Willamette Water Supply
Our Reliable Water

Willamette Water Supply System Commission

Board Meeting
Thursday, April 6, 2023
12:00 PM

Microsoft Teams Meeting

Willamette Water Supply
Our Reliable Water

Willamette Water Supply System Commission
Board Meeting Agenda
Thursday, April 6, 2023 | 12:00 – 1:30 PM
Microsoft Teams Meeting

This meeting will not be held at a physical location. If you wish to attend and need dial-in information, please contact annette.rehms@tvwd.org or call 971-222-5957 by 10:00 a.m. on April 6, 2023.

If you wish to address the WWSS Board, please request the Public Comment Form and return it 48 hours prior to the day of the meeting.

The meeting is accessible to persons with disabilities and those who need qualified bilingual interpreters. A request for an interpreter for the hearing impaired, a bilingual interpreter or for other accommodations should be made at least 72 hours before the meeting to the contact listed above.

REGULAR SESSION – 12:00 PM

CALL TO ORDER

1. **GENERAL MANAGER'S REPORT** – *Dave Kraska*
   Brief presentation on current activities relative to the WWSS Commission

2. **PUBLIC COMMENT**
   This time is set aside for persons wishing to address the Board on items on the Consent Agenda, as well as matters not on the agenda. Additional public comment will be invited on agenda items as they are presented. Each person is limited to five minutes unless an extension is granted by the Board. Should three or more people testify on the same topic, each person will be limited to three minutes.

3. **CONSENT AGENDA**
   These items are considered to be routine and may be approved in one motion without separate discussion. Any Board member may request that an item be removed by motion for discussion and separate action. Any items requested to be removed from the Consent Agenda for separate discussion will be considered immediately after the Board has approved those items which do not require discussion.

   A. Approve the February 2, 2023 meeting minutes

4. **BUSINESS AGENDA**
   A. Adopt Natural Hazards Mitigation Plan Annex – *Mike Britch*
   B. Approve Permitting Service Contract Amendment – *Christina Walter*

5. **INFORMATION ITEMS**
   A. Planned June Business Agenda items – *Joelle Bennett*
   B. The next Board Meeting is scheduled on June 1, 2023, via Microsoft Teams

6. **COMMUNICATIONS AND NON-AGENDA ITEMS**
   A. None scheduled

ADJOURNMENT

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Willamette Water Supply
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GENERAL MANAGER'S REPORT

To: WWSS Board of Commissioners

From: David Kraska, P.E., WWSS General Manager

Date: April 6, 2023

Subject: Willamette Water Supply System General Manager's Report

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This report provides an overview of some of the current Willamette Water Supply System (WWSS) work efforts under the direction of this Commission, beginning with a Safety Minute presentation.

1. **Safety Minute Presentations** – At its February 15, 2023 Board meeting, the Tualatin Valley Water District (TVWD) decided to stop presenting safety minutes at the beginning of future Board meetings. This change preserves staff's the Board's time for its critical business, and it does not signal that safety is any less important at TVWD. Safety remains a central part of TVWD's culture.

   Since TVWD is the Managing Agency for WWSS, we propose following its lead. Unless different direction is received from the WWSS Board, today's safety minute will be the last one presented at a WWSS Board meeting for the foreseeable future. Like TVWD, safety will remain a central part of the culture at the Willamette Water Supply Program (WWSP) and the WWSS Commission.

2. **Willamette Water Supply Program Personnel Update** – The WWSP team is celebrating the promotion of two key Program Management Team members from Stantec, Inc. (the consultant Program Manager for the WWSP). Upon the departure of Jeremy Taylor, who has been our Program Manager since January 2022, WWSP staff worked with leadership at Stantec to develop a transition plan. With only three years left to complete the WWSS and to maximize efficiency in getting the new Program Manager fully integrated, we focused on considering only internal candidates. As a result, Andre Tolme has been promoted to WWSP Program Manager. Andre's proven leadership of the WWSP construction management team positions him well to take on this new role while continuing to serve as the Program Construction Manager for the remaining years. Recognizing the significant workload increase to Andre, a new position was created to support him and the Program Management Team. Jill Chomycia has been promoted to the new Deputy Program Manager position and will lead many of the Program's controls and administrative activities. Both Andre and Jill are excited about the opportunity to grow in their roles and help us successfully complete the WWSP. We wish Jeremy all the best and thank him for his eight years of service to the WWSP.

3. **Permitting and Communications Updates** – The WWSP permitting and communications efforts remain very active. Attached to this General Manager's Report is a tabulation of the permits and approvals recently granted, and the status of those currently in process.
   Permitting highlights:
   - The Oregon Department of Environmental Quality (DEQ) has approved the WWSS's request for modification of the Water Quality Certification to include coverage for the Tualatin River Temporary Discharge Facility that will be needed for commissioning and start up of the system. DEQ decided

that the modification was not a significant change to the original certification. No public noticing was necessary for the approval of the modification.

- All permits needed to begin construction of Pipeline West (PLW)_2.1 have been secured.
- Systemwide Permit renewal requests have been submitted to Oregon Department of Fish and Wildlife (ODFW) for the Program's Wildlife Salvage and Fish Salvage Permits as well as Department of State Lands' Removal-Fill Permit in advance of their expiration.

Communications highlights:

- In preparation for the closure of Southwest (SW) Grabhorn Road, the Communications Team focused outreach efforts to residents along the Scholls Ferry Area Pipeline (PLM)_5.3 project. The road will be closed between SW Tile Flat Road and SW Stonecreek Drive. This will be a full closure for 24 hours a day, 7 days a week from April 5 through July 5. Local access to residences along SW Grabhorn Road south of SW Stonecreek Drive and north of SW Tile Flat Road will be continuously provided. No through traffic will be allowed. Staff are working with emergency services and other providers so that services to local residents are not interrupted. Notice of the road closure has been coordinated with partner agencies and posted on Oregon's Department of Transportation TripCheck (the clearinghouse for traffic and travel information that is utilized by WAZE and other applications).
- Staff finalized production of the 2022 WWSP Accomplishments Video. The video highlights the major milestones and efforts from the last year and provides a look ahead to the future. The video has been shared publicly through the WWSP newsletter this month, and via the Program website (www.OurReliableWater.org). The video has been translated into Spanish and that version will also be publicly available on the website.

4. **Construction and Operations Readiness Updates** – Attached to this General Manager's Report is a tabulation of the status of all the active construction projects. To provide a more complete understanding of the work underway, we will share a presentation of recent photos from the construction sites, and the status of our efforts to prepare for operations. A copy of this presentation is attached to this General Manager's report.

Willamette Water Supply Program Permits and Approvals – Recent Actions and Status

Date of Report: March 23, 2023

Permits and Approvals Recently Granted

Agency	Projects Involved	Permit or Approval Granted
DEQ	CSU	Water Quality Certification Modification for Tualatin River Discharge Facility
Washington County	PLM_5.3	Speed Reduction
Washington County	PLM_5.3/RES_1.0	ROW Utility and Access Permit Renewals
Washington County	RES_1.0	Building Permit for Water Quality Building
Washington County	PLM_1.3	ROW Utility Permit Renewal
Clean Water Services	PLM_5.1	Temporary Discharge Permit
Clean Water Services	PLW_2.1	Clean Water Services 1200-C
City of Hillsboro	PLW_2.1	Private Utility Permit, Public Infrastructure Permit, and Erosion Control and Grading Permit
City of Beaverton	MPE_1.3	Noise Variance
Oregon Department Fish & Wildlife	System-Wide	Wildlife Salvage Permit Renewal

Permits and Approvals Submitted

Agency	Projects Involved	Permit or Approval Submitted
City of Wilsonville	RWF_1.0	Building Permit Amendment and Class I Admin Review
Washington County	PLM_5.1	ROW Utility Permit
Washington County	PLM_5.3	Temporary Road Closure
City of Beaverton	MPE_1.2	Noise Variance
Department of State Lands (DSL)	System-Wide	Permit Renewal
Oregon Department Fish & Wildlife	System-Wide	Fish Salvage Permit Renewal

Permits and Approvals in Progress

Agency	Projects Involved	Permit or Approval in Progress
City of Beaverton	MPE_1.2	PFC Facility Electrical and Mechanical permits; Noise Variance
Washington County	MPE_1.3	Electrical and Temporary Road Closure permits; Beaverton Noise/Night Variance Permit
Washington County	PLM_3.0	Noise Variance
Washington County	PLM_4.3	Electrical, Noise Variance
Washington County	RES_1.0	Mechanical and Electrical Permits and 3 remaining Building Permits
City of Hillsboro	PLM_2.1	Berm Fence Permit

Anticipated Approvals

Agency	Projects Involved	Permit or Approval Anticipated
Washington County	PLM_4.3	Noise Variance
Washington County	RES_1.0	Building Permit for East Reservoir
City of Sherwood	WTP_1.0	Engineering Plan Review, Public Infrastructure Permit, Retaining Wall Permit, Mechanical permits; Wash. Co. Facility Permit
DSL and United States Army Corps of Engineers (USACE)	CSU/System-wide	Permit Modification for Tualatin River Temporary Discharge Facility

Willamette Water Supply Program Projects in Construction – Recent Status Update

Date of Report: March 23, 2023

Project	Description	Progress Since Last Month
1. RWF_1.0	Raw Water Facilities project located at the Willamette River Water Treatment Plant in Wilsonville	- Building subcontractors fully mobilized to site - Electrical submittals complete - Installing electrical conduit below Electrical Building foundation slab - Installing sewer and drain piping below Electrical Building foundation slab - Preparing equipment pads for slab construction - Completed additional drainage improvements in park
2. PLM_1.3	Raw water pipeline project in Wilsonville from Wilsonville Road to Garden Acres Road	- Mobilizing trenchless subcontractor to Wilsonville Road launch shaft - Excavating receiving shaft on north side of Wilsonville Road - Dewatering systems installed for trenchless crossing
3. WTP_1.0	Water Treatment Plant project, located in City of Sherwood, near the intersection of SW Tualatin-Sherwood Road and SW 124th Avenue	- Constructed tower crane - Onsite warehouse and craft lunch areas completed - Temporary electrical duct banks installed - Concrete placements at Area 30 (UV building) - Concrete placements at Area 37 (EQ Basin) - Concrete placements at Area 53 (Finished Water Pump Station building)
4. PLM_4.2	Finished water pipeline project being completed in partnership with Washington County's Tualatin-Sherwood Road Project, (WWSS pipeline from Langer Farms Parkway to SW 124th Avenue, Washington County work continues east to Teton Avenue)	- Road widening along south side of Tualatin-Sherwood Road - Curbs and sidewalk installation - Base paving to start soon on current work area - WWSP submittals
5. PLM_4.1	Finished water pipeline project being completed in partnership with Washington County's Highway 99 Crossing Pipeline and Tualatin-Sherwood Road – Langer Farms Parkway to Borchers Drive	- 66" waterline completed from Hwy 99 to SW Borchers Dr. - 66" waterline in progress between Hwy 99 and SW Baler Way - Completed 66" waterline crossing of Tualatin-Sherwood Rd. - Continue road widening along the south side of Tualatin-Sherwood Rd.

6. PLM_4.4	Finished water pipeline project being completed in partnership with Washington County's Roy Rogers Road – Chicken Creek to Borchers Drive	- Processing WWSP submittals and RFIs - Sound wall installation is complete - Storm drain improvements for current stage are completed - Concrete curbs and sidewalks are being poured - 66" pipe installation on track to start in spring of this year
7. PLM_4.3	Finished water pipeline project in unincorporated Washington County along Roy Rogers Road	- Microtunneling: Tualatin River Crossing – more than 800 LF installed (40%) - 66" open cut pipe installation along Roy Rogers Rd south of Beef Bend Road
8. RES_1.0/ PLM_5.3	Water Storage Tank and finished water pipeline project in rural Washington County. Tank site at SW Grabhorn Road and Stonecreek Drive. Pipeline extends from SW Grabhorn Road at SW Tile Flat Road to SW Rosedale Road at future Cornelius Pass Extension	RES_1.0: - Started installation of 66" inlet and outlet pipe - Started installation of 42" overflow pipe - Temporary and permanent power service to RES site ongoing PLM_5.3: - Continue installation of 66" waterline – approximately 11,600 LF (58%) installed - Completed trenchless crossing of Farmington Rd.
9. PLW_1.3	Finished water pipeline project in South Hillsboro from SW Farmington Road to SE Blanton Street	- Long-lead valve items arrived and were installed - Working through final punchlist - Closeout
10. PLW_1.2	Finished water pipeline project being completed in partnership with Washington County's Cornelius Pass Road project between Frances Street and Tualatin Valley Highway	- 48" WWSP waterline installation north of Rock Rd. and across Frances Street - Completed Cornelius Pass Road crossing with 48" WWSP waterline - 18" WWSP waterline installation on Frances Street - Retaining wall installation on NE corner TV Hwy and Cornelius Pass Road - Completed soundwall installation
11. PLW_2.1	Finished water pipeline project in Hillsboro. Cornelius Pass Road (Orenco Woods Nature Park to NE Cornelius Pass Road at NE Cherry Drive)	- Mobilizing to staging area in late April - Potholing utilities - Submittals
12. MPE_1.1/ COB_1.1	Finished water pipeline project being completed in partnership with the City of Beaverton's SW Western Avenue project	- 48" WWSP waterline pressure testing and disinfection - WWSP appurtenances and vaults - Service connections for COB 16" water main - Sidewalks, curb and gutter, and road grading - Street lighting and traffic signal poles on Western Ave. - Retaining wall construction
13. MPE_1.2/ COB_1.2	Finished water pipeline project in Beaverton from SW Scholls Ferry Road at Greenway Park to SW Allen Boulevard at Western Avenue	- 16" City of Beaverton waterline connections on Hall Blvd. and Denney Road - 16" City of Beaverton waterline open cut installation on Scholls Ferry Road near Denney Road - 48" waterline on Scholls Ferry Road near Nimbus Road (night work) - PFC facility meter vault concrete and underground piping

14. MPE_1.3	Finished water pipeline project on Scholls Ferry Road from Roy Rogers Road to Greenway Park	- 48" waterline installation on Scholls Ferry Road headed west from Fanno Creek (night work) - Turnout vault at Roy Rogers Road – concrete formwork and rebar

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Safety Minute:
Driving Near Construction Work Zones

April 6, 2023

1

ODOT Safety Campaign

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Oregon Construction Work Zones

Between 2014 and 2018, Oregon work zones saw the following average number of incidents each year:

- 331 crashes involving injuries
- 532 people injured
- 5 fatalities

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Reminders for Drivers:

- Pay attention when you see orange signs, barrels, cones and barricades
- Obey temporary speed signs

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Reminders for Drivers:

- Anticipate that work zone traffic lanes often are narrow
- Move over to give workers more room

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Reminders for Drivers:

- SLOW DOWN!
- Remember that fines double in all Oregon work zones, whether workers are present or not

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1A. WWSS Construction Update – *Dave Kraska*

April 6, 2023

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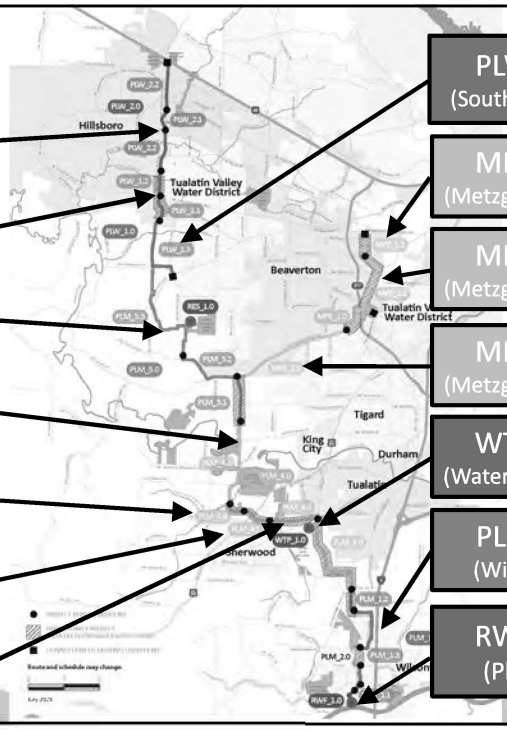
Construction Progress

Projects currently in construction

PLW_2.1 (Orenco Woods)
PLW_1.2 (South Hillsboro)
RES_1.0 (Storage Tanks)
PLM_5.3 (Grabhorn to Rosedale)
PLM_4.3 (Roy Rogers)
PLM_4.4 (Chicken Creek)
PLM_4.1 (Hwy 99 Crossing)
PLM_4.2 (Tualatin/Sherwood)



PLW_1.3 (South Hillsboro)
MPE_1.1 (Metzger Pipeline)
MPE_1.2 (Metzger Pipeline)
MPE_1.3 (Metzger Pipeline)
WTP_1.0 (Water Treatment)
PLM_1.3 (Wilsonville)
RWF_1.0 (Phase 2)

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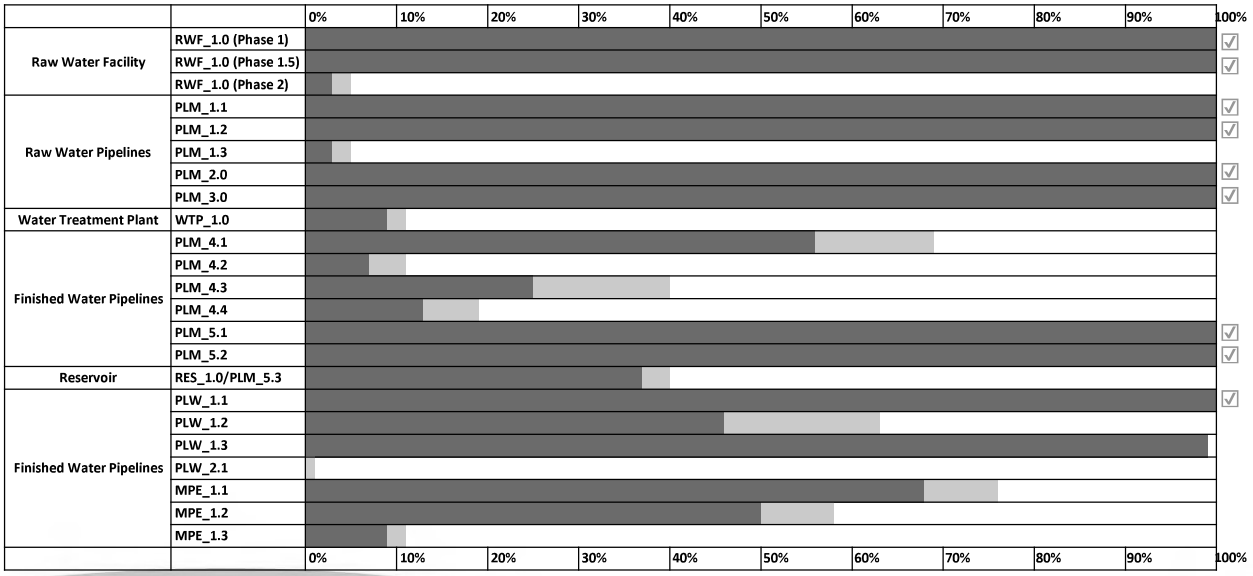
Estimated Construction Physical Percent Complete



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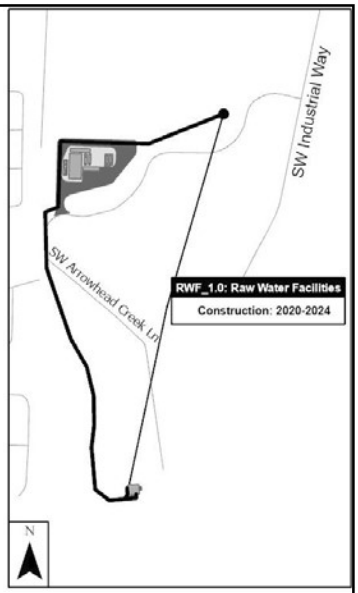
RWF_1.0 (GMP-2)

Contractor: Kiewit Infrastructure West Co.
Designer: Black & Veatch

Current and Planned Activities:

- Building subcontractors fully mobilized to site.
- Electrical submittals complete.
- Installing electrical conduit below Electrical Building foundation slab.
- Installing sewer and drain piping below Electrical Building foundation slab.
- Preparing equipment pads for slab construction.
- Completed additional drainage improvements in park.



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Construction Photos – RWF_1.0

Upper Site

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Construction Photos – RWF_1.0

Upper Site: Under-slab electrical conduit work at Electrical Building

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Construction Photos – RWF_1.0

Electrical conduit installation below slab of Electrical Building

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PLM_1.3

Contractor: Moore Excavation Inc.
Designer: HDR

Current and Planned Activities:

- Mobilizing trenchless subcontractor to Wilsonville Rd. launch shaft.
- Excavating receiving shaft on north side of Wilsonville Rd.
- Dewatering systems installed for trenchless crossing.

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Construction Photos - PLM_1.3

Installation of “slide-rail” shoring system for tunneling shaft at Wilsonville Rd.

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Construction Photos - PLM_1.3

Dewatering well installation at receiving shaft, north of Wilsonville Rd.

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WTP_1.0

Contractor: Sundt Construction, Inc.
Designer: CDM Smith

Current and Planned Activities:

- Constructed tower crane.
- Onsite warehouse and craft lunch areas completed.
- Temporary electrical duct banks.
- Concrete placements at Area 30 (UV building).
- Concrete placements at Area 37 (EQ Basin).
- Concrete placements at Area 53 (Finished Water Pump Station building).

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Construction Photos - WTP_1.0

Clearwell Area 35 and
FWPS Area 53

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Construction Photos - WTP_1.0

WTP site looking southwest

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Construction Photos - WTP_1.0

WTP site looking northwest

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PLM_4.2

Partner: Washington County
Contractor: Kerr/Emery JV
Designer: Brown & Caldwell

Current and Planned Activities:

- Road widening along South side of Tualatin-Sherwood Road.
- Curbs and sidewalk.
- Base paving to start soon on current stage of work.
- WWSP submittals.

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Construction Photos – PLM_4.2

Road widening along the south side of Tualatin-Sherwood Road. Retaining wall work is complete, curb and sidewalk is being placed.

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PLM_4.1

Partner: Washington County
Contractor: Moore Excavation Inc.
Designer: Brown & Caldwell

Current and Planned Activities:

- 66” waterline completed from Hwy 99 to SW Borchers Dr.
- 66” waterline in progress between Hwy 99 and SW Baler Way.
- Completed 66” waterline crossing of Tualatin-Sherwood Rd.
- Continue road widening along the south side off Tualatin-Sherwood Rd.

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Construction Photos – PLM_4.1

66” pipe installation looking west near Tualatin-Sherwood Rd. and Baler Way

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Construction Photos – PLM_4.1

66” waterline crossing of
Tualatin-Sherwood Road

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PLM_4.4

Partner: Washington County
Contractor: Tapani Inc.
Designer: Brown & Caldwell

Current and Planned Activities:

- Processing WWSP submittals and RFIs.
- Sound wall installation is complete.
- Storm drain improvements for current stage are completed.
- Concrete curbs and sidewalks are being poured.
- 66” pipe installation on track to start in spring of this year.

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Construction Photos – PLM_4.4

Road widening along the south side of Roy Rogers Rd. Sound walls are complete, curb and sidewalk are being constructed.

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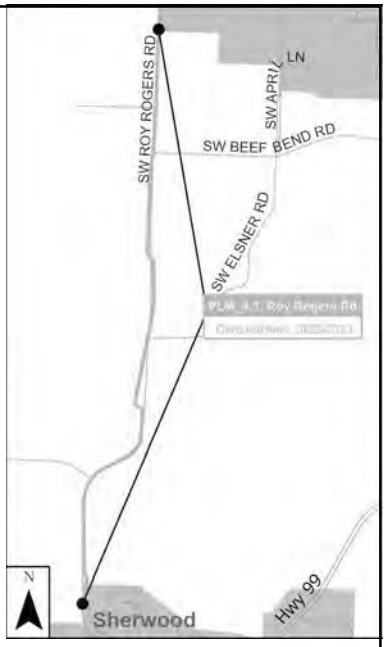
PLM_4.3

Contractor: Tapani Inc.
Designer: Brown & Caldwell

Current and Planned Activities:

- Microtunneling: Tualatin River Crossing – more than 900 LF installed (45%).
- 66” open cut pipe installation along Roy Rogers Rd south of Beef Bend Road.



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Construction Photos – PLM_4.3

Open cut 66” waterline installation along Roy Rogers Rd. (north of Beef Bend Rd.)

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Construction Photos – PLM_4.3

Tunnel receiving shaft on north side of Tualatin River

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Construction Photos – PLM_4.3

Microtunneling operation on south side of Tualatin River

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Construction Photos – PLM_4.3

Installing Intermediate Jacking Station in tunnel section

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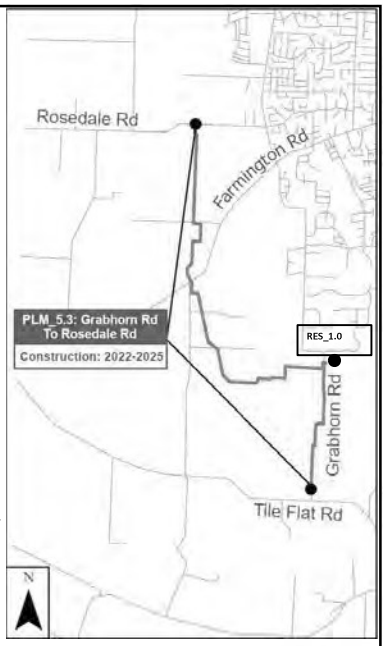
RES_1.0 / PLM_5.3

Contractor: Hoffman-Fowler JV
Designer: Black & Veatch / Jacobs

Current and Planned Activities:

- RES_1.0
  - Started installation of 66” inlet and outlet pipe.
  - Started installation of 42” overflow pipe.
  - Temporary and permanent power service to RES site ongoing.
- PLM_5.3
  - Continue installation of 66” waterline – approximately 11,600 LF (58%) installed.
  - Completed trenchless crossing of Farmington Rd.



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Construction Photos – RES_1.0

RES_1.0 site

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Construction Photos – RES_1.0

66-inch inlet and outlet pipe installation at Reservoir

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Construction Photos – PLM_5.3

66” waterline installation with Staging Area #1 and RES site in background

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Construction Photos – PLM_5.3

66-inch waterline installation near Staging Area #1

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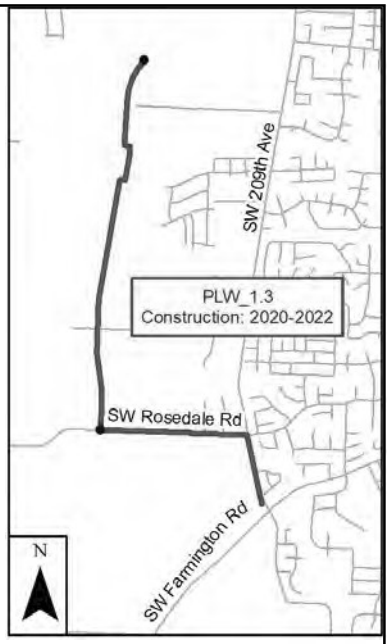
PLW_1.3

Contractor: Tapani, Inc.
Designer: Kennedy/Jenks

Current and Planned Activities:

- Long-lead valve items arrived and were installed
- Punchlist
- Closeout



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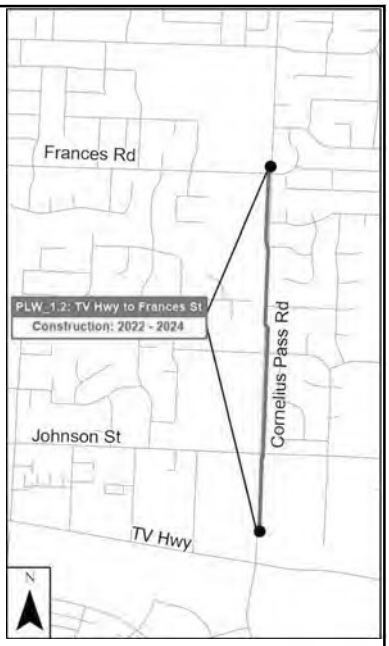
PLW_1.2

Partner: Washington County
Contractor: Tapani, Inc.
Designer: Kennedy/Jenks

Current and Planned Activities:

- 48” WWSP waterline installation north of Rock Rd. and across Frances St.
- Completed Cornelius Pass Rd. crossing with 48” WWSP waterline
- 18” WWSP waterline installation on Frances St.
- Retaining Wall installation on NE corner TV Hwy. and Cornelius Pass Rd.
- Completed soundwall



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Construction Photos – PLW_1.2

Trench shoring and excavation for crossing Cornelius Pass Rd.

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Construction Photos – PLW_1.2

48” waterline crossing of Cornelius Pass Rd.

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PLW_2.1

Contractor: Moore Excavation, Inc.
Designer: Kennedy/Jenks

Current and Planned Activities:

- Mobilizing to staging area in late April
- Potholing utilities
- Submittals

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Construction Photos – PLW_2.1

Tree clearing ahead of bird nesting season in Orenco Woods Nature Park (south entrance)
Before and After:

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MPE_1.1

Partner: City of Beaverton
Contractor: Moore Excavation Inc.
Designer: Brown & Caldwell

Current and Planned Activities:

- 48” WWSP waterline pressure testing and disinfection.
- WWSP appurtenances and vaults.
- Service connections for COB 16” water main.
- Sidewalks, curb and gutter, and road grading.
- Street lighting and traffic signal poles on Western Ave.
- Retaining wall construction.

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Construction Photos – MPE_1.1

Storm drainage and sidewalk construction on Western Ave.

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Construction Photos – MPE_1.1

16” COB water main construction on Western Ave.

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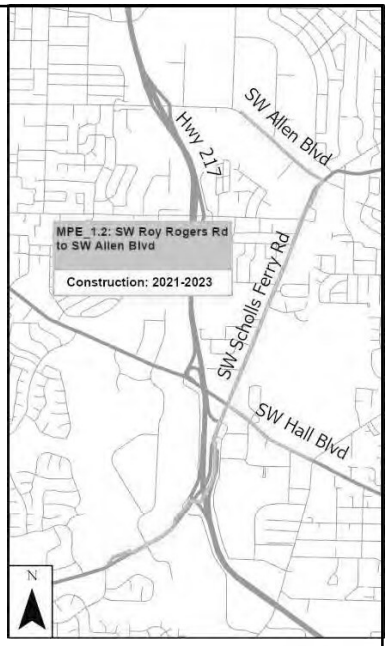
MPE_1.2

Contractor: Emery & Sons
Designer: Brown & Caldwell

Current and Planned Activities:

- 16” City of Beaverton waterline connections on Hall Blvd. and Denney Rd.
- 16” City of Beaverton waterline open cut installation on Scholls Ferry Rd. near Denney Rd.
- 48” waterline on Scholls Ferry Rd. near Nimbus Rd. (nights).
- PFC facility meter vault concrete and underground piping.



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Construction Photos – MPE_1.2

48” waterline installation (night work) on Scholls Ferry Rd.

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Construction Photos – MPE_1.2

PFC Facility underground piping

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Construction Photos – MPE_1.2

Concrete road panel replacement on Cascade Ave.

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Construction Photos – MPE_1.2

16” COB water main on Scholls Ferry Rd.

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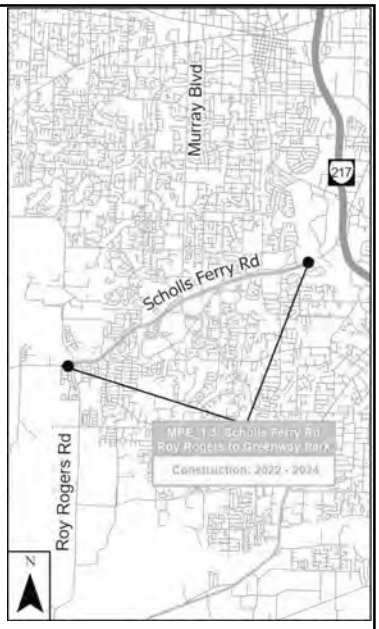
MPE_1.3

Contractor: Emery & Sons
Designer: Brown & Caldwell

Current and Planned Activities:

- 48” waterline installation on Scholls Ferry Rd. headed west from Fanno Creek (night work).
- Turnout vault at Roy Rogers Rd. – concrete formwork and rebar.



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Construction Photos – MPE_1.3

Night work at east end of alignment on Scholls Ferry Rd.

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Construction Photos – MPE_1.3

Night work on Scholls Ferry Rd. near Conestoga Dr.

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Construction Photos – MPE_1.3

Concrete formwork for Roy Rogers Rd. turnout vault

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QUESTIONS?

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DRAFT

Willamette Water Supply System Commission
Board Meeting Minutes
Thursday, February 2, 2023

Attendance:

Commissioners present:	
City of Beaverton	Allison Tivnon
City of Hillsboro	David Judah
Tualatin Valley Water District (TVWD)	Jim Duggan
Committee Members present:	
City of Beaverton	Dan Weinheimer, David Winship
City of Hillsboro	Niki Iverson, Chris Wilson, Lee Lindsey, Negar Niakan, Jessica Dorsey
TVWD	Tom Hickmann, Pete Boone, Paul Matthews
Managing Agency Staff present:	
WWSS Commission General Manager / Willamette Water Supply Program (WWSP) Director	Dave Kraska
TVWD General Counsel	Clark Balfour
WWSP Assistant Director	Joelle Bennett
WWSP Program Manager	Jeremy Taylor
WWSP Engineering and Construction Manager	*Not available*
WWSP Permitting and Outreach Manager	Christina Walter
WWSP Finance Manager	Justin Carlton
WWSS Commission Recorder / WWSP Executive Assistant	Annette Rehms
Other Attendees present:	
TVWD Water Resources Division Manager	Joel Cary

REGULAR SESSION – 12:00 PM

CALL TO ORDER

Chair Judah called the regular Willamette Water Supply System (WWSS) Commission meeting to order at 12:01 p.m.

ROLL CALL

Ms. Rehms administered the roll call and noted a quorum was present.

1. GENERAL MANAGER'S REPORT

Mr. Kraska presented a safety minute on freeze the grease. *(presentation on file)*

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The General Manager's report included an update on possible move to hybrid meetings, acceptance of the financial statements and report of the independent auditor, quarterly financial report for the period ended December 31, 2022, notice of the Willamette Water Supply System (WWSS) Insurance Renewal, and status updates on Willamette Water Supply Program (WWSP) permitting, communications, construction activities and an operational readiness status update. *(presentation on file)*

In response to questions about the insurance renewal and new coverages, staff said social engineering fraud is a broad term that refers to the scams used by criminals to exploit a person's trust in order to obtain money directly or obtain confidential information to enable a subsequent crime. An example is the use of phishing emails that attempt to trick the recipient into providing personal information or account credentials.

In response to questions about concrete slab installations and monitoring for quality issues, staff said the general risk factors in pouring concrete that can contribute to quality issues include the pour thickness and ambient temperature. The WWSS water treatment plant foundation slabs currently in construction will be poured in cooler ambient temperatures and are thinner than those at other regional projects. The WWSP construction managers and inspectors will be monitoring the contractor's work to verify the curing temperature and compliance with projects specifications to make sure we have a solid and strong foundation for the treatment plant.

In response to questions about public noticing of traffic impacts, staff said the WWSP Communication and Outreach team is responsible for communicating traffic impacts to the community for each project. The team employs a suite of tools to inform neighbors of our work in the area and they work closely with Washington County and neighboring cities to ensure the messaging is working. The communications team also supports Washington County with keeping the wc-roads.com site up to date with WWSS work.

2. PUBLIC COMMENT

There were no public comments.

3. CONSENT AGENDA

A. Approve the December 1, 2022, meeting minutes
B. Accept Financial Statements and Report of Independent Auditor for the Fiscal Year ended June 30, 2022

Motion was made by Duggan and seconded by Tivnon, to approve the Consent Agenda as presented. The motion passed unanimously with Tivnon, Judah, and Duggan voting in favor.

4. BUSINESS AGENDA

A. Election of Officers – *Dave Kraska*

Mr. Kraska presented the staff report requesting the Board elect a Chair and Vice Chair for the calendar year 2023, per WWSS Commission IGA Section 5.3. For improved consistency and stability of the WWSS Commission operations during this dynamic time of major capital investment, the WWSS Commission Board agreed at the January 2022 Board meeting to informally standardize on a two-year term for officers.

Mr. Kraska reminded the Commission that Commissioners Judah and Duggan have served their two years as Chair and Vice Chair. Following the staff report, Chair Judah opened the floor for election of officers for the WWSS Board of Commissioners for calendar year 2023.

Motion was made by Judah, seconded by Tivnon, to elect Jim Duggan (TVWD) as Chair for calendar year 2023. The motion passed unanimously with Tivnon, Judah, and Duggan voting in favor.

Motion was made by Tivnon, seconded by Duggan, to elect David Judah (City of Hillsboro) as Vice Chair for calendar year 2023. The motion passed unanimously with Tivnon, Judah, and Duggan voting in favor.

At this point in the meeting, Commissioner Duggan assumed responsibility for conducting the remaining portion of the February 2023 WWSS Commission Board meeting as the newly elected Board Chair.

B. Adopt Fiscal Year 2023-2024 Annual Work Plan and Budget and WWSP Capital Improvement Plan (Baseline 8.1) – *Justin Carlton*

Mr. Carlton presented an overview of the baseline development process, differences between WWSP contingency and management reserve, the proposed Capital Improvement Plan (Baseline 8.1), and the proposed Fiscal Year 2023-24 WWSS Annual Work Plan and Budget. He explained that the total value of this year's proposed Baseline 8.1 is the same as Baseline 7.0, and the FY 2023-24 budget includes appropriations for operations, administration, capital outlay, and general operating contingency. (*presentation on file)*

In response to questions, staff said that the WWSS operates on a fiscal year calendar starting July 1st and ending June 30th. The appropriations discussed will cover the period from July 1, 2023, to June 30, 2024.

Motion was made by Judah, seconded by Tivnon, to adopt Resolution No. WWSS 01-23 adopting the Willamette Water Supply System (WWSS) Annual Work Plan and Budget for the fiscal year 2023-24 and approving the Willamette Water Supply Program (WWSP) Capital Improvement Plan (Baseline 8.1). The motion passed unanimously with Tivnon, Judah, and Duggan voting in favor.

C. Adopt Congressional Directed Spending Grant Technical Correction – *Justin Carlton*

Mr. Carlton presented an overview of the Congressionally Directed Spending grant that The City of Hillsboro (COH) applied for and obtained on behalf of the Willamette Water Supply System (WWSS) Commission. He said the $1 million grant was awarded by the Environmental Protection Agency (EPA). Following announcement of the award, the EPA provided guidance that the grant recipient must be the agency for which the assets (in this case, WWSS water treatment plant disinfection equipment) are owned. As such, a technical correction is required to reassign the grant from the City of Hillsboro to the WWSS Commission. The EPA requires that both the City of Hillsboro and the WWSS Commission adopt resolutions indicating the reassignment of the grant from Hillsboro to the WWSS to issue the technical correction. The COH Utilities Commission has approved a similar Resolution, and the EPA will need to accept the Resolution to effect the change in recipient name.

Motion was made by Tivnon, seconded by Judah, to adopt Resolution No. WWSS 02-23 adopting the Annual Work Plan and Budget for the Willamette Water Supply System (WWSS) for fiscal year 2023-24 and

approving the WWSP Capital Improvement Plan (Baseline 8.1). The motion passed unanimously with Tivnon, Judah, and Duggan voting in favor.

5. INFORMATION ITEMS

A. Planned April Business Agenda items – Joelle Bennett

Ms. Bennett presented information on business agenda item planned for the April 2023 WWSS Commission Regular Board meeting.

Staff anticipates the following business agenda item:

1. Natural Hazard Mitigation Plan

B. The next Board meeting is scheduled on April 6, 2023, via Microsoft Teams.

6. COMMUNICATIONS AND NON-AGENDA ITEMS

A. None scheduled

ADJOURNMENT

There being no further business, Chair Duggan adjourned the meeting at 1:27 p.m.

James Duggan, Chair

David Judah, Vice Chair

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STAFF REPORT

To: WWSS Board of Commissioners

From: Mike Britch, P.E., WWSP Engineering & Construction Manager

Date: April 6, 2023

Subject: Adopt Natural Hazards Mitigation Plan Annex

Requested Board Action:
Consider adopting a resolution approving the Willamette Water Supply System representation in Tualatin Valley Water District updates to the Washington Country Multi-Jurisdictional Natural Hazard Mitigation Plan.

Key Concepts:
WWSP staff participated in development of a Tualatin Valley Water District (TVWD) Annex to the 2023 Natural Hazards Mitigation Plan (NHMP) for Washington County.

- The NHMP is updated every five years and the process is led by Washington County.
- TVWD contributed to the County's Annex in the previous NHMPs, this new TVWD Annex includes the Willamette Water Supply System.
- A completed and adopted NHMP is a perquisite to receiving funding in support of risk mitigation activities from Federal Emergency Management Agency's (FEMA's) Building Resilient Infrastructure and Communities (BRIC) program and from other funding sources.
- Adoption of the NHMP Annex by the governing body is required to pursue funding from FEMA and others.
- The WWSS Board can choose to adopt the TVWD portion to support future WWSS risk mitigation-related funding requests.

Background:
WWSP staff worked with TVWD and Washington County staff in the development of documentation that incorporates the WWSS into the NHMP, by adding it into the TVWD-specific portion, also called an "annex." This approach was supported by staff at the Oregon Department of Emergency Management because TVWD is the designated Managing Agency of the WWSS. Board adoption by both the TVWD and WWSS Commission is required as part of plan's approval and acceptance by the State of Oregon and FEMA.

Washington County completed the required public review in March and anticipate the County Board of Commissioner's adoption in April 2023.

With the board-approved annex in the County's plan, WWSS is eligible to apply for federal funding to assist with implementation of the hazard mitigation actions included in the plan. For WWSS, those include the following projects to further improve system resiliency:

- ShakeAlert system earthquake early warning network.
- Standby power and fuel storage to provide additional standby power generation and associated fuel storage at the water treatment plant.
- Emergency spare parts and storage facility to provide additional emergency spare parts and associated storage for enhanced operations of the WWSS.

- Seismic upgrades to two bridges on Roy Rogers Road to create a seismically resilient transportation corridor within Washington County for critical infrastructure systems such as water, electrical power, transportation, and wastewater.
- Infrastructure interdependencies workshops (TVWD and WWSS activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience).

Budget Impact:
Project costs for the implementation of the mitigation action activities will be developed in the future when making funding source requests.

Staff Contact Information:
Dave Kraska, P.E., WWSS General Manager, 503-941-4561, david.kraska@tvwd.org
Mike Britch, P.E., WWSP Engineering & Construction Manager, 503-941-4565, mike.britch@tvwd.org

Attachments:
- Proposed Resolution WWSS-03-2023
- Annex J - TVWD Natural Hazard Mitigation Plan Annex

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RESOLUTION NO. WWSS-03-23

A RESOLUTION ADOPTING WILLAMETTE WATER SUPPLY SYSTEM REPRESENTATION IN THE UPDATES TO THE 2023 WASHINGTON COUNTY MULTI-JURISDICTIONAL NATURAL HAZARD MITIGATION PLAN

WHEREAS, the above-entitled matter came before the Willamette Water Supply System Commission (WWSS Commission) at its regular meeting on April 6, 2023; and,

WHEREAS, the Willamette Water Supply System Intergovernmental Agreement (Agreement) between Tualatin Valley Water District (TVWD), the City of Hillsboro (Hillsboro), and the City of Beaverton (Beaverton) (collectively, Members) created the WWSS Commission, an ORS Chapter 190 intergovernmental entity, effective July 1, 2019, to exercise the powers and duties set forth in the Agreement; and,

WHEREAS, pursuant to the Agreement, TVWD has been designated as the Managing Agency of the WWSS Commission; and,

WHEREAS, the WWSS recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

WHEREAS, TVWD is preparing updates to the Washington County Multi-jurisdictional Natural Hazard Mitigation Plan (NHMP); and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

WHEREAS, an adopted NHMP is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, TVWD has fully participated in the FEMA prescribed mitigation planning process to prepare the NHMP, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

WHEREAS, TVWD has identified natural hazard risks and prioritized a number of proposed actions, processes and programs needed to mitigate the vulnerabilities of the TVWD and WWSS to the impacts of future disasters within the NHMP; and

WHEREAS, these proposed actions, processes and programs have been incorporated into the NHMP that has been prepared and promulgated for consideration and implementation by the cities and special districts of Washington County; and

WHEREAS, the Oregon Department of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the NHMP and pre-approved it contingent upon this official adoption of the participating government entities; and

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WHEREAS, the NHMP is comprised of three volumes: Volume I -Basic Plan, Volume II - City Addenda, and Volume III - Appendixes, collectively referred to herein as the NHMP; and

WHEREAS, the NHMP is in an on-going cycle of development and revisions to improve its effectiveness; and

WHEREAS, the WWSS Commission must adopt the NHMP in support of accessing funding for hazard mitigation for projects identified for the WWSS in the NHMP.

NOW, THEREFORE, BE IT RESOLVED BY THE WILLAMETTE WATER SUPPLY SYSTEM COMMISSION THAT:

Section 1: The WWSS Commission adopts the 2023 Washington County Multi-Jurisdictional Natural Hazard Mitigation Plan as an official plan.

Section 2: The WWSS Commission will coordinate with TVWD to submit this adopting resolution to Washington County, the Oregon Department of Emergency Management and Federal Emergency Management Agency, Region X.

Section 3: WWSS staff are hereby directed to work with TVWD and Washington County to finalize the NHMP for final submission to FEMA.

Approved and adopted at a regular meeting held on the 6th day of April 2023.

James Duggan, Chair

David Judah, Vice Chair

Annex J: Tualatin Valley Water District

1. Introduction

1.1. Planning Process Contact

The point of contact during the Washington County Natural Hazard Mitigation Plan (NHMP) planning process for the Tualatin Valley Water District (TVWD) was the Emergency Program Coordinator.

1.2. Annex Organization

This annex has six sections that satisfy mitigation requirements in the Code of Federal Regulations (CFR) Title 44, Part 201 (44 CFR §201):

- **Section 1:** Introduction
- **Section 2:** Planning Process
- **Section 3:** Hazard Identification and Risk Assessment
- **Section 4:** Capability Assessment
- **Section 5:** Mitigation Strategy
- **Section 6:** Action Items

The information provided in this annex is for TVWD alone. All pertinent information that is not identified in this annex is identified in other sections of this NHMP or within the respective appendices.

1.3. NHMP Adoption Process

Once the Washington County NHMP received the designation “Approvable Pending Local Adoption” from the Federal Emergency Management Agency (FEMA), TVWD presented the plan to the Board of Commissioners for final public comment and local adoption. A copy of the resolution was inserted into the NHMP and is held on file at TVWD and Washington County.

2. Planning Process

(In compliance with 44 CFR §201.6(c)(1))

2.1. Development and Adoption Process

To apply for certain types of federal aid, technical assistance, and most post-disaster funding, local jurisdictions and special districts must comply with 44 CFR §201.3, which sets forth the requirement that communities develop a plan outlining their present and proposed efforts to mitigate risks from natural hazards.

District officials recognize the benefits of having a long-term, all-hazards approach to mitigating natural hazards. The passage of the Disaster Mitigation Act of 2000 (DMA 2000) enabled District officials to recognize the benefits of having a long-term, all-hazards approach to hazard mitigation and mitigating natural hazards. The District's involvement in the Washington County NHMP represents the collective efforts of the NHMP Steering Committee members, all participating local Technical Committee members, the public, and stakeholders.

The District developed this annex in accordance with guidance outlined in 44 CFR §201.6(c)(5) of DMA 2000. The complete NHMP and this annex identify hazards and mechanisms to minimize damages associated with these hazards as they occur in the geographical service area of the District.

2.2. Organizing the Planning Effort

A comprehensive approach was taken in developing this NHMP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known.

Two teams worked simultaneously on this mitigation plan:

1. **Hazard Mitigation Steering Committee:** This committee consisted of points of contact from each plan participant. The group met to discuss countywide topics, including hazards and mitigation strategies. The points of contact were the leads of their local Technical Committee.
2. **Local Technical Committee:** Each plan participant had a Technical Committee that consisted of the Steering Committee representative for that jurisdiction or special district as well as designated representatives from within the organization. This team met to assess capabilities, hazards, and mitigation strategies within the planning area.

2.2.1. Tualatin Valley Water District Technical Committee

The TVWD annex of the overall NHMP was developed by the local Technical Committee of the TVWD with support from IEM, a consulting firm hired to assist with the planning process. The efforts of the committee, which took place throughout 2022, were led by the Emergency Program Coordinator.

Table 280: Tualatin Valley Water District Technical Committee Members for the 2023 NHMP

Position	Department	Role in Committee and Planning Process
Emergency Program Coordinator	TVWD Administrative Services	General oversight, hazard identification, and plan development
Capital Improvements Program Manager	TVWD Engineering Division	Hazard identification and plan development
Geographic Information System (GIS) Analyst	TVWD Asset Management Division	Hazard identification and plan development
Water Operations Division Manager	TVWD Engineering and Operations	Hazard identification and plan development
Risk Management Coordinator	TVWD Administrative Services	Hazard identification and plan development
Communications and Public Affairs Support	TVWD Customer Service	Communications, community outreach, education, and general support
Chief Operating Officer	TVWD COO	Strategic planning guidance and oversight

In addition, IEM participated in the following activities associated with development, approval, and adoption of the plan:

1. Facilitated the NHMP update process.
2. Based on committee direction and stakeholder and community input, prepared the first draft of the plan and provided technical writing assistance for plan review, editing, and formatting.
3. Submitted the proposed plan to the Oregon Department of Emergency Management (OEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
4. Coordinated plan adoption processes with TVWD, OEM, and FEMA.

2.3. Public Participation

Public participation is an important component of this NHMP. Public participation offers community members the chance to voice their ideas, interests, and opinions. In addition to FEMA's public participation requirement, Oregon's land use system addresses the need for public participation in Statewide Land Use Planning Goal 1, Citizen Involvement, which ensures the opportunity for the community to be involved in the planning process.

A survey regarding community perceptions of natural hazards and priorities was administered and used to help the Steering and Technical committees update their risk assessments and mitigation strategies. Community members were also provided an opportunity to comment on a draft of the NHMP. See Appendix B of the NHMP for additional information.

3. Hazard Identification and Risk Assessment

(In compliance with 44 CFR §201.6(c)(2)(i), §201.6(c)(2)(ii), §201.6(c)(2)(ii)(A), §201.6(c)(2)(ii)(B), §201.6(c)(2)(ii)(C), §201.6(c)(2)(iii), and §201.6(c)(3)(ii))

The following information serves to assist TVWD in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.

3.1. Tualatin Valley Water District Profile

This section provides information on TVWD-specific characteristics. Additional discussion of the planning area's community characteristics is outlined in Appendix A of the NHMP.

Many of these characteristics can affect how natural hazards impact the TVWD service area and how the District chooses to plan for natural hazard mitigation. Considering TVWD-specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

The TVWD was founded in 1991 with the merger of the Wolf Creek and Metzger Water Districts and serves an estimated 224,600 customers throughout Washington County and surrounding areas that include the cities of Beaverton, Hillsboro, and Tigard.[511] The District has 133 employees, covers 26,000 acres, 40 pressure zones, 759 miles of pipe, 21 active storage reservoirs, and 12 pump

[511] Tualatin Valley Water District. (2021, December 20). Annual Comprehensive Financial Report. https://www.tvwd.org/sites/default/files/fileattachments/finance/page/2176/2021_tvwd_acfr_final.pdf

stations.[512,513,514,515] TVWD supplies an average of about 23 million gallons of water per day. The District receives approximately 72% of its water from the Portland Water Bureau (PWB). This water primarily comes from the Bull Run watershed and is piped to a 50-million-gallon storage reservoir on Powell Butte, located on the east side of Portland. Around 28% of TVWD's water comes from the Joint Water Commission (JWC), which is jointly owned by the District and the Cities of Hillsboro, Beaverton, and Forest Grove. The JWC source is comprised of water from Hagg Lake (Scoggins Reservoir) and the Barney Reservoir released into the upper portion of the Tualatin River. When flows are available, water from the Tualatin River is used. When the Willamette Water Supply System (WWSS) is operational in 2026, the Willamette River will be an additional water source. The WWSS is currently under construction and will be operational during the five-year timeframe of this NHMP. The Willamette Water Supply System Commission (WWSS Commission) is an Oregon intergovernmental entity formed by TVWD, the City of Hillsboro, and the City of Beaverton.

The WWSS Commission was formed to build the WWSS in response to planned growth in their service areas. The WWSS will provide an additional, resilient water supply for Washington County.

TVWD has been designated the Managing Agency for the WWSS Commission, and TVWD operates the Willamette Water Supply Program (WWSP) to plan, design, and construct the WWSS. When completed TVWD, as the Managing Agency, will be responsible for future mitigation planning and action. Additional information about the WWSP is in Section 7 of this annex.

[512] Tualatin Valley Water District. (n.d.). Getting Water to You. https://www.tvwd.org/district/page/getting-water-you
[513] Tualatin Valley Water District. (n.d.). Water System and Sources. https://www.tvwd.org/district/page/water-system-and-sources
[514] Carollo Engineers. (2016, May 17). Master Planning for Seismic Reliability and Resiliency: Tualatin Valley Water District. PowerPoint Presentation
[515] TVWD NHMP Planning Documentation

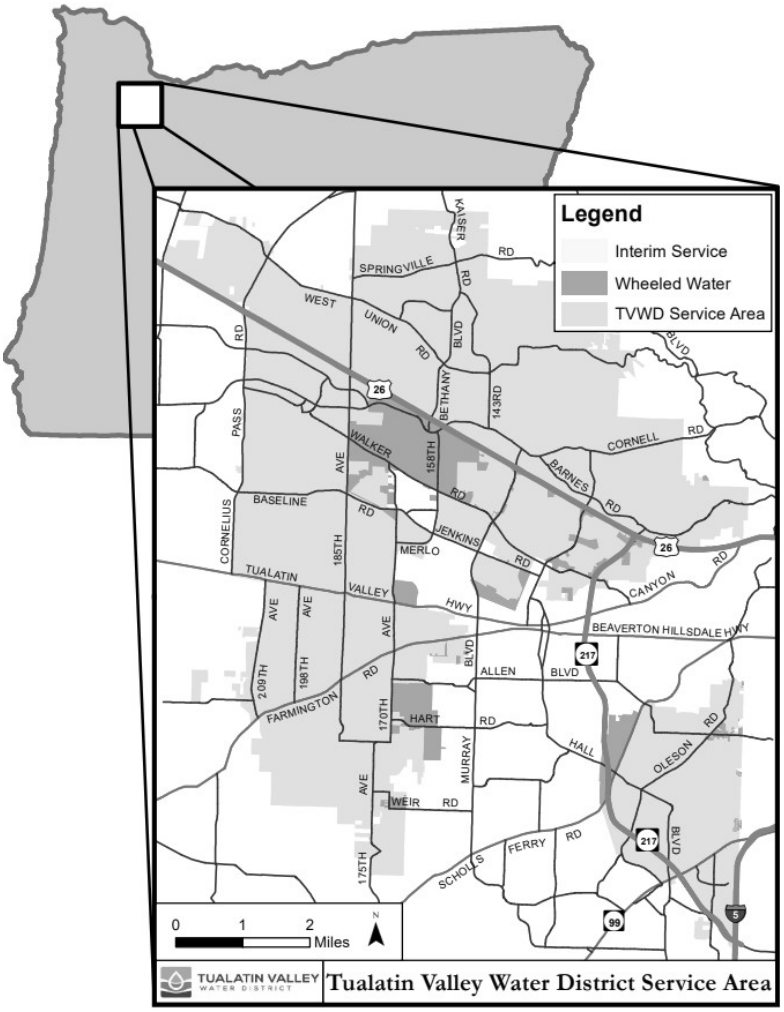


Figure 40: Tualatin Valley Water District Service Area

The District's pipes range from 2 to 60 inches, and pumping stations transmit water from the gravity flow water main to higher elevations within the service area. The gravity flow main is a 60-inch water main serving the District from Portland's Powell Butte Reservoir. The District's gravity line capacity is 42.3 million gallons per day (MGD), with another 14.5 MGD available from the JWC, an amount well above the average and peak daily flow.[516]

Within the system, there are 23 covered reservoirs with a combined storage capacity of 67.35 million gallons. Some reservoirs are belowground, with Tualatin Valley Park & Recreation District tennis courts or soccer fields built on top. The major pumping stations and the reservoirs have full telemetry control systems.[517]

The District's water system is monitored 24 hours a day, 7 days a week. In addition to watching water flows and pressure, the Supervisory Control and Data Acquisition (SCADA) system monitors several water quality parameters and security alarms. If the system identifies anything out of the ordinary, alarms alert an operator to the possible problem and staff are dispatched as needed.

[516] Tualatin Valley Water District. (n.d.). Getting Water to You. https://www.tvwd.org/district/page/getting-water-you
[517] Tualatin Valley Water District. (n.d.). Getting Water to You. https://www.tvwd.org/district/page/getting-water-you

TVWD recognizes the importance of water sector interdependencies and bases planning priorities, mitigation actions, and infrastructure development on these interconnected systems. Figure 41 is a map of these key public sector, infrastructure, and community service partners that rely on TVWD's water system to remain operational. This map has been adapted by WWSS staff from the Water Sector-Specific Plan annex to the National Infrastructure Protection Plan.[518]

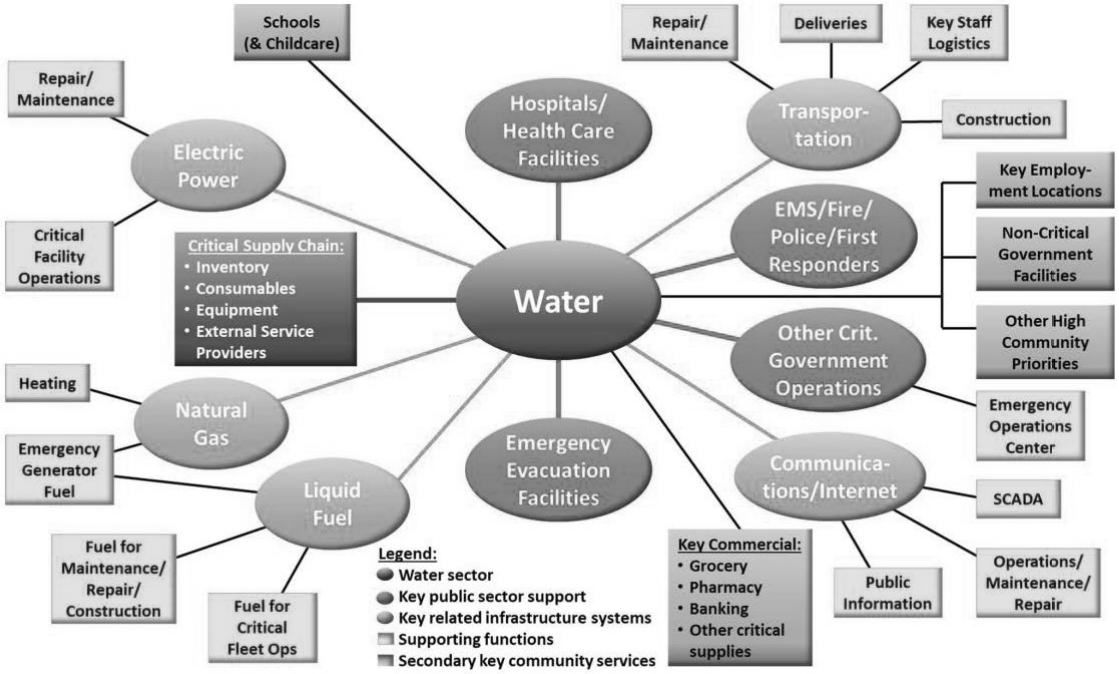


Figure 41: Tualatin Valley Water District Water Sector Interdependencies

TVWD critical and vulnerable facilities listed below in Table 281 may be vulnerable to one or more natural hazards.

[518] TVWD NHMP Planning Documentation; U.S. Department of Homeland Security and U.S. Environmental Protection Agency. (2010). 2010 Water Sector-Specific Plan: An Annex to the National Infrastructure Protection Plan. https://nepis.epa.gov/Exe/ZyPDF.cgi/P100KL4X.PDF?Dockey=P100KL4X.PDF

Table 281: Critical Facility and Asset Inventory

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
Willamette Water Supply Program Office	Infrastructure or Facility	
TVWD Headquarters		
Distribution system, pumps, and pipe system	Infrastructure or Facility	752 miles of pipe, 12 booster pump stations, 39 pressure zones, 21 active reservoirs, and aquifer storage and recovery wells
Pipes, conveyances, and intakes	Infrastructure or Facility	Encompasses the infrastructure that collects and transports water from source water to treatment or distribution facilities.
TVWD 385, 435, 385/435	Infrastructure or Facility	Zones
Cooper Mountain, intertie, pipe, and pump	Infrastructure or Facility	Zones
West Hills, intertie, pipe, and pump	Infrastructure or Facility	Zones
Metzger, intertie, pipe, and pump	Infrastructure or Facility	Zones
Storage and distribution facilities	Infrastructure or Facility	Encompasses all infrastructure used to store water after treatment, maintain water quality, distribute water to customers.
Emergency Underground Storage, WMP 8.5.4.1	Infrastructure or Facility	
Distributed Drinking Well Concept, mitigation plan to make wells more resilient	Infrastructure or Facility	Mitigation work (seismic upgrade) on existing wells and establish distribution point in proximity to the well and/or plan to haul water.
Center Street Tunnel	Infrastructure or Facility	
Grabhorn Reservoir	Infrastructure or Facility	
Generation station (fluoride)	Infrastructure or Facility	
Beaverton–Hillsdale Connection	Infrastructure or Facility	
Cornelius Pass Connection (PRV and fluoride)	Infrastructure or Facility	
Teufel Reservoir	Infrastructure or Facility	
Ridgewood View Reservoir	Infrastructure or Facility	
189th Street Pump Station	Infrastructure or Facility	

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
Goyak Pump Station	Infrastructure or Facility	
Springville Reservoirs	Infrastructure or Facility	
75th Street PRV and Fluoride Station	Infrastructure or Facility	
Taylors Ferry Reservoirs (backup connect to Portland)	Infrastructure or Facility	
Florence Lane Pump Station (Comm Hub)	Infrastructure or Facility	
Ridgewood View Reservoir (Comm Hub)	Infrastructure or Facility	
Florence Lane Reservoirs	Infrastructure or Facility	
Bonny Slope Park Reservoirs N/S	Infrastructure or Facility	
Garden Home Reservoir	Infrastructure or Facility	
North Road Reservoir	Infrastructure or Facility	
Schell Reservoir	Infrastructure or Facility	
Bull Run Connection (Florence Lane and 80th Avenue)	Infrastructure or Facility	
Somerset Reservoir	Infrastructure or Facility	
Sunset Pump Station	Infrastructure or Facility	
Sunset Reservoir	Infrastructure or Facility	
Teufel Pump Station	Infrastructure or Facility	
Thompson Pump Station	Infrastructure or Facility	
Thompson Reservoir	Infrastructure or Facility	
Inglewood Pump Station	Infrastructure or Facility	
Goyak Reservoir	Infrastructure or Facility	
Bethany Pump Station	Infrastructure or Facility	
Center Street PRV	Infrastructure or Facility	
Cooper Mountain Tanks	Infrastructure or Facility	
Inglewood Reservoir	Infrastructure or Facility	
189th Street Reservoir	Infrastructure or Facility	

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
Grabhorn Aquifer Storage and Recovery (ASR)Well	Infrastructure or Facility	
Rosander Reservoir	Infrastructure or Facility	
Cooper Mountain Pump Station	Infrastructure or Facility	
Catlin Crest Pump Station	Infrastructure or Facility	
Viewmont Pump Station	Infrastructure or Facility	
Garden Home Meter	Infrastructure or Facility	
Hoyt Park Connection	Infrastructure or Facility	
Multnomah Connection	Infrastructure or Facility	
Portable Pump (flow and eddy)	Infrastructure or Facility	
Willamette Water Supply System		
Name of Infrastructure, Facility, or Resource	**Type of Asset**	**Comments**
Intake Facilities (RWF_1.0)	Infrastructure or Facility	Under construction. Owned by Water Intake Facilities. Located in the City of Wilsonville in Clackamas County. Not vulnerable to dam failure.
Facilities, 66" Pipeline, Appurtenances (RWF_1.0)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Wilsonville in Clackamas County. Not vulnerable to dam failure.
66" Pipeline, Appurtenances (PLM_1.1)	Infrastructure or Facility	Construction complete. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Wilsonville in Clackamas County. Not vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
66" Pipeline, Appurtenances (PLM_1.2)	Infrastructure or Facility	Construction complete. Owned by TVWD and the cities of Hillsboro and Beaverton Located in the City of Wilsonville in Clackamas County. Not vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_1.3)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Wilsonville in Clackamas County. Not vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_2.0)	Infrastructure or Facility	Construction complete. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Wilsonville in Clackamas County. Not vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_3.0)	Infrastructure or Facility	Construction complete. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the cities of Sherwood and Tualatin in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
60 MGD Water Treatment Plant (WTP_1.0)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Sherwood in Washington County. Not vulnerable to dam failure, drought, or flood.
Deferred Projects (WTP_1.0)	Infrastructure or Facility	Future project. Will be owned by TVWD and the cities of Hillsboro and Beaverton. Will be located in the City of Sherwood in Washington County. Will not be vulnerable to dam failure, drought, or flood.

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
On-Site Hypochlorite Generation (WTP_1.0)	Infrastructure or Facility	Future project. Will be owned by TVWD and the cities of Hillsboro and Beaverton. Will be located in the City of Sherwood in Washington County. Will not be vulnerable to dam failure, drought, flood, landslide, or volcanic ash.
66" Pipeline, Appurtenances (PLM_4.1)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Sherwood in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_4.2)	Infrastructure or Facility	Future project; in bidding stage. Will be owned by TVWD and the cities of Hillsboro and Beaverton. Will be located in the City of Sherwood in Washington County. Will not be vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_4.3)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in Washington County. Not vulnerable to drought, extreme heat, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_4.4)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Sherwood in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_5.1)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Tigard in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
66" Pipeline, Appurtenances (PLM_5.2)	Infrastructure or Facility	Construction complete. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Beaverton in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
66" Pipeline, Appurtenances (PLM_5.3)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
15 MG Reservoir, Facilities, 66" Pipeline, Appurtenances (RES_1.0)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in Washington County. Not vulnerable to dam failure, drought, or flood.
15 MG Reservoir, 66" Pipeline, Appurtenances (RES_1.0)	Infrastructure or Facility	Future project. Will be owned by TVWD and the cities of Hillsboro and Beaverton. Will be located in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, windstorm, including tornado, or winter storm.
48" Pipeline, Appurtenances (PLW_1.1)	Infrastructure or Facility	Construction complete. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in the City of Hillsboro in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
48" Pipeline, Appurtenances (PLW_1.2)	Infrastructure or Facility	Construction complete. Owned by TVWD and the City of Hillsboro. Located in the City of Hillsboro in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
66" Pipeline, 48" Pipeline, Appurtenances (PLW_1.3)	Infrastructure or Facility	Under construction. Owned by TVWD and the cities of Hillsboro and Beaverton. Located in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
48" Pipeline, Appurtenances (PLW_2.1)	Infrastructure or Facility	Future project; in bidding stage. Will be owned by TVWD and the City of Hillsboro. Will be located in the City of Hillsboro in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
Facilities, 48" Pipeline, Appurtenances (PLW_2.2)	Infrastructure or Facility	Future project. Will be owned by TVWD and the City of Hillsboro. Will be located in the City of Hillsboro in Washington County. Not vulnerable to dam failure, drought, or flood.
48" Pipeline, Appurtenances (MPE_1.1)	Infrastructure or Facility	Under construction. Owned by TVWD. Located in the City of Beaverton in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.
48" Pipeline, Appurtenances, Facility (MPE_1.2)	Infrastructure or Facility	Under construction. Owned by TVWD. Located in the cities of Beaverton and Tigard in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, or volcanic ash.
48" Pipeline, Appurtenances (MPE_1.3)	Infrastructure or Facility	Future project; in bidding stage. Will be owned by TVWD. Will be located in the cities of Beaverton and Tigard in Washington County. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, wildland fire, windstorm, including tornado, or winter storm.

Name of Infrastructure, Facility, or Resource	Type of Asset	Comments
Fiber Optic Installation (Communications)	Infrastructure or Facility	Future project. Will be owned by TVWD and the cities of Hillsboro and Beaverton. Will be located throughout the service area. Not vulnerable to dam failure, drought, extreme heat, flood, volcanic ash, windstorm, including tornado, or winter storm.
Emergency Spare Parts & Storage Facilities (Parts/Storage)	Infrastructure or Facility	Future project. Will be owned by TVWD and the cities of Hillsboro and Beaverton. Location to be determined. Will likely not be vulnerable to dam failure, drought, extreme heat, flood, or volcanic ash.
ShakeAlert System (Communications)	Warning System	Future project. Will be owned by TVWD and the cities of Hillsboro and Beaverton. Location WTP_1.0. Will likely not be vulnerable to dam failure, drought, extreme heat, flood, landslide, volcanic ash, wildland life, windstorm, including tornado, or winter storm.

3.2. Natural Hazard Profiles

TVWD Technical Committee utilized the OEM's hazard analysis methodology to examine hazard vulnerability and probability by collecting information about history, probability, vulnerability, and maximum threat for each hazard that impacts the District. This methodology does not compare hazards to each other or rank hazards against each other. Instead, this process provides a sense of hazard priorities or relative risk and allows comparison of the same hazard across participants.

Each of the hazards examined by this analysis was scored using a formula that incorporates the four rating criteria, a weight factor, and three levels of severity: low, medium, and high. The score range for this methodology is 24 (lowest possible) to 240 (highest possible). For additional detail about the OEM risk and hazard analysis methodology, see Volume I, Section 2.

The scores for each hazard that impact TVWD are presented below. All natural hazards included in the NHMP have the potential to impact TVWD.

Table 282: Natural Hazard Risk Scores

Natural Hazard	History	Vulnerability	Maximum Threat	Probability	Score
Dam failure	Low	Medium	Medium	High	133
Drought	High	High	Medium	High	186
Earthquake: Cascadia (3–5-minute event)	Low	High	High	Medium	201
Earthquake: Crustal (1-minute event)	Low	High	High	Low	159
Extreme heat	High	Medium	High	High	177
Flooding, including channel migration and streambed erosion	Low	Low	Low	Medium	67
Landslide	High	Low	Low	Medium	88
Volcanic ash	Low	Medium	High	Low	119
Wildland fire	High	Medium	Medium	High	161
Windstorm, including tornado	High	Medium	Medium	High	169
Winter storm	High	Medium	High	High	206

Full descriptions of each hazard are provided in Volume I, Section 2. The potential effects of climate change on the magnitude and frequency of natural hazard events are described in each hazard description in this annex and in Volume I, Section 2.

The timeframe of data collected during the planning process for TVWD was from as far back as available to February 22, 2022. Hazard events that occurred during this period and were deemed significant by the District's Technical Committee are included in this annex's hazard profiles.

The following hazard profiles are in alphabetical order and include a brief hazard description, significant events, if applicable, and potential impacts and vulnerabilities. The potential impacts for each hazard are presented in the same order, as applicable: populations, economies, structures, improved property, critical facilities and infrastructure, historical properties and cultural resources, and natural environments.

3.2.1. Dam Failure

Because of the mission of TVWD, a dam failure could affect their operations and the customers they serve. Potential impacts of and vulnerabilities to dam failure are identified below.

3.2.1.1. Potential Impacts

The potential impacts of a dam failure event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- **Scoggins Dam and Reservoir:** TVWD obtains about 28% of their water from the JWC. Water is provided from Hagg Lake and Scoggins Dam and Reservoir. A dam failure could reduce the amount of water available for customers.
- **Eldon Mills Dam and Barney Reservoir:** Located at the headwaters of the North Fork Trask River. Should the dam fail, there is the potential for a reduction in water delivered from this source to their customers. The Barney Reservoir Joint Ownership Commission owns and operates the dam and reservoir. Its membership is comprised of five partners: the cities of Hillsboro, Forest Grove, and Beaverton, TVWD, and Clean Water Services.
- **Bull Run Water Shed:** Approximately 70% of TVWD's water is purchased from the City of Portland. Portland's primary source is water from the Bull Run watershed and the City uses pumped groundwater from the Columbia South Shore Well Field next to the Columbia River to augment the Bull Run supply when needed.
- **Aquifer Storage and Recovery (ASR):** During the winter when water is plentiful, TVWD stores treated drinking water underground in the aquifer surrounding the Grabhorn well on Cooper Mountain. During the hot summer months, the stored water is pumped from the aquifer to help meet peak water demands. The Grabhorn ASR well can store in excess of 300 million gallons of treated water. A dam breach could limit the amount of water available and could contaminate the aquifer storage water.

3.2.1.2. Vulnerabilities

All populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD that are vulnerable to a dam failure event.

TVWD-specific vulnerabilities include:

- Staff working at all District locations and/or responding to a dam failure event, including those at indoor and outdoor facilities. Personal safety of staff may be a vulnerability as well as staff's inability to get to worksites, move between different locations, and access impeded parking lots.
- TVWD's identified critical infrastructure.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Natural environments and acreage utilized and owned by the District.

Vulnerabilities within the TVWD service area include:

- Failure of any of the dams mentioned could adversely affect the population, economies, structures, improved property, critical facilities and infrastructure, historical and cultural resources, and natural environments of the service area via flooding and water shortages.

- The Clean Water Services Hillsboro Treatment Facility is in the potential dam failure impact area. This facility provides wastewater treatment for the cities of North Plains, Banks, the western region of Hillsboro, the southeastern portion of Cornelius, and the northwestern portion of Forest Grove. The facility cleans approximately 4 million gallons of wastewater on an average day.[519]
- The JWC Water Treatment Plant could be vulnerable to flooding created by a Scoggins Dam failure event. The plant could be vulnerable to higher-than-normal water levels and damage to infrastructure due to debris flows, which could lead to changes in the amount of water available for use.

[519] Clean Water Services. (2022). Locations. https://cleanwaterservices.org/about/locations/

3.2.2. Drought

Drought typically occurs as a regional event and often affects more than one city, county, and special district simultaneously. TVWD is a member of the JWC and has water storage reservoirs, therefore it may be impacted by drought differently than other NHMP participants. Significant events and the potential impacts of and vulnerabilities to drought are identified below.

3.2.2.1. Significant Events

TVWD identified three significant drought events.

- **1992:** During 1992, PWB and its wholesale customers, including the District, experienced severe water supply shortages for five reasons: (1) the Bull Run watershed, which serves the Portland metropolitan region, had experienced the lowest spring rainfall and stream flows since the year 1899; (2) demand for water during May and June of that year was unusually high due to record-breaking temperatures that occurred in the region; (3) reservoir levels were low, as is typical in the late summer months; (4) the PWB backup source, the Columbia South Shore wellfield, was unavailable because of concern that a contamination plume would move into the well field aquifer if those wells were used; and (5) voluntary requests to reduce water use were not effective. (Similar shortages also occurred in 1952, 1987, and 1991.)
- **2001:** The summer of 2001 was not particularly hot, but Hagg Lake filled to only 51%. As a result, all municipalities using supplies from the JWC were asked to curtail use in order to leave supplies for more senior irrigation water rights, as well as to leave adequate water supplies for instream use. Evaporation in the lake during the summer further reduced municipal supplies. The District was able to meet its customers' demands by purchasing additional water from the City of Portland.
- **April–August 2021:** April was the driest April on record since 1941. May had only 6 days of measurable rain. There was a heat dome in June 2021. The temperature reached 116 degrees Fahrenheit (°F) on June 28. Dry weather and heat continued until rain in September 2021. There was heat sheltering of staff and restricted operations.

3.2.2.2. Potential Impacts

The potential impacts of a drought event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- Reduction or loss of water supply, water use restrictions, and lack of potable water supply.
- Health effects, including increased heat-related, waterborne, and cardiorespiratory illnesses, as well as mental health conditions.
- Reduced economic productivity or business closures, including agriculture, livestock, recreation, energy, tourism, timber, and fisheries.
- Supply chain restrictions, including food shortages.
- Loss of power or reduced availability of electricity due to infrastructure damage and high demand.
- Property and infrastructure damage due to expansive soils, which are clay-based soils that expand and contract based on the amount of moisture in the soil.
- Damage to natural environments, including low water levels in lakes, rivers, and other water bodies, reduced plant growth, local species reduction or extinction, increased water temperature, and deteriorated water quality, which may result in fish kills and increased waterborne pollutants.
- Concurrent hazards, including extreme heat, wildfire, flooding, and landslides.

The District has adopted a four-stage Water Curtailment Plan to be invoked in the event of a water supply shortage. These stages are designed to be initiated and implemented in progressive steps. The plan includes both voluntary and mandatory rationing, depending upon the cause, severity, and anticipated duration of the shortage. The four stages and their initiating conditions are presented below. Curtailment could be initiated by any of the corresponding initiating conditions.

Table 283: Water Curtailment Event Triggers and Stages[520]

Curtailment Stages	Initiating Conditions
Stage 1: Routine Summer Advisory	• Portland Water Bureau (PWB) issues a "notice of drawdown," announcing the release of stored water in the Bull Run System. • PWB activates groundwater wells as part of its supplies. • Hagg Lake fails to fill 100% by May 1. • Barney Reservoir fails to fill 100% by May 1. • The JWC issues a "notice of drawdown," announcing the release of stored water.
Stage 2: Moderate Water Supply Shortage	• PWB is operating under a warm-dry scenario. • Hagg Lake is filled to less than 80% before May 1. • District customer use reaches contractual and/or facility capacity for seven consecutive days.
Stage 3: Severe Water Supply Shortage	• PWB has only groundwater sources available. • PWB cannot meet supply demands of wholesale customers. • JWC reservoirs drop below 40% of "normal conditions"; under such circumstances JWC enacts mandatory curtailment for its members. • Water supplies fail to meet U.S. Environmental Protection Agency Safe Drinking Water Act standards. • The District's distribution system experiences a significant and sustained reduction of water pressure. • District customer use reaches contractual and/or facility capacity for 14 consecutive days.
Stage 4: Critical Water Supply Shortage	• PWB offloads (i.e., ceases serving) the District from its system and JWC cannot meet the District's resulting additional demands for water. • JWC offloads the District from its system, and PWB supplies cannot meet the District's resulting additional demands for water. • Water supplies from the JWC or the PWB are either physically cut off or otherwise become unavailable. • District customer use reaches contractual and/or facility capacity for 28 consecutive days.

[520] Tualatin Valley Water District. (n.d.). Municipal Water Curtailment Element. https://www.tvwd.org/sites/default/files/fileattachments/district/page/2157/tvwd_curtailment_plan.pdf

3.2.2.3. Vulnerabilities

All populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD are vulnerable to drought. This includes:

- Staff with preexisting health conditions, staff without access to clean water, and staff who are pregnant women and/or older adults.
- TVWD's identified critical infrastructure.
- Water sources used by the District.
- Natural environments and acreage utilized and owned by the District.

3.2.3. Earthquake

The District could experience earthquakes that originate from the Cascadia Subduction Zone, Portland Hills Fault Zone, and Gales Creek Fault Zone. It could also experience liquefaction and coseismic landslides as the result of an earthquake. Potential impacts of and vulnerabilities to earthquake are identified below.

3.2.3.1. Potential Impacts

The potential impacts of an earthquake event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- Injuries or deaths.
- Mental health impacts, including post-traumatic stress disorder.
- Public health hazards resulting from disruption of drinking water and wastewater systems.
- Need for widespread search and rescue operations.
- Displaced residents in need of sheltering.
- Delayed emergency response times due to debris, blocked transportation routes, and damaged infrastructure and vehicles.
- Economic impacts to governments, including reduced future revenues, increased costs resulting from response activities, and increased future costs resulting from recovery and reconstruction activities.
- Industries can experience commerce losses from power interruptions, damaged buildings and assets, and road closures. Industries can also sustain direct losses to buildings, personnel, and other vital equipment.
- Personal and household economic impacts of loss of income, increased medical costs, and property damage that may not be covered by insurance.
- Damage to ground utilities; residential, public, and private buildings; and transportation systems above and below.
- Disruption of essential infrastructure systems, such as power systems, public utilities, and telecommunications.
- Blocked roads and rail transportation routes due to debris from trees and damaged property, ground deformation, and liquefaction.
- Downed or damaged powerlines that can lead to wildfires.
- Power outages and natural gas leaks.
- Hazardous material releases due to infrastructure and facility damage.
- Harm to ecosystems from loss of habitat, death and destruction of vegetation and animals, and erosion.
- Change in water flows, including paths of rivers and streams.
- Damage to crops, livestock, vegetation, parks, and natural systems.
- Concurrent hazards initiated by an earthquake, including flood, wildland fire, and landslide.

3.2.3.2. Vulnerabilities

All populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD are vulnerable to earthquakes. This includes:

- Staff working at all District locations: The personal safety of staff may be a vulnerability as well as staff's inability to get to worksites, move between different locations, and access impeded parking lots.
- TVWD's identified critical infrastructure, particularly the TVWD Headquarters building.[521] The District has done significant planning for seismic reliability and resiliency. Vulnerable facilities and infrastructure, anticipated damage to storage and pumping facilities, anticipated damage to pipelines, estimation of system leakage, and estimation of "time-to-drain" have been evaluated and the findings are on file at TVWD.
- Other critical infrastructure, including power sources and emergency generators.
- The Critical Infrastructure Hub (CEI Hub) is vulnerable to an event, and if damaged, TVWD's ability to obtain fuel could be significantly affected and water supplies may become contaminated. The CEI Hub is a six-mile area in Northwest Portland along the Willamette River. More than 90% of the state's liquid fuel supply is transported through CEI Hub facilities, including gasoline and diesel. Roughly 70% of the fuel arrives by pipe and another 30% arrives by tanker barge. In addition to the fuel storage facilities, the CEI Hub also contains liquid fuel and natural gas pipelines and transfer stations, a liquefied natural gas storage tank, storage of other non-fuel materials, a high-voltage electrical substation, and transmission lines.[522]
    - The CEI Hub is located on top of a high-risk liquefaction zone, as the NW Industrial Area was developed on top of the Willamette River Floodplain. In total, 397 tanks could release stored materials as a result of a Cascadia Subduction Zone earthquake. Based on tank age and location, approximately 365 tanks could release 50 to 100% of their materials, and 32 tanks could release up to 10% of stored materials. Together, the total potential releases from the materials stored in tanks at the CEI Hub range from 94.6 million to 193.7 million gallons. Approximately 57% of the total potential releases would be released onto ground, and 43% have the potential to flow into the Willamette River.[11]
    - A fire at the CEI Hub involving the fuels stored on-site is a likely scenario following a Cascadia Subduction Zone earthquake. Many fuel storage tanks have a metal floating lid which in an earthquake could scrape against the metal perimeter, creating a spark and potentially a fire. Fires within tanks could result in large explosions, further threatening people, property, and environmental resources. There are also power lines throughout the CEI Hub which could fall due to the earthquake and serve as a potential ignition source.[11]
    - Of the 393 active tanks that are not empty and have known contents at the CEI Hub, 200 tanks (approximately 51%) have materials that are known to be flammable. Based on the total estimate of releases, approximately 93% of releases will be of flammable materials. The total capacity of tanks with flammable materials is 298.7 million gallons. Therefore, the contents of these tanks all have the potential to burn, either on land or in the water. Because burning requires both a fuel and an ignition source, the specific amount of materials that would burn are a function of location and event-specific factors.[523]
- Areas near the epicenter of an earthquake event are likely to incur a significant amount of damage to all buildings, infrastructure, facilities, and property.

[521] Carollo. (2019, January 27). R&R Assessment and ERP Update: America's Water Infrastructure Act (AIWA) Compliance, Workshop #4 presentation.
[522] Portland Bureau of Emergency Management. (2022, April). The Mitigation Action Plan. https://www.portland.gov/sites/default/files/2022/mapfulldraft_6-15.pdf
[523] Portland Bureau of Emergency Management. (2022, April). The Mitigation Action Plan. https://www.portland.gov/sites/default/files/2022/mapfulldraft_6-15.pdf

- Buildings with very high or high collapse potential include those constructed prior to 1990.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Natural environments and acreage utilized and owned by the District.

3.2.4. Extreme Heat

Due to a rise in the frequency and severity of extreme heat events and the impacts from those events, the NHMP Steering Committee chose to include this hazard for the first time in the Washington County NHMP. Significant events and the potential impacts of and vulnerabilities to extreme heat are identified below.

3.2.4.1. Significant Events

Extreme heat was not included in previous NHMPs. TVWD identified one significant extreme heat event.

- **June 25–30, 2021:** An unprecedented heat dome enveloped the City of Portland, which is in the TVWD service area, reaching a record-breaking peak temperature of 116 °F on June 28. This surpassed the previous day's record high of 112 °F, which in turn broke the record set the day before of 108 °F. These temperatures reached around 30 to 40 °F higher than the average normal temperatures for these days in previous recorded years. The Governor declared a state of emergency in several Oregon counties. The heat caused roads and sidewalks to crack and forced closures of the Portland Streetcar public transit system. Portland's Bureau of Emergency Communications saw a surge of 911 calls, receiving over 240 calls related to heat incidents between June 24 and June 30. Multiple deaths were recorded due to heat.

3.2.4.2. Potential Impacts

The potential impacts of an extreme heat event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- Injuries or deaths.
- Heat illnesses, including heat rashes, heat cramps, heat exhaustion, heat stroke, and death.
- Extended operational hours of TVWD staff and additional resources needed for response to the event, including the operation of daytime cooling centers and overnight cooling shelters.
- Strain on or loss of water supply due to increased demand.
- Industries can experience commerce losses from power interruptions, damaged buildings and assets, and road closures. Industries can also sustain direct losses to buildings, personnel, and other vital equipment.
- Economic losses from decreased worker efficiency and effectiveness and time lost on the job when workers take more frequent or longer breaks to avoid overheating.
- Economic impacts of closure of outdoor activities and events, such as farmers markets and concerts.
- Property damage, such as roof expansions, leading to warped, cracked, and leaking shingles; dry, cracked, and leaking caulking around flashing and joints; cracked foundations; excessive drying of wood structures; and melted siding.
- Disruption of essential infrastructure systems from overheated and damaged utilities, including power, water, transportation, and communication systems.
- Impacts to roadways as heat expands concrete or causes cracking and buckling. Public transit can also be impacted due to melted cables, sagging wires, and warping tracks.
- Damage to crops, livestock, vegetation, parks, and natural systems.

- Impacts to greenspaces, such as scorch and sunscald of new foliage, branches or tops of trees dying, and significant stress and die-off of native trees, particularly Douglas fir and cedar. These impacts are intensified if drought is also occurring.
- Concurrent hazards include drought and wildland fire.

3.2.4.3. Vulnerabilities

All populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD are vulnerable to extreme heat.

Populations substantially vulnerable to extreme heat include:

- Staff who work or spend a significant amount of time outdoors, including those in operations and maintenance.
- Staff who live and/or work in buildings without air conditioning or cooling equipment.
- Staff living, working, or spending time in heat islands within the District's service area.
- Staff with higher heat sensitivity, including older adults, pregnant women, people with preexisting or chronic diseases, and those who take certain medications that affect thermoregulation or block nerve impulses.
- TVWD's identified critical infrastructure.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Vehicles, including District maintenance vehicles, are vulnerable to engine overheating and tire deterioration.
- Aboveground utility and power lines can droop or sag and create a heightened fire risk to staff and District facilities.
- Natural environments and acreage utilized and owned by the District.

3.2.5. Flooding, Including Channel Migration and Streambed Erosion

Flooding to a greater or lesser degree is fairly common in the county, and events typically occur from October through April. As the District is a planning participant whose assets are widely dispersed, its vulnerability to flooding may vary from site to site. The District experiences occasional localized flooding, but historically events have not been significant or severe. Potential impacts of and vulnerabilities to flooding are identified below.

3.2.5.1. Potential Impacts

The potential impacts of a flooding event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- Injuries or deaths.
- Public health concerns, such as the spread of infectious diseases, exposure to hazardous materials and debris, and water quality issues.
- Need for widespread search and rescue operations, including water rescues.
- Displaced residents in need of sheltering.
- Delayed emergency response times and disruption of traffic due to high water, debris, blocked transportation routes, and damaged infrastructure and vehicles.
- Economic impacts to governments, including reduced future revenues, increased costs resulting from response activities, and increased future costs resulting from recovery and reconstruction activities.
- Industries can experience commerce losses from power interruptions, damaged buildings and assets, and road closures. Industries can also sustain direct losses to buildings, personnel, and other vital equipment.
- Personal economic impacts of loss of income and property damage that may not be covered by insurance.
- Damage and destruction to the built environment, including above- and belowground utility lines; residential, public, and private buildings; and transportation systems.
- Disruption of essential infrastructure systems, such as power systems, public utilities, telecommunications, and transportation routes.
- Harm to ecosystems from loss of habitat, death and destruction of vegetation and animals, and erosion.
- Damage to crops, livestock, vegetation, and parks.

3.2.5.2. Vulnerabilities

TVWD-related population, economic, built environment, critical facility, infrastructure, and natural environment vulnerabilities to flooding include:

- Staff working at all District locations, including indoor and outdoor facilities. Personal safety of staff may be a vulnerability as well as staff's inability to get to worksites, move between different locations, and access impeded parking lots.
- TVWD's identified critical infrastructure.

- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Natural environments and acreage utilized and owned by the District.

3.2.6. Landslide

There are several steep slopes in the District's service area; however, they are located outside of TVWD's purview. As such, the District's Technical Committee identified potential landslide impacts to be minimal and secondary. Potential impacts of and vulnerabilities to landslides are identified below.

3.2.6.1. Potential Impacts and Vulnerabilities

The potential impacts of and vulnerabilities to a landslide event are identified below. The type, magnitude, and extent of these can vary based on the scale of the event.

- TVWD's identified critical infrastructure, particularly the TVWD Headquarters building.[524]
- Areas and infrastructure located on or near steep slopes.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Natural environments and acreage utilized and owned by the District.

[524] Carollo. (2019, January 27). R&R Assessment and ERP Update: America's Water Infrastructure Act (AIWA) Compliance, Workshop #4 presentation.

3.2.7. Volcanic Ash

Volcanic activity is possible from mountains near the County. It is anticipated that ashfall from a volcanic eruption from Mount St. Helens or Mount Hood has the potential to impact the District. The scale and types of impacts and vulnerabilities may differ depending on which volcano erupts; the level of eruption; the wind direction during and after eruption; and other weather conditions. Potential impacts of and vulnerabilities to volcanic ash are identified below.

3.2.7.1. Potential Impacts

Though it is unlikely that an event of this type will occur, the impacts of a significant ash fall could be substantial. Impacts may include:

- Indirect injuries and deaths, such as those sustained during ash cleanup operations or in traffic accidents.
- Short-term health effects, including respiratory effects.
- Widespread public health issues stemming from failing or damaged infrastructure, such as lack of clean water and sanitation. This includes public water systems that rely on outdoor reservoirs.
- The need to shelter individuals to protect them from poor air quality, including houseless persons and persons displaced from their residences due to poor residential air filtration systems.
- Delayed emergency response times due to decreased visibility and increased traffic hazards.
- Extended operational hours of TVWD staff and resources needed for response to the event.
- Economic impacts to governments, including reduced future revenues, increased costs resulting from response activities, and increased future costs resulting from recovery and cleanup activities.
- Industries can experience commerce losses from power interruptions, damaged buildings and assets, and road closures. Industries can also sustain direct losses to buildings, personnel, and other vital equipment.
- Personal and household economic impacts of loss of income, increased medical costs, and property damage that may not be covered by insurance.
- Damage to the built environment, including aboveground utility lines; residential, public, and private buildings; and transportation systems.
- Disruption of essential infrastructure systems, such as power systems, public utilities, drainage systems, telecommunications, and transportation routes.
- Downed or damaged powerlines can lead to wildfires.
- Damage to crops, livestock, vegetation, parks, and natural systems.

3.2.7.2. Vulnerabilities

All populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD are vulnerable to volcanic ash. This includes:

- Staff who experience chronic lung problems and/or preexisting health conditions or are older adults.
- Staff working at all District locations, including indoor and outdoor facilities. Personal safety of staff may be a vulnerability as well as staff's inability to get to worksites, move between different locations, and access impeded parking lots.

- Staff without access to effective dust masks, eye protection, and drinking water and food uncontaminated by ash.
- TVWD's identified critical infrastructure.
- Other critical infrastructure, including emergency generators and powerlines.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Water sources used by the District could become contaminated.
- Natural environments and acreage utilized and owned by the District.

3.2.8. Wildland Fire

Although the District could experience a wildland–urban interface event, historically it is more likely to be affected by smoke and poor air quality due to wildland fires outside its boundaries. Potential impacts of and vulnerabilities to wildland fire are identified below.

3.2.8.1. Significant Events

TVWD has not been directly impacted by a wildland fire event in recent history; however, it experienced effects from two events that occurred outside the County.

- **September 2–November 30, 2017:** The Eagle Creek Fire was located approximately 45 miles east of Washington County. The fire burned 50,000 acres and the Air Quality Index (AQI) daily average in the County reached as high as 99 particulate matter 2.5 micrometers or smaller ($PM_{2.5}$) during the event.
- **September 2020:** Multiple wildfires throughout Oregon and Washington caused some evacuees to come into the County. The AQI daily average in the County reached as high as 328 $PM_{2.5}$ during the month.[525] During these events, Washington County residents and evacuees were required to take protective actions, such as staying indoors with the doors and windows closed, using air-cleaning filters indoors, and wearing goggles and face masks when outside.

3.2.8.2. Potential Impacts

The potential impacts of a wildfire event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- Injuries or deaths.
- Exposure to wildfire smoke, which can lead to eye, nose, and throat irritation and the worsening of chronic heart and lung diseases.
- Widespread public health issues stemming from failing or damaged infrastructure, such as lack of clean water and sanitation.
- Need for widespread search and rescue operations.
- Displaced residents in need of sheltering.
- Delayed emergency response times due to blocked transportation routes and debris, congested transportation routes due to evacuations, and damaged infrastructure and vehicles.
- Extended operational hours of TVWD staff and resources needed for response to the event.
- Strain on or loss of water supply due to increased demand.
- Economic impacts to governments, including costs for fire suppression, staff, equipment, supplies, transportation and mobilization of first responders, evacuations, sheltering operations, post-fire recovery, and rebuilding costs associated with government-owned buildings, property, and infrastructure.
- Economic impacts, including loss of local revenue due to business and property tax losses, agriculture production losses, and reduced recreation and tourism activity. Scoggins Valley Park receives one million visitors a year, most during summer, which is when wildland fires tend to occur.

[525] Air Quality Historical Data Platform. (n.d.). City of Beaverton data. https://aqicn.org/data-platform/register/

- Industries can experience commerce losses from power interruptions, damaged buildings and assets, and road closures. Industries can also sustain direct losses to buildings, personnel, and other vital equipment.
- Personal and household economic impacts of loss of income, increased medical costs, and property damage that may not be covered by insurance.
- Damage and destruction to the built environment, including above- and belowground utility lines; residential, public, and private buildings; and transportation systems.
- Disruption of essential infrastructure systems, such as power systems, public utilities, telecommunications, and transportation routes.
- Debris from trees and damaged property, causing blocked road and rail transportation routes.
- Downed or damaged powerlines. This impact may be compounded since powerline failures can lead to additional wildfires.
- Power outages and natural gas leaks.
- Hazardous material releases due to infrastructure and facility damage.
- Harm to ecosystems from loss of habitat, death and destruction of vegetation and animals, and erosion.
- Damage to crops, livestock, vegetation, parks, and natural systems.
- Concurrent hazards, including air and water quality issues. Landslide and erosion issues are common following a wildland fire.

3.2.8.3. Vulnerabilities

Given the dynamic nature of wildland fires, all populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD are vulnerable to this hazard. This includes:

- Staff who experience chronic lung problems and/or preexisting health conditions or are older adults.
- Staff working at all District locations, including indoor and outdoor facilities. Personal safety of staff may be a vulnerability as well as staff's inability to get to worksites, move between different locations, and access impeded parking lots.
- First responders and other personnel working directly on fire protection, suppression, and patrols or near a wildfire can experience burns, smoke exposure, heat-related impacts such as heat stroke, heat exhaustion, dehydration, physical fatigue, mental health challenges, injuries, and death.
- TVWD's identified critical infrastructure.
- Other critical infrastructure, including emergency generators and powerlines.
- Areas and infrastructure located in the wildland/urban interface.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Water sources used by the District could become contaminated.
- Natural environments and acreage utilized and owned by the District.

3.2.9. Windstorm, Including Tornado

TVWD covers 23,000 acres and wind damages could be spread out and significant. Significant events and potential impacts of and vulnerabilities to windstorm, including tornado, are identified below.

3.2.9.1. Significant Events

TVWD identified two significant windstorm events.

- **October 12, 1962:** The "Columbus Day Storm" is the most destructive storm to ever occur in Oregon in recorded history, both in loss of life and property damage. The storm killed 38 people and did upwards of $200 million in damage. Hundreds of thousands of homes were without power for short periods of time, while others were without power for two to three weeks. More than 50,000 homes were seriously damaged and nearly 100 were completely destroyed. Entire fruit and nut orchards were destroyed, and livestock were killed as barns and trees blew over onto animals. Intense wind speeds were recorded in the metropolitan areas, with gusts of 116 mph on the Portland Morrison Bridge.
- **November 13–15, 1981:** Two cyclone-related windstorms hit the Pacific Northwest in quick succession. The strongest winds in Oregon were on November 14, with 85-mph gusts on the Morrison Bridge. Hundreds of thousands lost power, and 12 people died throughout Oregon and Washington.

3.2.9.2. Potential Impacts

The potential impacts of a windstorm event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- Injuries or deaths.
- Displaced residents in need of sheltering.
- Delayed emergency response times due to debris, blocked transportation routes, and damaged infrastructure and vehicles.
- Extended operational hours of TVWD staff and resources needed for response to the event.
- Economic impacts to governments, including reduced future revenues, increased costs resulting from response activities, and increased future costs resulting from recovery and reconstruction activities.
- Industries can experience commerce losses from power interruptions, damaged buildings and assets, and road closures. Industries can also sustain direct losses to buildings, personnel, and other vital equipment.
- Personal and household economic impacts of loss of income, increased medical costs, and property damage that may not be covered by insurance.
- Damage and destruction to the built environment, including aboveground utility lines; residential, public, and private buildings; and transportation systems. Significant damage could lead to the complete loss of structures or totaled vehicles.
- Disruption of essential infrastructure systems, such as power systems, public utilities, telecommunications, and transportation routes.
- Debris from trees and damaged property causing blocked road and rail transportation routes.
- Downed or damaged powerlines can lead to wildfires.
- Power outages.

- Harm to ecosystems from loss of habitat, and death and destruction of vegetation and animals.
- Damage to crops, livestock, vegetation, parks, and natural systems.

3.2.9.3. Vulnerabilities

All populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD are vulnerable to windstorms, including tornadoes. This includes:

- Staff working at all District locations, including indoor and outdoor facilities. Personal safety of staff may be a vulnerability as well as staff's inability to get to worksites, move between different locations, and access impeded parking lots.
- TVWD's identified critical infrastructure. Downed branches and trees can damage critical infrastructure and debris can clog or impede water flows and equipment.
- Areas and infrastructure located at higher elevations.
- Older buildings and infrastructure in the District not built to withstand high winds.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Natural environments and acreage utilized and owned by the District.

3.2.10. Winter Storm

Heavy snowfall rarely occurs within the District's service area. The bigger risk is from low temperatures causing infrastructure to freeze and ice causing impacts to infrastructure and transportation capabilities. Significant events and the potential impacts of and vulnerabilities to winter storms are identified below.

3.2.10.1. Significant Events

The District identified one significant winter storm event.

- **February 11–14, 2021:** Freezing rain and heavy snow came down, and gusty winds up to 50 mph occurred throughout the service area. Thirty calls for service required response. Two water mains broke and over 18 staff worked the response.

3.2.10.2. Potential Impacts

The potential impacts of a winter storm event are identified below. The type, magnitude, and extent of impacts can vary based on the scale of the event. Impacts may include:

- Injuries or deaths, including from carbon monoxide poisoning, falls from slick or icy conditions, frostbite, and hypothermia.
- Delayed emergency response times due to debris, blocked transportation routes, damaged infrastructure and vehicles, and difficulty using fire hydrants because of frozen or damaged water system components.
- Stranded travelers due to ice, snow, and transportation impacts.
- Extended operational hours of TVWD staff and resources needed for response to the event.
- Economic impacts to governments, including reduced future revenues, increased costs resulting from response activities, and increased future costs resulting from recovery and reconstruction activities.
- Industries can experience commerce losses from power interruptions, damaged buildings and assets, and road closures. Industries can also sustain direct losses to buildings, personnel, and other vital equipment.
- Personal and household economic impacts of loss of income, increased medical costs, and property damage that may not be covered by insurance.
- Damage and destruction to the built environment, including aboveground utility lines; residential, public, and private buildings; and transportation systems.
- An increased number of house fires due to unsafe alternate heating methods.
- Significant property damage and loss of water due to frozen or damaged pipes or the thawing of frozen pipes.
- Disruption of essential infrastructure systems, such as power systems, public utilities, telecommunications, and transportation routes.
- Debris from trees and damaged property causing blocked road and rail transportation routes.
- Downed or damaged powerlines can lead to wildfires, and tree debris can create fuel load for wildfire.
- Power outages.
- Harm to ecosystems from loss of habitat, and death and destruction of vegetation and animals.

- Damage to crops, livestock, vegetation, parks, and natural systems.
- Concurrent hazards, including flooding.

3.2.10.3. Vulnerabilities

All populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to TVWD are vulnerable to winter storms. This includes:

- Staff working at all District locations, including indoor and outdoor facilities. Personal safety of staff may be a vulnerability as well as staff's inability to get to worksites, move between different locations, and access impeded parking lots.
- TVWD's identified critical infrastructure.
- Areas and infrastructure located at higher elevations.
- Older buildings and infrastructure not built to withstand the weight and impacts of large amounts of snow and ice.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Natural environments and acreage utilized and owned by the District.

3.3. Historical Events

Hazard events that have affected the entire planning area since adoption of the 2017 NHMP are detailed in Volume I, Section 2. This is the first time TVWD has had an NHMP. Hazard events that have impacted the District are described in the hazard profiles above. These occurrences include drought, extreme heat, wildland fire smoke, windstorm, including tornado, and winter storm.

Two disaster declarations were issued by the District since adoption of the 2017 NHMP. Declarations for the COVID-19 pandemic went into effect on March 8, 2020. Resolution 07-20 authorized emergency procurement of good and services by the Board of Commissioners, and Resolution 08-20 declared an emergency and granted the chief executive officer emergency powers to prepare for, prevent, and mitigate the effects of COVID-19. Although pandemic is not a hazard included in this NHMP, this declaration is noted because FEMA provided support and Hazard Mitigation Grant Program funding during the event.

3.4. Overall Vulnerability

Based on the analysis completed by the Technical Committee, winter storm, earthquake, drought, extreme heat, and windstorm, including tornado, present the highest relative risk to the District. These hazards may become widespread events, and all populations, economies, structures, improved property, critical facilities and infrastructure, and natural environments related to the District can be vulnerable to these hazards.

Areas of greatest vulnerability to these hazards within the District include:

- Staff members with higher vulnerability, such as those with preexisting health conditions, older adults, pregnant women, and those who spend significant time outdoors.
- People working in heat islands within the District.
- Commerce losses from power interruptions, damaged buildings and assets, and road closures. The District may also sustain direct losses to buildings, personnel, and other vital equipment.
- Economic impacts to the District, including reduced future revenues, increased costs resulting from response activities, and increased future costs resulting from recovery and reconstruction activities.
- TVWD’s identified critical infrastructure.
- Other critical infrastructure, including power sources and emergency generators.
- The CEI Hub.
- Older buildings and infrastructure not built to current building codes or seismic standards may be more vulnerable.
- Transportation networks used to execute daily District functions and transportation systems staff rely on to report to duty. These transportation assets are not all owned by TVWD; however, their vulnerability can affect District operations.
- Water sources used by the District.
- Natural environments and acreage utilized and owned by the District. Plants, animals, ecosystems, and natural environments can be vulnerable to high rates of mortality due to hazard events.

4. Capability Assessment

(In compliance with 44 CFR §201.6(c)(3))

The following capability assessment and safe growth analysis examine the ability of the District to implement and manage a comprehensive mitigation strategy. Strengths, opportunities, and resources of the jurisdiction are identified to develop an effective hazard mitigation action plan. The capabilities identified in this assessment were evaluated collectively to develop feasible recommendations, which support the implementation of effective mitigation activities.

A capability questionnaire was distributed to the District's Technical Committee to initiate this assessment. The survey included questions regarding existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation activities, including legal and regulatory capabilities, administrative and technical capabilities, education and outreach capabilities, and fiscal capabilities. The Technical Committee also completed a safe growth analysis to identify potential gaps in growth guidance instruments and improvements that could be made to reduce vulnerability to future development.

4.1. Planning and Regulatory Assessment

Planning and regulatory capabilities include plans, policies, codes, and ordinances within the District that can prevent and reduce the impacts of hazards.

The District does not maintain plans that cover activities or areas that fall under the jurisdiction of the local governments it serves, such as land use mapping, transportation management, and public safety. However, its own properties and assets are well mapped, and the District's environmental policies address best practices in maintaining and restoring protective ecosystems. This is an essential part of operating an organization with unique structural and natural assets. City and County development regulations require development outside of sensitive areas. TVWD follows all local regulations and zoning ordinances as they apply to the organization.

TVWD's Capital Improvement Program and infrastructure policies limit expenditures on projects that would encourage development in areas vulnerable to natural hazards and limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards. The Capital Improvement Program provides funding for hazard mitigation projects identified in this NHMP. The District also has an evacuation and sheltering plan to deal with emergencies from natural hazards.

Types of Plans

The following TVWD plans address natural hazards, identify projects to include in the mitigation strategy, and can be used in a formative manner to implement mitigation actions:

- Master Planning for Seismic Reliability and Resiliency, May 2016.
- Water Master Plan Update, December 2018.
- Risk Resilience Assessment Report, February 2021. Supports compliance with America's Water Infrastructure Act of 2018.
- Emergency Response Plan, February 2021. Supports compliance with America's Water Infrastructure Act of 2018. Updates to this plan are ongoing and will be made in relation to the work done by the Regional Disaster Preparedness Organization (RDPO) on Emergency Water Provision and Curtailment tabletop exercises held in 2022.
- Willamette Water Supply Program, Program Formulation Summary, October 2018.
- Continuity of Operations Plan, 2005. This plan is scheduled for review and updating. The current version does not have projects to include in the mitigation strategy; however, future plan updates

will either include mitigation strategies, or the strategies will be contained in the District's Capital Plan or Master Plan, as appropriate.

4.2. Administrative and Technical Assessment

This portion of the assessment includes staff and their skills and tools that can be used for mitigation planning and implementing specific mitigation actions.

The Mitigation Planning Committee works together effectively to update and maintain the NHMP and consists of Emergency Planning Team and Sustainability Committee members. The Asset Management and Water Operations Departments effectively execute mitigation planning efforts.

TVWD's Facilities Supervisor and two Facilities staff members administer maintenance programs to reduce risk, including tree trimming and clearing drainage systems. Contracted services are used to implement additional maintenance programs to reduce risk. The District has multiple effective mutual aid agreements and planning partnerships, including the JWC, the Regional Water Providers Consortium, and the Oregon Water/Wastewater Agency Response Network.

The District has a full time Capital Improvement Program Manager, Emergency Program Coordinator, and a full-time Risk Management Coordinator in the Human Resources Department. A full-time Geographic Information System (GIS) Coordinator is a part of the Asset Management Division.

TVWD has many technical capabilities that have been used to assess or mitigate risk and could be used in future efforts. The WWSS has a grant writer and additional grant writers are contracted with as necessary. A GIS Analyst and Technician work with the Oregon Department of Geology and Mineral Industries (DOGAMI) on hazard data gathering and mapping and collaborate with the RDPO on hazard data and mitigation planning. Additional hazard data and information can be pulled from a variety of sources, including historical records and DOGAMI.

TVWD maintains a Water Master Plan and conducts regular updates to the Water Master Plan. The most recent plan is from 2018. TVWD is compliant with America's Water Infrastructure Act (AWIA). As part of AWIA compliance, TVWD sponsored a Risk and Resilience Assessment Report. The final report was completed in February of 2021. The report is updated every five years, per regulation, and will be used to update mitigation plans.

4.3. Education and Outreach Assessment

Education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information were assessed to determine the District's capabilities.

TVWD has very strong education and outreach capabilities. TVWD's Communications Department sends customers a monthly newsletter via email. Topics covered include learning how to store water, preventing frozen pipes, planning for wildland fires and extreme heat, signing up for emergency alerts, and creating and keeping an emergency kit.

Additionally, the District is a member of the Regional Water Providers Consortium. Members of this group partner together to increase the reach and scale of public education and outreach opportunities. Consortium public engagement efforts TVWD participated in from February 2, 2022, to June 1, 2022 include:

- Toilet leak detection promotion kit: This promotion was advertised on the Consortium's social media, website, and RegionalH2O newsletter, and through a KUNP newsletter. The promotion kit was available in English and Spanish and helps increase water conservation and drought mitigation efforts.

- School assembly programs: Beginning in the spring, the Mad Science program educated students about water, including conservation efforts. A total of 250 students from three schools participated.
- Digital advertising campaigns: Used to promote water-related issues in lieu of in-person events and workshops due to the COVID-19 pandemic.
- Print piece translation review and new graphics: Printed outreach materials were updated with new graphics and translated into seven languages. The new graphics are a result of feedback received from the multilingual how-to video project listening sessions that occurred from fall 2021 to winter 2022. The Consortium worked with Community Engagement Liaisons (CELs) and received $4,000 in Urban Area Security Initiative (UASI) grant money from Multnomah County to help support this work.
- Multilingual how-to video project: Consortium staff met with CELs to complete video scripts and graphics translations and to ensure that the CELs were prepared to act as on-camera spokespeople for the videos. Staff also negotiated with KUNP television so that their on-air newscaster could serve as the Spanish language spokesperson. Staff coordinated a 4-day video shoot involving 19 CELs that resulted in content for 21 videos in 7 languages.
- Public outreach and education campaigns: The 2022 campaigns began in the first week of May with Drinking Water Week and ran through the third week in October with the Great ShakeOut.
    - Drinking Water Week: The Consortium partnered with KATU television to do three on-air interviews and six “shout outs” on their AM Northwest and Afternoon Live shows during Drinking Water Week. The Consortium also produced a 60-second segment, which ran in the weekend news.
    - Conservation Campaign: The campaign incudes radio, digital online, English language television, and Spanish language television advertising.
        - KATU Television: Five on-air interviews, new and updated ads that aired 294 times, digital advertising, and featured content directed people to regionalH2O.org during Jeopardy and the evening news.
        - KUNP Television: A 60-second segment aired 19 times, new and updated ads aired 366 times, digital ads on KUNP.tv and YouTube, three newsletters, and translation support.
        - Garden Time Television: One interview aired.
        - Alpha Media Radio: Seasonally updated ads aired 2,132 times, and two on-air interviews took place.
        - Digital display advertising: Staff developed a series of ads designed to drive traffic to regionalH2O.org and increase sign-ups for the Weekly Watering Number.
        - Summer promotion: Outdoor watering promotion throughout July.
    - Source water protection campaign: The year-long “Clean Water. It’s Our Future” had delivered 487 ads as of April 30. This campaign concluded in June.
    - Emergency preparedness campaign: The campaign includes outreach tailored to help promote the new multilingual how-to videos on YouTube and in the community. Media partners included KATU television, KUNP television, and Intersection (TriMet bus ads).
    - Annual print order: Consortium members had the opportunity to add their logo to print pieces and to receive a start-up supply of the hose nozzle hangtag and several Junior Leak Detective print pieces in English and Spanish.

- Other public outreach projects:
  - RegionalH2O.org website: A new, interactive Region's Water Sources and Providers map was added to the website and a newly designed Weekly Watering Number widget was rolled out. Consortium staff continued updates to make regionalH2O.org accessible to those using assistive technologies and completed seasonal updates, monthly analytics reports, and weekly website maintenance. The website received 36,257 page views from 18,821 visitors from January 1 to April 30, 2022.
  - Consortium newsletters: The Consortium distributed two issues of The Source and one issue of RegionalH2O News.
    - RegionalH2O News: The March issue highlighted the new interactive Regional Water Providers & Water Sources map and Fix a Leak Week and the accompanying toilet leak detection promotion. It went to 979 recipients, with an open rate of 48% and a click rate of 8.5%.
    - The Source: The January issue provided members with a recap of the December tabletop exercise and outreach resources. It went to 158 members and had a 44.5% open rate and a 6.8% click rate. The April issue included updates on the Weekly Watering Number, Drinking Water Week outreach resources, and a celebration of the Consortium's 23-year involvement in the Children's Clean Water Festival. It went to 159 members and had a 41.7% open rate and a 5.6% click rate.
  - Consortium social media: The Consortium maintained an active presence on each of its three social media channels between January 1 and April 30, 2022.
    - Facebook: The Consortium account rose to 912 followers during the reporting period. A total of 83 posts were published, which resulted in 8,782 impressions and 541 engagements.
    - YouTube: The Consortium's 18 how-to videos and media segments were collectively viewed a total 12,495 times for a total of 395.7 hours and resulted in 73,569 impressions.
    - Twitter: The Consortium account has 644 followers and received 3,679 profile visits. A total of 103 tweets were published, which resulted in more than 24,000 impressions.
  - Spanish language outreach: The Consortium worked with community partners to translate more resources and content into Spanish. Translated content included an outdoor print piece, social media messaging, promotion content, and another KUNP newsletter. The KUNP newsletter went to 27,272 recipients and had a 20.85% open rate and a 2.61% click rate.
  - Member messaging toolkits: Messaging toolkit topics for this reporting period were National Engineers Week, Fix a Leak Week, and Water Week. Toolkits included social media copy, website links, graphic and media assets, and sample newsletter articles for members to use in outreach to their customers.

4.4. Financial Assessment

TVWD has access to or is eligible to potentially use the following funding resources for hazard mitigation initiatives:

- Capital improvements project funding obtained from water sales revenue.
- Authority to levy taxes for specific purposes.
- Fees for water services.

- Fees for new development.
- Incurrence of debt through general obligation bonds and/or special tax bonds.
- Incurrence of debt through private activities.
- Federal funding sources, including Building Resilient Infrastructure and Communities and Hazard Mitigation Assistance Grants. Grants for mitigation were sought for the 2016 Master Planning for Seismic Reliability and Resiliency Plan and 2018 Water Master Plan update. It is anticipated that the District will also apply for mitigation grants to update these plans when needed.
- State funding programs.
- Public or private partnership funding sources.

4.5. Capability Expansion and Improvement

Actions that can expand and improve existing authorities, plans, policies, and resources for mitigation include continuing to update plans as necessary to ensure they are current and reflect the needs of the District and its customers; increasing staff levels and natural hazard training for staff as necessary; further development of warning systems and messaging; and ensuring grant opportunities are capitalized upon to meet goals.

5. Mitigation Strategy

(In compliance with 44 CFR §201.6(c)(3)(i), §201.6(c)(3)(ii), §201.6(c)(3)(iii), §201.6(c)(3)(iv), and §201.6(c)(4)(ii))

The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) directs local mitigation plans to describe hazard mitigation actions and establish a strategy to implement those actions. Therefore, all other requirements for a local mitigation plan lead to and support the mitigation strategy.

5.1. Mitigation Goals

The Steering Committee reviewed and evaluated goals from the 2017 Washington County NHMP, 2020 City of Beaverton NHMP, 2011 Cities of Cornelius and Forest Grove NHMPs, and 2020 State of Oregon NHMP. The goals from each plan were grouped by topic and then synthesized to create the seven goals detailed in Volume I, Section 3. These goals are the basis of this plan and summarize what the Steering Committee will accomplish by implementing this plan.

5.2. Mitigation Successes

Risk Resilience Assessment and Emergency Response Plan Updates

In compliance with the 2018 America's Water Infrastructure Act, TVWD, in partnership with Carollo Engineering, conducted a Risk and Resilience Assessment and published an updated Emergency Response Plan certified with the U.S. Environmental Protection Agency. These February 2021 updates addressed all hazards in this NHMP.

Infrastructure Interdependencies Workshop

A workshop was held in May 2022 to bring together internal and external partners to discuss infrastructure interdependency throughout the service area. TVWD, WWSS, Clean Water Services, Portland General Electric, Washington County, Clackamas County, American Society of Civil Engineers Lifelines 2022 participants, and Cascadia Lifelines Program participants met to identify, assess, and develop mitigation strategies related to improving community resilience.

The activity integrated with the work being done by Metro on the Long-Range Transportation Plan, the RDPO's work with emergency transportation routes, RDPO's work on provisioning of emergency drinking water, and the Regional Water Consortium's work. It aligns with the TVWD Water Master Plan, the Oregon Resiliency Plan, and the plans within Washington County and the RDPO. This workshop addressed all hazards in this NHMP.

Key Customer Meetings

Before the COVID-19 *p*andemic, TVWD held quarterly meetings with key customers, including hospitals and health care organizations, those in the food production, manufacturing, and water quality sectors, fire departments, schools, Tualatin Hills Park & Recreation, Washington County, and the City of Beaverton. These collaboration meetings promoted co-resilience planning and education and helped the District determine each customer's level of mitigation and readiness planning and how that aligned with the Levels of Service as described in the Oregon Resiliency Plan.

The meetings integrated with the work being done by Metro on the Long-Range Transportation Plan, the RDPO's work with emergency transportation routes, RDPO's work on provisioning of emergency drinking water, and the Regional Water Consortium's work. It aligns with the TVWD Water Master Plan, the Oregon Resiliency Plan, and the plans within Washington County and the RDPO. This workshop addressed all hazards in this NHMP.

Emergency Preparedness Email Newsletter

TVWD's Communications Department sends customers a monthly newsletter via email. Topics covered include learning how to store water, preventing frozen pipes, planning for wildland fires and extreme heat, signing up for emergency alerts, and creating and keeping an emergency kit.

Willamette Water Supply System

This ongoing construction project will provide an additional, resilient water supply for Washington County. When complete, the WWSS will be one of Oregon's most seismically-resilient water systems—built to better withstand natural disasters, protect public health, and speed regional economic recovery through restoring critical services more quickly. See Section 7 of this annex for additional information about this system.

Mapping Critical Facilities in Relation to Hazards

TVWD is continually working with the RDPO and Washington County to map critical facilities in relation to exposure and vulnerability to all hazards included in this NHMP.

Development of Supervisory Control and Data Acquisition Master Plan

This ongoing project addresses control system challenges by identifying and prioritizing system upgrades that will increase utility efficiency and safety. The plan will be used for budgeting and planning for future SCADA system additions and enhancements.

Installation of Reservoir Seismic Isolation Layers

Seismic isolation layers were installed on two reservoirs to increase the seismic resiliency of this critical infrastructure.

Development of Emergency Water Provisioning Plan

The RDPO and the Regional Water Providers Consortium, which includes TVWD, are partnering to address how emergency drinking water will be provided to the public following a disaster. The project spans the five-county Portland Metropolitan Region, which includes Clackamas, Clark, Columbia, Multnomah, and Washington Counties.

In the last decade, water providers in the region have been using UASI funds and local budgets to purchase emergency mobile water treatment and distribution systems. Before additional equipment can be funded, the RDPO Steering Committee asked water providers and their partners to develop an emergency water planning framework and identify emergency water gaps to support future grant requests and emergency water distribution efforts. The overarching goal of the project is to advance regionally coordinated planning efforts for the effective and equitable delivery of drinking water post-disaster in the greater Portland metro region.

Vegetation Management

TVWD maintains an ongoing vegetation management program on its properties to decrease wildland fire fuel loads and contribute to wildland fire mitigation efforts in the County.

Emergency Power Supplies and Systems

To align with TVWD's America’s Water Infrastructure Act Risk and Resilience Assessment and the Oregon Resilience Plan, the District has installed backup power generation at its facilities.

Installation of Fuel Storage Tank

The overwhelming majority of TVWD-owned equipment required to construct, operate, and maintain the water system and its facilities is located at TVWD Headquarters, where there is an aboveground 20,000-gallon fuel storage container with the capacity to store and dispense 12,000 gallons of gasoline and 8,000 gallons of diesel. TVWD shares this source of fuel with the Tualatin Hills Park & Recreation District through an intergovernmental agreement for operation and maintenance of the tank and its related fueling infrastructure. This agreement created the Tualatin Regional Fueling Facility.

Provisional Water Trailers

In alignment with the Regional Water Providers and the RDPO Water Provisioning Plan, TVWD maintains and trains for the use of two provisional water trailers that can be used throughout the region in response to an emergency. TVWD has two emergency water distribution systems. These systems are compact and

portable manifold systems comprised of valves, connecting hoses, a circular fan, blivents, and water bags designed to dispense potable water into six-quart, food-grade bags during an emergency. There are additional trailers within the RDPO's area.

Established Radio Communications System

TVWD maintains a very high frequency (VHF) two-way radio system that operates on a Type 3 digital mobile radio (DMR), trunked system. TVWD also operates 1 VHF repeater at the Cooper Mountain Radio Site. The repeater is used for countywide interoperability.

5.3. Plan Incorporation and Integration into Existing Planning Mechanisms

Based on mitigation plan requirement 44 CFR §201.6(c)(4)(ii), the vulnerability and capabilities assessment for TVWD was carefully reviewed and considered when developing the mitigation actions for this plan. TVWD's Technical Committee will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this plan will be incorporated into the existing local planning strategies.

Once the plan is adopted, the committee will coordinate implementation with the responsible parties in TVWD and with external stakeholders as needed. The primary means for integrating mitigation strategies will be through the revision, update, and implementation of the actions as feasible.

The members of TVWD's Technical Committee will remain charged with ensuring the goals and strategies of new and updated local planning documents for the District are consistent with the goals and actions in the NHMP and will not contribute to increased hazard vulnerability.

5.3.1. Comprehensive Plan

The District's Water System Master Plan update contains mitigation actions, strategies, and goals through the incorporation of a seismic assessment and Capital Improvement Plan. The 2015 Water System Master Plan includes an attachment titled "Seismic Reliability and Resiliency Evaluation" that summarizes gaps and future improvements needed to the system when considering a seismic event. The 2015 Water System Master Plan further separates pipeline projects into groupings described as Tier 1, 2, and 3. When these plans go through regular updates, additional details about hazard mitigation will be added, as applicable. The Water Master Plan was updated in December of 2018. TVWD is currently working on a "Capital Improvement Master Plan."

5.3.2. Public Engagement, Education, and Outreach

TVWD will continue its public engagement efforts, including holding events to educate customers about water conservation and emergency readiness, distributing the TVWD Emergency Preparedness Email Newsletter, hosting school assembly programs, creating new outreach materials in seven languages, and coordinating a public outreach campaign on multiple platforms on the topics of conservation, emergency preparedness, and source water protection. The District will continually assess the need to increase or update engagement opportunities as needed to best serve the organization and its customers.

5.3.3. Emergency Plans That Address Evacuation and Sheltering

The District's 2022 Emergency Response Plan addresses evacuation and sheltering in place, and TVWD works with Washington County, the American Red Cross, and community partners to address sheltering for staff and families. Additionally, specific work regarding evacuation and sheltering is done with Tualatin

Hills Park & Recreation and the Beaverton School District. TVWD will work with its partners to review and update these plans as needed to fit the needs of the District's customers.

5.3.4. Enforcement of Existing Policies

TVWD District's Curtailment Plan has provisions for addressing the District's water curtailment policy that can be implemented during low water levels or water shortages. This policy will be updated as needed to fit the needs of the organization and its customers.

5.3.5. Funding Opportunities

TVWD will continue to review annual, post-disaster, and stand-alone grant opportunities for potential mitigation project funding opportunities. This includes the Hazard Mitigation Grant Program and the Building Resilient Infrastructure and Communities grant program.

6. Action Items

Action items for the 2023 NHMP were determined by TVWD's Technical Committee based on the review of its risk assessment, its existing capabilities, and the status of its previous action items. This range of actions includes structure and infrastructure projects and education and awareness programs. A summary of these actions and full action item planning worksheets are provided in Sections 6.1 and 6.2 below. Additional information about how these actions were developed, evaluated, and prioritized is in Volume I, Section 3.

6.1. Tualatin Valley Water District Action Items: 2023 Washington County NHMP

Table 284: TVWD Action Items

Action Item Number	Action Item Description	Hazard(s) Addressed	Priority
1	Florence Lane Pump Station. Retrofit the existing pump station to withstand the effects of natural disasters. This includes upgrading the existing backup power supply system.	Dam Failure, earthquake, extreme heat, flood, landslide, windstorm, including tornado, and winter storm	High
2	Mid-Term Pipeline upgrade to upgrade and retrofit the existing pipeline.	Dam failure, earthquake, flood, landslide, wildland fire, windstorm, including tornado, and winter storm	Medium
3	Retrofit the existing Somerset Reservoir.	Dam failure, earthquake, landslide, windstorm, including tornado, and winter storm	Medium
4	Rosander Pump Station. Upgrade the Sunset Pump Station to withstand seismic and other natural hazards.	Dam failure, earthquake, landslide, windstorm, including tornado, and winter storm	Medium
5	Supply Vulnerability Response Planning for Scoggins Dam. Evaluate supply vulnerability and response to natural hazards associated with Scoggins Dam.	Dam failure, earthquake, flood, landslide, windstorm, including tornado	Medium

Action Item Number	Action Item Description	Hazard(s) Addressed	Priority
6	Upgrade the Cornelius Pass Facility to meet current seismic design and provide controls and interconnection between the Willamette Water Supply System and the Joint Water Commission.	Dam failure, earthquake, flood, landslide, volcanic ash, windstorm, including tornado, and winter storm	Low
7	North Road Reservoir. Retrofit the existing structure to withstand anticipated natural hazards.	Dam failure, earthquake, landslide, windstorm, including tornado, and winter storm	Low
8	Partnership with Regional Water Providers Consortium on Public Education efforts.	Drought and earthquake	High
9	Retrofit the Cooper Mountain Pump Station to better withstand the effects of multiple natural hazards.	Earthquake, landslide, windstorm, including tornado, and winter storm	High
10	189th Pump Station seismic upgrade to meet current seismic code requirements and provide automated backup power.	Earthquake, windstorm, including tornado, and winter storm	High
11	Goyak Reservoir. Upgrade/retrofit existing structure to withstand hazards.	Earthquake, flood, windstorm, including tornado, and winter storm	High
12	Goyak Pump Station. Upgrade the existing pump station to withstand the effects of natural hazards, including upgrading the backup power system to be automated.	Earthquake, extreme heat, flood, landslide, wildland fire, windstorm, including tornado, and winter storm	High
13	Taylors Ferry Reservoirs and Site Seismic Improvements. Seismically upgrade water system facilities serving the upper pressure zones in the Metzger service area.	Earthquake, extreme heat, flood, windstorm, including tornado, and winter storm	High
14	Lead joint pipe seismic upgrade to retrofit the existing pump station to withstand the effects of natural disasters. This includes upgrading the existing backup power supply system.	Earthquake	High
15	America's Water Infrastructure Action/Security Recommendation Implementation. Includes adding security cameras to evaluate if sites are in good condition following a hazard event.	Earthquake, flood, landslide, volcanic ash, wildland fire, windstorm, including tornado, and winter storm	Medium

Action Item Number	Action Item Description	Hazard(s) Addressed	Priority
16	Meadow and Walker pressure-reducing valves. Upgrade existing facility to improve access and safety.	Flood	High
17	TVWD Headquarters building upgrade so the building can withstand all natural hazards.	All hazards	High
18	Emergency underground storage/water supply well – regional supply planning. Conduct an engineering study to help determine the future ability to use the Emergency Underground Storage sites to assist in the Emergency Drinking Water Provisioning Project and for first responders. Would include, but not be limited to: Scheupbach Well and Grabhorn, Miller, and Copper Mountain aquifer storage and recovery sites.	All hazards	Medium
19	Supply vulnerability planning. Integrate plans and policies into existing plans to identify water supply vulnerabilities and enhance mitigation efforts.	All hazards	Low
20	Supply Vulnerability Planning for the Portland Water Bureau Source. Update and revise existing plans, procedures, and agreements to ensure the water supply system is able to handle various natural disasters.	All hazards	Low
21	Pipeline vulnerability response planning. Evaluate major pipelines that may be vulnerable to natural hazards.	All hazards	Low
22	Retrofit and build an emergency operations center facility to withstand natural hazards.	All hazards	Low
23	Infrastructure interdependencies workshops. TVWD and WWSS activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience.	All hazards	Medium
24	Regional Water Providers Consortium Strategic Plan 2023-28. This will be a TVWD and Regional Water Providers service area activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience.	All hazards	Medium
25	Key and critical customer collaboration. TVWD and WWSS infrastructure interdependency service area activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience. To be held quarterly.	All hazards	High
26	Talkin' Water. Talking to community members about mitigation and preparedness via a virtual forum.	All hazards	High

Action Item Number	Action Item Description	Hazard(s) Addressed	Priority
27	Source Water Protection Plan	All hazards	Medium
28	Monthly Mitigation and Preparedness Newsletter. Newsletter sent out to customers of TVWD and covers a monthly emergency readiness / mitigation topic.	All hazards	Low
29	Risk resilience assessment and emergency response plan update in 2025 to support compliance with America's Water Infrastructure Act.	All hazards	Low
30	Increase the District's ability to transfer data among its numerous sites via wired connectivity. To include bandwidth to transmit video data for damage assessment/debris estimate.	All hazards	Medium
31	Increase the District's ability to transfer data among its numerous sites via wireless technology (Public 5G, Private LTE/5G and/or Long Range 5Ghz WiFi.)	All hazards	Medium

6.2. Mitigation Action Information Worksheets

Table 285: Increase Internet Connectivity District Wide (Cable and Fiber Connections)

Mitigation Action Information	
Title of action	Increase Internet Connectivity District Wide (Cable and Fiber Connections)
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☒ Public education/awareness ☒
Action description	Increase the District's ability to transfer data among its numerous sites via wired connectivity. To include bandwidth to transmit video data for damage assessment/debris estimate.
Hazard(s) addressed	Dam failure ☐ Flood ☐ Windstorm, incl. tornado ☐ Drought ☐ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☐ Extreme heat ☐ Wildland fire ☐
How does the action address identified current or future risks and vulnerabilities?	Existing internet connections are not complete, and during earthquakes, landslides, and winter storms, the current connections are susceptible to disruption of data communication lines that run underground, which can be affected by the natural hazard. The ability to transmit data between our sites ensures business continuity in such a disaster and allows us to act in an emergency ops/response capacity. Also permits seamless communication with the entire service area.
Area of action impact	Entire service area
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? All remote sites, listed in Critical Asset sheet
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☒ Goal 2 ☐ Goal 5 ☐ Goal 3 ☐ Goal 6 ☐
Integration into other initiatives	City of Beaverton and Washington County Emergency Operations Plans
Alignment with existing plans and policies	TVWD Emergency Operations Plan
Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☒ High ☐
Lead position, office, department, or division responsible for implementation	Information Technology and Facilities

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Information Technology and Facilities	City of Beaverton and Washington County
Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
General Fund and MACC Grant	Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities
Estimated Cost	$1,000,000.00 for installation of internet connections (cable/fiber connection) from vendors. Ongoing licensing and service costs are estimated at $60,000.00 annually.

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Limit disruption of essential infrastructure Enhance the ability of the District to assist in emergency operations	Build resilience in our network infrastructure and add capacity/bandwidth at our hard-to-reach locations. For example, facilities that do not currently have fiber connectivity, and don't exist near current infrastructure to support such connectivity.	$600,000.00

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☒ Long-term ☐ Ongoing ☐	Winter 2026	Winter 2027

Implementation Benchmarks: How Will Success Be Measured?

- Securing funding and project buy-in.
- Completing survey to determine type of equipment needed.
- Procuring equipment.
- Installing equipment.
- Training staff of how to use monitoring software and utilize data.
- Creating and implement maintenance plan**.**

Potential Challenges to Implementation

- Securing ongoing funding for maintenance to equipment and software updates.

Resources and References, if Applicable

- Potential vendors: Ziply and Comcast

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	No action	$0	Continued risks, frequent
Alternative #2	Scale project to four areas	$508,000.00	Continued risks
Alternative #3			
Implementation Progress Report for Plan Maintenance			
Date			
What progress in implementation has been made to date?			
What challenges in implementation have been experienced?			
What are the next steps in implementation?			

Table 286: Increase Wireless Capabilities District-Wide

Mitigation Action Information			
Title of action	Increase Wireless Capabilities District-Wide		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☒
Action description	Increase the District's ability to transfer data among its numerous sites via wireless technology (Public 5G, Private LTE/5G, and/or Long-Range 5Ghz Wi-Fi)		
Hazard(s) addressed	Dam failure ☐ Drought ☐ Earthquake ☐ Extreme heat ☐	Flood ☐ Landslide ☐ Volcanic ash ☐ Wildland fire ☒	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	During wildfire and heavy wind events, data communication lines that run on poles as well at underground, which can be affected by the natural hazard. The ability to transmit data between our sites ensures business continuity in such a disaster and allows us to act in an emergency ops/response capacity. Also permits seamless communication with the entire service area.		
Area of action impact	Entire service area		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)?		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☐ Goal 5 ☐ Goal 6 ☐	Goal 7 ☒
Integration into other initiatives	City of Beaverton and Washington County Emergency Operations Plans		
Alignment with existing plans and policies	TVWD Emergency Operations Plan		
Mitigation Action Implementation Plan			
Priority	Low ☐	Medium ☒	High ☐
Lead position, office, department, or division responsible for implementation	Information Technology and Facilities		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
Information Technology and Facilities		City of Beaverton and Washington County	

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
General Fund and MACC Grant	Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities
Estimated Cost	$75,000.00 for equipment and $25,000.00 for implementation support. Ongoing licensing and equipment replacement is estimated at $15,000 annually.

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Limit disruption of essential infrastructure, Enhance the ability of the District to assist in emergency operations,	Build resilience in our network infrastructure and add capacity/bandwidth at our hard-to-reach locations. For example, facilities that do not currently have fiber connectivity and don't exist near current infrastructure to support such connectivity.	$600,000.00

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☒ Long-term ☐ Ongoing ☐	Winter 2026	Winter 2027

Implementation Benchmarks: How Will Success Be Measured?

- Securing funding and project buy-in.
- Completing survey to determine type of equipment needed.
- Procuring equipment.
- Installing equipment.
- Training staff of how to use monitoring software and utilize data.
- Creating and implement maintenance plan.

Potential Challenges to Implementation

- Securing ongoing funding for maintenance to equipment and software updates.

Resources and References, if Applicable

- Potential vendor

Three Alternatives Considered, Including No Action

	Action Description	Estimated Cost	Evaluation
Alternative #1	No action	$0	Continued risks, frequent.
Alternative #2	Scale project to two areas		

Alternative #3			USGS only installs flood gauges, and the startup and ongoing costs to implement this type of solution are much more expensive.
Implementation Progress Report for Plan Maintenance			
Date			
What progress in implementation has been made to date?			
What challenges in implementation have been experienced?			
What are the next steps in implementation?			

Table 287: Supply Vulnerability Planning

Mitigation Action Information			
Title of action	Supply Vulnerability Planning		
Type of action	Plans/regulations ☒ Structure and infrastructure project ☐		Natural systems protection ☐ Public education/awareness ☐
Action description	Integrate plans and policies into existing plans to identify water supply vulnerabilities and enhance mitigation efforts.		
Hazard(s) addressed	Dam failure ☒ Drought ☒ Earthquake ☒ Extreme heat ☒	Flood ☒ Landslide ☒ Volcanic ash ☒ Wildland fire ☒	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	Allows the District to plan for future expenditures to make infrastructure upgrades and capital expenditure decisions that will enhance future hazard mitigation efforts.		
Area of action impact			
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Water supply facilities		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☒ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	Investing in critical infrastructure		
Alignment with existing plans and policies	Oregon Seismic Resilience Plan		
Mitigation Action Implementation Plan			
Priority	Low ☒	Medium ☐	High ☐
Lead position, office, department, or division responsible for implementation	Engineering & Operations		

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
	Joint Water Commission

Potential Funding Sources			
Non-Federal Funding Sources		**Federal Funding Sources**	
General funding, Capital Improvement funding		HMGP funding, BRIC funding	
Estimated Cost	$1 million		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Allows plans to be established to help direct funding efforts for supply resilience.		$6 million in financial benefits	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐			
Implementation Benchmarks: How Will Success Be Measured?			
Potential Challenges to Implementation			
Resources and References, if Applicable			

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 288: Supply Vulnerability Response Planning – Portland Water Bureau Source

Mitigation Action Information			
Title of action	Supply Vulnerability Response Planning – Portland Water Bureau Source		
Type of action	Plans/regulations ☒	Natural systems protection ☐	
	Structure and infrastructure project ☐	Public education/awareness ☐	
Action description	Update and revise existing plans, procedures, and agreements to ensure that the water supply system is able to handle various natural disasters.		
Hazard(s) addressed	Dam failure ☒	Flood ☒	Windstorm, incl. tornado ☒
	Drought ☒	Landslide ☒	Winter storm ☒
	Earthquake ☒	Volcanic ash ☒	
	Extreme heat ☒	Wildland fire ☒	
How does the action address identified current or future risks and vulnerabilities?	This planning will allow the District to find alternative sources of supply and identify deficiencies in the Portland Water Bureau source specifically that would require upgrading to supply the District with potable water following a natural hazard event.		
Area of action impact	The entire water District service area.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Facilities which supply water from Portland Water Bureau.		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒	Goal 4 ☐	Goal 7 ☐
	Goal 2 ☐	Goal 5 ☐	
	Goal 3 ☐	Goal 6 ☐	
Integration into other initiatives	Invest in critical infrastructure.		
Alignment with existing plans and policies	Incorporated in the Oregon Seismic Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☒	Medium ☐	High ☐
Lead position, office, department, or division responsible for implementation	Engineering & Operations		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
		Portland Water Bureau	

Potential Funding Sources			
Non-Federal Funding Sources		**Federal Funding Sources**	
General funding, Capital Improvement funding		BRIC funding, HMGP funding	
Estimated Cost	$1 million		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Allows the District to plan for future supply improvements.		$6 million in potential benefits.	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐			
Implementation Benchmarks: How Will Success Be Measured?			
Potential Challenges to Implementation			
Resources and References, if Applicable			
Three Alternatives Considered, Including No Action			
Alternative #1	**Action Description**	**Estimated Cost**	**Evaluation**
Alternative #2			
Alternative #3			
Implementation Progress Report for Plan Maintenance			
Date			
What progress in implementation has been made to date?			
What challenges in implementation have been experienced?			
What are the next steps in implementation?			

Table 289: Supply Vulnerability Response Planning – Scoggins Dam

Mitigation Action Information			
Title of action	Supply Vulnerability Response Planning – Scoggins Dam		
Type of action	Plans/regulations ☒ Structure and infrastructure project ☐		Natural systems protection ☐ Public education/awareness ☒
Action description	Evaluate supply vulnerability and response to natural hazards associated with Scoggins Dam.		
Hazard(s) addressed	Dam failure ☒ Drought ☐ Earthquake ☒ Extreme heat ☐	Flood ☒ Landslide ☒ Volcanic ash ☐ Wildland fire ☐	Windstorm, incl. tornado ☒ Winter storm ☐
How does the action address identified current or future risks and vulnerabilities?	Allows agencies to plan appropriately for responding to and recovering from a dam failure following a natural hazard event.		
Area of action impact			
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Scoggins Dam		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☒ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	Investing in critical infrastructure.		
Alignment with existing plans and policies	Oregon Seismic Resilience Plan		
Mitigation Action Implementation Plan			
Priority	Low ☐	Medium ☒	High ☐
Lead position, office, department, or division responsible for implementation	Engineering & Operations		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
		Joint Water Commission	

Potential Funding Sources			
Non-Federal Funding Sources		**Federal Funding Sources**	
General funding, Capital Improvement funding		BRIC funding, HMGP funding	
Estimated Cost	$5 million		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Allows agencies to establish plans to prevent and/or recover from a dam failure.		$30 million in financial benefits	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☒ Long-term ☐ Ongoing ☐			
Implementation Benchmarks: How Will Success Be Measured?			
Potential Challenges to Implementation			
Resources and References, if Applicable			

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 290: Somerset Reservoir

Mitigation Action Information			
Title of action	Somerset Reservoir		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☐
Action description	Retrofit the existing reservoir.		
Hazard(s) addressed	Dam failure ☒ Drought ☐ Earthquake ☒ Extreme heat ☐	Flood ☐ Landslide ☒ Volcanic ash ☐ Wildland fire ☐	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	The existing reservoir is the only reservoir in the upper pressure zone in the West Hills area of TVWD. To meet resilience goals, an additional reservoir or a rehabilitated, seismically resilient reservoir would need to be constructed.		
Area of action impact	This impacts the 1045 pressure zone as well as zones served from the Barnes Pump Station.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Somerset Reservoir		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☐ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	This meets the District's initiative to invest in critical infrastructure.		
Alignment with existing plans and policies	This aligns with the Oregon Seismic Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☐	Medium ☒	High ☐
Lead position, office, department, or division responsible for implementation	Engineering & Operations		

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, operations, safety, risk.	City of Portland, Washington County

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	BRIC funding, HMGP funding, others to be evaluated.
Estimated Cost	$4 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
District is able to maintain service to the upper West Hills area following a seismic event.	Prevents damage due to potential reservoir failure and the resulting flooding.	$24 million in potential financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐		

Implementation Benchmarks: How Will Success Be Measured?

Potential Challenges to Implementation

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 291: Infrastructure Interdependencies Workshops

Mitigation Action Information			
Title of action	Infrastructure Interdependencies Workshops		
Type of action	Plans/regulations ☐		Natural systems protection ☐
	Structure and infrastructure project ☐		Public education/awareness ☒
Action description	The TVWD and WWSS infrastructure interdependency service area activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience.		
Hazard(s) addressed	Dam failure ☒	Flood ☒	Windstorm, incl. tornado ☒
	Drought ☒	Landslide ☒	Winter storm ☒
	Earthquake ☒	Volcanic ash ☒	
	Extreme heat ☒	Wildland fire ☒	
How does the action address identified current or future risks and vulnerabilities?	Introduction to "Infrastructure Interdependencies" topic, "Why Now?"; "Hierarchy of infrastructure systems overview"; and "Co-resilience planning" Education within group. • Universe of critical infrastructure systems, from FEMA; includes all the key services represented by the group attending. • Even just for water service, water providers are dependent upon all the other utilities and public services, especially after a disaster. • Recent experience with supply chain issues proves how critical it is to plan ahead and be prepared. What mitigation can we do? • Why now? For WWSP, design is complete, and program activities are transitioning to emergency planning, operational planning, construction, and future mitigation. • Hierarchy of infrastructure dependencies; identify order of problem-solving by specific system at risk, then identify other services needed to address the specific problem; very clear that there are strong interdependencies between utilities.		
Area of action impact	Total infrastructure within the service area with combined mitigation activity coordinated within the lifelines and identified infrastructure interdependencies.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? WWSP		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒	Goal 4 ☐	Goal 7 ☒
	Goal 2 ☒	Goal 5 ☒	
	Goal 3 ☒	Goal 6 ☒	
Integration into other initiatives	The program is integrated with the work being done by Metro on the Long Range Transportation Plan, the RDPO work with Emergency Transportation Routes, the RDPO work on Provisioning of Emergency Drinking Water, and the Regional Water Consortium's work.		
Alignment with existing plans and policies	Aligned with the Water Master Plan, the Oregon Resiliency Plan, and the plans within Washington County and the RDPO.		

Mitigation Action Implementation Plan			
Priority	Low ☐ Medium ☒ High ☐		
Lead position, office, department, or division responsible for implementation	Principal Engineer, TVWD (WWSP)		
Supporting Partners			
Internal Partners	**External Partners, Including Community Partners**		
Willamette Water Supply System (WWSS)/Tualatin Valley Water District Emergency Program Coordinator	• Clean Water Services (wastewater infrastructure) • Portland General Electric (electrical power infrastructure) • Washington County (transportation infrastructure/emergency management) • Clackamas County (emergency management) • ASCE Lifelines 2022 Conference Participants (regional subject matter experts and agencies) • Cascadia Lifelines Program (consortium of lifeline providers)		
Potential Funding Sources			
Non-Federal Funding Sources	**Federal Funding Sources**		
General Funds for staff time and supplies	• Homeland Security Grant Program (HSGP) • Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities		
Estimated Cost	$50,000 per year from TVWD, does not include the funds from the external stakeholders. Estimate $150,000.00 per year required to implement a funded program and implement programs.		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Aligned mitigation planning. Protection of life safety.	Increased understanding of lifelines and infrastructure interdependencies; mitigation actions have added weight and receive higher priority.	$300,000.00 per year	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	May 23, 2022	May 2027	

Implementation Benchmarks: How Will Success Be Measured?
Start date, May 23, 2022. Meeting schedule to meet with individual stakeholders to develop a mission and vision statement. Establishment of framework during 2022 and into 2023. • Align with Lifelines and the Infrastructure Interdependencies. Assessment of current state within TVWD, WWSP, and the listed external partners. • Assessment of the Levels of Service from the Oregon Resiliency Plan. • Assessment of projects within Oregon, and especially within the RDPO and Washington County. • Alignment with FEMA Region 10. • 2023: Establish goals and quarterly workshops. • Work product will be used to inform other programs/projects, as mentioned with the long-range transportation plan and the ETR plans. • Progress measured by infrastructure mitigation work being done, grants awarded, and work started, for example, the two bridges key to the WWSP service. • 2022: Seek sources of funding for the mitigation planning projects.
Potential Challenges to Implementation
• Ability to scale the problem. The mitigation work is significant, our challenge will be to narrow the work, define the scope, and make measurable progress. • Availability of the key stakeholders. • Conflicting projects that are parallel but not integrated. • Work capacity of staff, being able to dedicate time and effort to a non-funded project. • Funding. Currently, this is all in-kind work, and there are no funds for staff time or a budget for supplies.
Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	No action	0	Lack of coordination and collaboration until emergency response required.
Alternative #2	Scale project to only water providers	Year 1 – 10,000.00 Ongoing 10,000.00	Mitigation focused on only one lifeline.
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 292: Taylors Ferry Reservoirs and Site Seismic Improvements

Mitigation Action Information	
Title of action	Taylors Ferry Reservoirs and Site Seismic Improvements
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☒ Public education/awareness ☐
Action description	Seismically upgrade the water system facilities serving the upper pressure zones in the Metzger service area.
Hazard(s) addressed	Dam failure ☐ Flood ☒ Windstorm, incl. tornado ☒ Drought ☐ Landslide ☐ Winter storm ☒ Earthquake ☒ Volcanic ash ☐ Extreme heat ☒ Wildland fire ☐
How does the action address identified current or future risks and vulnerabilities?	Upgrading the water system facilities includes reservoir upgrades, pump station upgrades, and storage and maintenance facility upgrades that will keep the facilities operational during and after a seismic event. This has additional benefits for protecting the facilities from other natural hazards.
Area of action impact	The upper pressure zones in the Metzger service area, including the 498 and 643 pressure zones. The operations and maintenance building serves the entire Metzger service area.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Taylors Ferry Facilities
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☐ Goal 2 ☐ Goal 5 ☐ Goal 3 ☐ Goal 6 ☐
Integration into other initiatives	This project aligns with the District's initiative to invest in critical infrastructure.
Alignment with existing plans and policies	This aligns with the Oregon Seismic Resilience Plan.
Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☐ High ☒
Lead position, office, department, or division responsible for implementation	Engineering & Operations

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, Operations, Finance, IT, Safety, Security, Facilities	Washington County, TVF&R
Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	HMGP funding
Estimated Cost	$15.8 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
The District is able to maintain essential potable water service to residents and businesses within the service area.	The District is able to better respond to other system needs and is able to provide emergency sources of water supply. This will assist with economic recovery efforts following a natural hazard event.	$94.8 million in potential financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☒ Mid-term ☐ Long-term ☐ Ongoing ☐	April 2023	June 2025

Implementation Benchmarks: How Will Success Be Measured?

- Success measured based on the District's ability to maintain water service following all kinds of anticipated natural hazards.

Potential Challenges to Implementation

- Rising cost of materials and construction costs.

Resources and References, if Applicable

Three Alternatives Considered, Including No Action

	Action Description	Estimated Cost	Evaluation
Alternative #1	Do nothing.		Does not meet the intent of providing a resilient source of supply.
Alternative #2	Rehabilitate.		Does not meet the full hazard mitigation requirements.
Alternative #3	Replace.		Meets all updated seismic standards.

Implementation Progress Report for Plan Maintenance	
Date	August 1, 2022
What progress in implementation has been made to date?	Design efforts are at 90% complete. Awaiting FEMA requests for information to finalize the funding approval and begin construction.
What challenges in implementation have been experienced?	None
What are the next steps in implementation?	Complete design, obtain permits, obtain full FEMA approval of funding, and construct the improvements.

Table 293: North Road Reservoir

Mitigation Action Information			
Title of action	North Road Reservoir		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☐
Action description	Retrofit the existing structure to withstand anticipated natural hazards.		
Hazard(s) addressed	Dam failure ☒ Drought ☐ Earthquake ☒ Extreme heat ☐	Flood ☐ Landslide ☒ Volcanic ash ☐ Wildland fire ☐	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	By upgrading the facility, the District will be able to provide potable water to customers in the 820 pressure zone following a natural hazard.		
Area of action impact	The 820 pressure zone and downstream residents who would be impacted by a reservoir failure.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? North Road Reservoir		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☐ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	Meets the initiative of investing in critical infrastructure.		
Alignment with existing plans and policies	Aligns with the Oregon Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☒	Medium ☐	High ☐
Lead position, office, department, or division responsible for implementation	Engineering and Operations.		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
Engineering, operations, safety, risk		Multnomah County	

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	BRIC funding, HMGP funding, other potential sources to be evaluated.
Estimated Cost	$10 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Allows the District to remain in service and prevents damage to downstream properties following a natural hazard.		$60 million in potential financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	2038	2040

Implementation Benchmarks: How Will Success Be Measured?

Potential Challenges to Implementation

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 294: Pipeline Vulnerability Response Planning

Mitigation Action Information	
Title of action	Pipeline Vulnerability Response Planning
Type of action	Plans/regulations ☒ Natural systems protection ☐ Structure and infrastructure project ☐ Public education/awareness ☐
Action description	Evaluate major pipelines that may be vulnerable to natural hazards.
Hazard(s) addressed	Dam failure ☒ Flood ☒ Windstorm, incl. tornado ☒ Drought ☒ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☒ Extreme heat ☒ Wildland fire ☒
How does the action address identified current or future risks and vulnerabilities?	Through studying the vulnerabilities of the existing piping, the District can better prepare for future natural hazards and can prioritize the rehabilitation or replacement of pipelines most in need of seismic or other upgrades to withstand natural hazard events.
Area of action impact	All of TVWD.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Critical pipeline facilities.
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☒ Goal 2 ☒ Goal 5 ☒ Goal 3 ☐ Goal 6 ☒
Integration into other initiatives	Incorporate this planning and the prioritization into other regional plans and initiatives. This includes District initiatives to invest in critical infrastructure.
Alignment with existing plans and policies	This study will help to align spending on critical pipelines with other critical infrastructure projects done by the county.
Mitigation Action Implementation Plan	
Priority	Low ☒ Medium ☐ High ☐
Lead position, office, department, or division responsible for implementation	Engineering & Operations

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, operations, finance	Washington County, Cities of Hillsboro, Beaverton, and Tigard.

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	HMGP funding, BRIC funding, others to be evaluated.
Estimated Cost	$500,000

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Allows the District to coordinate upgrades with other regional infrastructure projects to limit costs and vulnerabilities.		$3 million in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	2028	2029

Implementation Benchmarks: How Will Success Be Measured?

Potential Challenges to Implementation

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 295: Rosander Pump Station

Mitigation Action Information	
Title of action	Rosander Pump Station
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☒ Public education/awareness ☐
Action description	Upgrade the Sunset Pump Station to withstand seismic and other natural hazards.
Hazard(s) addressed	Dam failure ☒ Flood ☐ Windstorm, incl. tornado ☒ Drought ☐ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☐ Extreme heat ☐ Wildland fire ☐
How does the action address identified current or future risks and vulnerabilities?	Upgrading the Sunset Pump Station by constructing at the Rosander Pump Station and associated pipelines, which will allow the District to serve customers in the West Hills area of the District following natural hazards.
Area of action impact	West Hills area of the District.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Sunset Pump Station
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☐ Goal 2 ☐ Goal 5 ☐ Goal 3 ☐ Goal 6 ☐
Integration into other initiatives	Included in the District's initiative to invest in critical infrastructure.
Alignment with existing plans and policies	Aligns with the Oregon Resilience Plan
Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☒ High ☐
Lead position, office, department, or division responsible for implementation	Engineering and Operations.

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, operations, facilities, asset management, risk, safety.	Washington County

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	BRIC funding, HMGP funding, others to be evaluated.
Estimated Cost	$8 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Allows the District to maintain service to the West Hills area following a seismic event.		$48 million in potential financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	2028	2030

Implementation Benchmarks: How Will Success Be Measured?

Potential Challenges to Implementation

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	Do nothing.		
Alternative #2	Upgrade facility in place.		
Alternative #3	Upgrade facility by constructing at the Rosander site.		

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 296: Goyak Pump Station

Mitigation Action Information			
Title of action	Goyak Pump Station		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☒ Public education/awareness ☐
Action description	Upgrade the existing pump station to withstand the effects of natural hazards, including upgrading the backup power system to be automated.		
Hazard(s) addressed	Dam failure ☒ Drought ☐ Earthquake ☒ Extreme heat ☒	Flood ☒ Landslide ☒ Volcanic ash ☐ Wildland fire ☒	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	Upgrading the existing pump station will limit the risk of a failure and enhance the District's ability to serve the higher elevations in the Cooper Mountain Area. By upgrading the facility, the District will be able to maintain service to customers, as well as provide a backup source of supply for the City of Beaverton. Upgrading the backup power system will allow the facility to function without operator involvement and delay due to response times.		
Area of action impact	Cooper Mountain service area for TVWD and City of Beaverton as a backup source of supply.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Goyak Pump Station		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☒ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	Meets the District's initiative of investing in critical infrastructure.		
Alignment with existing plans and policies	Meets goals of the Oregon Seismic Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☐	Medium ☐	High ☒
Lead position, office, department, or division responsible for implementation	Engineering and Operations		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
Engineering, Operations, Risk, Safety		Washington County, City of Beaverton	

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	HMGP funding, BRIC funding, others to be evaluated.
Estimated Cost	$2 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Resilient source of potable water to the Cooper Mountain area.	Public confidence that no interruptions anticipated following natural hazard events. Fewer operator challenges following small and large events to keep the facility operational.	$12 million in anticipated benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☒ Mid-term ☐ Long-term ☐ Ongoing ☐	2024	2026

Implementation Benchmarks: How Will Success Be Measured?
• Successful completion of design and construction with backup power online following hazards.

Potential Challenges to Implementation
• Difficult site constraints, impacts to neighbors.

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	Do nothing.	$0	Does not meet objective.
Alternative #2	Combine 189th and Goyak Pump Stations, reducing the number of facilities.	$1.5 million	Swap cost of upgrading the facility to installation of a resilient piping connection to 189th Pump Station.
Alternative #3	Seismic upgrade and new backup power.	$2 million	Ongoing maintenance of separate facilities.

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 297: Goyak Reservoir

Mitigation Action Information			
Title of action	Goyak Reservoir		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☐
Action description	Upgrade/retrofit the existing structure to withstand hazards.		
Hazard(s) addressed	Dam failure ☒ Drought ☐ Earthquake ☒ Extreme heat ☐	Flood ☒ Landslide ☐ Volcanic ash ☐ Wildland fire ☐	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	Upgrading the existing facility will allow the District to continue potable water service to customers following a natural hazard identified above. Risks currently involve the structure not meeting full current seismic codes and the current drains not meeting desired goals of limiting water loss.		
Area of action impact	The Cooper Mountain area. The reservoir directly serves the 550 and 400 pressure zones, and indirectly serves the upper pressure zones.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Goyak Reservoir		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☐ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	This meets the District's initiative to invest in critical infrastructure.		
Alignment with existing plans and policies	Meets the Oregon Seismic Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☐	Medium ☐	High ☒
Lead position, office, department, or division responsible for implementation	Engineering & Operations		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
Engineering, operations, risk, safety			

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	HMPG funding, BRIC funding, others to be evaluated.
Estimated Cost	$1 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Maintains the ability to serve potable water following a seismic event.	Prevents flooding to downstream homes by having a resilient reservoir.	$6 million in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☒ Mid-term ☐ Long-term ☐ Ongoing ☐	2024	2025

Implementation Benchmarks: How Will Success Be Measured?
• Ability to maintain service following a natural hazard.

Potential Challenges to Implementation
• Site constraints, permitting.

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	Do nothing.	$0	Does not meet objectives.
Alternative #2	Construct new reservoir.	$10 million	Does not include land purchase and piping. Inefficient.
Alternative #3	Rehabilitate existing reservoir.	$1 million	

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 298: Meadow & Walker PRV

Mitigation Action Information	
Title of action	Meadow & Walker PRV
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☒ Public education/awareness ☐
Action description	Upgrade the existing PRV facility to improve access and safety.
Hazard(s) addressed	Dam failure ☐ Flood ☒ Windstorm, incl. tornado ☐ Drought ☐ Landslide ☐ Winter storm ☐ Earthquake ☐ Volcanic ash ☐ Extreme heat ☐ Wildland fire ☐
How does the action address identified current or future risks and vulnerabilities?	The existing facility constantly fills with water and road grime, making access and maintenance a challenge. This project will upgrade the facility to improve access and maintenance, reducing the risk of flooding that causes detrimental impacts to the operations of the system.
Area of action impact	This is a main feed to the 385 pressure zone.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Meadow & Walker PRV facility
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☐ Goal 2 ☐ Goal 5 ☐ Goal 3 ☐ Goal 6 ☐
Integration into other initiatives	Aligns with the District's initiative to invest in critical infrastructure.
Alignment with existing plans and policies	Aligns with District plans to improve safety and access to facilities.
Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☐ High ☒
Lead position, office, department, or division responsible for implementation	Engineering & Operations
Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, operations, risk, safety	
Potential Funding Sources	

Non-Federal Funding Sources	Federal Funding Sources
Capital reserves, water sales revenue, revenue bonds.	BRIC funding, HMPG funding, others to be determined
Estimated Cost	$1.5 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Ability to maintain infrastructure and avoid failures following natural hazards.		$9 million in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☒ Mid-term ☐ Long-term ☐ Ongoing ☐	2023	2025

Implementation Benchmarks: How Will Success Be Measured?

Potential Challenges to Implementation

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 299: Mid-Term Pipeline Upgrade

Mitigation Action Information			
Title of action	Mid-Term Pipeline Upgrade		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☒ Public education/awareness ☐
Action description	Upgrade and retrofit existing pipeline.		
Hazard(s) addressed	Dam failure ☒ Drought ☐ Earthquake ☒ Extreme heat ☐	Flood ☒ Landslide ☒ Volcanic ash ☐ Wildland fire ☒	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	This project will evaluate and upgrade existing critical pipelines within the District's system.		
Area of action impact	All of TVWD.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Critical pipelines.		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☒ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	Meets initiatives for investing in critical infrastructure.		
Alignment with existing plans and policies	Aligns with the Oregon Seismic Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☐	Medium ☒	High ☐
Lead position, office, department, or division responsible for implementation	Engineering and Operations		

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, operations, risk, safety	Washington County

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	BRIC funding, HMGP funding, others to be evaluated.
Estimated Cost	$98 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Improves the resilience of the water transmission mains and the District's ability to meet operational goals following an event.		$588 million in potential financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	2028	2048

Implementation Benchmarks: How Will Success Be Measured?
• District's ability to serve water following a natural hazard.

Potential Challenges to Implementation

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 300: 189th Pump Station Seismic Upgrade

Mitigation Action Information	
Title of action	189th Pump Station Seismic Upgrade
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☒ Public education/awareness ☐
Action description	Upgrade the 189th Pump Station to meet current seismic codes and provide automated backup power.
Hazard(s) addressed	Dam failure ☐ Flood ☐ Windstorm, incl. tornado ☒ Drought ☐ Landslide ☐ Winter storm ☒ Earthquake ☒ Volcanic ash ☐ Extreme heat ☐ Wildland fire ☐
How does the action address identified current or future risks and vulnerabilities?	The 189th Pump Station is in need of seismic upgrades to meet current code requirements. By upgrading the pump station and providing backup power, the Cooper Mountain area that is served by this pump station will be able to remain in service following the hazards identified. This pump station is also key to providing backup water supply to the City of Beaverton's Cooper Mountain area.
Area of action impact	The Cooper Mountain service area within TVWD.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? 189th Pump Station
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☒ Goal 2 ☐ Goal 5 ☐ Goal 3 ☐ Goal 6 ☐
Integration into other initiatives	This meets the District's ongoing initiative of investing in critical infrastructure.
Alignment with existing plans and policies	Meets the Oregon Seismic Resilience Plan.
Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☐ High ☒
Lead position, office, department, or division responsible for implementation	Engineering and Operations

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, Operations, Risk & Safety	Washington County

Potential Funding Sources			
Non-Federal Funding Sources		**Federal Funding Sources**	
Capital reserves, water sales revenue, revenue bonds.		BRIC, HMGP, others to be evaluated.	
Estimated Cost	$8 million		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Ability to continue uninterrupted potable water service following major natural hazard events.	Public confidence in the water service which meets anticipated levels of service.Meets District initiatives to invest in critical infrastructure.	$48 million in estimated financial benefits.	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☒ Mid-term ☐ Long-term ☐ Ongoing ☐	2023	2025	
Implementation Benchmarks: How Will Success Be Measured?			
• Success measured based on pump station availability and ability to meet water demands.			
Potential Challenges to Implementation			
• Rising costs of implementation and ability to construct improvements within existing land footprint. Potential impacts to neighbors and ability to serve potable water during construction.			
Resources and References, if Applicable			
• 2018 Water Master Plan Update, 2015 Water Master Plan, 2022 Pre-design (in-progress).			

Three Alternatives Considered, Including No Action			
Alternative #1	**Action Description**	**Estimated Cost**	**Evaluation**
	Pump replacements	$100,000	TBD
Alternative #2	Rehabilitate in place	$2 million	TBD
Alternative #3	Full seismic upgrade	$8 million	TBD

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 301: Florence Lane Pump Station

Mitigation Action Information			
Title of action	Florence Lane Pump Station		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☐
Action description	Retrofit the existing pump station to withstand the effects of natural disasters. This includes upgrading the existing backup power supply system.		
Hazard(s) addressed	Dam failure ☒ Drought ☐ Earthquake ☒ Extreme heat ☒	Flood ☒ Landslide ☒ Volcanic ash ☐ Wildland fire ☐	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	Upgrading the existing pump station to meet current codes will allow the District to maintain service to customers following a natural hazard. The existing backup power system may not be active following an event, and this project intends to address that as well.		
Area of action impact	The upper pressure zones in the Metzger service area.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)?		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☐ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	This meets the District's ongoing initiative of investing in critical infrastructure.		
Alignment with existing plans and policies	Meets the Oregon Seismic Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☐ Medium ☐ High ☒		
Lead position, office, department, or division responsible for implementation	Engineering and Operations		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
Engineering, operations, risk, safety.		Washington County	

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	BRIC funding, HMGP funding, others to be evaluated.
Estimated Cost	$5 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Ability to sustain operations following a natural hazard.	Public confidence in the water system.	$30 million in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☒ Mid-term ☐ Long-term ☐ Ongoing ☐	2023	2025

Implementation Benchmarks: How Will Success Be Measured?
• Meeting implementation timelines to be online prior to 2026.

Potential Challenges to Implementation
• Site constraints, land use permitting, funding availability.

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	Do nothing		
Alternative #2	Construct new pipeline in Florence Lane		
Alternative #3	Perform upgrades		

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 302: Cooper Mountain Pump Station

Mitigation Action Information			
Title of action	Cooper Mountain Pump Station		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☐
Action description	Retrofit the Cooper Mountain Pump Station to better withstand the effects of multiple natural hazards.		
Hazard(s) addressed	Dam failure ☐ Drought ☐ Earthquake ☒ Extreme heat ☐	Flood ☐ Landslide ☒ Volcanic ash ☐ Wildland fire ☐	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	The existing Cooper Mountain Pump Station does not meet all current seismic codes; in particular, a Cascadia Subduction Zone seismic event would be detrimental to being able to serve potable water to the area. This seismic upgrade would allow the District to meet levels of service for the various hazards before and after the events.		
Area of action impact	Upper pressure zones on Cooper Mountain.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)?		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☐ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	This meets the District's ongoing initiative of investing in critical infrastructure.		
Alignment with existing plans and policies	Aligns with the Oregon Resilience Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☐ Medium ☐ High ☒		
Lead position, office, department, or division responsible for implementation	Engineering and Operations		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
Engineering, Operations, Risk, & Safety		Washington County	

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	BRIC, HMGP, others to be evaluated.
Estimated Cost	$5 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Ability to continue uninterrupted potable water service following major natural hazard events.	Public confidence in the water service that meets anticipated levels of service. Meets District initiatives to invest in critical infrastructure.	$30 million in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☒ Mid-term ☐ Long-term ☒ Ongoing ☐	2024	2026

Implementation Benchmarks: How Will Success Be Measured?

- Success measured based on pump station availability and ability to meet water demands following a natural hazard event.

Potential Challenges to Implementation

- Rising costs of implementation, ability to construct improvements adjacent to residential area.

Resources and References, if Applicable

- 2018 Water Master Plan Update, 2015 Water Master Plan, 2022 Pre-design (in-progress).

Three Alternatives Considered, Including No Action

	Action Description	Estimated Cost	Evaluation
Alternative #1	Pump replacements	$100,000	TBD
Alternative #2	Rehabilitate in place	$3 million	TBD
Alternative #3	Seismic upgrade	$5 million	TBD

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 303: Cornelius Pass Facility Upgrade

Mitigation Action Information	
Title of action	Cornelius Pass Facility Upgrade
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☒ Public education/awareness ☐
Action description	Upgrade the Cornelius Pass Facility to meet current seismic design, and provide controls and interconnection between the Willamette Water Supply System and the Joint Water Commission.
Hazard(s) addressed	Dam failure ☒ Flood ☒ Windstorm, incl. tornado ☒ Drought ☐ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☒ Extreme heat ☐ Wildland fire ☐
How does the action address identified current or future risks and vulnerabilities?	This facility upgrade will allow water to move between two regional supply sources: the Willamette Water Supply System and the Joint Water Commission. It will provide regional connectivity and controls to allow water to be shared, providing resiliency for the risks identified above.
Area of action impact	Potential to include all water service providers served by the Willamette Water Supply System and the Joint Water Commission.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)?
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☒ Goal 2 ☒ Goal 5 ☐ Goal 3 ☐ Goal 6 ☐
Integration into other initiatives	This meets the District's ongoing initiative of investing in critical infrastructure.
Alignment with existing plans and policies	Meets the Oregon Seismic Resilience Plan.
Mitigation Action Implementation Plan	
Priority	Low ☒ Medium ☐ High ☐
Lead position, office, department, or division responsible for implementation	Engineering and Operations

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, Operations, Risk, Safety, Finance	Washington County, WWSS, JWC, Hillsboro

Potential Funding Sources			
Non-Federal Funding Sources		**Federal Funding Sources**	
Capital Reserves, water sales revenue, revenue bonds.		BRIC funding, HMGP funding, others to be evaluated.	
Estimated Cost	$20 million		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Ability to continue uninterrupted potable water service following major natural hazard events.	Public confidence in the water service which meets anticipated levels of service. Meets District initiatives to invest in critical infrastructure.	$120 million in estimated financial benefits.	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	2032	2034	
Implementation Benchmarks: How Will Success Be Measured?			
• Success measured based on water availability, ability to meet water demands, and supply region before, during, and after a natural hazard.			
Potential Challenges to Implementation			
• Rising costs of implementation and ability to construct improvements within existing land footprint adjacent to wetlands. Property acquisition.			
Resources and References, if Applicable			

Three Alternatives Considered, Including No Action			
Alternative #1	**Action Description**	**Estimated Cost**	**Evaluation**
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 304: Emergency Operations Center

Mitigation Action Information			
Title of action	Emergency Operations Center		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☐
Action description	Retrofit and build a facility to withstand the natural hazards.		
Hazard(s) addressed	Dam failure ☒ Drought ☒ Earthquake ☒ Extreme heat ☒	Flood ☒ Landslide ☒ Volcanic ash ☒ Wildland fire ☒	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	Following a natural disaster, it is essential to be able to convene a response group at a centralized location to provide response and communicate with stakeholders. A fully resilient Emergency Operations Center will allow the District to better respond following an event and will help the District to return to service in a timely manner.		
Area of action impact	Potential to assist with the emergency response in all of Washington County.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Emergency Operations Center		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☐ Goal 5 ☒ Goal 6 ☐	Goal 7 ☒
Integration into other initiatives	This meets the District's ongoing initiative of investing in critical infrastructure.		
Alignment with existing plans and policies	Meets the intent of the Oregon Seismic Resiliency Plan.		
Mitigation Action Implementation Plan			
Priority	Low ☒	Medium ☐	High ☐
Lead position, office, department, or division responsible for implementation	Engineering and Operations		

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
All internal departments.	Washington County

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	HMGP funding, BRIC funding, others to be evaluated.
Estimated Cost	$30 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Ability to respond to system failures following a major natural hazard. Improve communications.	Potentially serve as a location for potable water distribution.	$180 million in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	2032	2035

Implementation Benchmarks: How Will Success Be Measured?
• Ability to respond to disasters, improvement in response times.

Potential Challenges to Implementation
• Location, funding.

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
Alternative #1	**Action Description**	**Estimated Cost**	**Evaluation**
	Do nothing		
Alternative #2	Upgrade existing		
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 305: Emergency Underground Storage/Water Supply Well – Regional Supply Planning

Mitigation Action Information	
Title of action	Emergency Underground Storage/Water Supply Well – Regional Supply Planning
Type of action	Plans/regulations ☒ Natural systems protection ☒ Structure and infrastructure project ☐ Public education/awareness ☐
Action description	Conduct an engineering study of emergency underground storage and subsequent water use during response and recovery operations. The project would include, but not be limited to, Schuepbach Well, Grabhorn Aquifer Storage and Recovery (ASR), Miller Hill ASR, and Cooper Mountain. ASR. Include feasibility, methods, and required equipment for use of emergency underground stored water. The project would help determine the future ability to use the Emergency Underground Storage sites during an emergency to assist in the Emergency Drinking Water Provisioning Project and the provisioning of water to firefighters for firefighting efforts.
Hazard(s) addressed	Dam failure ☒ Flood ☒ Windstorm, incl. tornado ☒ Drought ☒ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☒ Extreme heat ☒ Wildland fire ☒
How does the action address identified current or future risks and vulnerabilities?	Underground storage capabilities exist, and our service area is within the area projected to be impacted by a Cascadia Subduction Zone Earthquake (CSZE), West Hills Earthquake, or other natural hazards that could impact aboveground water storage infrastructure. As part of the goals of the 2013 Oregon Resilience Plan, water utilities will develop a 50-year mitigation plan for resilience to the impact of the CSZE, magnitude 9.0. Redundant water supply systems provide emergency water supply in the event of an emergency disruption in water supply, like a major earthquake event.
Area of action impact	All of TVWD's service area.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? The facilities mentioned in the description.
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☒ Goal 7 ☒ Goal 2 ☐ Goal 5 ☐ Goal 3 ☐ Goal 6 ☒
Integration into other initiatives	Fulfills initiative to invest in critical infrastructure.

Alignment with existing plans and policies	An Emergency Water Supply Study is aligned with TVWD's AWIA Risk and Resilience Assessment and the Oregon Resilience Plan. Also, in alignment with the Regional Water Providers Consortium and Regional Disaster Preparedness Organization. 2015 Water Master Plan, included in the 2018 update to the Water Master Plan.

Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☒ High ☐
Lead position, office, department, or division responsible for implementation	Engineering & Operations.

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, Operations, Risk, Safety	Washington County

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	HMGP funding, BRIC funding, others to be evaluated.
Estimated Cost	$150,000

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Develops a plan that can be implemented to supply emergency water.	Customer involvement and communication can allow public to gain trust and understand the value of water.	$900,000 in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☒ Long-term ☐ Ongoing ☐	2026	2027

Implementation Benchmarks: How Will Success Be Measured?
• Successful completion of the plan. Readiness ability to meet demands in a timely manner.
Potential Challenges to Implementation
• Resource availability to lead the study.
Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
Alternative #1	**Action Description**	**Estimated Cost**	**Evaluation**
Alternative #2			
Alternative #3			
Implementation Progress Report for Plan Maintenance			
Date			
What progress in implementation has been made to date?			
What challenges in implementation have been experienced?			
What are the next steps in implementation?			

Table 306: Lead Joint Pipe Seismic Upgrade

Mitigation Action Information	
Title of action	Lead Joint Pipe Seismic Upgrade
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☒ Public education/awareness ☐
Action description	Retrofit the existing pump station to withstand the effects of natural disasters. This includes upgrading the existing backup power supply system.
Hazard(s) addressed	Dam failure ☒ Flood ☒ Windstorm, incl. tornado ☒ Drought ☐ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☐ Extreme heat ☐ Wildland fire ☐
How does the action address identified current or future risks and vulnerabilities?	Upgrading the existing piping to meet current seismic design standards will allow the District to maintain service to customers following a seismic event.
Area of action impact	Several areas within the District's service area.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Distribution piping network
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☐ Goal 2 ☐ Goal 5 ☐ Goal 3 ☐ Goal 6 ☐
Integration into other initiatives	This meets the District's ongoing initiative of investing in critical infrastructure.
Alignment with existing plans and policies	Meets the Oregon Seismic Resilience Plan.
Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☐ High ☒
Lead position, office, department, or division responsible for implementation	Engineering and Operations.

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
Engineering, operations, risk, safety.	Washington County

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
Capital reserves, water sales revenue, revenue bonds.	BRIC funding, HMGP funding, others to be evaluated.
Estimated Cost	$25 million

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Ability to sustain operations following a natural hazard.	Public confidence in the water system.	$125 million in estimated financial benefits.

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☒ Mid-term ☐ Long-term ☐ Ongoing ☐		

Implementation Benchmarks: How Will Success Be Measured?

Potential Challenges to Implementation
• Site constraints, funding availability.

Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1			
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 307: Regional Water Providers Consortium Strategic Plan 2023–28

Mitigation Action Information	
Title of action	Regional Water Providers Consortium Strategic Plan 2023–28
Type of action	Plans/regulations ☒ Natural systems protection ☐ Structure and infrastructure project ☐ Public education/awareness ☒
Action description	The TVWD and Regional Water Providers service area activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience.
Hazard(s) addressed	Dam failure ☒ Flood ☒ Windstorm, incl. tornado ☒ Drought ☒ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☒ Extreme heat ☒ Wildland fire ☒
How does the action address identified current or future risks and vulnerabilities?	Meeting water needs, emergency preparedness, and resiliency by strengthening regional partnerships. Recent experience with emergency tabletop exercises has underscored how critical it is to plan ahead and be prepared, as well as to determine what mitigation we can do to have resilient customers so that we meet our LOS requirements. Addressing common mitigation issues and using the strength of the Regional Water Providers Consortium.
Area of action impact	Total infrastructure within the service area with combined mitigation activity coordinated within the lifelines and identified infrastructure interdependencies.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Hospitals, care centers, fire stations, and other lifelines as defined in the Oregon Resiliency Plan.
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☒ Goal 2 ☒ Goal 5 ☒ Goal 3 ☒ Goal 6 ☒
Integration into other initiatives	The Regional Water Consortium's five-year strategic plan for 2023–28 is aligned/integrated with the work of the Regional Disaster Preparedness Organization.
Alignment with existing plans and policies	Aligned with the Water Master Plan, the Oregon Resiliency Plan, and the plans within Washington County and the RDPO.
Mitigation Action Implementation Plan	
Priority	Low ☐ Medium ☒ High ☐
Lead position, office, department, or division responsible for implementation	Emergency Program Coordinator

Supporting Partners	
Internal Partners	**External Partners, Including Community Partners**
• Communications and Public Affairs Supervisor	• City of Beaverton • Clackamas River Water • City of Cornelius • City of Forest Grove • Gladstone • Gresham • Hillsboro • Lake Oswego • Milwaukie • Newberg • Oak Lodge Water Services • City of Portland • Raleigh Water District • Rockwood • Sandy • Scapoose • Sherwood • South Fork Water Board • Sunrise Water Authority • Tigard • Tualatin • West Slope Water District • Wilsonville

Potential Funding Sources	
Non-Federal Funding Sources	**Federal Funding Sources**
General Funds for staff time and supplies	• Homeland Security Grant Program (HSGP) • Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities
Estimated Cost	$10,000 per year from TVWD

Estimated Benefit		
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**
Aligned mitigation planning. Protection of life safety.	Increased understanding of lifelines and infrastructure interdependencies; mitigation actions have added weight and receive higher priority.	$30,000.00 per year

Project Timeline		
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	2023	2028

Implementation Benchmarks: How Will Success Be Measured?
• Development of strategic plan. • Development of core planning team. • Assessment of the levels of service from the Oregon Resiliency Plan. • Assessment of projects within Oregon and especially within the RDPO and Washington County. • Alignment with FEMA Region 10. • See Strategic Plan 2018–2023 for elements to be updated.
Potential Challenges to Implementation
• Ability to scale the problem. The mitigation work is significant; our challenge will be to narrow the work, define the scope, and make measurable progress. • Availability of the key stakeholders (critical and key customers). • Conflicting projects that are parallel but not integrated. • Work capacity of staff; being able to dedicate time and effort to a non-funded project. • Funding. Currently, this is all in-kind work, and there are no funds for staff time or a budget for supplies.
Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	No action	$0	Lack of coordination and collaboration until emergency response required.
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 308: Infrastructure Interdependencies Workshops

Mitigation Action Information	
Title of action	Infrastructure Interdependencies Workshops
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☐ Public education/awareness ☒
Action description	The TVWD and WWSS infrastructure interdependency service area activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience.
Hazard(s) addressed	Dam failure ☒ Flood ☒ Windstorm, incl. tornado ☒ Drought ☒ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☒ Extreme heat ☒ Wildland fire ☒
How does the action address identified current or future risks and vulnerabilities?	Introduction to "Infrastructure Interdependencies" topic, "Why Now?"; "Hierarchy of infrastructure systems overview"; and "Co-resilience planning" Education within group. • Universe of critical infrastructure systems, from FEMA; includes all the key services represented by the group attending. • Even just for water service, water providers are dependent upon all the other utilities and public services, especially after a disaster. • Recent experience with supply chain issues proves how critical it is to plan ahead and be prepared. What mitigation can we do? • Why now? For WWSP, design is complete, and program activities are transitioning to emergency planning, operational planning, construction, and future mitigation. • Hierarchy of infrastructure dependencies; identify order of problem-solving by specific system at risk, then identify other services needed to address the specific problem; very clear that there are strong interdependencies between utilities.
Area of action impact	Total infrastructure within the service area with combined mitigation activity coordinated within the lifelines and identified infrastructure interdependencies.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? WWSP
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☒ Goal 2 ☒ Goal 5 ☒ Goal 3 ☒ Goal 6 ☒
Integration into other initiatives	The program is integrated with the work being done by Metro on the Long Range Transportation Plan, the RDPO work with Emergency Transportation Routes, the RDPO work on Provisioning of Emergency Drinking Water, and the Regional Water Consortium's work.
Alignment with existing plans and policies	Aligned with the Water Master Plan, the Oregon Resiliency Plan, and the plans within Washington County and the RDPO.

Mitigation Action Implementation Plan			
Priority	Low ☐ Medium ☒ High ☐		
Lead position, office, department, or division responsible for implementation	Principal Engineer, TVWD (WWSP)		
Supporting Partners			
Internal Partners	**External Partners, Including Community Partners**		
Willamette Water Supply System (WWSS)/Tualatin Valley Water District Emergency Program Coordinator	• Clean Water Services (wastewater infrastructure) • Portland General Electric (electrical power infrastructure) • Washington County (transportation infrastructure/emergency management) • Clackamas County (emergency management) • ASCE Lifelines 2022 Conference Participants (regional subject matter experts and agencies) • Cascadia Lifelines Program (consortium of lifeline providers)		
Potential Funding Sources			
Non-Federal Funding Sources	**Federal Funding Sources**		
General Funds for staff time and supplies	• Homeland Security Grant Program (HSGP) • Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities		
Estimated Cost	$50,000 per year from TVWD, which does not include the funds from the external stakeholders. Estimate $150,000.00 per year required to implement a funded program and implement programs.		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Aligned mitigation planning. Protection of life safety.	Increased understanding of lifelines and infrastructure interdependencies; mitigation actions have added weight and receive higher priority.	$300,000.00 per year	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	May 23, 2022	May 2027	

Implementation Benchmarks: How Will Success Be Measured?
Start date, May 23, 2022. Meeting schedule to meet with individual stakeholders to develop a mission and vision statement. Establishment of framework during 2022 and into 2023. • Align with Lifelines and the Infrastructure Interdependencies. Assessment of current state within TVWD, WWSP, and the listed external partners. • Assessment of the Levels of Service from the Oregon Resiliency Plan. • Assessment of projects within Oregon and especially within the RDPO and Washington County. • Alignment with FEMA Region 10. • 2023: Establish goals and quarterly workshops. • Work product will be used to inform other programs/projects, as mentioned with the long-range transportation plan and the ETR plans. • Progress measured by infrastructure mitigation work being done, grants awarded, and work started, for example, the two bridges key to the WWSP service. • 2022: Seek sources of funding for the mitigation planning projects.
Potential Challenges to Implementation
• Ability to scale the problem. The mitigation work is significant, our challenge will be to narrow the work, define the scope and make measurable progress. • Availability of the key stakeholders • Conflicting projects which are parallel but not integrated • Work capacity of staff, being able to dedicate time and effort to a non-funded project. • Funding. Currently, this is all in-kind work, and there are no funds for staff time or a budget for supplies.
Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	No action.	$0	Lack of coordination and collaboration until emergency response required.
Alternative #2	Scale project to only water providers.	Year 1 – $10,000.00 Ongoing $10,000.00	Mitigation focused on only one lifeline.
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 309: Key and Critical Customer Collaboration

Mitigation Action Information	
Title of action	Key and Critical Customer Collaboration
Type of action	Plans/regulations ☐ Natural systems protection ☐ Structure and infrastructure project ☐ Public education/awareness ☒
Action description	The TVWD and WWSS infrastructure interdependency service area activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience.
Hazard(s) addressed	Dam failure ☒ Flood ☒ Windstorm, incl. tornado ☒ Drought ☒ Landslide ☒ Winter storm ☒ Earthquake ☒ Volcanic ash ☒ Extreme heat ☒ Wildland fire ☒
How does the action address identified current or future risks and vulnerabilities?	Reinstate, post-COVID, Key and Critical Customer Collaboration meetings. "Why Now?," Key and Critical Customer Co-resilience Planning and Education within group. • Determine Customer's level of mitigation and readiness planning and how that aligns with our Levels of Service as described in the Oregon Resiliency Plan. • Recent experience with emergency tabletop exercises has underscored how critical it is to plan ahead and be prepared, as well as to determine what mitigation we can do to have resilient customers so that we meet our LOS Requirements. • Hierarchy of lifelines and LOS will define our priority of work during an emergency response.
Area of action impact	Total infrastructure within the service area with combined mitigation activity coordinated within the lifelines and identified infrastructure interdependencies.
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? Hospitals, care centers, fire stations and other lifelines as defined in the Oregon Resiliency Plan
Mitigation Action Integration	
Alignment with NHMP goals	Goal 1 ☒ Goal 4 ☐ Goal 7 ☒ Goal 2 ☒ Goal 5 ☒ Goal 3 ☒ Goal 6 ☒
Integration into other initiatives	The program is integrated with the work being done by Metro on the Long Range Transportation Plan, the RDPO work with Emergency Transportation Routes, the RDPO work on Provisioning of Emergency Drinking Water, and the Regional Water Consortium's work.
Alignment with existing plans and policies	Aligned with the Water Master Plan, the Oregon Resiliency Plan, and the plans within Washington County and the RDPO.

Mitigation Action Implementation Plan			
Priority	Low ☐ Medium ☐ High ☒		
Lead position, office, department, or division responsible for implementation	Customer Service Manager		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
• Communications and Public Affairs Supervisor • Tualatin Valley Water District Emergency Program Coordinator		• Hospitals and Health Care • Fire Department • Food Production • Manufacturing, water quality • Schools • Tualatin Hills Parks & Recreation • Washington County • City of Beaverton	
Potential Funding Sources			
Non-Federal Funding Sources		**Federal Funding Sources**	
General Funds for staff time and supplies		• Homeland Security Grant Program (HSGP) • Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities	
Estimated Cost	$50,000 per year from TVWD, which does not include the funds from the external stakeholders. Estimate $150,000.00 per year required to implement a funded program and implement programs.		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Aligned mitigation planning. Protection of life safety.	Increased understanding of lifelines and infrastructure interdependencies; mitigation actions have added weight and receive higher priority.	$300,000.00 per year	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☐ Long-term ☒ Ongoing ☐	May 23, 2022	May 2027	

Implementation Benchmarks: How Will Success Be Measured?
• Define key and critical customers via a review of pre-COVID practice. • Outreach to the key and critical customers. • Meeting schedule to meet with individual stakeholders to develop a mission and vision statement. Establishment of framework during 2022 and into 2023. • Group meeting schedule. • Determine level of mitigation planning, what the key and critical customers have done, and what is their capacity? • Assessment of the Levels of Service from the Oregon Resiliency Plan. • Assessment of projects within Oregon, especially within the RDPO and Washington County. • Alignment with FEMA Region 10. • 2023: Establish goals and quarterly workshops. • Progress measured by infrastructure mitigation work being done, grants awarded, and work started, for example, the two bridges key to the WWSP service. • 2022: Seek sources of funding for the mitigation planning projects.
Potential Challenges to Implementation
• Ability to scale the problem. The mitigation work is significant; our challenge will be to narrow the work, define the scope, and make measurable progress. • Availability of the key stakeholders (critical and key customers). • Conflicting projects that are parallel but not integrated. • Work capacity of staff, being able to dedicate time and effort to a non-funded project. • Funding. Currently, this is all in-kind work, and there are no funds for staff time or a budget for supplies.
Resources and References, if Applicable

Three Alternatives Considered, Including No Action			
	Action Description	**Estimated Cost**	**Evaluation**
Alternative #1	No action	$0	Lack of coordination and collaboration until emergency response required.
Alternative #2	Scale project to only water providers	Year 1 – $10,000.00 Ongoing $10,000.00	Mitigation focused on only one lifeline.
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

Table 310: TVWD HQ Building Upgrade

Mitigation Action Information			
Title of action	TVWD HQ Building Upgrade		
Type of action	Plans/regulations ☐ Structure and infrastructure project ☒		Natural systems protection ☐ Public education/awareness ☐
Action description	Upgrade the existing headquarters building for TVWD to withstand all natural hazards.		
Hazard(s) addressed	Dam failure ☒ Drought ☒ Earthquake ☒ Extreme heat ☒	Flood ☒ Landslide ☒ Volcanic ash ☒ Wildland fire ☒	Windstorm, incl. tornado ☒ Winter storm ☒
How does the action address identified current or future risks and vulnerabilities?	Upgrading the existing TVWD headquarters building will allow the District to remain operational following a seismic or other natural hazard event. This is the central hub for providing potable water to over 220,000 residents and businesses.		
Area of action impact	The entire TVWD service area.		
Is the action related to a critical facility or facilities?	Yes ☒ No ☐ If yes, what facility(ies)? TVWD HQ Building		
Mitigation Action Integration			
Alignment with NHMP goals	Goal 1 ☒ Goal 2 ☐ Goal 3 ☐	Goal 4 ☒ Goal 5 ☐ Goal 6 ☐	Goal 7 ☐
Integration into other initiatives	Invest in critical infrastructure		
Alignment with existing plans and policies	Oregon Seismic Resilience Plan		
Mitigation Action Implementation Plan			
Priority	Low ☐	Medium ☐	High ☒
Lead position, office, department, or division responsible for implementation	Engineering & Operations		
Supporting Partners			
Internal Partners		**External Partners, Including Community Partners**	
All TVWD departments		Washington County	

Potential Funding Sources			
Non-Federal Funding Sources		**Federal Funding Sources**	
General funding, Capital Improvement funding		HMGP funding, BRIC funding	
Estimated Cost	$15 million		
Estimated Benefit			
Primary Benefit(s)	**Secondary Benefit(s)**	**Financial Benefit(s)**	
Allows the District to remain operational and to be an emergency operations center available in times of natural hazard.		$90 million in financial benefits	
Project Timeline			
Expected Timeline for Completion	**Potential Start Date**	**Potential Completion Date**	
Short-term ☐ Mid-term ☒ Long-term ☐ Ongoing ☐			
Implementation Benchmarks: How Will Success Be Measured?			
Potential Challenges to Implementation			
Resources and References, if Applicable			

Three Alternatives Considered, Including No Action			
Alternative #1	**Action Description**	**Estimated Cost**	**Evaluation**
Alternative #2			
Alternative #3			

Implementation Progress Report for Plan Maintenance	
Date	
What progress in implementation has been made to date?	
What challenges in implementation have been experienced?	
What are the next steps in implementation?	

7. Willamette Water Supply System

Water needs in Washington County are projected to increase, with new supplies needed as early as 2026. Developing an additional water supply through a partnership improves regional water reliability and supports the region's plans for responsible growth within urban growth boundaries.

The WWSS Commission is an Oregon intergovernmental entity formed by TVWD, the City of Hillsboro, and the City of Beaverton. The WWSS Commission was formed to build the WWSS in response to planned growth in their service areas. The WWSS will provide an additional, resilient water supply for Washington County.

The Willamette River, one of Oregon's largest rivers, is the WWSS' new supply source. The raw water intake is located at the Willamette River Water Treatment Plant in Wilsonville. From there, raw water will be pumped to the WWSS Water Treatment Plant, a new state-of-the-art water filtration plant where multiple treatment processes will produce high-quality drinking water. Drinking water will be pumped to reservoir facilities on Cooper Mountain, then will be gravity-fed to additional storage and customers in the TVWD, Hillsboro, and Beaverton service areas. The new system will be completed by 2026.

TVWD has been designated the Managing Agency for the WWSS Commission, and TVWD operates the Willamette Water Supply Program to plan, design, and construct the WWSS. WWSS staff is comprised of personnel from TVWD and the cities of Hillsboro and Beaverton.

The Willamette Water Supply System Intergovernmental Agreement, effective July 1, 2019, and amended in 2020 and 2021, sets forth the terms for the joint ownership, financing, design, permitting, construction, operation, maintenance, repair, and replacement of the WWSS.

The powers and duties of TVWD as a Managing Agency include creating the "Master Plan" for capital improvements in collaboration with each party participating and maintaining the Capital Improvement Plan budget, which is updated and submitted to the WWSS Board. The TVWD Emergency Program Coordinator also acts as the Emergency Program Coordinator for WWSS.

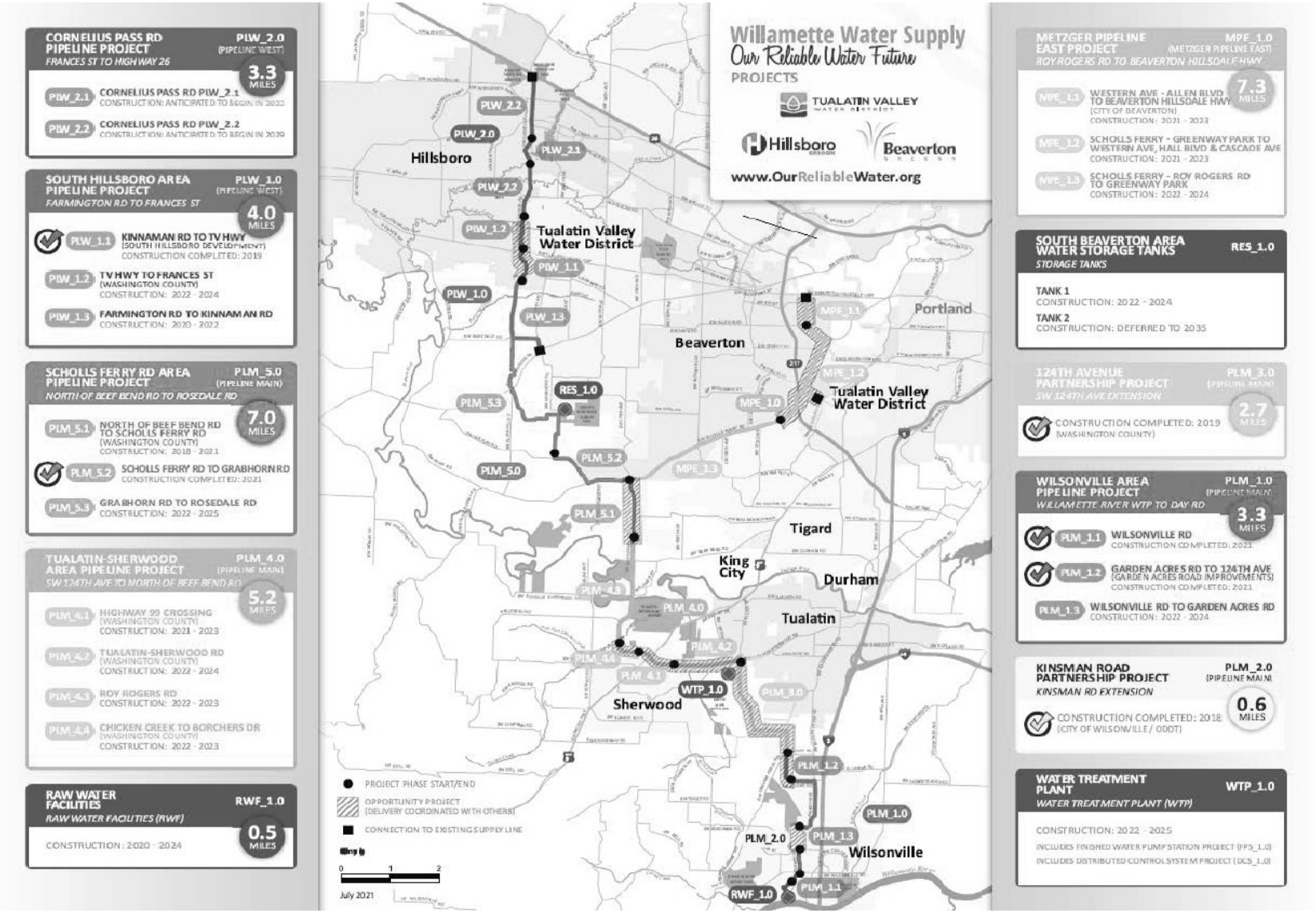


Figure 42: Willamette Water Supply System Project Map

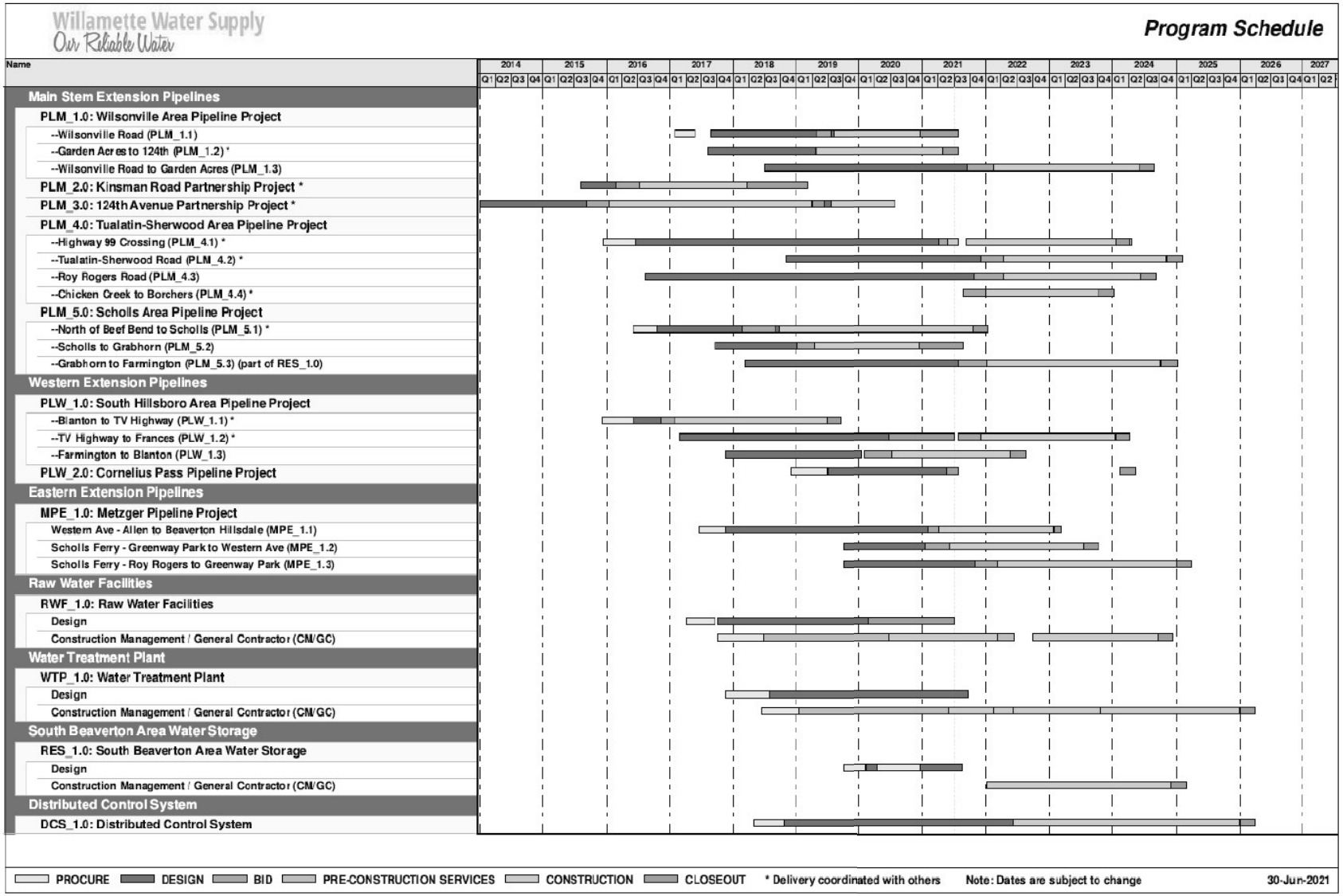


Figure 43: Willamette Water Supply System Program Schedule

7.1. NHMP Planning Process

The WWSS has a three-member Board of Commissioners that serves as the governing body of the WWSS Commission. Once the Washington County NHMP has received the designation “Approvable Pending Local Adoption” from FEMA, WWSS will submit the plan to the Board of Commissioners for final public comment and local adoption. A copy of the resolution will be inserted into the NHMP and held on file in Washington County, TVWD, and WWSS.

WWSP participated in the entire planning process for the NHMP and shared Technical Committee members with TVWD. The TVWD Emergency Program Coordinator was the point of contact for WWSS during the planning process. Additionally, public and stakeholder engagement NHMP requirements for public and stakeholder engagement were executed by TVWD on behalf of WWSS, as it is TVWD’s duty as WWSS Managing Agency to provide public communications and outreach for WWSS. WWSS is being highlighted within the TVWD NHMP annex due to its separate governing body and to ensure the system meets all FEMA planning requirements and is eligible for hazard mitigation assistance grants.

7.2. Hazard Identification and Risk Assessment

WWSS shares natural hazard scores, significant events, potential impacts, vulnerabilities, and overall vulnerability with TVWD for each hazard profiled in this NHMP. Critical facilities and assets identified by WWSS are included in Table 282 of this annex.

7.3. Capability Assessment, Expansion, and Improvement

Because WWSS is managed by TVWD, it has the same planning, regulatory, administrative, technical, educational, public outreach, and financial capabilities and opportunities for capability expansion and improvement as described in Section 4 of this annex. Additionally, because WWSS staff is comprised of personnel from TVWD and the cities of Hillsboro and Beaverton, the system can utilize resources from these three entities if it is ever required.

7.4. Mitigation Strategy

The mitigation goals detailed in Volume I, Section 3 also apply to WWSS, as they were an active participant in the NHMP planning process. The Technical Committee for WWSS will establish a process in which the mitigation strategy, goals, objectives, and actions outlined in this NHMP and the TVWD annex will be incorporated into existing local planning strategies, as applicable. Because WWSS infrastructure is part of the TVWD infrastructure, any mitigation actions taken by either WWSS or TVWD will have a positive impact on the resiliency of the entire water system.

In addition to the TVWD action items included in Section 6.1 of this annex, WWSS identified supplemental action items. A summary of these actions is provided below. Full action item planning worksheets are provided in Section 6.2 of this annex.

Table 311: Willamette Water Supply System Action Items

Action Item Number	Action Item Description	Hazard(s) Addressed	Priority
1	ShakeAlert System earthquake early warning network sponsored by the USGS and west coast regional stakeholders.	Earthquake	High
2	Standby power and fuel storage to provide additional standby power generation and associated fuel storage at the Willamette Water Supply System's water treatment plant facility.	Earthquake, extreme heat, wildland fire, windstorm, including tornado, and winter storm	High
3	Emergency Spare Parts and Storage Facility to provide additional emergency spare parts and associated storage facilities for enhanced operations of the Willamette Water Supply System.	Earthquake, extreme heat, wildland fire, windstorm, including tornado, and winter storm	High
4	Seismic Upgrade to two bridges on Roy Rogers Road so they can serve as a critical transportation link within Washington County for critical infrastructure systems and continue to provide critical service to the community following a major seismic event (water, electrical power, transportation, and wastewater).	Earthquake	High
5	Infrastructure interdependencies workshops. TVWD and WWSS activity focused on identification, assessment, and development of mitigation strategies related to improving community resilience. This action is also included in TVWD's action item list.	All hazards	Medium

Willamette Water Supply
Our Reliable Water

4A. Natural Hazard Mitigation Plan Annex – *Mike Britch*

April 6, 2023

1

Outline

- Key Concepts
- Background
- WWSS Mitigation Action Plans

2

Key Concepts

- The NHMP is updated every five years and is led by Washington County.
- TVWD contributed to the County's Annex in the previous NHMPs, this new TVWD Annex includes the WWSS.
- A completed and adopted NHMP is a perquisite to receiving funding in support of risk mitigation activities from Federal Emergency Management Agency's (FEMA's) Building Resilient Infrastructure and Communities (BRIC) program and from other funding sources.
- Adoption of the NHMP Annex by the governing body is required to pursue funding from FEMA and others.
- The WWSS Board can choose to adopt the TVWD portion to support future WWSS risk mitigation-related funding requests.

3

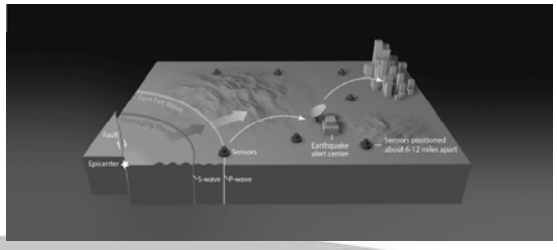
Background

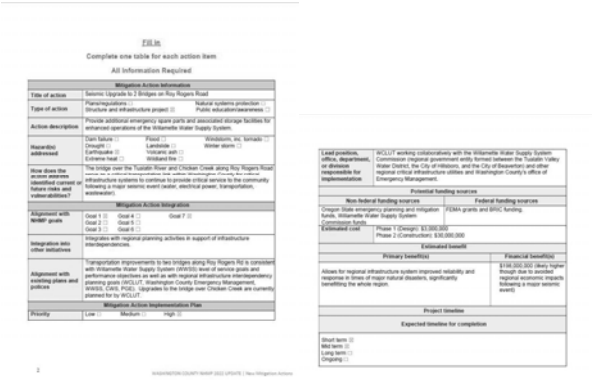
- WWSP staff worked with TVWD and Washington County staff in the development of documentation in support of incorporating the WWSS into the NHMP.
- TVWD is the designated Managing Agency of the WWSS. Board adoption is required by both the TVWD and WWSS Commission as part of the State of Oregon and FEMA for approval and acceptance.
- Washington County completed the required public review in March and anticipates the County Board of Commissioner's adoption April 2023.
- With an approved annex plan, WWSS is eligible to apply for federal funding to assist with implementation of hazard mitigation actions included in the plan.

4

WWSS Mitigation Action Plans

- Mitigation Action Plans:
  - Five action plans developed:
    1. **ShakeAlert Earthquake Early Warning System:** Used with onsite accelerometers at facilities





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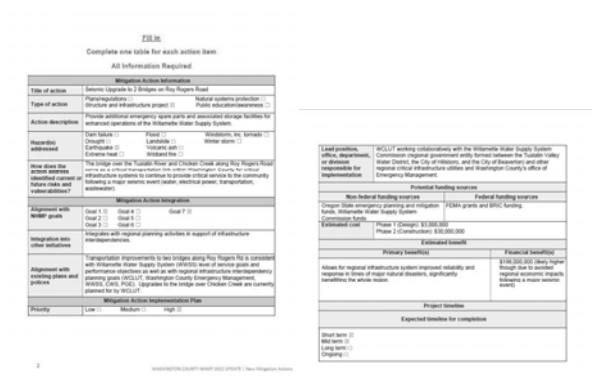
WWSS Mitigation Action Plans

- Mitigation Action Plans:
  - Five action plans developed:
    2. **Standby Power and Fuel Storage:** Provide additional standby power generation and associated fuel storage at the at the water treatment plant.
    3. **Emergency Spare Parts and Storage Facility:** Additional emergency spare parts and associated storage facilities for enhanced WWSS operations.



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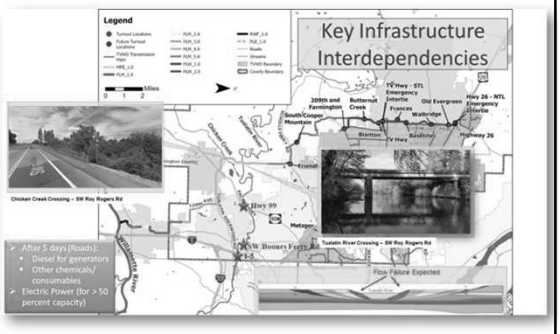
6

WWSS Mitigation Action Plans

- Mitigation Action Plans:
  - Five action plans developed:
    4. **Seismic Upgrade to Two Bridges on Roy Rogers Road:** Serve as a critical transportation link within Washington County to provide supplies for WTP and RWF operations following an earthquake.
    5. **Infrastructure Interdependencies Workshops:** Previous workshop held May 23, 2022, with regional critical infrastructure partners to support co-resilience planning and improved overall regional resilience.



Summary

- By completing the NHMP it sets the stage to have access to FEMA BRIC funding (up to 75% of costs) and from other sources to achieve enhanced resilience.
- There is no obligation to proceed with any of these projects.
- Once the plan has been adopted, WWSP staff will evaluate next steps with the mitigation action plans and provide updates as applicable.

Requested Board Action

Consider adopting Resolution WWSS-03-23 approving the Willamette Water Supply System representation in the updates to the Washington Country Multi-Jurisdictional Natural Hazard Mitigation Plan.

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Willamette Water Supply
Our Reliable Water

STAFF REPORT

To: WWSS Board of Commissioners

From: David Kraska, P.E., Willamette Water Supply System General Manager

Date: April 6, 2023

Subject: DEA Contract No. 2016-320 Amendment #39 Approval

Requested Board Action:
Consider approving David Evans and Associates (DEA) contract amendment of up to $782,782.52 to continue to provide regulatory permitting and related consulting services for the Willamette Water Supply Program (WWSP).

Key Concepts:

- Implementation of WWSP requires assistance of consultants with expertise in environmental as well as land use permit application and compliance to provide experience in wetlands, cultural resources, hazardous materials assessments, and endangered species survey work needed to be performed to secure permits and support compliance.
- The existing contract was procured and structured with the intent to enact periodic amendments to add scope and budget.
- The proposed amendment enables WWSP to maintain continuity of permitting application/compliance services through April 18, 2024.

Background:
DEA was selected through a competitive process to provide the WWSP with professional permitting services. The permitting services contract was approved and awarded in October 2015 with an initial two-year scope of work and a total term of twelve years in possible extensions. In 2022 the contract was extended through April 9, 2023.

A summary of work performed to date is as follows:

- Notable accomplishments during the prior contract terms (2016-2022): Acquisition of system-wide permits from the US Army Corp of Engineers (USACE), Oregon Department of State Lands (DSL), and Oregon Department of Environmental Quality (DEQ); acquisition of land use and preconstruction permits across most work packages; and modifications to permits where needed.

- Notable accomplishments in the current contract term (April 2022 through March 2023):
    - Secured 78 pre-construction permits needed for multiple projects across the program.
    - Coordination and submission of 2 minor USACE/DSL permit modification bundles and acquisition and/or modification of land use and/or preconstruction permits for multiple projects: PLM_1.3, MPE_1.2, MPE_1.3, and PLM_5.3; as well as a major permit modification for the approval of the temporary Tualatin River blow off necessary for system start up and commissioning.
    - Provided technical support and documentation for analyses and negotiations with outside agencies in support of various activities including commissioning and startup; the selection of the preferred location for a temporary discharge on the Tualatin River and the conceptual design of that facility; long-term operations; and easement acquisition.

- Supported construction compliance for various work packages and provided annual reports for various permits.
- Renewed Department of State Lands, and Oregon Department of Fish and Wildlife Fish Salvage and Capture, Hold, Transfer, and Relocation Permits.
- Provided technical support in Thermal Trading Plan WaterWatch litigation.

Thus far the WWSP has identified 543 permits needed for the construction of the Willamette Water Supply System (WWSS). To date 446 (82%) permits have been secured. Continued support in permit acquisition and compliance are needed from DEA in order to maintain current construction, commissioning, and startup schedules.
The scope of work for the next 12-month extension (April 18, 2023, through April 19, 2024) will include but is not limited to:

- Coordinating permit modification process
- Continuing preconstruction permit acquisitions
- Monitoring environmental compliance during construction
- Supporting Thermal Trading Plan implementation
- Preparing and implementing post-construction monitoring
- Conducting preconstruction site assessments and surveys
- Preparing and submitting 2023 annual reports to regulatory agencies
- Engaging with various stakeholders and regulatory agencies, as needed

The level of effort needed under this contract continues to remain high in 2023 due to additional hazardous materials, cultural resource, and environmental resource studies and permit modifications required by the projects. Some work has been delayed from the existing contract into the coming 12 months and these costs are reflected in the remaining unspent budget and in the budget for the new contract term.

Budget Impact:
Amendment #39 includes a budget increase of $782,782.52. These funds will be added to the approximately $720,170.37 that is projected to be unspent at the end of the current contract term (April 18, 2023). In the approved Baseline Budget 8.1, a Permitting budget line item of $1,936,680 was included for these Permitting Support Services. As projected last year, the amount for the proposed DEA scope of work/contract extension is less than prior years' amendments because project designs have been finalized and have successfully advanced through the Land Use Permitting process, and DEA's primary responsibilities have shifted to field monitoring for permit compliance.

Initial Contract Value	**$589,896**
Amendments 1 through 38	$ 9,998,259.13
Current Contract Value	$ 10,588,155.13
Projected Unspent Balance from Current Contract	$ 720,170.37
Proposed Amendment 39 *TVWD estimated share[1] $484,385.82* *Hillsboro estimated share[1] $258,396.51* *Beaverton estimated share[1] $40,000.19*	$ 782,782.52
Proposed Contract Value	$ 11,370,937.65

1. Based on overall project ownership percentage from Baseline 8.1 budget.

Staff Contact Information:
Christina Walter, Permitting and Outreach Manager; (503) 840-3830; christina.walter@tvwd.org

Attachments:

- Draft DEA Contract Amendment #39
- Exhibit A: Statement of Work
- Exhibit B: Consultant Fee and Rate Schedule

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Amendment 39 to Agreement 2016-320

FOR

PERMITTING SERVICES

FOR

THE WILLAMETTE WATER SUPPLY PROGRAM

This Amendment, effective the date as signed by Owner, is entered into by and between Willamette Water Supply System Commission (“Owner”) and DAVID EVANS AND ASSOCIATES INC ("Consultant").

WHEREAS, the Owner and Consultant entered into this Agreement for Consultant to provide Permitting Services for the Willamette Water Supply Program.

WHEREAS, the Owner and Consultant desire to amend the Agreement by modifying the terms of the Agreement as follows:

This amendment incorporates PCO-286

PCO#	Description	Time Impact (Days)	Change Amount
PCO - 286	DEA 2023-2024 Contract Renewal	365	$782,782.52

The Original Contract Sum was	$666,872.56
Net Change by Previously Authorized Requests and Changes	$9,374,127.13
The Contract Sum Prior to this Amendment was	$10,040,999.69
The Contract Sum will change by	$782,782.52
The New Contract Sum including this Amendment	$11,370,937.65
The Contract Time will change by	365 Days
The Date of Contract Completion as of this Amendment Therefore is	4/18/2024

Except as modified or changed herein, all other terms and conditions of the original Agreement, or as previously amended, shall remain unchanged and in full force and effect.

IN WITNESS WHEREOF, the Parties hereto have executed this Amendment 39 effective as of the date signed by Owner.

OWNER

By: _____

Name: _____

Title: _____

Date: _____

DAVID EVANS AND ASSOCIATES INC

By: _____

Name: _____

Title: _____

Date: _____

PCO-286 Contract No. 2016-320
Permitting Services

This change extends the contract term through April 18, 2024, and modifies the scope and budget to reflect efforts anticipated during the new term.

REPLACE Exhibit A- Statement of Work in its entirety with the attached: Exhibit A - Statement of Work_2023-2024.pdf
REPLACE Exhibit B - Consultant Fee and Rate Schedule in its entirety with the attached: WWSP Rate Tables for 2023-2024 Contract Year

Item	Description	Quantity	Units	Unit Price	Net Amount
001	Permitting Project Management, Schedule, and Coordination			$	$174,130.40
003	Environmental Services			$	$170,480.41
012.1	RWF_1.0 Meetings and On-Site Investigations			$	$8,807.88
012.2	RWF_1.0 Design Support Services			$	$40,526.37
013.1	WTP_1.0 Meetings and On-Site Investigations			$	$ 1,432.50
013.2	WTP_1.0 Design Support Services			$	$10,763.55
013.4	WTP_1.0 Phase II Environmental Site Assessment			$	$- 0.50
014.1	RES_1.0 Meetings and On-Site Investigations			$	$-5,221.00
014.2	RES_1.0 Design Support Services			$	$22,630.94
015.1	PLM_1.0 Meetings and On-Site Investigations			$	$-7,218.32
015.3	PLM_1.1 Construction-Related Authorizations and Compliance			$	$9,207.60
015.5	PLM_1.3 Construction-Related Authorizations and Compliance			$	$-13,102.62
017.1	PLM_4.0 Meetings and On-Site Investigations			$	$9,005.23

017.3	PLM_4.1 Construction-Related Authorizations and Compliance	$	$-2,685.54
017.4	PLM_4.2 Design Support and Construction Compliance	$	$-2,284.25
017.5	PLM_4.3 Design Support and Construction Compliance	$	$89,941.02
017.6	PLM_4.4 Design Support and Construction Compliance	$	$-1,213.77
018.1	PLM_5.0 Meetings and On-Site Investigations	$	$3,711.60
018.4	PLM_5.2 Construction-Related Authorizations and Compliance	$	$-4,241.90
018.5	PLM_5.3 Construction-Related Authorizations and Compliance	$	$80,442.85
019.1	PLW_1.0 Meetings and On-Site Investigations	$	$9,495.85
019.4	PLW_1.2 Construction-Related Authorizations and Compliance	$	$-8,331.69
019.5	PLW_1.3 Construction-Related Authorizations and Compliance	$	$22,919.32
020.1	PLW_2.0 Meetings and On-Site Investigations	$	$-9,683.45
020.3	PLW_2.1 Design Support & Constr. Compliance Services	$	$102,989.24
020.4	PLW_2.2 Design Support & Constr. Compliance Services	$	$ 171.75
021.1	PLE_1.0 Meetings and On-Site Investigations	$	$4,739.30
021.3	MPE_1.1 Design Support and Construction Compliance Services	$	$-6,120.82
021.4	MPE_1.2 Design Support and Construction Compliance Services	$	$53,008.53
021.5	MPE_1.3 Design Support and Construction Compliance Services	$	$28,482.04
Total		**$**	**782,782.52**

WWSP 2023-2024 Annual Contract Extension - Cumulative Contract Budgets

Budget status as of 1-14-2023 (February 7, 2023 invoice)

WWSP Item #	Task	Current Cumulative Contract Amount	Previously Invoiced	Total Invoiced To-Date	Remaining on Contract	Proposed Budget for 2023-2024 Contract Year	Difference from 2022-2023 Contract Year Budgets (+/-)	Change to Cumulative Budget (+/-) *(to be updated when final 2022-2023 invoice is submitted mid-April)*	New Cumulative Contract Amount	Available Funds for 2023-2024 Contract Year (math check)	Notes
001	Task 1. Project Mgmt/Schedule/Coordination	1,503,948.88		1,384,563.74	119,385.14	249,529.93	-53,050.30	130,144.79	1,634,093.67	249,529.93	12 monthly 1.5-hour meetings (include MIG |APG); 12 monthly 1-hour meetings - opposite the long meeting (WWSP and DEA), and agenda prep; 5 additional meetings, as needed; monthly, 1-hour check-in for Jill & Sarah; quarterly risk review meetings (1 hour); and DEA's weekly internal staff check-in meeting (1-hour). Weekly design meetings have ended. All meeting are anticipated to be virtual. Decrease in cost is due to closing HRA's meeting task and removing costs associated with travel time for meetings
002	Task 2: Permitting & Program Team Mtgs	120,431.51		120,431.51	0.00	0.00	0.00	0.00	120,431.51	0.00	No change
003	Task 3. Environmental Services	1,717,969.35		1,587,626.87	130,342.48	255,994.84	-13,270.39	125,652.36	1,843,621.71	255,994.84	Permit renewals; annual reporting; agency coordination on McKernan Creek TCE minor modification; assuming one additional minor modification; startup and commissioning coordination including permitting and agency coordination meetings; operational minor blowoff discharges including permitting and agency coordination; program-wide monitoring and maintenance plan memo; program-wide agency coordination; program-wide GIS updates; Thermal Trading Plan; cultural resources annual reporting; permit tracking and reporting; permit conditions tracking including producing permit closeout tables and tracking future opps conditions, and permit conditions bi-weekly meetings. Difference from last year's budget due to reducing the cultural resources budget for work on CSU and Molalla. Will process amendment when cultural resources work is defined for
004	Task 4: Cultural Resource Services	101,831.74		101,831.74	0.00	0.00	0.00	0.00	101,831.74	0.00	No change
005	Task 5: Land Use Services	194,814.58		194,814.58	0.00	0.00	0.00	0.00	194,814.58	0.00	No change
006	Task 6: Other Permitting Services	42,250.02		42,250.02	0.00	0.00	0.00	0.00	42,250.02	0.00	No change
007	Task 7: Program Definition	140,076.67		140,076.67	0.00	0.00	0.00	0.00	140,076.67	0.00	No change
008	Task 8: Enviro Permitting Alt Routes	88,565.24		88,565.24	0.00	0.00	0.00	0.00	88,565.24	0.00	No change
009	Task 9: Permit Related Dsgn Team Support	151,491.26		151,491.26	0.00	0.00	0.00	0.00	151,491.26	0.00	No change
010	Task 10: Haz Mat. Eval. - Historic Routes	120,704.11		120,704.11	0.00	0.00	0.00	0.00	120,704.11	0.00	No change
011	Task 11: Const/Post-Const Enviro Services	26,485.14		26,485.14	0.00	0.00	0.00	0.00	26,485.14	0.00	No change
012.1	Task 12.1 RWF_1.0 Meetings & Workshops	94,644.31		94,094.32	549.99	9,357.87	8,807.87	8,807.88	103,452.19	9,357.87	Cultural resources work package closeout summary reporting
012.2	Task 12.2 RWF_1.0 Design Support & Constr. Compliance Services	407,283.30		366,543.35	40,739.95	75,836.39	-931.08	35,096.44	442,379.74	75,836.39	Reduction in site visits during Phase 2; IWW and pile installation monitoring and coordination; permitting coordination for Wilsonville upgrades to existing WTP; cultural resources annual reporting
012.3	Task 12.3 RWF_1.0 Constr-Related Auths & Co	102.89		102.89	0.00	0.00	0.00	0.00	102.89	0.00	No change
013.1	Task 13.1 WTP_1.0 Meetings & Workshops	92,127.12		90,401.52	1,725.60	2,600.00	-2,500.00	874.40	93,001.52	2,600.00	Fewer/shorter weekly permitting meetings. Keeping small contingency budget for permitting coordination meetings
013.2	Task 13.2 WTP_1.0 Design Support & Constr. Compliance Services	423,173.25		342,114.53	81,058.72	79,935.23	-45,119.17	-1,123.49	422,049.76	79,935.23	Weekly construction meetings and site visits for full contract period; coordination on CWS SPL restoration requirements; potential cultural resources inadvertent discovery and annual reporting
013.4	Task 13.4 WTP_1.0 Phase II EnvSiteAsmnt	38,064.53		38,064.03	0.50	0.00	-0.50	-0.50	38,064.03	0.00	Task is complete; remaining budget released.
014.1	Task 14.1 RES_1.0 Meetings & Workshops	39,345.20		33,074.20	6,271.00	1,050.00	-5,221.00	-5,221.00	34,124.20	1,050.00	Reduction in weekly permitting meetings; contingency budget for additional coordination meetings
014.2	Task 14.2 RES_1.0 Design Support & Constr. Compliance Services	233,359.62		197,033.43	36,326.19	53,261.05	-5,933.95	16,934.86	250,294.48	53,261.05	Weekly construction meetings and site visits for full contract period; contingency budget for coordination on potential design changes, i.e. the fence realignment along Grabhorn Road; potential cultural resources inadvertent discovery and annual reporting
014.4	Task 14.4 RES_1.0 Phase II EnvSiteAsmnt	38,227.84		38,227.84	0.00	0.00	0.00	0.00	38,227.84	0.00	No change
015.1	Task 15.1 PLM_1.0 Meetings & Workshops	68,727.73		59,409.41	9,318.32	2,100.00	-14,680.00	-7,218.32	61,509.41	2,100.00	Reduction in weekly status meetings and gound lease coordination meetings during 2022-2023 contract year. Budgeting for potential ground lease coordination; additional coordination meetings as needed
015.2	Task 15.2 PLM_1.0 Design Support & Constr. Compliance Services	107,009.07		107,009.07	0.00	0.00	0.00	0.00	107,009.07	0.00	No change
015.3	Task 15.3 PLM_1.1 Design Support & Const. Compliance Services	96,106.46		94,064.93	2,041.53	10,200.00	0.00	8,158.47	104,264.93	10,200.00	Year-three restoration and monitoring efforts

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015.4	Task 15.4 PLM_1.2 Design Support & Constr. Compliance Services	22,458.50		21,908.50	550.00	550.00	0.00	0.00	22,458.50	550.00	Includes small contingency budget for project and permit close-out
015.5	Task 15.5 PLM_1.3 Design Support & Constr. Compliance Services	524,762.42		341,168.36	183,594.06	135,497.45	-82,929.55	-48,096.61	476,665.81	135,497.45	Weekly construction meetings and weekly site visits for full contract term; environmental support and coordination on hazmat Phase 1 surveys for ground lease improvements; BPA coordination; MBTA coordination; cultural resources monitoring and coordination, potential inadvertent discovery and annual reporting. Hazmat monitoring at the Wilsonville Road crossing is taking place during the current contract term, thus allowing us to reduce the overall budget for 2023-2024.
016.1	Task 16.0 PLM_3.0 Construction-related Auths	760.33		760.33	0.00	0.00	0.00	0.00	760.33	0.00	No change
017.1	Task 17.1 PLM_4.0 Meetings & Workshops	65,421.41		63,422.54	1,998.87	11,004.10	78.10	9,005.23	74,426.64	11,004.10	Small contingency budget for additional coordination meetings; cultural resources work package closeout summary reporting
017.2	Task 17.2 PLM_4.0 Design Support & Constr. Compliance Services	124,614.82		124,614.82	0.00	0.00	0.00	0.00	124,614.82	0.00	No change
017.3	Task 17.3 PLM_4.1 Design Support & Constr. Compliance Services	49,382.17		31,076.33	18,305.84	14,996.88	-5,413.22	-3,308.96	46,073.21	14,996.88	County permitting coordination; potential land use permit renewal; cultural resources monitoring and coordination during construction, potential inadvertent discovery and annual reporting
017.4	Task 17.4 PLM_4.2 Dsgn Sppt & Const Comp	56,038.54		39,245.62	16,792.92	13,675.63	-6,215.37	-3,117.29	52,921.25	13,675.63	Permit tracking; County permitting coordination; cultural resources monitoring and coordination during construction, potential inadvertent discovery and annual reporting
017.5	Task 17.5 PLM_4.3 Dsgn Sppt & Const Comp	363,965.96		321,556.96	42,409.00	111,148.65	15,704.05	68,739.65	432,705.61	111,148.65	Weekly construction meetings and weekly site visits for full contract term; fish and wildlife salvage; in-water work coordination; potential inadvertent cultural resources discovery and reporting; cultural resources annual reporting
017.6	Task 17.6 PLM_4.4 Dsgn Sppt & Const Comp	16,097.05		8,782.05	7,315.00	6,101.23	-1,213.77	-1,213.77	14,883.28	6,101.23	County permitting coordination; potential inadvertent cultural resources discovery and reporting; cultural resources annual reporting
018.1	Task 18.1 PLM_5.0 Meetings & Workshops	168,463.42		161,755.92	6,707.50	10,419.10	3,512.10	3,711.60	172,175.02	10,419.10	Small contingency budget for additional coordination meetings; cultural resources work package closeout summary reporting
018.2	Task 18.2 PLM_5.0 Design Support & Constr. Compliance Services	234,143.51		234,143.51	0.00	0.00	0.00	0.00	234,143.51	0.00	No change
018.3	Task 18.3 PLM_5.1 Design Support & Constr. Compliance Services	3,940.14		3,390.14	550.00	550.00	0.00	0.00	3,940.14	550.00	Includes small contingency budget for project and permit close-out
018.4	Task 18.4 PLM_5.2 Design Support & Constr. Compliance Services	158,075.13		152,783.23	5,291.90	1,050.00	-5,000.00	-4,241.90	153,833.23	1,050.00	Warranty repair coordination
018.5	Task 18.5 PLM_5.3 Design Support & Const. Compliance Services	695,797.44		617,879.95	77,917.49	134,505.49	-20,623.51	56,588.00	752,385.44	134,505.49	Weekly construction meetings and weekly site visits for full contract term; coordination on McKernan Creek TCE; coordination on shoofly, Hruby property design change, and on possible additional laydown area on Grabhorn Road; fish and wildlife salvage; in-water work coordination; upland mitigation; cultural resources monitoring during construction, inadvertent discovery and annual reporting; hazmat coordination for construction support. Reducing the cultural resources budget and hazmat budget for the new contract term.
019.1	Task 19.1 PLW_1.0 Meetings & Workshops	36,708.11		35,757.86	950.25	10,446.10	9,396.10	9,495.85	46,203.96	10,446.10	Small contingency budget for additional coordination meetings; cultural resources work package closeout summary reporting
019.2	Task 19.2 PLW_1.0 Design Support & Const. Compliance Services	139,186.02		139,186.02	0.00	0.00	0.00	0.00	139,186.02	0.00	No change
019.3	Task 19.3 PLW_1.1 Design Support & Constr. Compliance Services	19,800.31		19,800.31	0.00	0.00	0.00	0.00	19,800.31	0.00	No change
019.4	Task 19.4 PLW_1.2 Design Support & Constr. Compliance Services	28,589.56		17,729.77	10,859.79	2,478.10	-8,880.44	-8,381.69	20,207.87	2,478.10	Potential permitting coordination; cultural resources annual reporting
019.5	Task 19.5 PLW_1.3 Design Support & Constr. Compliance Services	284,383.71		276,785.47	7,598.24	26,484.92	-16,257.08	18,886.68	303,270.39	26,484.92	Year 1 monitoring and reporting, Year-1 warranty report; replanting likely; cultural resources annual reporting
020.1	Task 20.1 PLW_2.0 Meetings & Workshops	61,045.57		48,539.84	12,505.73	2,600.00	-13,321.00	-9,905.73	51,139.84	2,600.00	Quarterly Stakeholder meetings; small contingency budget for additional meetings as needed
020.2	Task 20.2 PLW_2.0 Design Support & Constr. Compliance Services	286,689.01		286,689.01	0.00	0.00	0.00	0.00	286,689.01	0.00	No change
020.3	Task 20.3 PLW_2.1 Design Support & Constr. Compliance Services	255,325.67		208,955.36	46,370.31	130,993.05	8,097.05	84,622.74	339,948.41	130,993.05	Weekly construction meetings and weekly site visits for full duration of contract term; OWNP construction-phase wildlife management monitoring and potential inadvertent wildlife salvage during construction; fish salvage at the Rock Creek crossing; cultural resources monitoring during construction, inadvertent discovery, and annual reporting; small contingency budget for land use consultation/potential adjustments to land use approvals; hazmat coordination for construction support

WWSP Item #	Task	Current Cumulative Contract Amount	Previously Invoiced	Total Invoiced To-Date	Remaining on Contract	Proposed Budget for 2023-2024 Contract Year	Difference from 2022-2023 Contract Year Budgets (+/-)	Change to Cumulative Budget (+/-) *(to be updated when final 2022-2023 invoice is submitted mid-April)*	New Cumulative Contract Amount	Available Funds for 2023-2024 Contract Year (math check)	Notes
020.4	Task 20.4 PLW_2.2 Design Support & Constr. Compliance Services	3,396.41		1,013.16	2,383.25	2,555.00	72.00	171.75	3,568.16	2,555.00	Small contingency budget for potential permitting consultation and potential land use consultation/adjustments to land use approvals
021.1	Task 21.1 MPE_1.0 Meetings & Workshops	144,481.28		139,351.48	5,129.80	9,869.10	-6,104.80	4,739.30	149,220.58	9,869.10	Small contingency budget for additional coordination meetings; cultural resources work package closeout summary reporting
021.2	Task 21.2 MPE_1.0 Design Support & Constr. Compliance Services	503,388.75		503,388.75	0.00	0.00	0.00	0.00	503,388.75	0.00	No change
021.3	Task 21.3 MPE_1.1 Design Support & Constr. Compliance Services	11,930.97		4,382.05	7,548.92	1,428.10	-6,340.90	-6,120.82	5,810.15	1,428.10	Permitting closeout support; cultural resources annual reporting
021.4	Task 21.4 MPE_1.2 Design Support & Constr. Compliance Services	261,532.60		224,212.39	37,320.21	80,096.05	-12,175.95	42,775.84	304,308.44	80,096.05	Weekly construction meetings and weekly site visits through February 2024; coordination at Upper Fanno Creek crossing (this work is currently delayed and could carry into new contract period); restoration coordination; potential land use coordination at PFC facility; cultural resources inadvertent discovery and reporting, annual reporting; potential hazmat coordination for construction support
021.5	Task 21.5 MPE_1.3 Design Support & Constr. Compliance Services	116,609.01		81,665.59	34,943.42	56,638.63	-1,207.77	21,695.21	138,304.22	56,638.63	Weekly construction meetings and weekly site visits for full duration of contract; small contingency budget for potential land use consultation; cultural resources inadvertent discovery and reporting, annual reporting
022.1	Task 22.0 On-Call Tasks	98,753.45		98,753.45	0.00	0.00	0.00	0.00	98,753.45	0.00	No change
023	Task 23.0 Program Level Construction Compliance	5,674.04		5,674.04	0.00	0.00	0.00	0.00	5,674.04	0.00	No change
	Totals	**10,588,155.13**	**0.00**	**9,633,353.21**	**954,801.92**	**1,502,952.89**	**-280,722.48**	**548,150.97**	**11,136,306.10**	**1,502,952.89**	

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EXHIBIT A – STATEMENT OF WORK (SOW)
Willamette Water Supply Program
Program Regulatory Permitting and Related Consulting Services

Introduction

The Willamette Water Supply System (WWSS) Commission ("Owner"), is contracting with David Evans and Associates, Inc. ("Consultant") to provide regulatory permitting and related consulting services for the Willamette Water Supply Program ("WWSP" or "Program") as described herein.

Ms. Christina Walter has been designated as the Owner's Representative for this Agreement. Ms. Walter may be reached by phone at 503-840-3830 or by email at christina.walter@tvwd.org.

Background

The WWSS Commission is an Oregon intergovernmental entity formed by Tualatin Valley Water District (TVWD), the City of Hillsboro (Hillsboro), and the City of Beaverton (Beaverton). The WWSS Commission was formed to build the Willamette Water Supply System (WWSS) in response to planned growth in their service areas. The WWSS will provide an additional, resilient water supply for Washington County.

TVWD has been designated the Managing Agency for the WWSS Commission, and TVWD operates the Willamette Water Supply Program (WWSP) to plan, design, and construct the WWSS.

The WWSS is a drinking water infrastructure system that will provide the Owner with a seismically resilient water supply, designed to meet future demand and provide redundancy in case of an emergency event. The WWSS includes more than thirty (30) miles of transmission pipelines, ranging from 36 inches to 66 inches in diameter from the Willamette River Water Treatment Plant ("WRWTP") in Wilsonville, Oregon, north to the TVWD, Hillsboro and Beaverton service areas. The WWSS also includes the construction of finished water storage tanks (terminal storage), a new water treatment plant (WTP), and an expansion of the existing WRWTP raw water facilities (RWF). Additional background and information can be found at www.ourreliablewater.org.

The WWSS is divided into work packages for design, construction, sequencing and management purposes. Some work packages are anticipated to be constructed in partnership with another agency or jurisdiction (e.g., roadway improvement projects by Washington County). In these instances, the partner agency administers the prime construction contract. Such projects are referred to as "opportunity projects." For the purposes of developing this Statement of Work and associated not-to-exceed budget, a WWSP design and construction schedule is provided in Attachment 1 and generalized work package descriptions are provided as follows:

- RWF_1.0: The RWF site is located on two parcels within the City of Wilsonville at the existing WRWTP. RWF_1.0 includes modifications to the existing intake facility and pump station, seismic modifications to the Willamette riverbank, construction of a new electrical building and a trenchless crossing of Arrowhead Creek. This work package is not an opportunity project. Construction on this work package began in 2020 and is expected to conclude in 2024.
- WTP_1.0: The WTP site is located on a recently annexed parcel in the City of Sherwood, Washington County. The WTP_1.0 work package will include the construction of a new WTP and associated facilities on a previously undeveloped parcel. This work package is not an opportunity project. Construction on this work package began in 2022 and is expected to conclude in 2025.

EXHIBIT A – STATEMENT OF WORK (SOW)
Willamette Water Supply Program
Program Regulatory Permitting and Related Consulting Services

- RES_1.0: The Reservoir site is located in unincorporated Washington County. The RES_1.0 work package includes the construction of two new terminal storage reservoirs on one property, and the use of a neighboring property as a staging area for construction. This work package is not an opportunity project. Construction on this work package began in 2022 and is expected to conclude in 2024.

- PLM_1.0: The Pipeline Main (PLM)_1.0 work package extends from RWF_1.0 on the east side of Arrowhead Creek in Wilsonville to north of Day Road in unincorporated Washington County. This work package is sub-divided into three work packages as follows:

    - PLM_1.1 extends from the north end of RWF_1.0 on the east side of Arrowhead Creek along Kinsman Road, south of the intersection with Wilsonville Road. It includes an open-trench crossing of Coffee Lake Creek south of Wilsonville Road. This work package is not an opportunity project. This work package was completed in 2022.
    - PLM_1.2 extends from Ridder Road, just east of the intersection with Garden Acres Road in Wilsonville, to north of Day Road in unincorporated Washington County. With the exception of a trenchless crossing of Day Road, PLM_1.2 will be constructed as an opportunity project with the City of Wilsonville's expansion of Garden Acres Road. The WWSP will obtain all permits associated with the construction of the Day Road crossing. This work package was completed in 2021.
    - PLM_1.3 follows Kinsman Road from just south of Wilsonville Road to Barber Road (the southern extent of PLM_2.0), and from Boeckman Road (the northern limit of PLM_2.0) to Ridder Road, just south of the intersection with Garden Acres Road (the southern extent of PLM_1.2). It includes a trenchless crossing of Wilsonville Road, as well as a crossing of Tapman Creek in the developed right-of-way on SW Ridder Road. This work package is not an opportunity project. Construction on this work package began in 2022 and is expected to conclude in 2025.

- PLM_2.0: The PLM_2.0 work package extends from Barber Road to Boeckman Road in Wilsonville. Construction of this work package was completed in the spring of 2019.

- PLM_3.0: The PLM_3.0 work package extends from SW Grahams Ferry Road just north of SW Day Road (the northern limit of PLM_1.2) to SW Tualatin-Sherwood Road (the eastern limit of PLM_ 4.2) in unincorporated Washington County. Construction of this work package was completed in the summer of 2019.

- PLM_4.0: The PLM_4.0 work package extends from SW 124th Avenue at Tualatin-Sherwood Road (the northern limit of PLM_3.0) to the Urban Growth Boundary on SW Roy Rogers Road, just north of SW Beef Bend Road (the southern limit of PLM_5.0). This work package is sub-divided into four work packages as follows:

    - PLM_4.1 extends from SW Tualatin-Sherwood Road at SW Olds Place to SW Lavender Avenue. This work package is an opportunity project to be constructed in partnership with Washington County's roadway improvements along SW Tualatin-Sherwood Road. Construction on this work package began in 2022 and is expected to conclude in 2024.

- PLM_4.2 extends from SW Tualatin-Sherwood Road at SW 124th Avenue (the northern limit of PLM_3.0) to SW Tualatin-Sherwood Road at SW Olds Place. It includes a crossing of Rock Creek in the developed right-of-way. This work package is an opportunity project to be constructed in partnership with Washington County's roadway improvements along SW Tualatin Sherwood Road. Construction on this work package began in 2022 and is expected to conclude in 2025.
- PLM_4.3 extends from SW Roy Rogers Road, just south of Chicken Creek at the Sherwood city limits) to the Urban Growth Boundary on SW Roy Rogers Road, just north of SW Beef Bend Road (the southern limit of PLM_5.0). It includes trenchless crossings of Chicken Creek and the Tualatin River, and an open-trench crossing of an unnamed drainage north of SW Beef Bend Road. This work package is not an opportunity project. Construction on this work package began in 2022 and is expected to conclude in 2024.
- PLM_4.4 extends from SW Roy Rogers Road at SW Lavender Avenue to just south of Chicken Creek. This work package is an opportunity project to be constructed in partnership with Washington County's roadway improvements along SW Roy Rogers Road. Construction on this work package began in 2022 and is expected to conclude in 2024.

- PLM_5.0: The PLM_5.0 work package extends from the Urban Growth Boundary on SW Roy Rogers Road (the northern limit of PLM_ 4.0) in Tigard to SW Rosedale Road at the intersection with the future SW Cornelius Pass Road in unincorporated Washington County. This work package is sub-divided into three work packages as follows:
  - PLM_5.1 extends from the Urban Growth Boundary on SW Roy Rogers Road (the northern limit of PLM_4.0) to SW Scholls Ferry Road, just west of the intersection with Roy Rogers Road. It includes the crossing of an unnamed drainage in the developed right-of-way, and a trenchless crossing of the creek south of SW Scholls Ferry Road. This work package is an opportunity project to be constructed in partnership with Washington County's roadway improvements along SW Roy Rogers Road. This work package was completed in 2022.
  - PLM_5.2 extends from SW Scholls Ferry Road, just west of the intersection with SW Roy Rogers Road to SW Tile Flat Road at SW Grabhorn Road. It is located within Tigard, Beaverton, and unincorporated Washington County. It includes a trenchless crossing of the unnamed creek on SW Scholls Ferry Road at Strobel Road. This work package is not an opportunity project, with the exception of the creek crossings at Strobel Road, which was constructed in partnership with West Hills Development. This work package was completed in 2021.
  - PLM_5.3 extends along SW Grabhorn Road at SW Tile Flat Road to the future reservoir site, cross country along undeveloped land from SW Grabhorn Road to the BPA easement east of SW Clark Hill Road, along the BPA easement to SW Farmington Road. North of SW Farmington Road, the pipeline continues along the alignment of a proposed future extension of Cornelius Pass Road, to SW Rosedale Road. It is located within unincorporated Washington County and includes open trench crossings of McKernan Creek and several unnamed seasonal drainages along SW Grabhorn Road, near SW Clark Hill Road, and north of SW Farmington Road. This work package is not an opportunity

project. Construction on this work package began in 2022 and is expected to conclude in 2024.

- PLW_1.0: The Pipeline West (PLW)_1.0 work package extends along the future alignment of SW Cornelius Pass Road at the intersection with SW Rosedale Road (the northern extent of PLM_5.0) to just south of the intersection with Tualatin Valley Highway, within portions of unincorporated Washington County and Hillsboro. From there, the work package follows the existing Cornelius Pass Road to the north side of the intersection with SE Frances Street (the southern limit of PLW_2.0) in Hillsboro. This work package is sub-divided into three work packages as follows:
    - PLW_1.1 extends along existing and future SW Cornelius Pass Road for an approximately 5,000 foot section south of the intersection with SW Tualatin Valley Highway to just north of SW Tualatin Valley Highway in Hillsboro. Construction of this work package was completed in 2019.
    - PLW_1.2 extends along the existing SW Cornelius Pass Road from the north side of the intersection with SW Tualatin Valley Highway to the north side of the intersection with SE Frances Street (the southern limit of PLW_2.0) in Hillsboro. It includes a crossing of Reedville Creek in the right-of-way. This work package is an opportunity project, and will be constructed in partnership with Washington County. Construction on this work package began in 2022 and is expected to conclude in 2023.
    - PLW_1.3 extends along the future SW Cornelius Pass Road from SW Rosedale Road to SW Kinnaman Road. This work package also includes an extension of pipeline along SW Rosedale and SW Farmington Roads to connect to an existing TVWD vault at the intersection of SW 209th Avenue and SW Farmington Road. This work package is located in within Hillsboro and unincorporated Washington County. It includes open-trench crossings of an unnamed seasonal drainage north of Rosedale Road and an unnamed tributary to Butternut Creek, and a trenchless crossing of Butternut Creek. This work package is not an opportunity project. Construction of this work package was completed in 2023.
- PLW_2.0: The PLW_2.0 work package extends along SW Cornelius Pass Road north of the intersection with SE Frances Street (the northern limit of PLW_1.0) and ties in to an existing TVWD facility just south of Highway 26. PLW_2.0 is located within Hillsboro and unincorporated Washington County. This work package is sub-divided into two work packages as follows:
    - PLW_2.1 extends from SW Cornelius Pass Road at Orenco Woods Nature Park through Orenco Woods Nature Park, across undeveloped land to SW Cornelius Pass Road north of Cherry Lane. It includes an open-trench crossing of Rock Creek. While not an opportunity project, this work package includes trail improvements within Orenco Woods Nature Park for Hillsboro and Metro. Construction on this work package began in 2022 and is expected to conclude in 2024.
    - PLW_2.2 includes all of PLW_2.0 south and north of PLW_2.1, and modifications to the existing TVWD facility. It includes an open-trench crossing of Beaverton Creek. While not an opportunity project, this work package also includes the construction of a parallel

water distribution line for Hillsboro. Construction on this work package is expected to begin in 2029.

- MPE_1.0: The Metzger Pipeline East (MPE)_1.0 work package extends northeast along SW Scholls Ferry Road from the intersection with SW Roy Rogers Road SW Allen Boulevard, and along SW Allen Boulevard to SW Western Avenue, tying in to existing TVWD transmission lines on SW Hall Boulevard near SW Oleson Road and at the intersection of SW Western Avenue and SW Beaverton-Hillsdale Highway. It is located in Beaverton, Tigard, and unincorporated Washington County. This work package includes two trenchless crossings of Fanno Creek. In addition to the WWSS pipeline, this work package will include the construction of a parallel water distribution pipeline for the City of Beaverton. This work package is sub-divided into three work packages.
    - MPE_1.1 extends from Allen Boulevard along Western Avenue to Beaverton-Hillsdale Highway. It is an opportunity project and is being constructed in partnership with Beaverton. Construction on this work package began in 2021 and is expected to conclude in 2023.
    - MPE_1.2 extends from the south end of MPE_1.1 south along Allen Boulevard and SW Scholls Ferry Road to just west of Highway 217 and Fanno Creek. It includes a branch along SW Hall Boulevard that terminates at a new pressure and flow control facility. This work package includes two trenchless crossings of Fanno Creek. Although not an opportunity project, this work package will include the construction of a parallel water distribution pipeline for the City of Beaverton. Construction on this work package began in 2021 and is expected to conclude in 2023.
    - MPE_1.3 extends from the western end of MPE_1.2 just west of Fanno Creek and Highway 217 along SW Scholls Ferry Road to the intersection of PLM_5.1 and PLM_5.2 on SW Scholls Ferry Road. This work package is not an opportunity project. Construction on this work package began in 2022 and is expected to conclude in 2024.

In addition to the work packages and opportunity projects described above, the WWSP will administer the construction of “concession projects” in association with related work package construction and in cooperation with local jurisdictions and agencies. Concession projects will include the following:

- City of Wilsonville Ground Lease Street Improvements: As a condition of the ground lease agreement between the WWSP and the City of Wilsonville, the WWSP will permit, design and construct a number of street improvement projects along the PLM_1.0 work package route. These projects will include, but are not limited to, the construction of a right hand turn lane at the intersection of SW Wilsonville Road and SW Kinsman Road, a right hand turn lane at the intersection of SW Boeckman Road and SW 95th Avenue, and improvements to roadways and sidewalks.
- Washington County Road Construction: In coordination with Washington County and the City of Sherwood, the WWSP will permit, design and construct a new road across the WTP_1.0 property to serve as a City collector that will connect to SW 124th Avenue. This new road will beconstructed concurrent with the WTP_1.0 facility.

Statement of Work

EXHIBIT A – STATEMENT OF WORK (SOW)
Willamette Water Supply Program
Program Regulatory Permitting and Related Consulting Services

General Assumptions

- Assumes a 12-month duration from April 19, 2023, through April 18, 2024
- Contract is based on a Not to Exceed (NTE) value. Consultant shall manage and allocate task and sub-task budgets according to the needs of the Project, so long as the total amount invoiced to Owner does not exceed the NTE
- The following Statement of Work identifies exclusions and assumptions to which Consultant has relied in determining Consultant's effort, scope, fee and schedule for the project. Consultant and Owner agree to renegotiate these terms in the event an assumption or exclusion becomes invalid.
- Owner will obtain site access as needed for Consultant to execute Statement of Work
- Consultant is responsible for providing the necessary labor, equipment, and materials to perform the Work described herein in accordance with the Agreement and Work Authorization Forms. Consultant shall not utilize the services of a subconsultant without prior approval of the Owner.
- Consultant shall be responsible for maintaining a Health and Safety Plan for Owner's review and acceptance and meeting all applicable OSHA safety standards.
- Consultant shall perform its services to facilitate issuance of required permits and permit modifications to allow WWSS construction to proceed as scheduled, inform Owner of risks to timely permit/modification issuance, and present Owner with strategies to avoid, minimize, or mitigate those risks
- Unless stated otherwise, deliverables under this contract shall include one (1) draft deliverable, one (1) final deliverable, and one (1) consolidated set of responses to comments provided by Owner, if any.
- Unless stated otherwise, deliverables provided to permitting agencies shall include one (1) draft and one (1) final deliverable to the Owner, followed by one (1) draft deliverable to the agencies, revised as requested by the agency.
- Final deliverables will be submitted within two (2) weeks of receiving consolidated Owners' comments unless a deliverable-specific turnaround time is specified by Owner.
- Consultant shall provide all deliverables via e-Builder unless specifically directed otherwise by Owner for specified deliverables.
- Owner shall be responsible for providing application submittal, renewal and other permit-related fees.
- Owner shall obtain the necessary signatures for all permit application submittals.
- Consultant shall provide Owner with a complete, written inventory of information needs, within any format or formatting requirements, for each permit for which the Consultant is preparing an application.
- The Project Manager shall be responsible for managing Consultant staff and subconsultants, ensuring the performance of internal quality control ("QC") on all draft and final deliverables prior to submittal to Owners, and act as the primary Consultant point of contact.
- Consultant shall contact Owner's work package construction manager prior to entering a work package construction site.

EXHIBIT A – STATEMENT OF WORK (SOW)
Willamette Water Supply Program
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- Consultant shall maintain GIS databases and ArcGIS Online (AGOL) mapping programs with the latest publicly available information and update the mapping programs regularly with the latest available design information for the WWSP.
- Consultant shall maintain an AGOL mapping program separate, but compatible with, the WWSP-maintained AGOL program.
- Consultant's personnel listed below are considered essential to the Work being performed hereunder. No substitution of key personnel or subconsultants shall be made by Consultant without written consent from the Owner. Owner reserve the right to require replacement of key personnel at the sole discretion of Owner.

Name	Title
Jennifer Miller	Principal in Charge
Sarah Betz	Project Manager
Shawna Hale	Deputy Project Manager
Ethan Rosenthal	Joint Removal-Fill Permit Lead
Kristine Marshall	Endangered Species Act Lead / Environmental Compliance Lead
John Macklin	Environmental Compliance Liaison
Josh Smith	Environmental Compliance Liaison
Phil Rickus	Wetland Delineation Lead / Environmental Compliance Liaison
Suzanne Carey	Work Package Permitting Liaison
Jon Pheanis	Land Use Lead, MIG | APG
Shayna Rehberg	Senior Planner MIG | APG
Cathy Bialas	Project Archaeologist, HRA
Joshua Dinwiddie	Archaeologist, HRA
James Farrow	Hazardous Materials Lead, Terraphase
Rob Annear	Thermal Trading Plan Lead, Contract Employee with Geosyntec
Jacob Krall	Thermal Trading Plan Lead, Geosyntec

1. Project Administration and Meetings

1.1 Project Administration

Consultant shall provide project management, coordination, and contract administration tasks relative to the execution of the Work described herein. Consultant shall assign a qualified Project Manager to

manage the delivery of all services, tasks, and deliverables; oversee adherence to the Statement of Work; and manage to the established budget and schedule.

Schedule

One (1) Consultant team member shall coordinate internally with the Consultant work package and discipline leads on a monthly basis to compile permitting-related schedule updates. Consultant shall then coordinate with the WWSP's scheduler to provide permitting-related schedule updates for incorporation into the WWSP's program-wide master schedule.

Consultant shall maintain a program-level construction compliance schedule, which will be updated regularly based on updates to the WWSP's master program schedule and the timing of permit approvals, construction notice to proceed (NTP), etc.

Invoicing

Consultant shall prepare and submit monthly payment applications via e-Builder. Monthly pay applications shall be submitted by the 10th day of each month and include a completed monthly progress report. The monthly report shall summarize the work accomplished under each task and subtask for the invoice period, summarize the work anticipated in the subsequent month, and identify any work execution challenges or potential contractual changes.

Meetings

Consultant shall attend and participate in bi-weekly permitting meetings in person or virtually. Bi-weekly permitting meetings will be held virtually, unless otherwise noted. Consultant shall prepare and submit an agenda for the bi-weekly permitting meetings at least one (1) business day prior to the meeting. Consultant shall take meeting notes and submit them to the Permitting Team, if requested. Attendees shall include the Consultant's Project Manager and/or Deputy Project Manager and other staffas deemed necessary by Owner.

Consultant shall attend other WWSP meetings and workshops as requested by Owner. Examples of other WWSP meetings could include, but are not limited to, quarterly Functional Manager risk review meetings, monthly safety meetings, Program-level construction-related workshops and Program-wide scheduling meetings. Required attendees shall be included in the request by Owner. Attendance at project-specific design and construction meetings is included in appropriate project tasks below.

Task 1.0 Assumptions

- Project administration is related to program-wide contract administration and quality control. Management, quality control and coordination related to technical tasks is not included in Task 1 but is included in Tasks 12 through 21.
- A total of 12 monthly 1.5-hour permitting meetings with no more than six (6) Consultant team members attending each meeting
- A total of 12 monthly one-hour permitting meetings with no more than two (2) Consultant team members attending each meeting
- A total of 24 other WWSP meetings, with no more than two (2) Consultant team members attending each meeting.

2. Task Closed

3. Program-Level Permitting Support

3.1 – 3.8.1: Tasks Closed

3.8.2 Environmental Authorization Coordination

Consultant shall facilitate implementation of program-level environmental permits and authorizations and compliance with permit conditions. Consultant shall prepare and facilitate approval of modifications to existing permits and authorizations resulting from changes in design. Consultant shall coordinate with USACE, USFWS, DSL, DEQ, NMFS, SHPO, ODFW, CWS, Oregon State Parks, local jurisdictions and other resource agencies, as needed, to advance permit modification approvals, clarify permit requirements, comply with permit conditions and respond to comments and/or questions. Consultant shall prepare annual reports for submittal to applicable agencies to document project construction for the year and demonstrate compliance with permit conditions. Consultant shall prepare and submit yearly Program-level permit renewals to applicable agencies. Consultant shall prepare Program-level reports and memoranda, as requested by Owner, to address compliance with permit requirements, permitting recommendations and best practices, and other permitting-related topics. Consultant shall provide permitting support and coordination for startup and commissioning activities.

Task 3.8.5 Thermal Trading Plan

Consultant shall coordinate with DEQ to facilitate WWSP compliance with the approved Thermal Trading Plan (TTP), as required by the Project's 401 Water Quality Certification issued by DEQ, including preparation of draft and final annual reports.

Consultant shall coordinate with WWSP, DEQ, Molalla River Watch, and Oregon State Parks (and their consultants as applicable) to implement the WWSP's Thermal Trading Plan approach for the Molalla River State Park Restoration Project, including calculation and documentation of riparian shading credits associated with the project.

Consultant shall coordinate with WWSP and others as appropriate to support litigation activities associated with the Thermal Trading Plan.

Activities may include, but are not limited to:

- Meetings and coordination with Owner, Consultant team, stakeholders and agencies
- Identification and evaluation of riparian shading project opportunities
- Site visits
- Temperature analysis and modeling
- Development and maintenance of GIS and LiDAR databases for project tracking
- Riparian Shading Credit Modeling and Documentation, including the following activities:
    - In collaboration with Wolf Water Resources, develop the inputs to model for the current conditions scenario in DEQ's Shade-a-Lator model to establish the baseline for credit calculations.

- Implement several potential future conditions scenarios based on alternative restoration strategies to model and estimate credits that will be obtained upon completion of the restoration project.

- Support for potential fish habitat modeling to quantify credits not based on riparian shading.

Task 3.8 Assumptions

- Includes up to six (6) site visits by up to two (2) Consultant team members to evaluate on-site conditions

3.9 Permit Tracking and Reporting

Consultant shall support the WWSP in maintaining the Permitting Conditions database by identifying required permits for the WWSP and each work package, including the permit name and type, permitting agency, project applicability, permit conditions and permit reporting requirements. Permits incorporated into the databases include those pertaining to natural resources, cultural resources, land use and pre-construction approvals. Consultant shall complete an update of the information within the databases each month via e-Builder or spreadsheet as requested by Owner, and as new permits for the WWSP are obtained.

Consultant shall support the WWSP in maintaining other Program-wide databases and tracking tools, as requested by Owner.

Consultant shall maintain and update construction compliance forms, such as the environmental compliance site visit form to maintain consistency with WWSP practices and project needs. Consultant shall also maintain a construction-related action item tracking list, which will be provided to Owner upon request.

Task 3.17.1 Molalla River State Park Cultural Resources Surveys

Consultant shall conduct cultural resources surveys and reporting for the Molalla River State Park Restoration Project, and coordinate with the Owner, Molalla River State Park and its consultants to provide cultural resources-related project support

Activities may include, but are not limited to:

- Meetings and coordination with Owner, Molalla River State Park and its consultants
- Archival research to identify previously documented cultural resources within or near the proposed survey areas
- Site visits and pedestrian surveys
- Acquisition of a State Archaeology Permit
- Subsurface sampling of high probability areas
- Preparation of a technical report detailing the results of the work

Work Package-Specific Tasks

Task 12 through Task 22 are work package-specific and address the permitting–related work necessary to facilitate design and construction of each work package. Each work package requires similar efforts, categorized by a subtask for Meetings and Workshops, followed by subtasks specific to Design Support

and Environmental Construction Compliance for each construction package. These subtasks are described below and these descriptions are then referenced within each work package, with any exceptions or additions noted.

Subtask 1 – Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops, with required attendees included in a request by Owner. Meetings and workshops may include, but are not limited to:

- Bi-weekly design coordination meetings
- Public meetings/hearings
- Work package-specific meetings with regulatory agencies
- Work package-specific permitting meetings related to:
    - Natural resources
    - Pre-construction permitting
    - Land use
    - Cultural Resources
    - Hazardous Materials
    - Permit requirements or permit compliance
- Design questions
- Alternative evaluations
- Work package summary reporting

Subtask 2 – Design Support and Construction Compliance

Consultant shall provide design-related technical and permitting support specific to each of the construction packages within a work package. This task is intended to address work package-specific services during the design and construction phases. Services shall be provided as requested by Owner and may include, but are not limited to:

<u>Design Phase</u>

- Design-related correspondence with the WWSP and its design consultants, including responding to design-related inquiries
- Identifying and gathering technical and design-related information
- Support for real estate processes
- Natural resources surveys and reporting, including wetland delineations, ESA clearance surveys, significant resource area assessments and tree surveys and assessments
- Restoration and planting plan coordination with design consultant and contractor, preparation of annotated planting plans
- Compliance with state and federal cultural resources permits and Programmatic Agreement (PA), cultural resources surveys and reporting in compliance with state and federal cultural resources permits and the WWSP's Programmatic Agreement with USACE and SHPO. Surveys and reporting include, but are not limited to:
    - Pedestrian, shovel and architectural surveys, as well as geoarchaeological deep testing at trenchless crossing locations (for specific work packages with trenchless crossings)

  - Preparation and submittal of survey reports to USACE and SHPO
  - Preparation, submittal and renewal of survey permits on public properties
  - Updates to Consultant's cultural resources sensitivity model and AGOL mapping database
- Preparation and submittal of land use applications including development of natural resource reports, Drainage Hazard Area evaluations, land use application narratives, and coordination with the WWSP and Design Consultant on the preparation of application exhibits. Land use permitting efforts also include, but are not limited to:
  - Research on code requirements by jurisdiction
  - Coordination with local agency planning staff and facilitation of pre-application conferences and community/agency outreach
  - Preparation of land use application checklists, schedules and responses to information requests from Owner, Design Consultant and/or local agencies
  - Preparation of supplemental application materials and responses to completeness reviews
  - Review of agency staff reports and draft conditions of approval
  - Preparation for and participation in public hearings
  - Post-approval coordination with the WWSP
- Evaluation of potential hazardous materials within and adjacent to the WWSP project footprint. Evaluations may include, but are not limited to:
  - Hazardous materials assessments of recognized environmental conditions (RECs)
  - Preparation of Level 1 and/or Phase 1 Environmental Site Assessments
  - Preparation of Phase 2 Environmental Site Assessments, including the collection andanalysis of soil and/or groundwater samples
  - Preparation of Soil Management Plans
- Tree surveys and reporting in support of, but not limited to, the following:
  - Land use applications
  - Pipeline alignment and facility footprint evaluations
  - Property owner negotiations
  - Tree donation coordination
- Site visits with WWSP staff and/or agency representatives
- Obtaining environmental clearances for design activities, such as migratory bird nesting surveys and geotechnical surveys
- Review of Design Consultant submittals, including:
  - 30, 60, 90 and 100% design plans (or alternate work package-specific design milestones such as 50, 70, 90 and 100%)
  - Work package-specific environmental specifications
  - Site restoration, erosion and sediment control, grading, and water diversion plans
  - Value Engineering and Constructability evaluations
- Preparation for and attendance at design and construction-related workshops
- Facilitation of agency design reviews, such as USACE review of final restoration plans for stream crossings and ODFW review of final water diversion/fish passage plans

EXHIBIT A – STATEMENT OF WORK (SOW)
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- Preparation of pre-construction permitting memos to identify the pre-construction permits required for each construction package, including submittal requirements, agency review timelines and application fees
- Review of Design Consultant and Contractor pre-construction permit applications and facilitation of application submittal, review and approval by the applicable agencies
- Monthly updates to the Master Permit Tracking Log via e-Builder in advance of Program schedule updates
- Coordination with Bonneville Power Administration (BPA), WWSP and the Design Consultant to secure land use agreements for BPA transmission line crossings, including scheduling and tracking, and application review
- Preparation of alternative evaluations for design and alignment options, and participation in the ranking and selection of alternatives
- Preparation and submittal of work package-specific permit modification requests to applicable permitting agencies, as defined in the WWSP's Permit Modification Strategy
- Maintaining contact with regulatory agencies to facilitate timely responses

Construction Phase

- Participation in weekly construction coordination meetings
- Facilitation of compliance with environmental, cultural resources, land use and pre-construction permits
- Acquisition of construction-related authorizations, such as in-water work extensions and modifications to pre-construction and construction-related authorizations
- Support and confirmation of permit closeout and compliance obligations, including erosioncontrol monitoring, site restoration and post-construction monitoring and reporting
- Review of Contractor submittals, including, but not limited to:
    - Construction Management Plan
    - Project Permitting Plan
    - Erosion and Sediment Control Plan
    - Construction Bypass Plan
    - Dewatering Plan
    - Work Area Isolation Plan
    - Pollution Control Plan
- Identification of technical and design requirements to comply with WWSP permits and authorizations
- Conducting fish salvage, wildlife salvage, ESA, and Migratory Bird Treaty Act (MBTA) construction clearance surveys, including preparation and submittal of applicable permits and post-survey reporting
- Coordination with APHIS on nesting bird surveys, monitoring and nest removal, and compliancewith MBTA permits
- Responding to Requests for Information (RFI) from Owner, Contractor or Partner agencies

- Environmental compliance monitoring, including site visits, to confirm the Contractor has correctly demarcated protected areas, buffers, and resources. Field activities and findings will be documented, as appropriate, in a Site Visit Form and submitted via e-Builder within one (1) business day
- Performing on-site monitoring and inspection of Contractor conformance with project contract plans, documents, and permits. Inspection reports shall be submitted via e-Builder within one (1) business day of inspection
- Performing on-site monitoring and inspection of tree removal and protection by a certified arborist
- Performing on-site hazardous materials monitoring in areas with potential subsurface soil and/or groundwater contamination
- Collection, analysis and interpretation of soil and/or groundwater samples to confirm the presence of hazardous substances in areas where contamination is suspected, and guidance on disposal requirements.
- Preparation of recommendations and coordination with Owner's work package construction manager or designee to define appropriate corrective measures prior to exiting a work package construction site
- Monitoring of site restoration and planting plan coordination; review of as-built plans in resource areas for compliance with environmental permit requirements; coordination with Owner on Contractor warranty and maintenance requirements
- Conducting Inadvertent Discovery Plan training for encountering cultural resources and on-sitemonitoring for cultural resources, where necessary
- Responding on-site to inadvertent cultural resource discoveries and coordination with the contractor, WWSP and applicable agencies to document discoveries, clear the site and re-start work
- Cultural resources monitoring, if needed, in areas where known cultural resource sites occur
- Attendance at safety training meetings prior to the start of construction for each work package
- Conducting brief site visits to Partner project construction sites to review and document site conditions and compliance with WWSP permits
- Review of proposed field design changes for permit compliance
- Participation in the planning of and attendance at agency site inspections
- Facilitation of compliance reporting to outside agencies

12.0 RWF_1.0 Environmental, Cultural Resources, Land Use andHazardous Materials Coordination

12.1 RWF_1.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

13.0 RWF_1.0 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for RWF_1.0, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks. In addition to the services described under Subsequent Tasks, Consultant shall provide the following additional services:

Design Phase

- Facilitation of USACE and ODFW review and approval of fish screen replacement design

13.1 WTP_1.0 Environmental, Cultural Resources, Land Use and Hazardous Materials Coordination

13.2 WTP_1.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

In addition to the meetings described under Subtask 1 – Meetings and Workshops, consultant shall attend weekly permitting-focused meetings through March 2022.

13.3 WTP_1.0 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for WTP_1.0, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks. In addition to the services described under Subsequent Tasks, Consultant shall provide the following additional services:

Design Phase

- Evaluation of tree densities and general species composition using LiDAR imagery to support land use and pre-construction permit requirements
- Coordination with the WWSP, Design Consultant, CMGC Contractor and local agencies to secure pre-construction permit approvals required for the construction of the Orr Road concession project
- Evaluate implications of construction schedule modifications.

14.0 RES_1.0 Environmental, Cultural Resources, Land Use andHazardous Materials Coordination

14.1 RES_1.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

14.2 RES_1.0 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for RES_1.0, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks. In addition to the services described under Subsequent Tasks, Consultant shall provide the following additional services:

Design Phase

- Evaluate implications of construction schedule modifications.

15.0 PLM_1.0 Environmental, Cultural Resources, Land Use andHazardous Materials Coordination

15.1 PLM_1.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

15.2 PLM_1.1 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_1.1, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

15.3 PLM_1.2 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_1.2, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

15.4 PLM_1.3 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_1.3, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks. In addition to the services described under Subsequent Tasks, Consultant shall provide the following additional services:

Design Phase

- Preparation of state and federal environmental permit applications for the construction of ground lease street improvement concession projects on behalf of the City of Wilsonville, and coordination with the applicable agencies to facilitate permit approvals
- Coordination with the WWSP, Design Consultant, Contractor and local agencies to secure pre-construction permit approvals required for the construction of the ground lease street improvement concession projects

16.0 Task Closed

17.0 PLM_4.0 Environmental, Cultural Resources, Land Use andHazardous Materials Coordination

17.1 PLM_4.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

17.2 PLM_4.1 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_4.1, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

17.3 PLM_4.2 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_4.2, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

17.4 PLM_4.3 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_4.3, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks. In addition to the services described under Subsequent Tasks, Consultant shall provide the following additional services:

Design Phase

- Coordination on and review of the Farm Impacts Analysis report to support the PLM_4.3 land use application

17.5 PLM_4.4 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_4.4, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

18.0 PLM_5.0 Environmental, Cultural Resources, Land Use andHazardous Materials Coordination

18.1 PLM_5.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

18.2 PLM_5.1 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_5.1, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

18.3 PLM_5.2 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_5.2, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

18.4 PLM_5.3 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLM_5.3, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks. In addition to the services described under Subsequent Tasks, Consultant shall provide the following additional services:

- Upland oak woodland mitigation coordination and design, preparation of mitigation memo and cost estimate
- White rock larkspur reconnaissance surveys and documentation; avoidance, minimization, and relocation coordination

19.0 PLW_1.0 Environmental, Cultural Resources, Land Use and Hazardous Materials Coordination

19.1 PLW 1.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

19.2 PLW_1.2 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLW_1.2, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

19.3 PLW_1.3 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLW_1.3, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

20.0 PLW_2.0 Environmental, Cultural Resources, Land Use andHazardous Materials Coordination

20.1 PLW 2.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

20.2 PLW_2.0 Design Support and Construction Compliance Services – CLOSED

20.3 PLW_2.1 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for PLW_2.0, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks. In addition to the services described under Subsequent Tasks, Consultant shall provide the following additional services:

Design Phase

- Coordination with the WWSP, City of Hillsboro and Metro on the preparation of a Wildlife Protection Plan to provide wildlife protection during construction at the OWNP and surrounding areas

Construction Phase

- Implementation of pre-construction and construction phase wildlife monitoring in accordance with the WWSP's Wildlife Protection Plan, including installation of monitoring equipment, data collection, and reporting

20.4 PLW_2.2 Design Support and Construction Compliance Services

Consultant shall provide permit coordination with WWSP, design consultants, and agencies to facilitate baseline schedule changes to Construction Schedule.

21.0 MPE_1.0 Environmental, Cultural Resources, Land Use andHazardous Materials Coordination

21.1 Task Closed

21.2 MPE 1.0 Meetings and Workshops

Consultant shall attend work package-specific meetings and workshops as requested by Owner and identified in the description of Subtask 1 – Meetings and Workshops under Work Package-Specific Tasks.

In addition to the meetings described under Subtask 1 – Meetings and Workshops, consultant shall attend weekly permitting-focused meetings through March 2022.

21.3 MPE_1.1 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for MPE_1.1, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

21.4 MPE_1.2 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for MPE_1.2, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

21.5 MPE_1.3 Design Support and Construction Compliance Services

Consultant shall provide work package-specific design and construction compliance services for MPE_1.3, as identified in the description of Subtask 2 – Design Support and Construction Compliance Services under Work Package-Specific Tasks.

WWSP 2023 - 2024 Rate Table - DEA

Staff	Current Labor Classification	Proposed Labor Classification	Current Rate	Proposed Rate	Reason for Rate Change >4%	Proposed Increase Above Currrent
Shawna Hale	Deputy Project Manager	Deputy Project Manager	$151.20	$157.25		4.00%
Hao Vo	Engineering Designer II	Engineer III	$113.40	$128.00	Promotion	12.87%
Natalie Newcomer	Engineer IV	Engineer V	$172.94	$192.00	Promotion	11.02%
Sarah Jones	Engineer V	Engineer VI	$185.85	$215.00	Promotion	15.68%
Joshua Smith	Environmental Specialist II	Environmental Specialist II	$110.25	$114.66		4.00%
John D. Macklin	Environmental Specialist V	Environmental Specialist V	$179.55	$186.73		4.00%
Kristine J. Marshall	Environmental Specialist V	Environmental Specialist V	$179.55	$186.73		4.00%
Noah Herlocker	Environmental Specialist VI	Environmental Specialist VI	$218.50	$227.24		4.00%
Kayla S. Kruse	GIS Analyst IV	GIS Analyst IV	$151.20	$160.00	Merit increase	5.82%
Sara Gilbert	GIS Analyst IV	GIS Analyst IV	$151.20	$160.00	Merit increase	5.82%
Tamara Danisch	Landscape Architect III	Landscape Architect III	$136.28	$141.73		4.00%
Brookley Henri	Landscape Architect IV	Landscape Architect IV	$155.93	$162.17		4.00%
Jonathan C. Gage	Landscape Architect V	Landscape Architect V	$193.07	$203.00	Merit increase	5.14%
Jiin Brunke	N/A	Planner II	N/A	$118.00	New to Project	N/A
Laurie Bunce	N/A	Planner III	N/A	$131.88	New to Project	N/A
Georgia M. Cooper	Planner IV	Planner IV	$194.00	$201.76		4.00%
Dongyang Liu	Project Accountant III	Project Accountant III	$110.25	$114.66		4.00%
Lori Hicks	Project Accountant III	Project Accountant III	$110.25	$114.66		4.00%
Corie Peters	Project Coordinator III	Project Coordinator III	$107.66	$115.00	Merit increase	6.82%
Sarah Betz	Project Manager	Project Manager	$199.50	$223.00	Promotion	11.78%
Valerie Thompson	Scientist III	Scientist IV	$141.01	$146.65		4.00%
Ethan J. Rosenthal	Scientist IV	Scientist V	$163.80	$170.35		4.00%
Phil R. Rickus	Senior Ecologist	Senior Ecologist	$153.00	$159.12		4.00%
Suzanne M. Carey	Senior Planner	Senior Planner	$228.00	$257.00	Promotion	12.72%
Jennifer D. Miller	Senior Project Principal	Senior Project Principal	$274.05	$285.01		4.00%
Christine E. Immroth	Technical Writer	Technical Writer	$112.22	$116.71		4.00%
Christina M. Weber	Utility Coordination	Utility Coordination	$145.84	$151.67		4.00%
Doug Gates	Water Resource Dept. Manager	Water Resource Specialist	$240.10	$246.00		2.46%
Atalia Raskin	N/A	Water Resources Dept. Manager	N/A	$228.00	New to project	N/A

WWSP 2023-2024 Rate Table - MIG | APG

Staff	Current Labor Classification	Proposed Labor Classification	Current Rate	Proposed Rate	Reason for Rate Change >4%	Proposed Increase Above Currrent
Jon Pheanis	N/A	Principal/Sr Project Advisor	N/A	$ 185.00	New to project	N/A
Shayna Rehberg	Senior Planner	Senior Planner	$121.54	$ 155.00	Merit rate increse	27.53%
Carrie Brennecke	N/A	Senior Planner	N/A	$ 140.00	New to project	N/A
Brandon Crawford	Assistant Planner	Assistant Planner	$85.34	$110.00	Promotion	28.90%
Keegan Gulick	N/A	Planner	N/A	$ 100.00	New to project	N/A
Rachael Husted	N/A	Project Administrator	N/A	$120.00	New to project	N/A

WWSP 2023-2024 Rate Table - Historical Research Associates

Staff	Current Labor Classification	Proposed Labor Classification	Current Rate	Proposed Rate	Reason for Rate Change >4	Proposed Increase Above Currrent
Aaron Hood-Foster	N/A	Archaeological Technician 2	0	$ 91.00	New to project	N/A
Brad Bowden	Principal Archaeologist	Principal Archaeologist	$ 201.19	$ 209.23		4.00%
Cathy Bialas	Archaeologist 3	Archaeologist 3	$120.93	$142.70	Merit rate increase	18.00%
Clark Chatlain	Project Administrator	Project Administrator	97.38	101.25	Replaceing Bonnie Curtis	3.97%
Darrin Muir	Information System Specialist	Information System Specialist	$ 132.70	$ 138.00		3.99%
Dawn Vogel	Production Assistant/Editor	Production Specialist/Editor	$96.31	$114.00	Merit rate increase	18.37%
Elizabeth Provost	Architectural Historian 2	Architectural Historian 3 (Specialist)	$107.00	$134.00	Promotion	25.23%
Gabe Frazier	Archaeologist 3 (Specialist)	Archaeologist 3 (Specialist)	$117.72	$140.00	Merit rate increase	18.93%
Janna Tuck	Archaeologist 1	Archaeologist 1	$91.52	$95.18		4.00%
Jennifer Gebhardt	Logistics Coordinator	Logistics Coordinator	$93.00	$96.72		4.00%
Jessi Frank	Administrative Assistant/Production S	Production Specialist	$76.96	$90.82	Merit rate increase	18.01%
Josh Dinwiddie	Archaeologist 2	Archaeologist 3	$97.38	$118.00	Promotion	21.17%
Michele Punke	Senior Archaeologist (Specialist)	Senior Archaeologist/Regional Manage	$ 138.05	$ 164.00	Promotion	18.80%
Michele Stoll	Accounting Specialist	Project Accountant	$84.54	$111.00	Promotion	31.30%

WWSP 2023-2024 Rate Table - Terraphase

Staff	Current Labor Classification	Proposed Labor Classification	Current Rate	Proposed Rate	Reason for Rate Change >4	Proposed Increase Above Currrent
Aditya Manohar	Staff II Engineer	Staff II Engineer	$ 133.00	$138.00		N/A
Arnab Chakrabarti	Principal	Principal	$ 238.00	$ 247.00		3.78%
Bryan O'Reilly	Staff II GIS	Staff II GIS	$ 133.00	$ 138.00		3.76%
Craig Heimbucher	Associate	Associate	$ 211.00	$ 233.00	Promotion	10.43%
Dana Brown	Project Geologist	Project Geologist	174	$180.00		N/A
Daren Roth	Associate	Associate	$ 211.00	$ 219.00		3.79%
David Bishop	Senior GIS	Senior GIS	$ 152.00	$ 158.00		3.95%
David Liu	Support Staff	Support Staff	$ 82.00	$ 85.00		3.66%
Don Malkemus	Senior Project Geologist	Senior Project Geologist	$ 192.00	$ 199.00		3.65%
Gio Ossa	Support Staff	Support Staff	$ 82.00	$ 85.00		3.66%
James Farrow	Principal	Principal	$ 238.00	$ 247.00		3.78%
Jeff Wallace	Principal	Principal	$ 238.00	$ 247.00		3.78%
Joe Luchette	Associate	Associate	$ 211.00	$ 219.00		3.79%
Nancy Law	Support Staff	Support Staff	$ 82.00	$ 85.00		3.66%
Tim Kloeblen	Project Geologst	Project Geologst	$ 174.00	$ 180.00		3.45%
Veronica Hadsell	Project Coordinator	Project Coordinator	$ 133.00	$ 138.00		3.76%
Vinoth Muthia	Staff I Geologist	Staff I Geologist	$ 114.00	$ 118.00		3.51%

WWSP 2023-2024 Rate Table - Geosyntec

Staff	Current Labor Classification	Proposed Labor Classification	Current Rate	Proposed Rate	Reason for Rate Change >4%	Proposed Increase Above Currrent
James Peale	Senior Principle	Principal	$275.00	$286.00		4.00%
Aaron Poresky	N/A	Principal	N/A	$265.00	New to project	N/A
Daniel Pankani	Senior Professional	Senior Professional	$234.00	$243.00		3.85%
Jacob Krall*	Project Professional	Project Professional	$208.00	$243.00	Promotion	16.83%
Rich Wildman	Project Professional	Project Professional	$208.00	$243.00	Promotion	16.83%
Austin Orr	Project Professional	Project Professional	$208.00	$216.00		3.85%
Ariel Mosbrucker	Project Professional	Project Professional	$208.00	$216.00		3.85%
Jamie Feldman	Professional	Senior Staff Professional	$185.00	$192.00		3.78%
Leon Li	Professional	Senior Staff Professional	$185.00	$192.00		3.78%
Jack Lisin	Senior Staff Professional	Senior Staff Professional	$162.67	$169.00		3.89%
Maral Razmand	Senior Staff Professional	Senior Staff Professional	$162.67	$169.00		3.89%
Mike DuBose	N/A	Senior Staff Professional	N/A	$169.00	New to project	N/A
Josh Gotlieb	N/A	Senior Staff Professional	N/A	$169.00	New to project	N/A
Lindsey Spencer	Staff Professional	Staff Professional	$140.00	$169.00	Promotion	20.71%
Sherry Carcamo	Project Administrator	Project Administrator	$76.96	$80.00		3.95%

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4B. Permitting Contract Amendment #39 (Contract No. 2016-320) – *Christina Walter*

April 6, 2023

1

DEA (Permitting Services) Contract Amendment 39 Overview

- Requires Board approval to proceed
- Recognizes both additions and reductions in services
- Permitting Services is at a critical phase and this amendment enables sustained progress

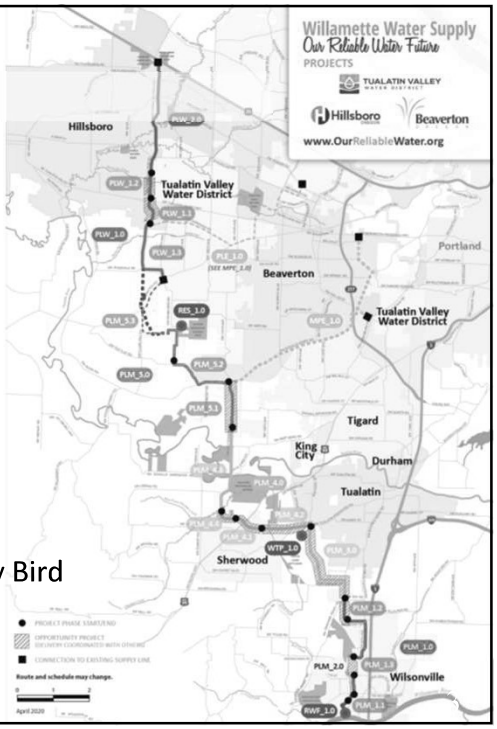
- Requested Board Action:

  Approve an amendment in the amount of $782,782.52 for scope of work to cover the term April 19, 2023 – April 18, 2024

2

Permitting Services Overview

- Coordinate USACE/DSL permit modification bundles
- Coordinate acquisition of pre-construction permits for various projects - 78 remain to be secured
- Monitor compliance during construction on 14 active construction sites
- Prepare and implement post-construction monitoring & restoration plans
- Coordinate with DEQ on Water Quality Certification and Thermal Trading Plan implementation
- Annual reports to USACE, ODFW, ODFW CHTR, Migratory Bird Treaty Act, and TTP



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New Activities in 2023

- RWF_1.0: Land Use Permitting support for partitioning/subdivision of Wilsonville property
- PLM_1.3: Coordination on hazmat Phase 1 surveys for ground lease improvements
- PLM_5.3: Secure McKernan Creek TCE minor permit modification of USACE/DSL permits; Coordination on shoofly/Hruby property design change
- PLW_2.1: OWNP construction phase wildlife management monitoring/protection
- CSU: Secure land use permit and inform final design of temporary Tualatin River discharge facility

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Major Components of Proposed Contract Amendment

- New scope of work for term April 19, 2023 – April 18, 2024
- Corresponding new budget

Budget Impact

Initial Contract Value	$589,896
Amendments 1 through 38	$9,998,259.13
Current Contract Value	$10,588,155.13
Proposed Amendment #39 *TVWD Estimated Share $484,385.82* *Hillsboro Estimated Share $258,396.51* *Beaverton Estimated Share $40,000.19*	$782,782.52
Proposed Contract Value	$11,370,937.65

Notes:
- Total fee for services for April 2022 – April 2023 is $1,502,952.89, including approximately $720,170.37 in unspent budget and $782,782.52 additional budget under this amendment.
- Contract values were anticipated in Baseline 8.1 budget.

Requested Board Action

Consider approving Amendment #39 to Contract No. 2016-320, with David Evans and Associates, Inc., in the amount of $782,782.52, to provide additional permitting services for the Willamette Water Supply Program.

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STAFF REPORT

To: WWSS Board of Commissioners

From: Joelle Bennett, P.E., WWSP Assistant Program Director

Date: April 6, 2023

Subject: Anticipated Business Agenda Items for the June 2023 Meeting of the WWSS Board of Commissioners

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Key Concepts:
The next Willamette Water Supply System (WWSS) Commission Board meeting agenda is anticipated to include a staff recommendation for the following business agenda item:

1. WWSS Program and Construction Management Services FY 2024 Annual Work Plan

Background:
There is one anticipated business agenda item for the June 1, 2023, meeting of the WWSS Board of Commissioners. Due to the dynamic nature of the WWSS work, request for approval of some items may be delayed or new items may emerge on the business agenda for the next meeting. WWSS staff strive to provide preliminary information one meeting prior to requesting action and a full staff report describing the recommended action during the appropriate month.

1. WWSS Program and Construction Management Services FY 2024 Annual Work Plan

   Stantec Consulting Services Inc. (Stantec) is contracted to provide program and construction management services for the WWSP through 2026. Specific services are authorized on an annual basis through approval of an annual work plan. The FY 2024 annual work plan identifies Stantec's planned services, planned staffing, estimated fees, and key assumptions for delivery of program and construction management support services that are correlated to WWSP's 2023 Baseline 8.1. The estimated fee for the WWSP Program and Construction Management Services FY 2024 Annual Work Plan is approximately $23.7 M.

   WWSP staff will provide an overview of the work plan and recommend approval at the next WWSS Board meeting.

Budget Impact:
Anticipated costs for the actions described in this staff report are reflected in the WWSP FY 2023 budget and the overall program baseline budget.

Staff Contact Information:
Dave Kraska, P.E., WWSS General Manager, 503-941-4561, david.kraska@tvwd.org
Joelle Bennett, P.E., WWSP Assistant Director, 503-941-4577, joelle.bennett@tvwd.org

Attachments:
- Approvals and Procurement Forecast (February 2023 – June 2023)

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Willamette Water Supply
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Approvals and Procurement Forecast: February through June 2023

This report provides a four-month projection of (1) forthcoming actions under the WWSS Management Authority Matrix and (2) ongoing and forthcoming procurements.

a = Actual date
e = Email approval
FC = Finance Committee
LCRB = Local Contract Review Board
MC = Management Committee
N/A = Not applicable
OC = Operations Committee
Rec. = Recommendation
t = Tentative date
TBD = To be determined; sufficient information not available to project a date
Note: Dates in red text indicate meetings needed outside the normal meeting schedule

Type	Description	Projected Action	Body/Position (projected action date)		
			Program Director	WWSS Committees	WWSS Board
Program Baseline or Related Plans (above Program Director's Authority)	1. WWSP 2023 Rebaseline Schedule and Budget and WWSS Fiscal Year 2023-2024 Work Plan and Budget	Approve	N/A	1/19/2023 a	2/2/2023 a
		Execute	N/A	N/A	N/A
	2. Natural Hazard Mitigation Plan	Approve	N/A	1/19/2023 a	4/6/2023 t
		Execute	4/7/2023 t	N/A	N/A
Real Estate	3. None	Approve	N/A	N/A	N/A
IGAs, MOUs, Permit Commitments, & Similar Agreements	4. DCS_1.0 Sherwood Broadband Services IGA	Approve	N/A	MC: 3/18/2021 a	4/1/2021 a
		Execute	4/10/2023 t	N/A	N/A
Contracts (above Program Director's Authority)	5. None	Approve	N/A	N/A	N/A
		Execute	N/A	N/A	N/A
Contract Amendments and Change Orders (above Program Director's Authority)	6. Permitting Services Contract Amendment for Next One-year Period • Goal: Extend DEA's contract through March 2023 • Value: $782,782.52	Approve	N/A	3/23/2023 t	4/6/2023 t
		Execute	4/7/2023 t	N/A	N/A
	7. WWSP Program and Construction Management Services FY 2024 Annual Work Plan • Goal: Approve scope, staffing, and fee for program and construction management services for FY 2024 • Value: $23.7 M	Approve	N/A	5/18/2023 t	6/1/2023 t
		Execute	6/2/2023 t	N/A	N/A
Local Contract Review Board (LCRB) Actions	8. None	Approve	N/A	N/A	N/A
Other	9. Congressional Directed Spending Grant Technical Correction	Approve	N/A	1/19/2023 a	2/2/2023 a
		Execute	2/9/2023 a	N/A	N/A

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Willamette Water Supply System Commission
Board Meeting

April 6, 2023