL BE ADDED IF THE DRAIN ROCK IS SMALLER THAN 2"-4".
- ② 12" FABRICATED SOLID WALL HDPE 90° SHORT RADIUS ELBOW PER ASTM D1248 SDR 26. SLIGHT TAPER ON OUTLET PIPE BY MANUFACTURER TO MAKE WATERTIGHT CONNECTION BY SLIPPING INTO OUTLET PIPE. ELBOW SHALL BE ANCHORED TO MANHOLE WALL WITH STAINLESS STEEL BANDS AND 1/2" STAINLESS STEEL BOLT.
- ③ ALL PIPE TO SEDIMENTATION MANHOLE & PRECAST DRYWELL SHALL HAVE CLASS "B" BEDDING & PIPE ZONE MATERIAL.



# Utility Surprises





# Pipe Selection





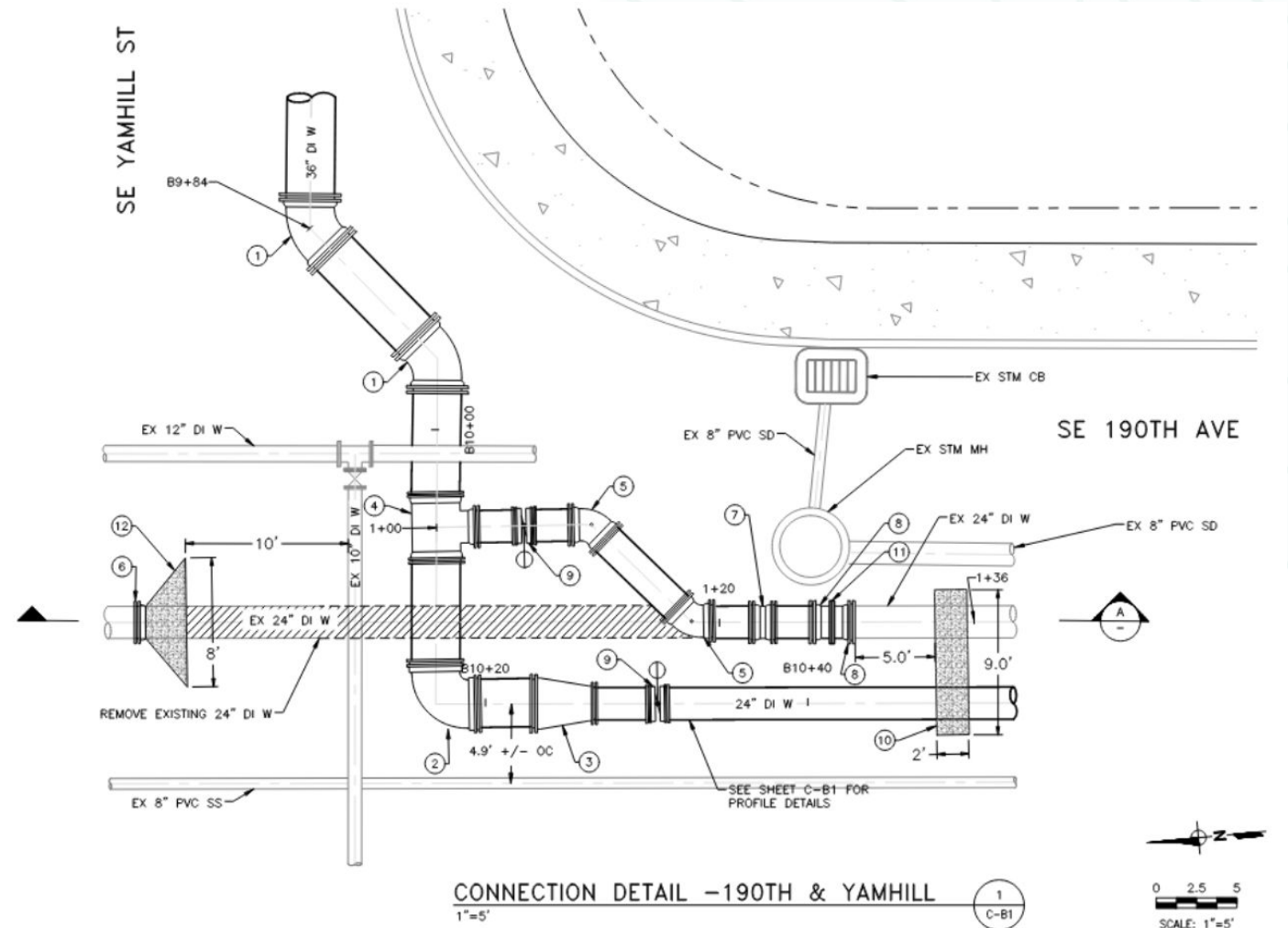
# Gauged Pipe – Design vs Construction



Image source: [mcwaneductile.com](http://mcwaneductile.com)

# Limited space in the existing corridor

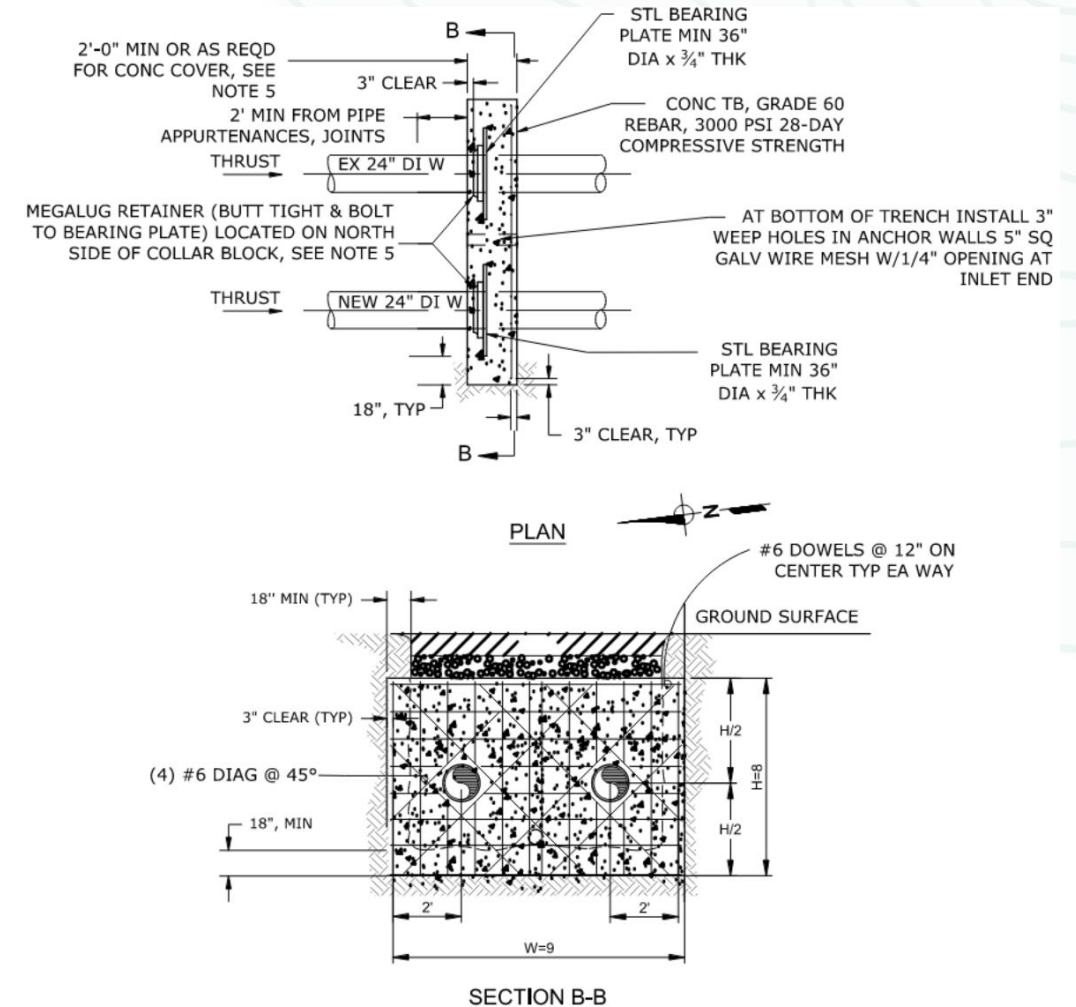
- “No” room for 36” pipe in 190<sup>th</sup> Ave.
- Repurpose existing 24” Main
- Storm, water, sewer, gas + new water and new fiber
- Fit new 24” main between existing main and sewer





# Using Existing Pipes

- Reusing existing pipe was a good idea
- It did require additional design considerations
- Managing thrust
- Existing pipe isn't restrained joint pipe



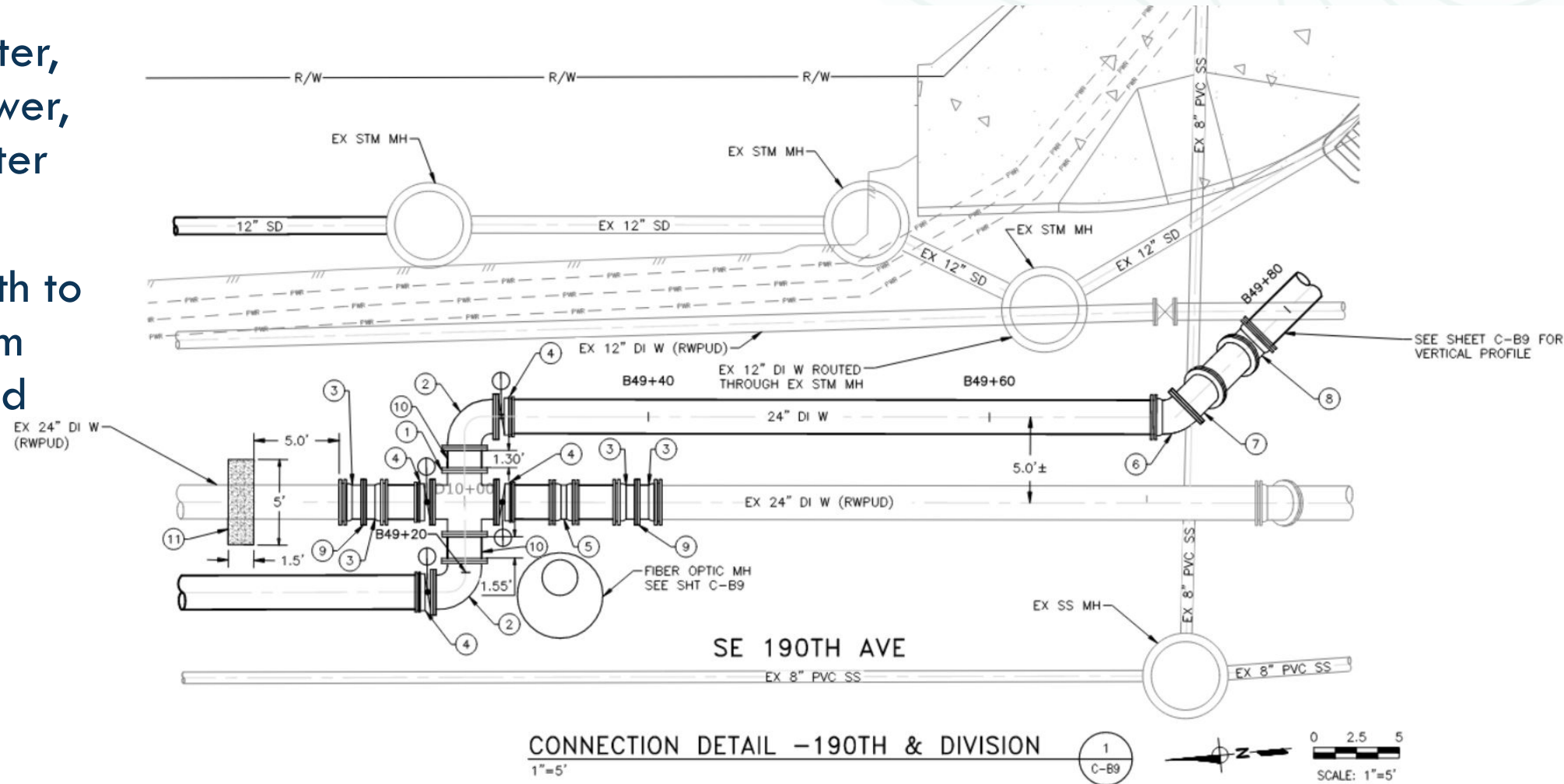
CONCRETE ANCHOR WALL FOR WATER LINES

SCALE: NTS



# The Other End of 190th

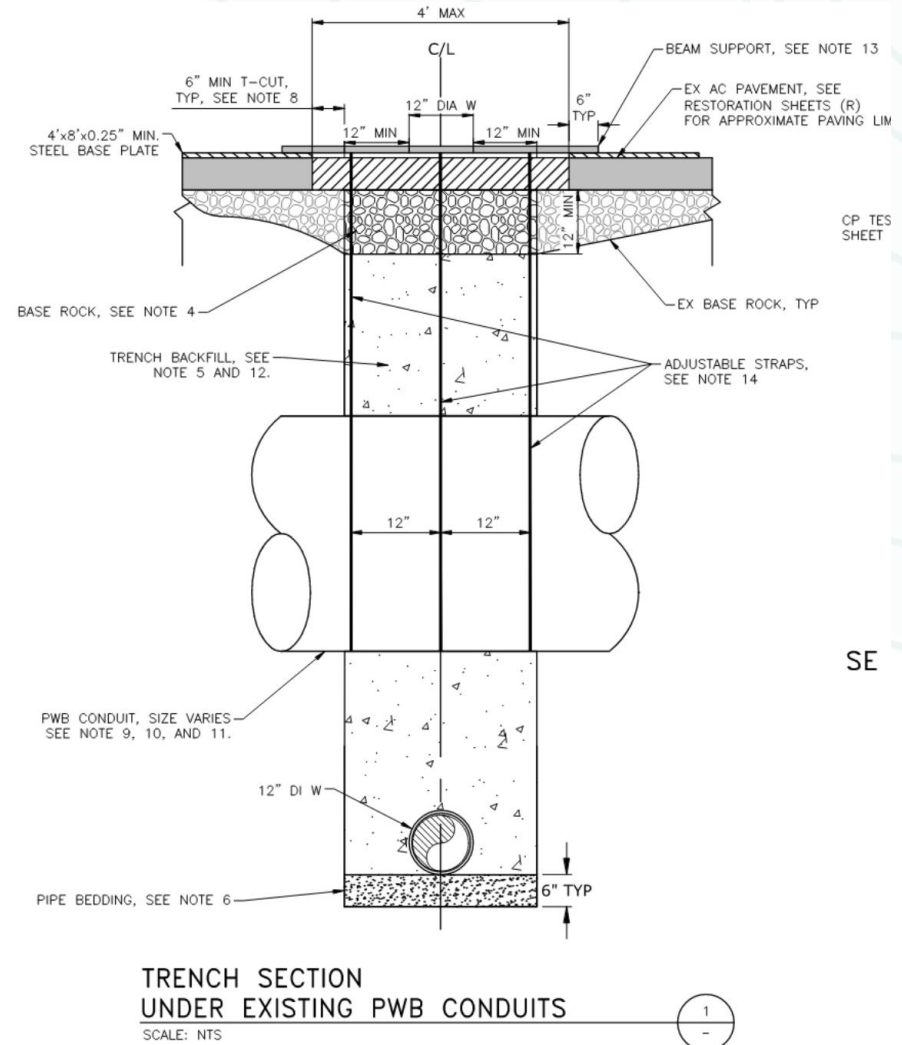
- Storm, 24" water, 12" water, sewer, gas + new water and new fiber
- Split to go north to a new Gresham Meter vault and east to serve RWPUD and Gresham





# Crossing Critical Infrastructure

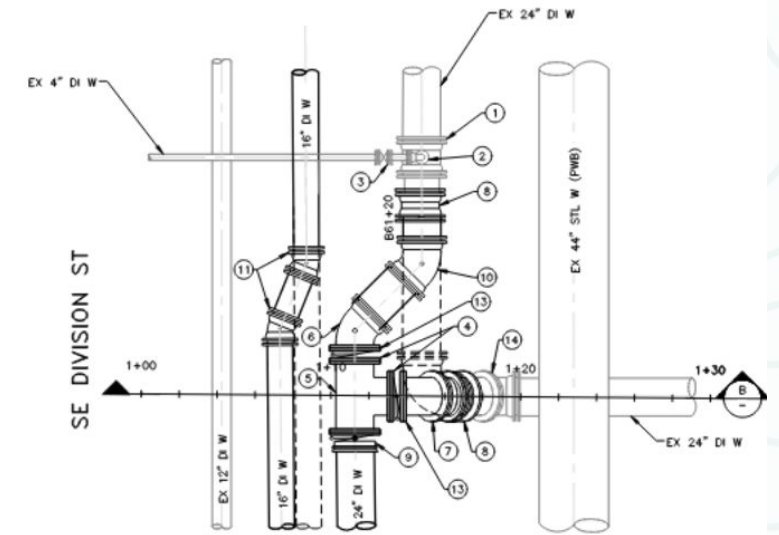
- Constructed a new 12" water distribution under the City of Portland's 44" and 56" supply conduits.
- Required Utility Protection Plan
- Supported the Conduits while constructing under them.
- Monitored movement during construction.



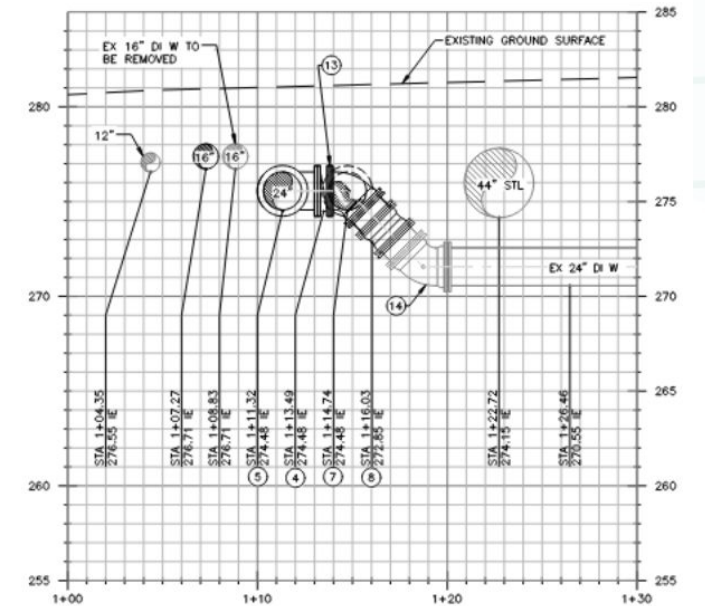


# More complicated connections

- We connected to two existing pipes that cross under Portland's conduits.
- Complex 3D geometry to make sure fittings worked
- Really tight construction – existing 12", 16", 44", 56", and 24" water in the roadway
- Moved the 16" "out of the way"



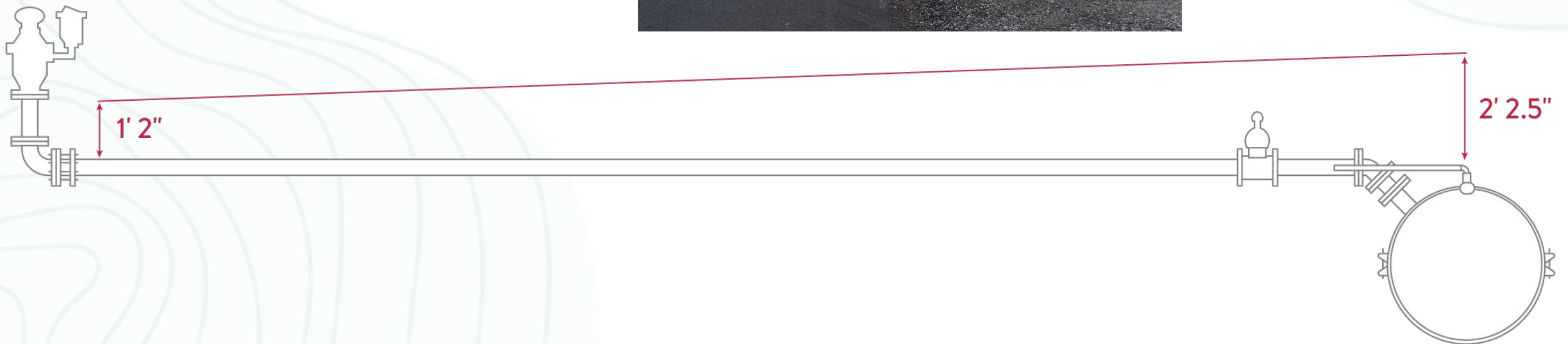
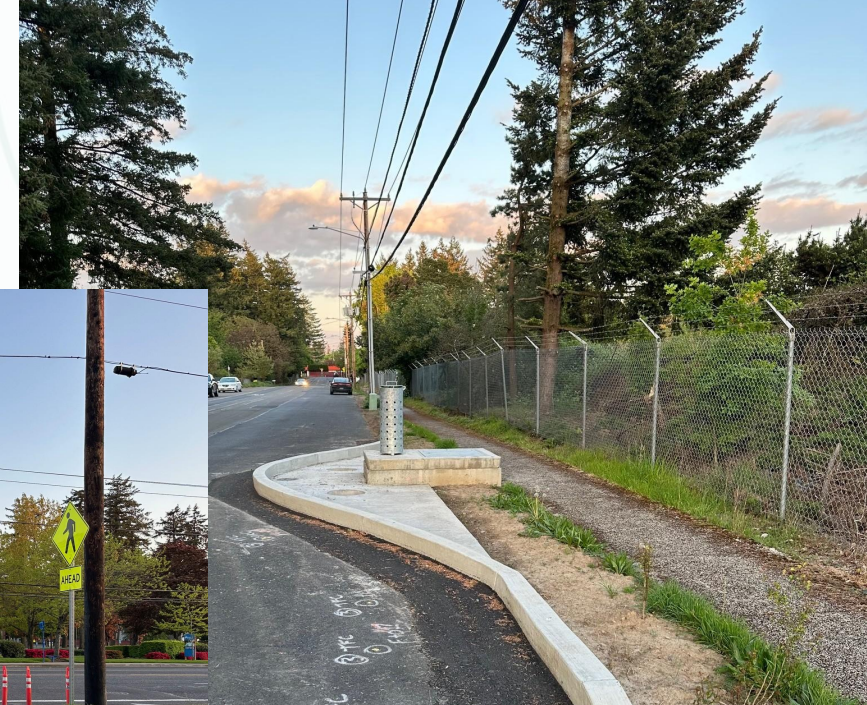
CONNECTION DETAIL – DIVISION 24" CROSSING  
1"=4' (2) C-812



SECTION DETAIL – DIVISION 24" CROSSING  
1"=4' (B)



# Locations of CARVs





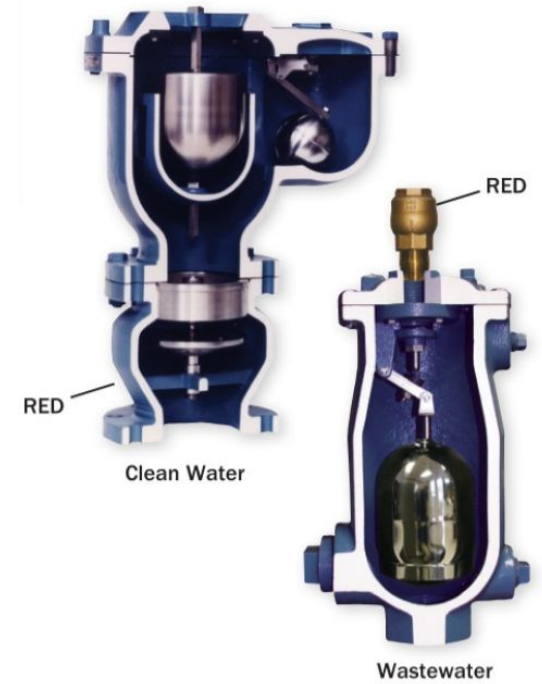
# Construction

Additional Information Here





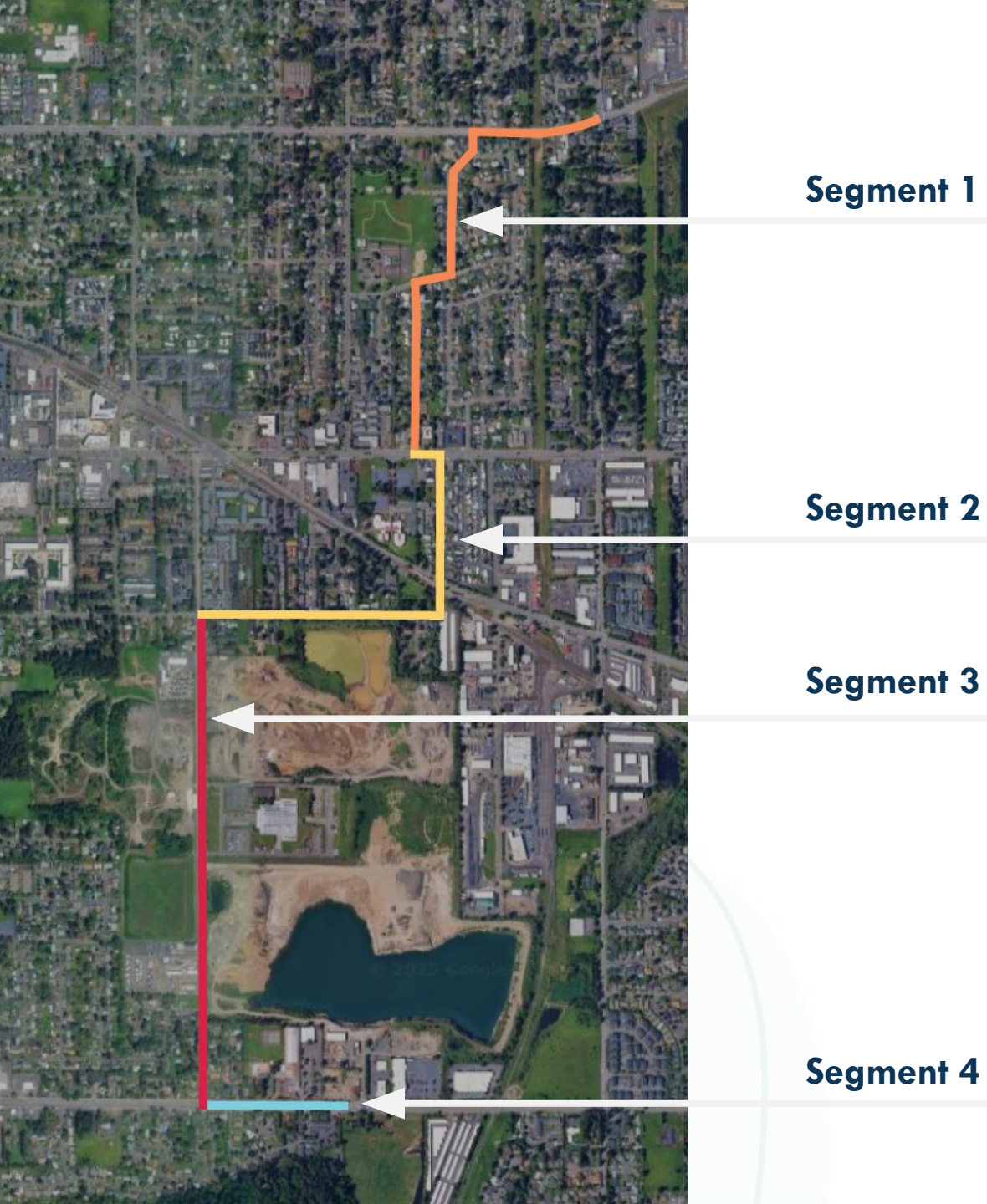
# Long Lead Time Items





# Sequencing Considerations

- Set maximum testing lengths to reduce risk
- Seasonal constraints for filling/draining pipe
- Road restoration relative to testing sequence



# Filling, Flushing, and Testing

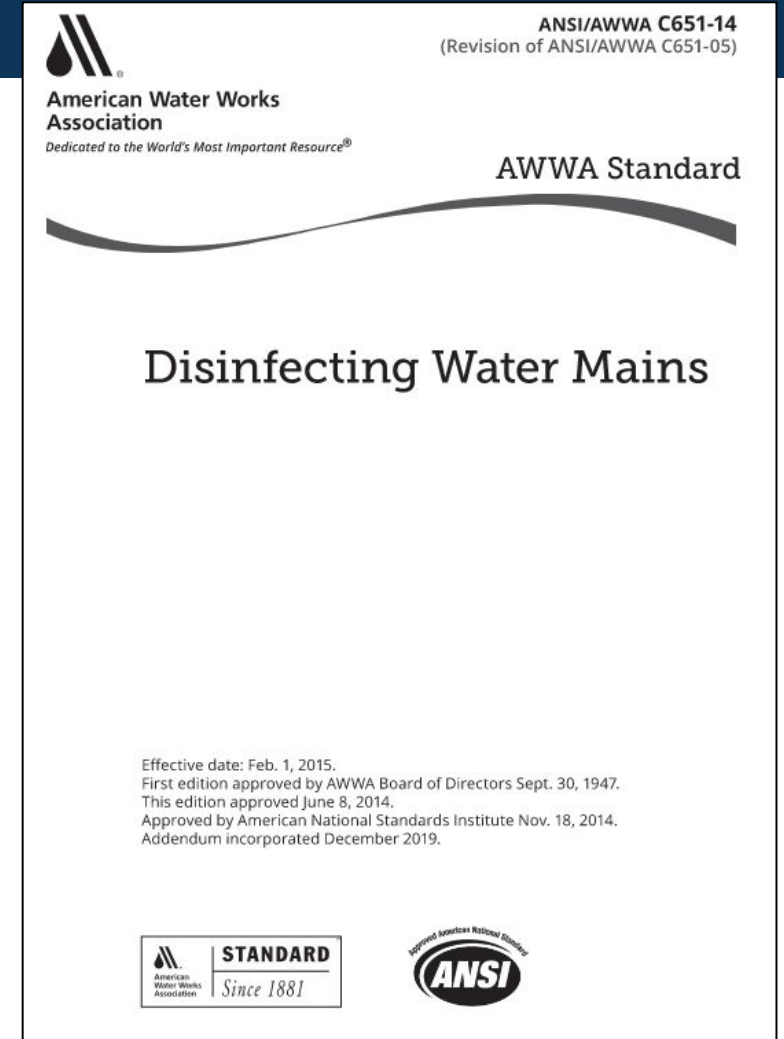
## AWWA C561

- Flushing at 3 fps is often not possible
- Turnover complete volume 2-3 times
- Limitations for dichlorination and disposal of water

## Bac-T testing frequency and timing

- Samples required every 1,200 feet
- Sample at end of line
- Sample at each branch greater than one pipe length

## Design Expectations vs Construction Realities





# Tracking Down Leaks





# Key Takeaways



- Utility research is best way to mitigate risk
- Document sequencing plan constraints
- Plan for larger pavement restoration extents



# Questions?





WISC