Willamette Water Supply
Our Reliable Water

Steel Resolve:
Installing Pipe Through Streams, Streets, and Sensitive Spaces

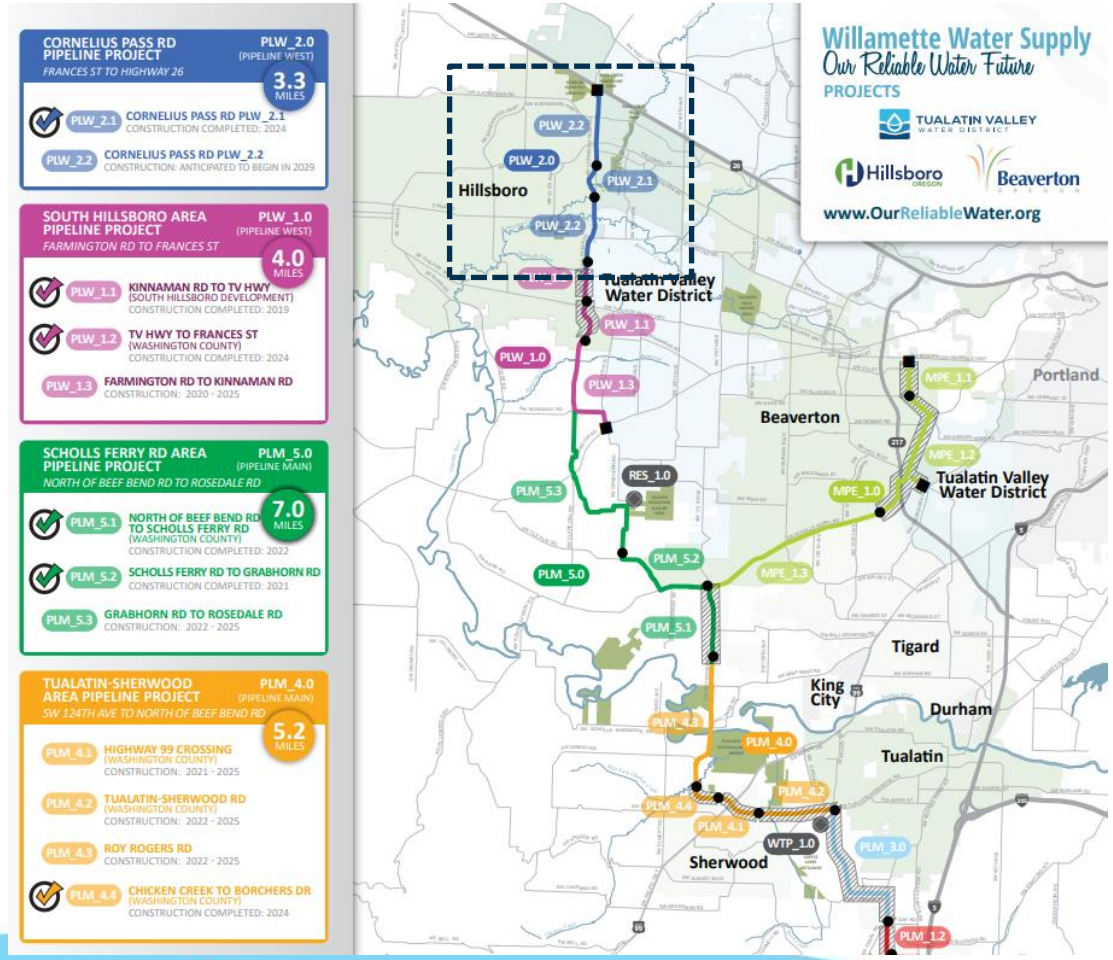
Presenters: Joelle Bennett, Water Supply Director
Erika Murphy, Project Manager

May 6, 2026

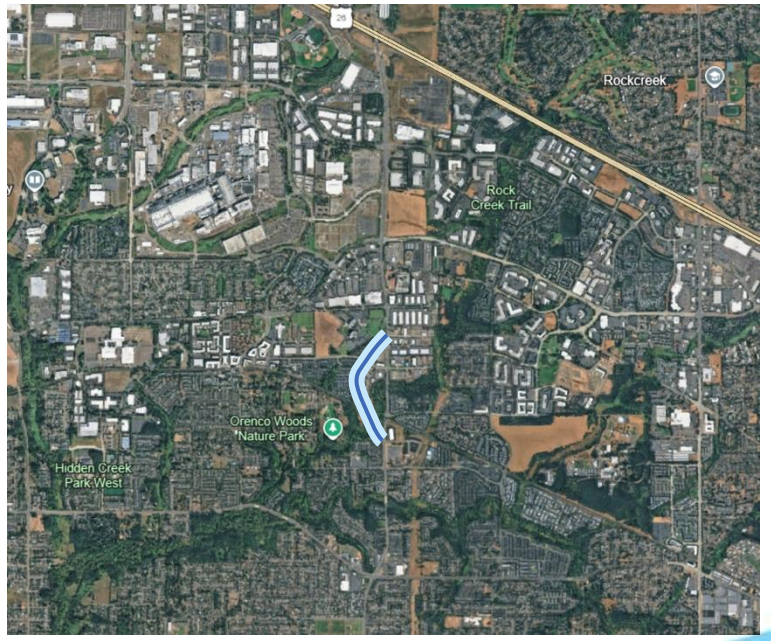
Thank you to the Team!

Role	Agency/Company
Owners	TVWD, Hillsboro, Beaverton
Program Managers	Carollo, Stantec
Design Engineer	Kennedy Jenks
Construction Contractor	Moore Excavation, Inc. (MEI)
Construction Management & Inspection	Carollo, Stantec
Construction Safety	Everyone
Communications/Outreach	Consor Engineers
Environmental Compliance Lead	David Evans and Associates (DEA)

Willamette Water Supply's PLW_2.1 Project







Project Constraints

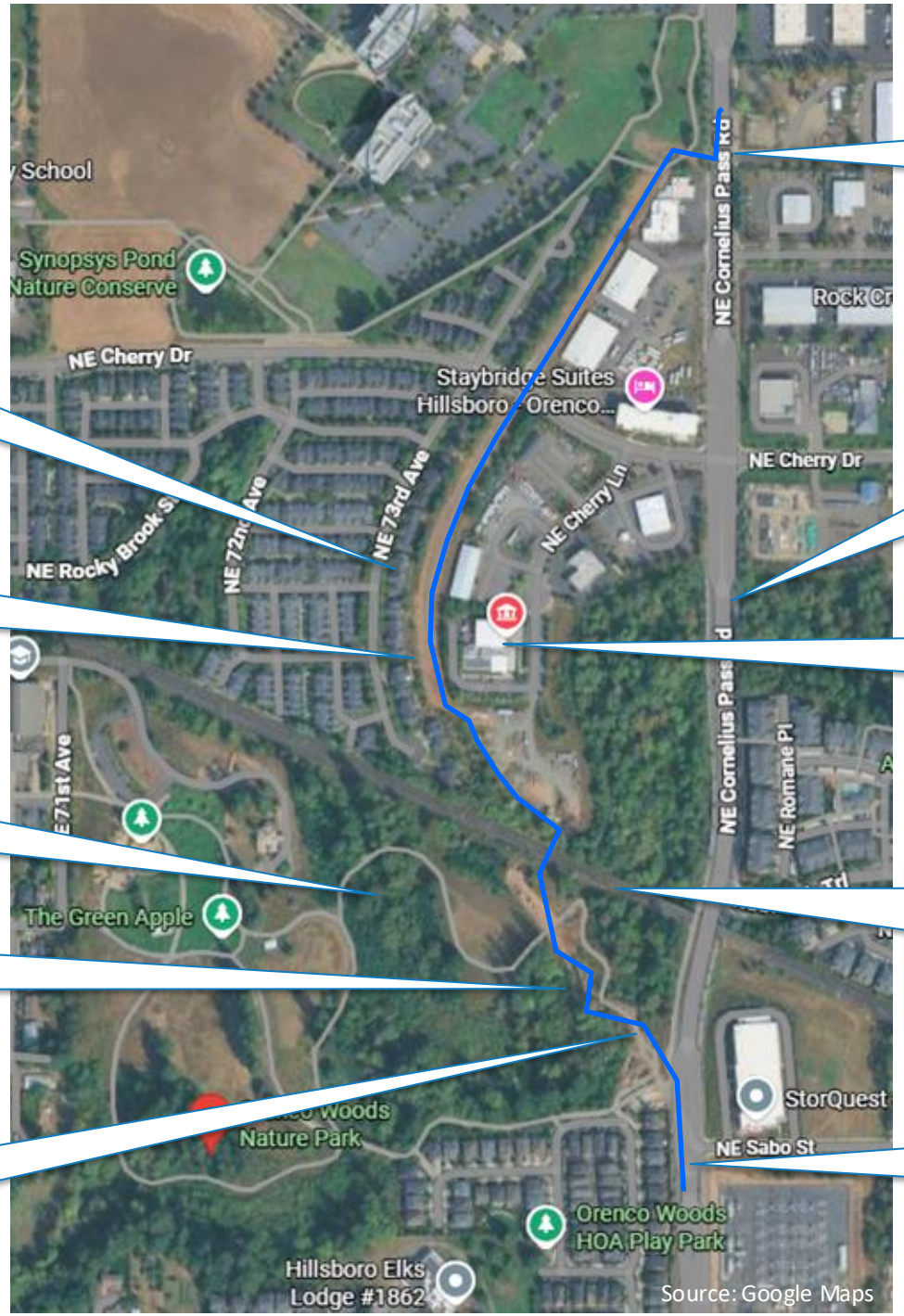
Many Pipeline Neighbors

Former Rail Berm

Orenco Woods Nature Park

Sewer Alignment

Popular Trail



Cornelius Pass Road (arterial)

Rock Creek / Bridge

Fire Station

TriMet Light Rail, Overpass, and Power

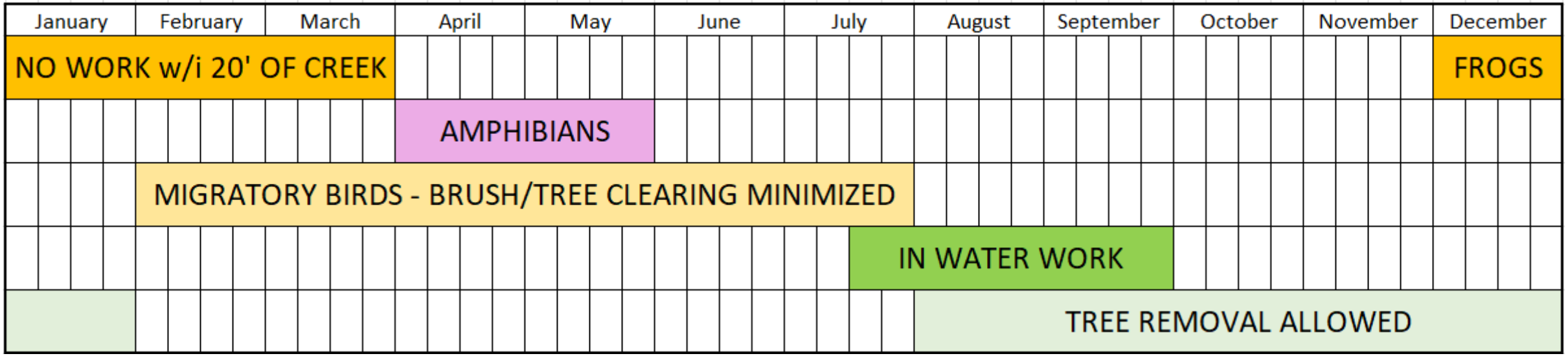
Cornelius Pass Road (arterial)

PLW_2.1 Project Elements

- 3,455 LF of 48-inch welded steel pipeline
- Pipe thickness ranging from 0.375 to 1.0 inch
- Open-cut crossing of Rock Creek and Cherry Drive
- Trenchless crossing of TriMet light rail
- Project begins/ends in Cornelius Pass Road for future expansion

WWSP used Best Value selection for contractor due to proximity of neighbors, open crossing of Rock Creek, sensitive work in OWNP, and TriMet trenchless crossing.

Schedule Constraints



12-month maximum work window in OWNP, including:

- December – March: no work within 20’ of Rock Creek
- April – May: minimize work within 20’ of Rock Creek
- February – August: minimize tree removal and brush clearing
- July 15 – September 30: In-water-work allowed

Bidding and Construction Schedule

- Three Best Value proposers, aligned with Engineer's Estimate
- Awarded to MEI (~$14,700,000)

- Construction Schedule:
  - July 2022 – Limited Notice to Proceed (LNTP) to contractor
  - November 2022 – Notice to Proceed (NTP) to contractor
  - May 2023 – May 2024 – Pipeline construction in OWNP (12 months max)
  - July and August 2024 – Trail Improvements in OWNP
  - September 2024 – Substantial Completion

Changes During Design

- Berm property work area reduced from 95-ft to 70-ft wide to allow for neighbors to use part of berm property as part of License Agreements
- Alignment adjusted for seismic resiliency – perpendicular to TriMet tracks and seismically vulnerable slope
- OWNP settlement agreement requirements, including trail improvements to other parts of park
- Implementation of WWSP-developed Wildlife Protection and Adaptive Management Plan
- Tree donation opportunity at Jackson Bottom Wetlands



Coordinating Responsibility in Streams & Sensitive Spaces

Neighbors: Popular park with lots of interest

David Evans Associates (DEA): Review, implement & monitoring Wildlife Plan

Hillsboro Planning: Land use oversight, review Wildlife Plan

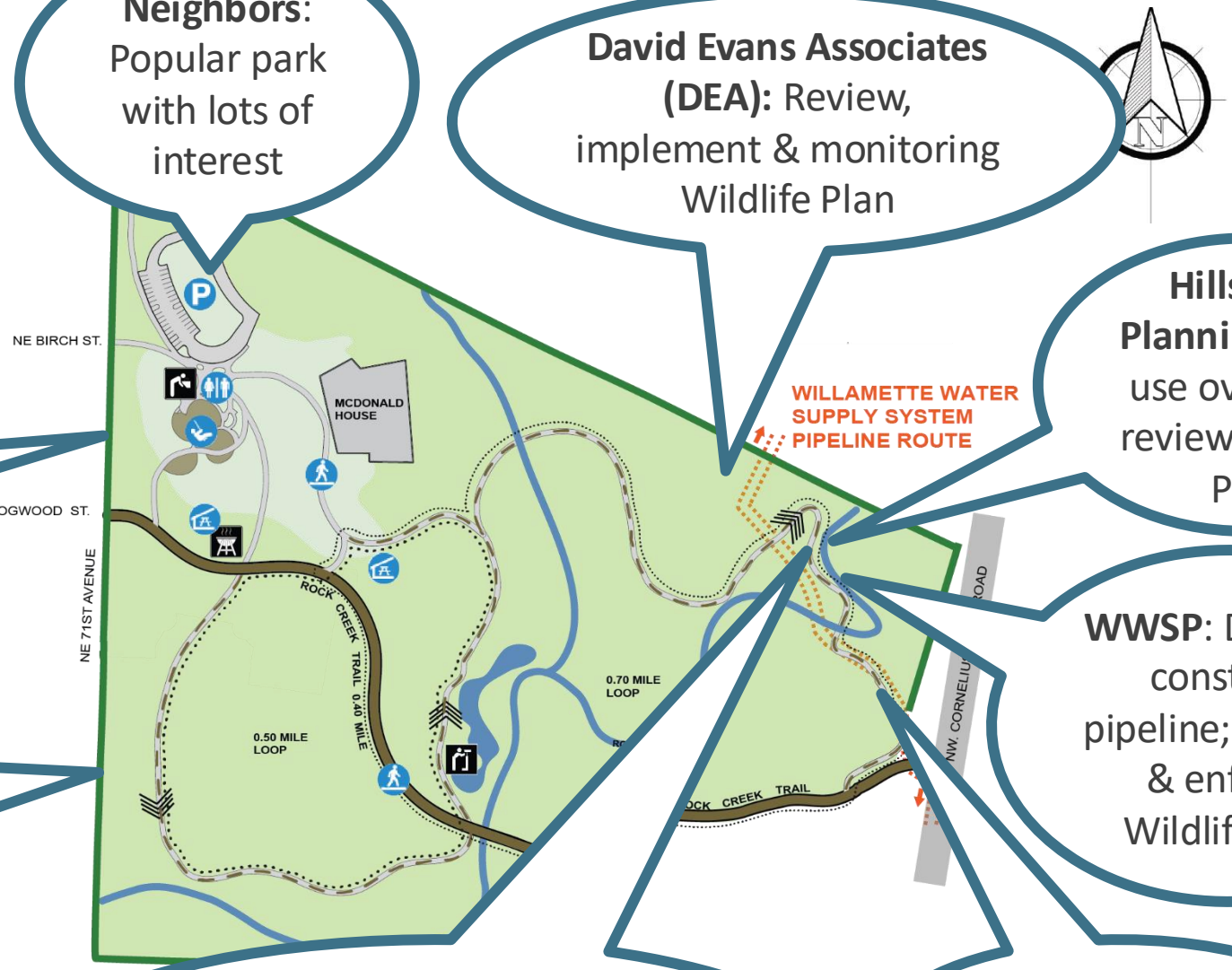
Metro: Property owner, review Wildlife Plan

Hillsboro Parks & Recreation: Property owner & operator, review Wildlife Plan

WWSP: Design & construct pipeline; develop & enforce Wildlife Plan

ODFW, DSL, USACE, NMFS, USFWS, DEQ, Hillsboro Planning: Environmental enforcement of WWSP permit requirements

WWSS: Water pipeline owner & operator



Wildlife Protection and Adaptive Management Plan for Orenco Woods Nature Park: Wildlife Plan

Willamette Water Supply System: WWSS

Willamette Water Supply Program: WWSP

Pre-Construction

Objective 1: Promote and Reinforce Contractor Commitment to Wildlife and Wildlife Habitat Objectives

Objective 2: Tailor Schedule to Reduce Impacts to Wildlife and Wildlife Habitat

Active Construction

Objective 3: Avoid and Minimize Impacts to Nesting Birds

Objective 4: Minimize Obstacles to Wildlife Passage Along Rock Creek and Beaverton Creek Corridors

Objective 5: Minimize Entrapment Hazards of Open Trenches and Shafts

Objective 6: Inhibit Small Wildlife from Entering Work Area

Objective 7: Recover Wildlife from Work Area, Trench, and Shafts, if Applicable

Objective 8: Avoid and Minimize Impacts to Fish and Wildlife in Wetlands, Rock Creek, and Beaverton Creek

Post-Construction

Objective 9: Identify and Implement Opportunities for Beneficial Use of Cleared Vegetation for Wildlife Habitat

Objective 10: Restore Disturbed Habitat Post-Construction

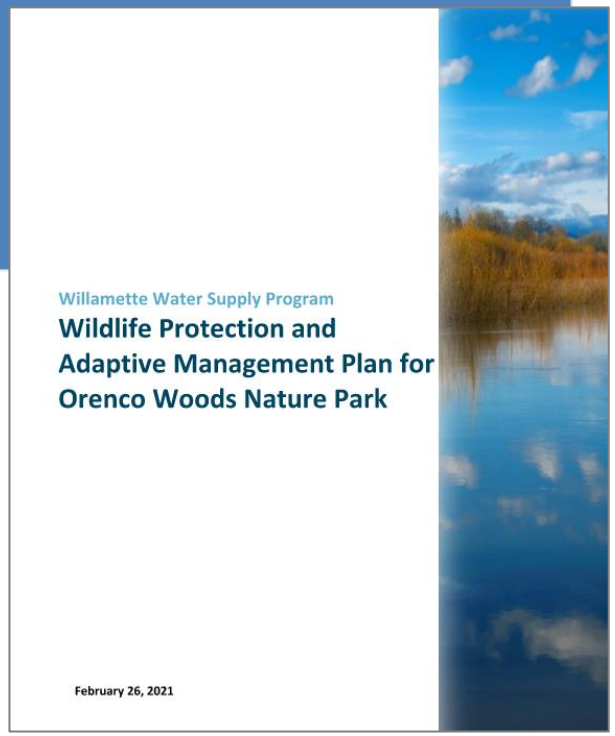


Figure 5 – Objectives for Wildlife and Habitat Protection by Construction Phase

SUCCESS! No animals harmed during construction

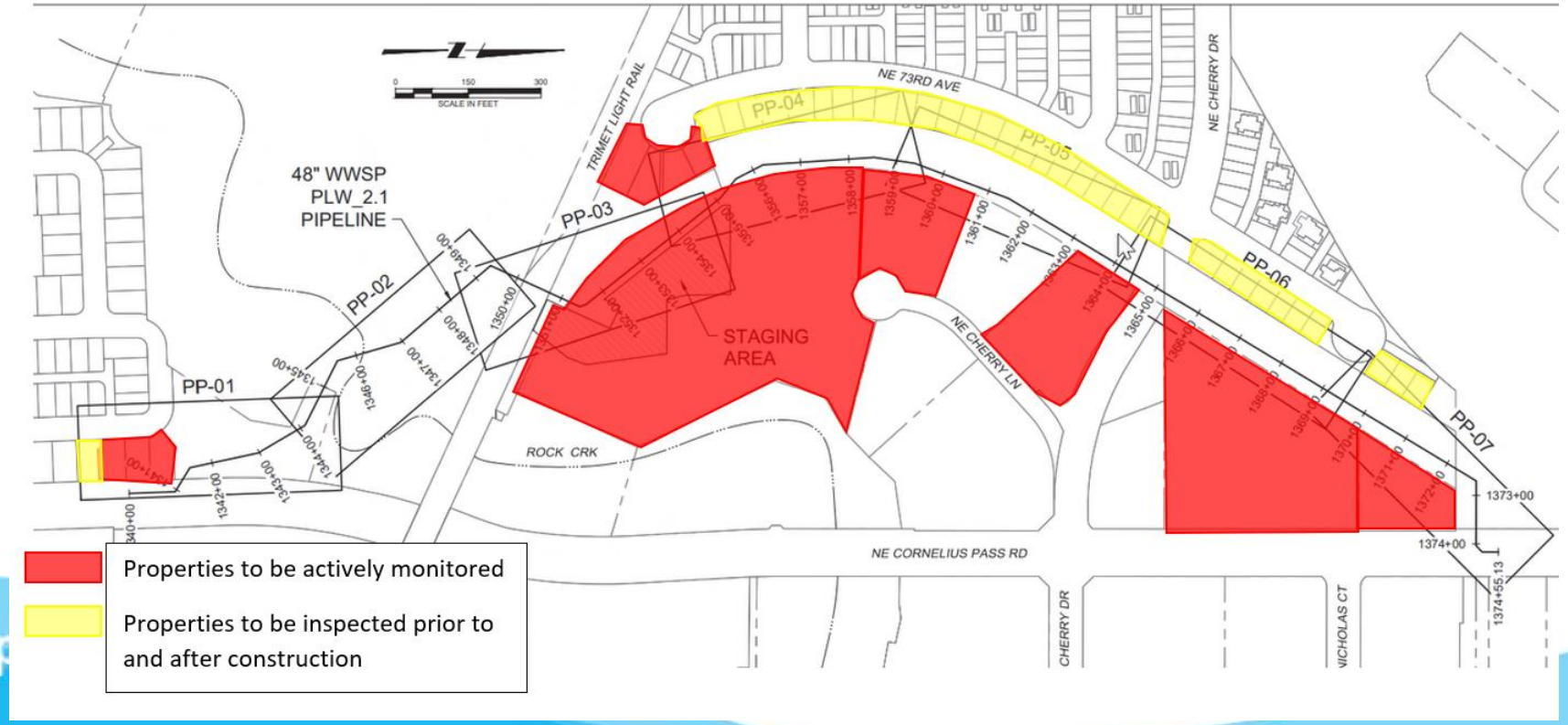






Sensitive Spaces – Vibration Monitoring

- Offered pre-construction and post-construction home inspections for neighbors within 100’ of active construction
- 5 vibration monitors in strategic locations where construction activities were most active



Vibration – Perceived vs. Damaging

Table 2-5. Summary of Recommended Vibration Limits.

Protected Item	PPV Limit	Remarks
Psychological impact on people	0.1 ips	This limit will be felt by most people.
Damage to structures	See Figure 2-6	Measured at ground surface within 5' of structure.
Damage to "green" concrete	See Table 2-3	Depends on cure time
Damage to buried utilities and wells	5.0 ips	Measured at ground surface above utility or at well head.

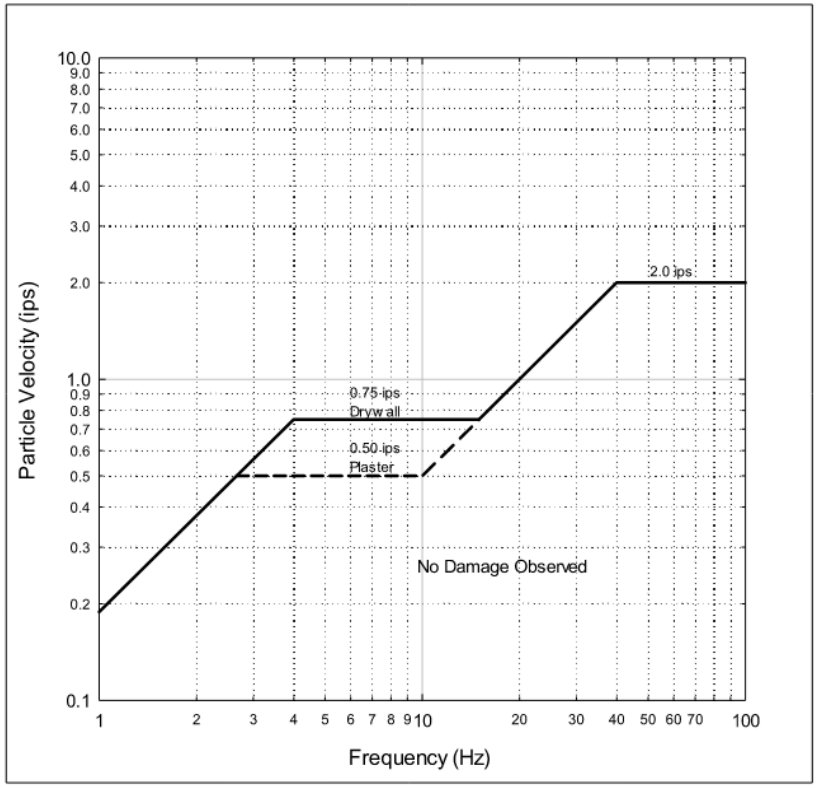
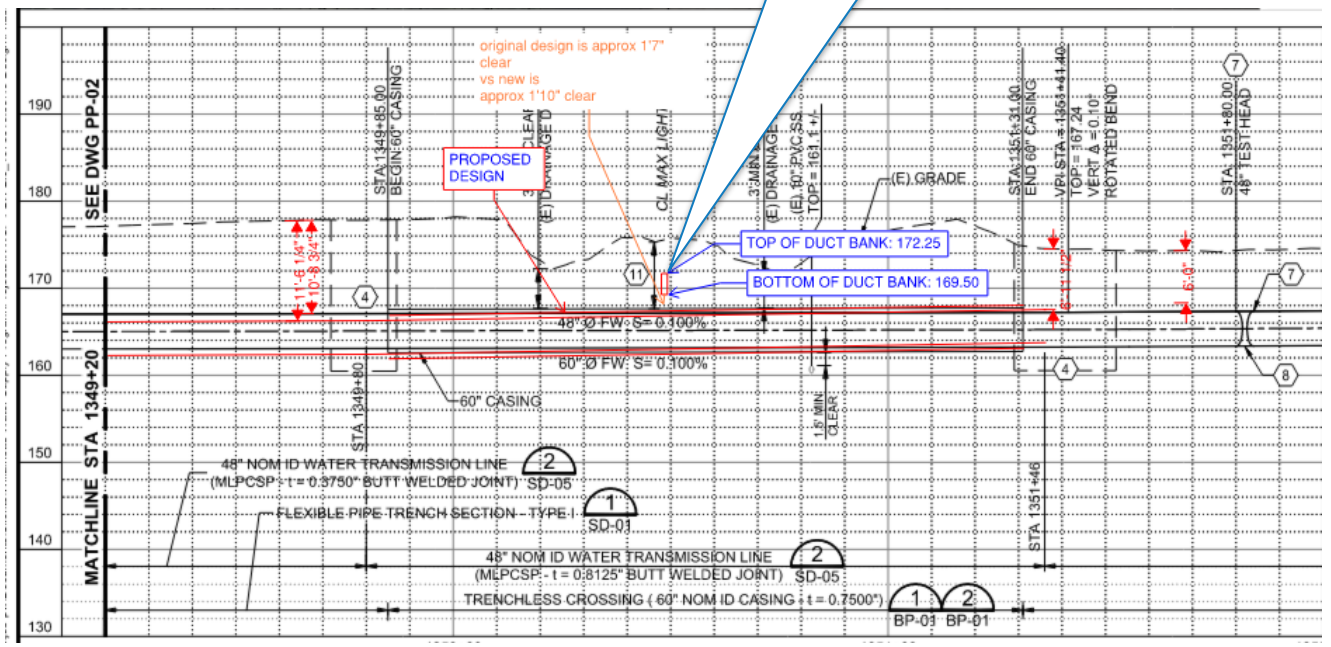


Figure 2-6. USBM Damage Criterion.

Sensitive Spaces – TriMet Crossing

- Settlement monitoring prior to and during construction
- Ductbank disclosed at pre-construction meeting – no exact depth, size, or material, high voltage assumed
- Options for identifying ductbank:
  - Ground penetrating radar (GPR)
  - Pilot bore (too dangerous)
  - Hand digging
- Full-time, onsite TriMet supervision
- Required trains to slow to 25mph

Clearance between duct bank and casing less than 2-ft, redesign gained 3-in of clearance







Ground penetrating radar (GPR) at TriMet tracks to identify unlocated ductbank





Hand digging to locate ductbank

In-stream Work Brings Trench Flood

- August 31, 2023
- Hillsboro got 0.75 inches of rain
- Daily record for August 31 (site recording since 1929)







Change Order Summary

- Original Contract Amount: $14,697,548

- Total Project Changes: $23,236 (0.16% of contract price)
  - Steel de-escalation (-$136,860)
  - TriMet ductbank potholing, GPR, and hand-digging ($66,000)
  - Increased manhole lids/safety ESDCs ($26,230)
  - Permit condition wetland plantings ($37,960)
  - Removal of permanent fencing (-$28,434)
  - Miscellaneous items ($31,850)





Pipeline construction within Orenco Woods Nature Park – before, during, and after Rock Creek crossing

Orenco Woods Nature Park – after construction



Challenges	Key Takeaways
Trenchless TriMet rail crossing with unlocated ductbank	Hand digging was safest approach even with additional utility locate work
Open cut crossing through Rock Creek within in-water work window	Things happen even with the best planning. Being ready for recovery meant only one day lost work; pumps, pressure washers, extra shoring on hand.
Nighbor impacts from construction noise and vibration	Educate early about normal construction impacts, offer vibration monitoring and pre-construction inspection to create a record
Neighbor resistance to park impacts	Partnering with park owners early for easements and having flexibility to provide trail improvements and restoration work
Neighbor concern for wildlife	Extensive coordination with neighbors regarding wildlife safety and disruptive construction activities, created a plan to protect wildlife and communicate along the way

Questions?



Erika Murphy
erika.murphy@carollo.com

Joelle Bennett
joelle.bennett@tvwd.org