TACOMA PUBLIC UTILITIES ADDENDUM
PIERCE COUNTY REGIONAL HAZARD MITIGATION PLAN
2025-2030 EDITION

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Planning Process

This **NEW** Addendum details the hazard mitigation elements specific to **Tacoma Public Utilities (TPU)**, as a member of the Utility Discipline Group for the Pierce County Regional Hazard Mitigation Plan 2025-2030 Edition. *This Addendum is not intended to be a standalone document but rather supplements the information contained in the base plan document with additional information specific to TPU.*

Pierce County Planning Participation

TPU participated in Pierce County planning meetings (Utility Group and North Regional Group), mitigation seminars, and public comment and outreach events, as described in the Planning Process section of the *2025-2030 Pierce County Regional Hazard Mitigation Plan*. *[Elements A1-a.b., A2-a., A3-a.]*

TPU Planning Team

In addition to providing representation to the County's Planning Team meetings, TPU also formulated its own internal planning team to support the broader planning process.

The Lead Planner, working with the planning team—consisting of department emergency managers as contributors, subject matter experts (SME) for technical information, and the executive leadership team for final review—ensured the plan met FEMA requirements. Drawing from open-source materials and department/division documents, the Lead Planner drafted the plan content, which was then refined through input from the contributors and reviewed by leadership to ensure accuracy, compliance, and alignment with organizational priorities.

The TPU Planning Team was comprised of the members listed in **Table 1** below. *[Element A1-b.]*

Table 1. TPU Planning Team Members

Name	Title	Division	Team Role
Jackie Flowers	*Director of Utilities*	*TPU Administration*	*Director*
Alex Yoon	*Deputy Director, Management Services*	*TPU Administration*	*Exec. Sponsor*
Courtney Rose	Chief Emergency Manager	TPU Administration	Team Lead
Lisa Millius	Assistant Emergency Manager	TPU Administration	Lead Planner
Jayson Lelli	Department Emergency Manager	Tacoma Power	Contributor
Jeremy Kaiser	Department Emergency Manager	Tacoma Water	Contributor
Kyle Kellem	Roadmaster/Emergency Manager	Tacoma Rail	Contributor
Paul Bekkers	Manager, Fleet & Facilities	Tacoma Power	SME
Julie DeYoung	Manager, Business Services	Tacoma Power	SME
Paul Lennemann	Manager, Dam Safety	Tacoma Power	SME
Melissa Luchini	Office Assistant, Real Property Services	TPU Administration	SME
Bode Makinde	Principal Analyst, Customer Data/Analytics	TPU Administration	SME
Dan McCabe	Division Manager, Finance & Technology	Tacoma Rail	SME
Ebony Peebles	Manager, Business Services – Budget	TPU Administration	SME
Marc Powell	Senior Analyst, Financial Stewardship	Tacoma Water	SME
Michelle Rhubright	Senior Manager, Budget & Finance	Tacoma Power	SME
Daniel Reisinger	Principal Engineer, Water System Planning	Tacoma Water	SME
Nathan Worthington	Engineer Technician IV, Dam Safety	Tacoma Power	SME

Executive Leadership Team

TPU's Executive Leadership Team supported the Planning Team by providing overall guidance, reviewing the plan and ensuring alignment with organizational goals and priorities. The Executive Leadership Team is as follows:

- Jackie Flowers, Director of Utilities
- Alex Yoon, Utilities Deputy Director, Management Services Office
- LaTasha Wortham, Utilities Deputy Director, Customer Experience and External Affairs
- Chris Robinson, Utilities Deputy Director, Power Superintendent
- Alan Matheson, Utilities Deputy Director, Rail Superintendent
- Keri Burchard-Juarez, Utilities Deputy Director, Water Superintendent
- Laurie Hardie, Enterprise Safety Director
- Engel Lee, Chief Deputy City Attorney, City Attorney – Civil Division TPU

TPU Planning Team Meetings

January 6, 2025 – TPU Hazard Mitigation Plan (HMP) Kick-Off Meeting: Courtney Rose, TPU Chief Emergency Manager introduced, and explained the reasoning, of the addition of TPU to the Pierce County Regional Hazard Mitigation Plan. Debbie Bailey and Todd Kilpatrick from Pierce County Emergency Management provided a mitigation overview. Twelve (12) of members of staff were in attendance. *[all Element A1-a.]*

April 10, 2025 – Lead Planner and Water Planners Meeting: Lisa Millius met with Tacoma Water staff, Jeremy Kaiser, Jenni Chadick, Marc Powell, and Daniel Reisinger to go over Mitigation Measures and provide guidance on requirements for plan submissions.

May 9, 2025 – Lead Planner and Rail Planner Meeting: Lisa Millius met with Kyle Kellem (Tacoma Rail) to go over Mitigation Measures and provide guidance on requirements for plan submissions.

May 28, 2025 – Lead Planners Update to Emergency Managers: Lisa Millius and Courtney Rose met with Adam Gallion, Kyle Kellem, Jeremy Kaiser, Jayson Lelli, and Christina Chew. Lisa and Courtney provided a plan status update, asked how the EMs were coming along on their mitigation measure worksheets, and asked if they had any questions.

June 18, 2025 – Lead Planner and Power Planners Meeting: Lisa Millius met with Tacoma Power staff Jayson Lelli and Nathan Worthington to go over Mitigation Measures and provide guidance on requirements for plan submissions.

Public Utility Board Meetings & Public Comment

Public Utility Board meetings are held the second and fourth Wednesday of the month at 6:30 p.m. in the Tacoma Public Utilities Auditorium, 3628 S. 35th St., Tacoma or virtually via Zoom Meetings. These meetings are open to the public for comment and televised live on *TV Tacoma* and archived to watch any time.[1]

June 26, 2024, 6:30 p.m. – Public Utility Board Meeting: Courtney Rose, TPU Chief Emergency Manager, and Debbie Bailey, Pierce County Mitigation Specialist, provided a presentation on TPU's inclusion to the 2025 update of the Pierce County Hazard Mitigation Plan. Debbie explained how incorporation will allow TPU to apply for FEMA grant funding for projects in all our operational areas. Pre-disaster funding

opportunities include Hazard Mitigation Assistance. TPU Emergency Management will lead the planning. *TPU did not receive any comments from the public regarding this subject.* *[all Element A1-a.]*

Week of July 21-July25 – Bill insert mailed to every TPU customer, an invitation to participate in the Community Wildfire Preparedness Survey and how to sign up of Pierce County ALERT. The survey was a partnership between TPU and Pierce County Department of Emergency Management. *See Attachment 2. TPU Bill Insert – Wildfire Readiness Survey.* See *County Regional Plan* for survey questions and results.

August 13, 2025, time – Public Utility Board Meeting, Study Session: Courtney Rose, TPU Chief Emergency Manager, and Lisa Millius, TPU Assistant Emergency Manager, provided an update…

[placeholder – PUB presentation, resolution request], Attachment 3. Public Utility Board [adoption document]

Plan Approval and Adoption

Plan Approval Process

Pierce County must first submit its hazard mitigation plan to the Washington State Emergency Management Division (EMD) for a pre-adoption review. EMD has 30 days to review the plan and forward it to FEMA Region 10 for an additional 45-day review. FEMA evaluates the plan based on the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201.6.

Revisions may be requested by either EMD or FEMA during the review process. These changes can include updates to background information, technical content, or simple editorial corrections. The Pierce County Department of Emergency Management (PCDEM) will convene a Planning Team Meeting to make any required revisions before resubmitting the plan.

Once the plan passes the pre-adoption review, each jurisdiction must formally adopt it through a designated individual or governing body. The adopted plan, along with a signed resolution, must be submitted to the State Hazard Mitigation Officer at EMD. EMD will then forward the adopted plan to FEMA Region 10 for final approval.

Plan Adoption

On [date], the Public Utility Board formally adopted the 2025-2030 TPU Hazard Mitigation Plan Addendum for inclusion into the *2025-2030 Pierce County Regional Hazard Mitigation Plan*. See [Placeholder *[Elements F1-a., F2-a.]*

Plan Implementation & Monitoring

Implementation

After adoption, TPU will carry out its mitigation strategies over the next five years. Implementation will be based on the TPU's specific capabilities, infrastructure, and available resources.

With plan adoption, TPU automatically becomes part of the Hazard Mitigation Forum, which includes representatives from all participating jurisdictions in Pierce County. The Forum serves as a coordinating body for multi-jurisdictional projects and provides a platform for sharing success stories, best practices, and cross-jurisdictional collaboration. See the *Regional Hazard Mitigation Plan* for details.

Plan Evaluation and Update

TPU must reevaluate and update the Addendum at least once every five years. TPU may choose to conduct reviews more frequently, such as every one to three years. A full update is typically conducted every five years, regardless of interim reviews.

The Addendum must also be reviewed after any major disaster. These post-disaster reviews help identify new mitigation needs that may not have been previously addressed. These are conducted independently of the scheduled review cycle.

At the end of each five-year cycle, the updated Addendum must be submitted to PCDEM, who will gather the updates from all jurisdictions and submit them to the State EMD and FEMA for approval.

Continued Public Involvement

Public involvement is a critical part of both the plan review and update process. Before submitting a plan for its five-year review, TPU will hold public information and comment events. These events give customer an opportunity to voice concerns, provide feedback, or offer ideas about the plan.

Utility Profile

Mission and Vision

MISSION: "We deliver clean, reliable services essential to quality of life."

VISION: "We will be a trusted community partner, where employees are proud to deliver equitable, affordable utility services.

TPU History

When Tacoma was first settled by European Americans in 1852, settlers obtained water directly from springs and shallow wells. Several small distribution systems were developed beginning in 1873.

In 1884, Charles B. Wright obtained a franchise for light and water systems and incorporated the Tacoma Light & Water Company. During the next five years, he built a system that drew water from local waterways. Dissatisfied with the quality of service, the City Council began negotiating with Wright in 1890 to buy the water and light plants.

After political negotiations, a price of $1.75 million was agreed upon for the purchase. On July 1, 1893, the issue was put to a vote, with 3,195 votes in favor and 1,956 against. The City of Tacoma purchased the system, becoming the owner of both the water supply and the early electric utility.

In 1910 the City Council authorized construction of the Green River gravity supply system. The Green River Municipal Watershed has been Tacoma Water's primary water supply since 1913.

Tacoma Public Utilities may be the only utility in the country that owns and operates a railroad. It all began in June of 1925 when a Tacoma City Charter amendment transferred control of the "Tacoma Municipal Belt Line Railway" (now known as Tacoma Rail) from the City's General Government to Tacoma Public Utilities.

Cushman No. 1 Dam was one of the first major dams in the Pacific Northwest. It was symbolically activated in 1926 when President Calvin Coolidge pressed a button in the White House during a ceremony to energize the project. Cushman No. 2 Dam was completed in 1930.

Alder Dam and LaGrande Dam were built in 1945 to replace the original 1912 diversion dam.

The Cowlitz River Project include Mayfield Dam was built in 1963; and Mossyrock Dam (built in 1968), the tallest dam in Washington state at 606 feet above bedrock.

Completed in 1972, the Wynoochee Dam is owned by the city of Aberdeen, however, Tacoma Power created the Wynoochee River Project in 1994 after building a powerhouse a quarter mile downstream from the Wynoochee Dam.

Completed in 2015, the Green River Filtration Facility filters and disinfects the water TPU delivers. Prior to the facility construction, the Green River was one of the few major unfiltered surface water supplies left in the U.S.

Service Summaries

TPU Governance and Administration

TPU, the largest department of the City of Tacoma government, is governed by the five-member Public Utility Board, appointed by the mayor and confirmed by City Council[2]; members serve five-year terms, unpaid. The Tacoma City Council retains oversight in a few key areas as defined by the City Charter. Those include budget and rates approval, Director of Utilities confirmation, system expansion, and property deposition. The Public Utility Board monitors the operations of TPU, approves service rates, and ensures decisions are in accordance with City policies and laws.

The Director of Utilities, appointed by the Public Utility Board, manages all operations and business affairs of TPU, along with appointing a Superintendent (Deputy Director) for each utility system.

TPU administration includes offices responsible for budget and performance, risk and claims management, records management, and emergency management, managed by a Deputy Director; and customer service and external affairs managed by a Deputy Director. These divisions support the whole of TPU, including the three operating divisions – Tacoma Power, Tacoma Water, and Tacoma Rail.

Map 1. TPU Combined Service Area Map shows TPU's combined Power, Rail, Water services areas.

Map 2. TPU Operational Areas shows TPU's operational areas as referred in the following Service Summaries.

Tacoma Power Service Summary

Tacoma Power's service area covers 180 square miles and provides electric service to the cities of Tacoma, Fircrest, University Place, Fife, parts of Steilacoom, Lakewood, Joint Base Lewis-McChord, and to unincorporated Pierce County as far south as Roy. Tacoma Power serves over 182,000 residential, commercial, and industrial customers; 55 percent inside Tacoma's city limits and 45 percent outside city limits.

Tacoma Power electric supply consists of 89 percent hydroelectric energy. Of that, 46 percent is generated by Tacoma Power's four hydroelectric projects:

- Cowlitz River Project – Mayfield and Mossy Rock dams – in Lewis County, owned and operated by Tacoma Power.
- Cushman Hydroelectric Project – Cushman No. 1 and Cushman No. 2 dams – in Mason County, owned and operated by Tacoma Power.
- Nisqually River Project – Alder and LaGrande dams – owned and operated by Tacoma Power, the Nisqually River Project is in Pierce County with the Nisqually River serving as the border between Pierce and Thurston counties.
- Wynoochee River Project in Grays Harbor County – Wynoochee dam owned by the City of Aberdeen and operated by Tacoma Power.

Along with the dams and eight generation switchyards, Tacoma Power's infrastructure includes: 2,388 miles of power lines (distribution and transmission), nine (9) main/transmission substations and switching stations, 49 distribution substations, and 13 dedicated distribution stations.

As mandated by Federal Energy Regulatory Commission (FERC), Tacoma Power operates four fish hatcheries, manages over 21,000 acres of wildlife habitat, and provides recreational activities at four reservoir-located parks. The FERC licenses include operational tribal, state, and federal agreements.

In 2023, Tacoma Power joined the Western Energy Imbalance Market (EIM) allowing participants in the western United States to offer excess generation capacity for purchase or buy lower-cost wholesale power when needed.

Tacoma Rail Service Summary

Tacoma Rail serves 39 customers on 43 miles of track in two operating divisions (Lakewood Subdivision and Tidelands Division) within Pierce County. Tacoma Rail provides service 24 hours a day, seven days a week to handle all the responsibilities of any common carrier railroad, including track inspection and maintenance, locomotive maintenance, customer service and administration.

On November 16, 2004, Tacoma Rail took over the freight service operations from the Burlington Northern-Santa Fe Railway for the Lakewood Subdivision. To provide this service, Tacoma Rail has trackage rights over Sound Transit's line segment between Dupont and South Tacoma. The Lakewood Subdivision serves 7 customers which includes service to the Lakewood Industrial Park located in Lakewood.

The Tidelands Division serves all four intermodal terminals within the Port of Tacoma: North Intermodal Yard, Pierce County Terminal, South Intermodal Yard, and Washington United Terminals; and the Port's break bulk facilities. In addition to the Port's facilities, they switch 40 industrial customers, handling commodities such as automobiles, food, forest and building products, metals, minerals, and petroleum products.

Tacoma Water Service Summary

Tacoma Water's service area covers 119 square miles and serves over 108,897 residential, commercial, and industrial customers; 61 percent within Tacoma's city limits and 39 percent outside city limits. Tacoma Water provides water directly and through wholesale to the following customers: the cities of Auburn, Black Diamond, Bonney Lake, Enumclaw, Fife, and Puyallup; and utility districts/providers of Coal Creek, Cumberland, Firgrove, Fruitland, Lake Meridian, Mountain Terrace, RSN Enterprises, Valley Water, and Washington Water.

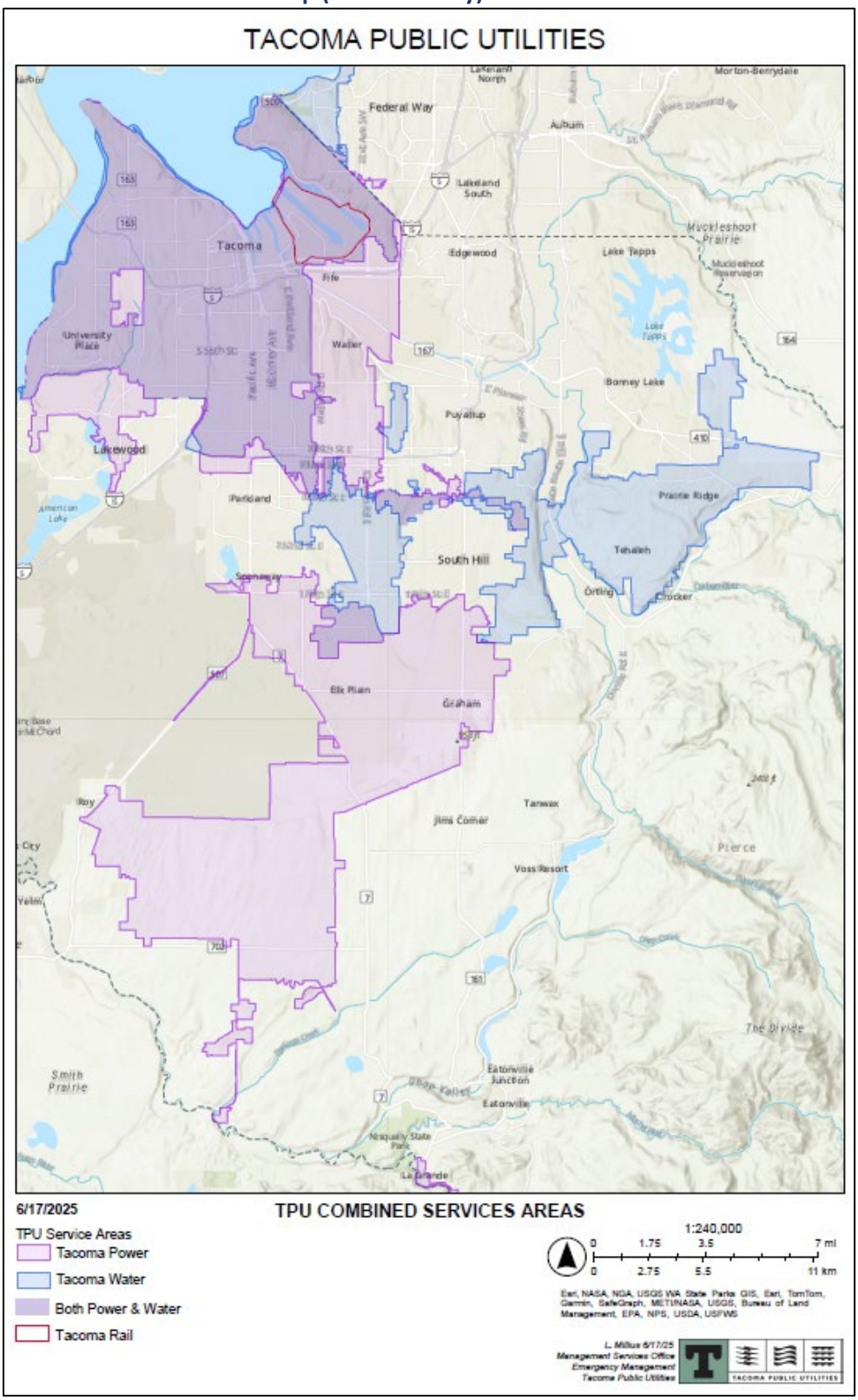
Tacoma Water also serves the city of Kent, the Covington Water District, and the Lakehaven Water and Sewer District through the Regional Water Supply System partnership formed in 2002.

The Green River Filtration Facility is located at the Tacoma Water Headworks, near the town of Cumberland in south King County. Tacoma Water's infrastructure also includes groundwater wells, McMillin Reservoir (main water storage facility) and 17 other reservoirs and standpipes that supplement water supply as needed.

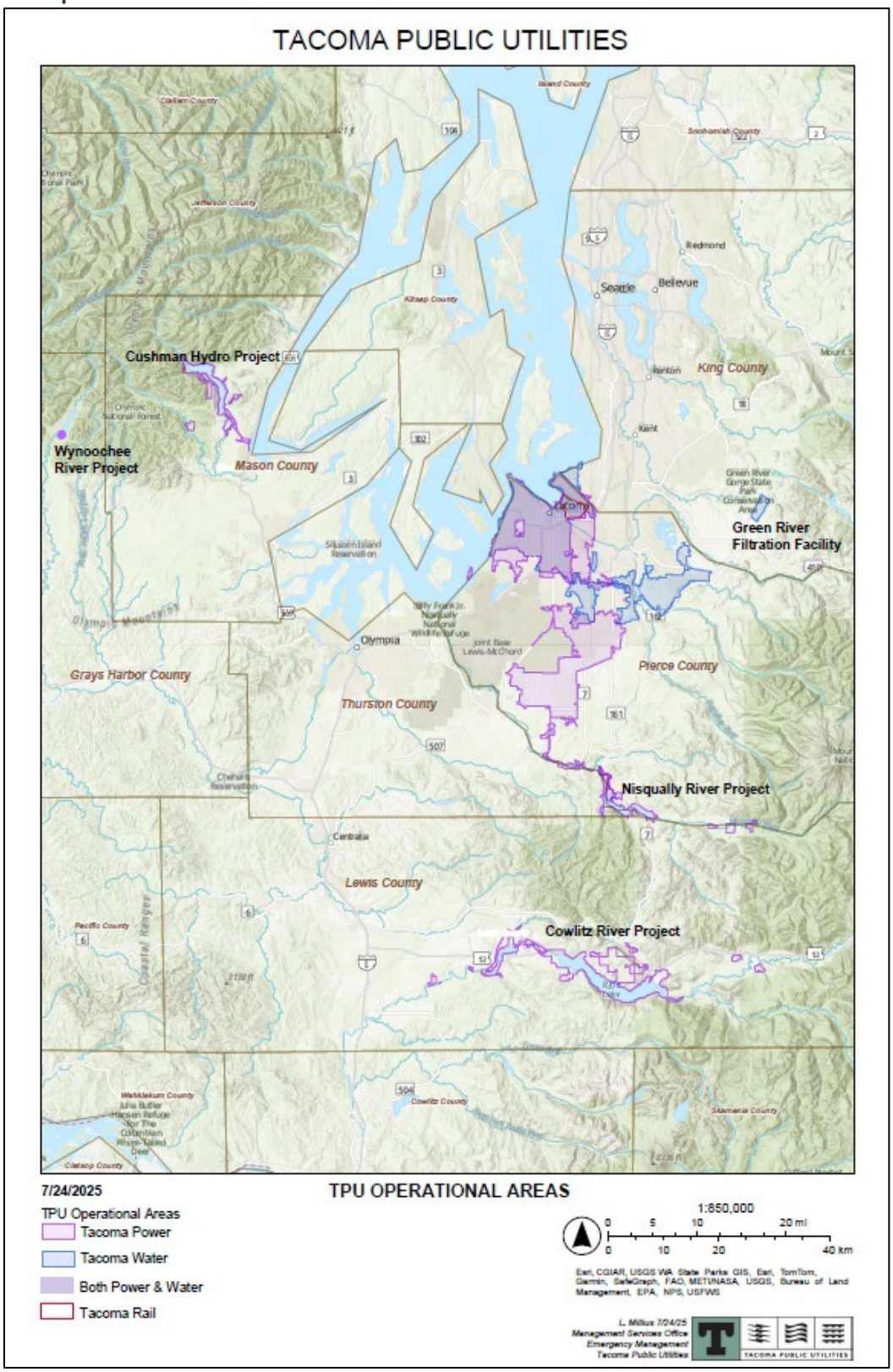
The Green River Watershed covers about 148,000 acres of forestland, in which Tacoma Water owns 11 percent of that land. To preserve and protect this watershed, Tacoma Water has agreements with federal, state, tribal and private landowners, and other utilities to limit watershed access.

Tacoma Water's Habitat Conservation Plan serves as an umbrella for several agreements for river operations, water supply operations and forest and land management to ensure a consistent approach to fish and wildlife protection.

Map 1. TPU Combined Service Area Map (Pierce County)



Map 2. TPU Operational Areas



Parcel Summary

TPU owns property in five counties – King, Lewis, Mason, Pierce, and Thurston. Table 2 outlines the number of parcels and values for each Division in each operational area.[3]

Parcels in Lewis County apply to the Cowlitz River Project.

Parcels in Thurston County apply to those directly along the Nisqually River from the hydro project, for approximately seven miles (less a few private or state-owned parcels).

Parcels in Mason County apply to the Cushman Hydroelectric Project.

Parcels in King County apply to the Green River Filtration Facility.

Table 2. Parcels and Values 2024/2025

Utility Division & County	# of Parcels	Land Value	Improved Value	Total Assessed Value
Tacoma Power – Pierce Co.	303	$138,269,500.00	$53,362,800.00	$191,632,300.00
Tacoma Power – Lewis Co.	243	$49,915,600.00	$78,729,900.00	$128,645,500.00
Tacoma Power – Thurston Co.	34	$10,873,500.00	$0.00	$10,873,500.00
Tacoma Power – Mason Co.	94	$15,978,055.00	$32,681,565.00	$48,659,620.00
Tacoma Water – Pierce Co.	161	$72,637,200.00	$20,127,400.00	$92,764,600.00
Tacoma Water – King Co.	194	$56,757,769.00	$14,918,000.00	$71,675,769.00
Tacoma Rail	9	$22,162,300.00	$2,606,900.00	$24,769,200.00
TOTALS:	**1,038**	**$366,593,924.00**	**$202,426,565.00**	**$569,020,489.00**

Note: Although Tacoma Power operates in Grays Harbor County (Wynoochee River Project), the dam and land surrounding is owned by the City of Aberdeen.

Demographics

NOTE: TPU's service and operational areas are spread throughout Pierce County and cannot be profiled under one governing entity (i.e. City of Tacoma), therefore, Pierce County's demographic data, as detailed in the *2025-2030 Pierce County Regional Hazard Mitigation Plan*, applies to TPU.

TPU Customer and Community Programs

Tacoma Public Utilities offers a variety of programs and incentives to help residential, commercial, and industrial customers reduce energy and water use, lower utility bills, and support environmental sustainability—making it easier for the community to adopt conservation practices and improve utility efficiency.

Examples of these programs are:

Bill Credit Assistance Plan & Discount Rate Program – Tacoma Public Utilities and the City of Tacoma Environmental Services offer the Bill Credit Assistance Plan and the Discount Rate Program to help qualifying customers with paying their bills. In 2024, TPU assisted 8,200 customers/households in receiving $3,498,440. The Discount Rate Program provided 5,744 customers with $4,153,473 in discounts.[4]

Community Connection & Senior Assistance Fund – TPU employees have a long history of giving back to the community. Through TPU's Community Connection volunteer program, employees gave more than $276,497 in cash, products, and volunteer time in 2024. TPU's Senior Assistance Fund, which is entirely funded by TPU employees, provides one-time utility bill assistance of $100 to low-income senior customers in need of help. In 2024, Fifty-nine (59) senior customers received $9,076 in assistance.[1]

Evergreen Options Grant – Each year, Tacoma Power awards a local non-profit the $50,000 Evergreen Options grant. Grant recipients are chosen by a vote of Power customers. In October 2024, the Multicultural Child and Family Hope Center received the grant to install a solar array at their facility. This grant will not only enhance operational sustainability but also to help realize the Center's vision of becoming a Resiliency Hub for the Pierce County community during emergencies.[5]

Water Bottle Filling Stations – Tacoma Power, Metro Parks Tacoma, and the City of Tacoma Public Works department installed and maintain water bottle filling stations (equipped with water fountains and bowls for dogs) throughout Tacoma. Currently, four stations have been installed at city parks and two stations installed in business districts.

Capability Assessment

The TPU Planning Team assessed the Utility's capabilities that can contribute to the reduction of long-term vulnerabilities to hazards. These capabilities were sorted into the following categories:

- Planning and Regulatory Capabilities
- Administrative and Technical Capabilities
- Financial Capabilities
- Education and Outreach Capabilities

NOTE: TPU has omitted capabilities listed in the *County Regional Plan* and the *City of Tacoma Addendum* that apply to TPU (i.e., city/county/state building codes, zoning codes, etc.). **Capabilities listed in this section may be unique to TPU or utility organizations.** [Elements C1-a., C1-b.]

Planning and Regulatory

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards.

TPU Planning Capabilities

Utility-Wide

- TPU Continuity of Operations Plan & Annexes, 2024
- TPU Emergency Management Program 5-Year Work Plan, 2025-2030
- TPU Strategic Plan 2025

Tacoma Power

- Cowlitz Hydroelectric Project Emergency Action Plan 2024
- Cushman Hydroelectric Project Emergency Action Plan 2024
- Nisqually Hydroelectric Project Emergency Action Plan 2024
- Wynoochee Hydroelectric Project Emergency Action Plan 2024
- Tacoma Power Emergency Response Plan, 2024
- Tacoma Power Geomagnetic Disturbance Operations Plan, 2024
- Tacoma Power Strategic Plan, 2025
- Water Release Notification Plan, 2024
- Wildfire Mitigation Plan, 2024

Tacoma Rail

- Oil Spill Contingency Plan/Comprehensive Oil Spill Response Plan, 2024-2025
- Tacoma Rail Strategic Plan 2022-2026
- Bridge Safety Management Policy

Tacoma Water

- All Hazards Vulnerability Assessment Plan 2025
- Emergency Operations Plan, 2020-2024
- Headworks Master Plan 2024-2054
- Integrated Resource Plan, 2018
- Pipeline 1 Pressurization Program, 2021
- Tacoma Water Strategic Plan, 2020-2025
- Water Operations Master Plan, 2023

- Water Shortage Response Plan, 2018
- Watershed Strategic Plan, 2022-2027
- Wells Master Plan, 2023

TPU Regulatory Capabilities

Local Authority

- City of Tacoma Charter, Article IV Public Utilities
- City of Tacoma Municipal Code – Title 12 Utilities
- City of Tacoma Ordinance No. 28986 Home in Tacoma
- Tacoma-Pierce County Health Department Regulations

Washington (WA) State

- Revised Code of WA (RCW) Chapter 38.52 Emergency Management (WA Military Department)
- RCW Section 76.04.185 Electric Utility Wildfire Mitigation Plan (WA Dept. of Commerce)
- Clean Energy Transformation Act, SB 5116, 2019 (WA Dept. of Commerce)
- Climate Commitment Act, SB 5126, 2021 (WA Dept. of Ecology)
- State Water Quality Standards (WA Dept. of Ecology)
- WA Department of Health, Office of Drinking Water Policies
- WA Department of Health, Wastewater Rules & Regulations
- WA Administrative Code (WAC) Chapter 296-45 Electric Power Generation, Transmission, and Distribution (WA Dept. of Labor & Industries)
- WAC Chapter 246-290 Group A Public Water Supplies (WA Dept. of Health)
- WAC Chapter 173-186 Oil Spill Contingency Plan – Railroad (WA Dept. of Ecology)
- WAC Chapters 51-56 Uniform Plumbing Code (WA Dept. of Enterprise Services)
- North American Electric Reliability Corporation (NERC) – Reliability Standards (Federal Energy Regulatory Commission (FERC))
- America's Water Infrastructure Act of 2018 (AWIA) Section 2013 (U.S. Environmental Protection Agency)
- Title 40 of the Code of Federal Regulations (CFR) – Protection of Environment (U.S. Environmental Protection Agency)
- Title 49 of the CFR – Transportation, Chapter II U.S. Federal Railroad Administration
- Endangered Species Act (U.S. Fish & Wildlife Services)

Administrative and Technical

Administrative and technical capabilities include TPU staff and their skills and tools, which can help carry out mitigation measures.

TPU Administrative Capabilities

- Public Utility Board
- Chief Emergency Manager, Assistant Emergency Managers (TPU administration)
- Department Emergency Managers, Assistant Emergency Managers (personnel in each Utility)
- Civil, Electrical, and Structural Engineers (personnel in each Utility)
- Planners with understanding of natural hazards (personnel in each Utility, TPU administration)
- Benefit/cost analysis (personnel in each Utility, TPU administration)

- GIS applications (personnel in each Utility)
- Grant writers (personnel in each Utility)

TPU Technical Capabilities

- Communications Systems – land mobile, VHF radio, satellite phones
- Infrastructure systems' alerting sensors and monitoring equipment
- Emergency sirens at hydro projects, hatcheries, and parks
- Emergency response training and exercises
- Emergency alerts and notifications (various City, County, State)
- American Public Power Association (APPA)
- American Water Works Association (AWWA)
- American Short Line & Regional Railroad Association (ASLRRA)
- Water Supply Forum (Serving Snohomish, King & Pierce Counties)
- Washington Water/Wastewater Agency Response Network (WAWARN)

Financial

The list below outlines financial[6] capabilities available to the Utility, which may be used to support mitigation activities.

Tacoma Power

- Contribution in aid of construction
- Sales of bulk and retail electric energy, transmission transport/wheeling fees
- Service connection fees and late payment fees
- Income from campgrounds
- Interdepartmental space rental
- Loan interest from Customer Energy Solutions programs

Tacoma Rail

- Switching revenue
- Locomotive servicing

Tacoma Water

- Contribution in aid of construction
- System development charges
- Water sales, wholesale and other

Education and Outreach

The list below outlines education and outreach programs and methods used to carry out mitigation activities and communicate information about hazards.

- Public Information Officer(s) – Customer Experience & External Affairs
- TPU website (mytpu.org) and social media accounts – Customer Experience & External Affairs
- Public education and outreach activities – Emergency Management and Dam Safety
- Employee Emergency Preparedness information (intranet) – TPU Emergency Management
- Pierce County Community Wildfire Protection Plan – Pierce County Department of Emergency Management

Hazard Identification & Risk Assessment

Regional Assessments

The hazard identification and risk assessments in the *2025-2030 Pierce County Regional Hazard Mitigation Plan*, apply to most of the operational and service areas of TPU (see Map 1. TPU Combined Service Area Map). This includes identification and descriptions of hazards in Pierce County, location and extent of risk, vulnerability and impacts to the community, history of previous hazards events, and probability of future events. *[Elements B1-a., B1-c., B1-d., B1-e., B2-a., B2-b.]*

For this Addendum, TPU includes additional information specific to its utilities and/or critical infrastructure that may impact operations and the ability to provide essential services in Pierce County.

Omissions

The following hazards and risks have been omitted from TPU's Addendum: *[Element B1-a. "omitting"]*

- **Civil Unrest, Cyber Incidents, Terrorism and Extremism** – Documents pertaining to utility infrastructure risks, mitigation measures, and response to these incidents protected by RCW 42.56.420 – Security.[7] These incidents may cause impacts to TPU by limiting or preventing access to facilities or equipment.
- **Epidemic and Pandemic** – This information is covered under TPU's Continuity of Operations Plan, Communicable Disease Annex. The Annex includes lesson learned from TPU's response to and recovery from COVID-19 (EM-3427-WA[8]) during March 2020 through September 2022.
- **Hazardous Materials and Transportation Accidents** –TPU mitigates and responds to these incidents on its own property per State and local environmental compliance. Tacoma Rail maintains and exercises their Oil Spill Contingency Plan in accordance with Chapter 173-186 WAC, Oil Spill Contingency Plan – Railroad and a Comprehensive Oil Spill Response Plan in accordance with 49 CFR Part 130 (combined into the same plan).[9] Transportation accidents may cause impacts to TPU by limiting or preventing access to facilities or equipment; or lend to supply chain interruptions.
- **National Flood Insurance Program (NFIP)** – TPU does not participate in the NFIP in Pierce County. *[Elements B2-c., C2-a]*

Dam Failure

See the *County Regional Plan* for dam failure definition and descriptions, dam locations, probability of occurrence, previous incidents, and impacts to communities.

Note: Risk assessments for Tacoma Power's hydroelectric projects in Grays Harbor, Lewis, and Mason counties are described in the county hazard mitigation plans

Lake Tapps – TPU's service area falls within the inundation from a failure at one or more dikes at Lake Tapps Reservoir.

Alder and LaGrande Dams – TPU owns and operates both dams as part of the Nisqually River Project; therefore, Tacoma Power has the responsibility of mitigating dam failure at the Project. See section "TPU's Hydroelectric Projects" for information on licensing, compliance, and safety at all TPU hydroelectric projects.

Howard A. Hanson Dam – Located in King County and operated by the U.S. Army Corps of Engineers was built primarily for flood control and regulating water flow during dry periods. If the dam was to fail Tacoma Water's Green River Filtration Facility, located just three miles downstream, would likely be inundated and severely damaged by flooding. This would shut down Tacoma Water's primary treatment plant—Green River Filtration Facility—disrupting drinking water service for Tacoma and surrounding communities. The flood would also introduce heavy sediment and debris into the river, making treatment more difficult even if the facility remained intact, and could lead to long-term water supply interruptions until repairs or alternative sources were secured.

Drought

See the *County Regional Plan* for drought definitions and descriptions, hazard locations, probability of occurrence or reoccurrence, previous incidents, and impacts to communities.

Impacts to Power Operations and Services

Drought conditions can significantly reduce the efficiency and output of hydroelectric power systems. In reservoir-based systems, declining water levels limit the amount of water available for generation and degrade the water-to-energy conversion efficiency. Drought may impact the ability to maintain minimum river flows or maintain fish hatchery operations per FERC license agreements.

Impacts to Water Operations and Services

A water shortage in Tacoma Water's system is a temporary lack of sufficient flow in the Green River and/or groundwater that cannot be offset by other sources in Tacoma's wells, reservoirs, or distribution system. While shortages can occur anytime, they are often categorized by season. Spring droughts develop due to low snowpack and reduced spring rain, limiting summer streamflow. Fall droughts, which are more common and harder to predict, result from delayed autumn rains following a dry summer—posing particular risk during salmon spawning season.

Tacoma Water's *2018 Water Shortage Response Plan (WSRP) [Element A4-a]* provides a framework for managing water supply and demand during shortages. It addresses both gradual events, like droughts, and sudden system failures. The plan prioritizes public health and safety while minimizing impacts on the environment, economy, and community water use.[10]

TPU Risk: *Pierce, King, Lewis, and Thurston counties, along with eight additional counties, are currently in a drought emergency declaration[11] expanded on April 8, 2025[12], and in effect through April 7, 2026, unless terminated prior to that date. Based on current water supply conditions, Tacoma Water's service area is excluded from the emergency declaration but is under a drought advisory.*

Earthquake

See the *County Regional Plan* for earthquake (seismic) hazard descriptions, hazard locations, probability of occurrence or reoccurrence, previous incidents, and impacts to communities.

Impacts to Power Operations and Service

Earthquakes can severely damage power generation, transmission, and distribution infrastructure. Ground shaking may cause the collapse of power plants or substations, damage to transformers, and failure of overhead transmission lines. Liquefaction can undermine the foundations of critical electrical components, while slope failures may bring down towers or poles. Fires caused by damaged or shorted

electrical systems can further disrupt service. Widespread outages can result, potentially lasting days to weeks depending on the extent of the damage.[13]

Impacts to Water Operations and Service

Water infrastructure is vulnerable to a range of earthquake-induced hazards. Ground movement and liquefaction can rupture underground water and sewer pipes, leading to service interruptions and contamination risks. Water treatment plants and pumping stations may be damaged or lose power, reducing water availability and quality. Landslides can block or damage intake structures, while fires following earthquakes may be harder to contain due to broken water mains or reduced water pressure.[13]

Impacts to Rail Operations and Service

Earthquakes can significantly impact rail systems by deforming tracks, shifting ballast, or triggering slope failures that block or destroy sections of rail lines. Liquefaction may cause track settlement or misalignment, making rail transport unsafe or inoperable. Bridges used in rail infrastructure are especially at risk during strong ground shaking. Additionally, rail services may be halted due to damaged signaling systems or cellular network outages, disrupting freight operations.[13]

Secondary Impacts

Along with ground motion impacts, earthquakes can trigger catastrophic secondary impacts such as **landslides** and **tsunami**. Impacts from these hazards are described in this section, separately.

TPU Hazard Locations: see *Map 3. Earthquake Hazards - Liquefaction Susceptibility* on page 27

TPU Risk: *Most TPU infrastructure is vulnerable to earthquakes; and infrastructure in the Tacoma Tideflats[14] is particularly susceptible to liquefaction and tsunami.*

Flood

See the *County Regional Plan* for flood definitions and descriptions, hazard locations, probability of occurrence or reoccurrence, previous incidents, and impacts to communities.

Impacts to Power Operations and Service

Floods pose a significant risk to components of electric power generation, transmission, and distribution systems, potentially resulting in large-scale service failures lasting days to weeks and affecting thousands of people.

Substations, which are vital to the power system, are especially at-risk during floods. Water can damage important parts like transformers and circuit breakers, sometimes even causing fires. Some equipment is protected inside control buildings, but many parts are out in the open and more easily damaged.

Power lines, which carry electricity to homes and businesses, are usually above ground on poles or towers, though some are buried underground. Floods can damage overhead lines by knocking down trees or debris, and erosion can harm underground cables.

Flood-related infrastructure damage can cause widespread, prolonged outages and hinder restoration efforts. Floodwaters can impede utility crew access, and damage to substations may disrupt communication with control centers, complicating repairs and coordination.[15]

Impacts to Water Operations and Service

When water enters the watershed too quickly for the land to absorb, flooding can occur. Flooded rivers, lakes, and streams often become cloudy with silt and debris, increasing turbidity. High turbidity can overwhelm water treatment plants, forcing systems to rely on emergency storage or alternate sources.

Flooding can block or damage water intake systems, disrupt treatment processes, and make it hard to reach facilities. Tanks, pipes, and equipment can be damaged by pressure, erosion, or falling trees. Wells can flood, letting in contaminants, and extra nutrients and pollutants can affect both the water supply and what's released after treatment.

A significant loss of pressure can allow floodwaters into the distribution system, often leading to boil water advisories. Flooding may also cause restricted access to facilities or laboratories due to debris, damaged roadways, and sinkholes. Loss of power and communication lines can further disrupt pump operation, water quality monitoring, and service continuity.[16]

Impacts to Rail Operations and Service

Rail operations are at risk due to the flooding of trackside equipment, wind damage, debris strikes, and debris blocking the track. Electric signaling systems are especially vulnerable to power outages. Railway damage may include track damage, halted rail service, and damaged or destroyed equipment.

Water can weaken or erode the soil under railroad tracks, causing the tracks to bend or shift when trains pass over. If the soil becomes too wet and muddy, it can wash away the ballast that support the tracks. Some soils also expand when wet and shrink when dry, which can lead to track misalignment.

Flooding at the Port of Tacoma can lead to port closures and delays, affecting shipping and logistics. It can also obstruct access roads and rail lines needed for cargo movement (intermodal rail).[17]

TPU Hazard Locations: see *Map 4. Flood Hazard Areas* on page 28

TPU Risk: *Normal, reoccurring flooding has minor impact to the majority of TPU infrastructure.*

Landslide

See the *County Regional Plan* for landslide descriptions, hazard locations, probability of occurrence or reoccurrence, previous incidents, and impacts to communities.

Impacts to Power Operations and Service

Landslides can significantly impact power systems by damaging infrastructure such as power lines, poles, and towers. When slopes fail, they can topple or bury electrical equipment, resulting in power outages that range from local disruptions to widespread service failures. The instability of terrain during and after a landslide also makes it hazardous and time-consuming for crews to access and repair damaged components, potentially extending restoration times. In some cases, landslides can damage power substations or underground cables, compounding the impact.[18]

Impacts to Water Operations and Service

Landslides can severely impact drinking water systems by rupturing or misaligning water mains, damaging reservoirs or treatment infrastructure, and blocking or contaminating water sources. Ground movement can break underground pipes, leading to loss of water service, leaks, or flooding. In areas

where landslides dam rivers or streams, temporary lakes may form and later fail, causing downstream flooding that further damages water infrastructure and increases turbidity and contamination risks.[18]

TPU Hazard Locations: see *Map 5. Landslide - Deep-Seated Slide Susceptibility* on page 29, and *Map 6. Landslide - Shallow Slide Susceptibility* on page 30

TPU Risk: *Most of TPU's service areas in Pierce County are moderately susceptible to shallow landslides. However, Tacoma Water infrastructure located in the Prairie Ridge area and Tacoma Power's LaGrande dam and facilities are both within a deep-seated slide hazard area.*

Severe Weather

See the *County Regional Plan* for severe weather descriptions, probability of occurrence, previous incidents, and impacts to communities.

Impacts to Power Operations and Service

Windstorms are a leading cause of power outages across the Puget Sound area, especially during fall and winter months. Dense urban forests and tall, shallow-rooted trees often fall onto power lines during wind events. In hilly or forested areas, these impacts are amplified by saturated soils and steep slopes, which make trees more prone to uprooting.

Snow and ice events can significantly disrupt electrical infrastructure, especially in areas with tree-lined corridors and above-ground transmission and distribution systems. Accumulated snow and ice weigh down branches and trees, causing them to fall onto power lines and damage poles or transformers. Ice accretion[19] on conductors increases mechanical stress, potentially leading to line sag, galloping[20], or snapping. Restoring power can lead to the "cold load pickup" phenomenon, where the system becomes overloaded as multiple in-building systems attempt to recover simultaneously. Cold temperatures drive up heating demand, stressing generation and grid management, particularly during prolonged cold spells.

Severe heat can cause a surge in electricity demand – air conditioning and cooling loads increase sharply during heatwaves. Pad-mounted and pole-mounted transformers can overheat in sustained high temperatures, leading to localized outages. High ambient temperatures lower the current-carrying capacity of overhead transmission lines by reducing convective cooling, increasing resistance, and causing line sag.[21]

Although less frequent, electrical infrastructure could be impacted by Geomagnetic Disturbances. Geomagnetic Disturbances (GMDs) are caused by solar coronal mass ejections that disrupt Earth's magnetic field, inducing direct currents into the ground and ultimately into power systems. GMD effects range from minor power fluctuations to extreme grid disruptions. Moderate storms can trigger voltage alarms and damage transformers. Severe disturbances can lead to widespread voltage control issues, while extreme events risk blackouts and transformer damage.[22]

Impacts to Water Operations and Service

High winds often cause widespread power outages that directly impact water system operations. Water treatment plants, and pump stations. Elevated water tanks may experience structural stress or damage from wind gusts. Uprooted trees or falling debris can damage buried pipelines, valves, or exposed fittings. High winds can cause surface water contamination through wind-driven debris or runoff (especially if heavy rain accompanies the storm).

Ice formation on above-ground components such as pump stations, pressure valves, or intake structures may cause mechanical failures or impede operations. Prolonged freezing temperatures can lead to frozen service lines or water mains, especially in communities with shallow buried infrastructure. During winter storms, customer demand for bottled or emergency water can rise sharply, particularly if breaks or boil-water advisories are issued.

During extreme heat, residential and commercial water use spikes, potentially stressing supply systems. Prolonged heat accelerates snowpack melt and evaporation, reducing summer water availability and inflows to surface reservoirs. This affects both municipal supply and hydroelectric production. Warmer water temperatures in storage and distribution systems can lead to microbial growth and reduced chlorine residuals, requiring closer monitoring and faster treatment responses.[21]

Impacts to Rail Operations and Service

High winds can blow down trees, power poles, and large debris onto tracks causing delays or derailment risks. Power outages may disrupt electrically powered signaling systems and crossing gates.

Ice can freeze track switches and short signal circuits, causing significant delays or service suspensions. Snow drifts, ice buildup, or fallen trees can block tracks.

Extreme heat can cause steel rail to expand and deform, especially in older tracks or those not properly stress relieved. Heat can cause overheating or malfunction of signal equipment, switches, and communication systems, especially where cooling or shading is limited.[21]

TPU Risk: *TPU's operations and services are impacted by severe weather (of some type) almost annually. Most outages last a few days, some several days; however, utility divisions have robust response capabilities to keep outages to a minimum.*

Tsunami/Seiche

See the *County Regional Plan* for tsunami and seiche descriptions, hazard locations, probability of occurrence or reoccurrence, previous incidents, and impacts to communities.

Impacts to TPU Operations and Services

Each of the three utility divisions (Tacoma Power, Tacoma Water, and Tacoma Rail) have infrastructure within the Tacoma Tideflats. While Puget Sound is more protected than the open Pacific coast, it is still vulnerable—especially from local sources, such as underwater landslides or earthquakes caused by the Seattle or Tacoma Fault, or the Cascadia Subduction Zone.

Water could surge inland within minutes, especially in low-lying waterfront areas like the Tacoma Tideflats. Modeling from the Washington Geological Survey shows that tsunami waves in some Puget Sound inlets could exceed 20 feet in height.

Impacts could include above ground infrastructure (power, water, and rail) being flooded or washed away; the Port of Tacoma suffering major damage and forcing port closure; and loss of roads, bridges, and rail in the area.[23]

TPU Hazard Locations: see *Map 7. Tsunami Hazard Areas* on page 31

TPU Risk: *Power, Water, and Rail infrastructure within the Puyallup River valley are susceptible to tsunami. Reservoirs at hydroelectric projects may be susceptible to tsunami (Hood Canal) or seiche depending on the location of a localized earthquake.*

Volcano (Lahar & Tephra/Ashfall)

See the *County Regional Plan* for volcanic hazard descriptions, hazard, probability of occurrence or reoccurrence, previous incidents, and impacts to communities.

Lahar Impacts to TPU Operations and Services

A lahar from Mount Rainier traveling down the **Puyallup River Valley** into the Tacoma Tideflats would deliver a fast-moving surge of mud, debris, and boulders that could bury or destroy power lines and poles, while substations in low-lying areas would be inundated, causing catastrophic equipment failure, and requiring full reconstruction.

Tacoma Rail infrastructure including buildings, yards, tracks, and bridges would be buried under deep sediment or washed out, with signaling systems and switches rendered inoperable, halting regional freight movement for months.

Tacoma Water infrastructure would also be heavily affected. Municipal wells near within flood prone areas could be clogged or contaminated by sediment, rendering them unusable, while pipelines suspended beneath bridges could rupture if those bridges fail or are scoured by the lahar, cutting off water service and potentially causing additional flooding.

A lahar from Mount Rainier traveling down the **Nisqually River** would severely disrupt power infrastructure by inundating and burying facilities, knocking down towers and poles, eroding foundations, and severing transmission lines. Substations and hydroelectric facilities along the river, such as those near Alder and LaGrande, could be flooded or clogged with mud and debris, leading to equipment failure and long-term outages. Heavy sediment and debris flows would damage or isolate access roads, slowing repairs. Even after the initial event, shifting river channels and ongoing sediment deposition could pose persistent risks to rebuilt infrastructure.

Tephra/Ashfall Impacts to Power Operations and Service

Tephra and/or ash, suspended in intake water can accelerate wear on hydroelectric turbines depending on factors such as the volume of ash deposited in the catchment, reservoir size, ash settling rate, and its abrasiveness. Volcanic ash can be a serious problem for electrical systems, as it can cause power outages by creating electrical discharges—called flashovers—across insulators on power lines and equipment. This happens when the ash becomes wet from things like dew, fog, or light rain, making it conductive and allowing electricity to jump across the insulator surfaces.[24]

Tephra/Ashfall Impacts to Water Operations and Service

Volcanic ashfall can sharply increase water demand, especially during cleanup. This surge can strain distribution systems, even if supply is sufficient, due to pressure drops in certain areas. Elevated demand may last for weeks or months.

Large treatment systems can struggle when volcanic ash increases turbidity in surface water sources like rivers and lakes. Although ash usually causes only minor changes in water chemistry—such as slight pH drops or more dissolved metals—high turbidity[25] can overload filters, reduce treatment efficiency, and wear down pumps, seals, and impellers. Clogging may even cause motor failure. In many cases, power outages from ash pose a greater threat to operations than the ash itself. [24]

Tephra/Ashfall Impacts to Rail Operations and Service

Volcanic ash can cause serious disruptions to rail systems, particularly affecting diesel-electric locomotives and track infrastructure. When ash enters locomotive air intake systems, it can quickly clog filters, reducing engine performance or causing complete failure. The fine, abrasive particles in ash also accelerate wear on internal engine components. In addition, ash that infiltrates electrical systems—especially when mixed with moisture—can short out circuits and damage control systems. Cooling systems are also at risk, as radiators can become blocked by ash, leading to overheating.

Track infrastructure is similarly vulnerable. Ash can accumulate on rails, switches, and crossings, disrupting signal systems and causing switches to malfunction. Visibility of signal lights may also be impaired when ash coats lenses. When wet, ash becomes slippery and paste-like, reducing train traction and increasing braking distances, which can create hazardous operating conditions.[24]

TPU Hazard Locations: see *Map 8. Volcanic Hazard Areas* on page 32

TPU Risk: *Power, Water, and Rail infrastructure within the Puyallup River valley are susceptible to lahar. Ashfall can seriously reduce visibility, make roads and railroad tracks slippery, and cause respiratory issues for outside workers. Dependent on the wind direction, ashfall may impact TPU service areas.*

Wildfire

See the *County Regional Plan* for wildfire definitions and descriptions, hazard locations, probability of occurrence or reoccurrence, previous incidents, and impacts to communities.

Impacts to TPU Operations and Service

Utility infrastructure within wildfire hazard areas is vulnerable to direct fire damage. If wildfires are nearby, debris and smoke particles can impact infrastructure and equipment (as described in the volcanic hazards). Wildfire smoke, whether from near or distant fires, can impair visibility while outdoors and driving, and cause mild to serious respiratory illness.

Impacts to Power Operations and Service

Approximately 25% of Tacoma Power's service area is within the Wildland Urban Interface (WUI)[26]; with the majority being in LaGrande, Lakewood, and Loveland Districts. Power's generation facilities and transmission lines in other counties are susceptible to wildfires due to their geography and locations.

Tacoma Power's *2024 Wildfire Mitigation Plan*[27] *[Element A4-a]* outlines the Power's wildfire risk and drivers associated with operation and maintenance; roles and responsibilities, including coordination with other utilities, Tribal partners, and local emergency management agencies; wildfire prevention strategies; and the right to initiate a Public Safety Power Shutoff.

Tacoma Power also participates in planning meetings for the *Pierce County Community Wildfire Protection Plan (CWPP)* and Washington State Department of Commerce, Energy Resilience Wildfire Mitigation Workgroup.

Impacts to Water Operations and Service

A small portion of Tacoma Water service area (around Prairie Ridge and east slopes of South Hill) is susceptible to wildfire. The area of most concern for wildfire is the Green River Watershed and the water filtration facility.

A wildfire that burns several thousand acres can impact water quality by increasing turbidity and introducing nutrients, metals, and other chemicals into the water. These pollutants can enter reservoirs like the Green River Watershed both as airborne particles and through runoff from burned hillsides.[28]

In addition to the direct impacts of wildfire, firefighting efforts can also affect the water supply. While Washington state law limits the manufacture, sale, and use of firefighting foams containing Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS), these foams may still be deployed in certain emergency situations, potentially contaminating water sources. The water supply could also be affected if water from the Green River Watershed is drawn for wildfire suppression efforts.

Tacoma Water has a pump/fire trailer for use at the Green River Filtration Facility. During maintenance activities, such as mowing or roadside brushing, workers have the fire trailer strategically positioned nearby for a quick response in case a wildfire breaks out. RCW 76.04[29] outlines forest protection which applies to the Green River Watershed.

Impacts to Rail Operations and Service

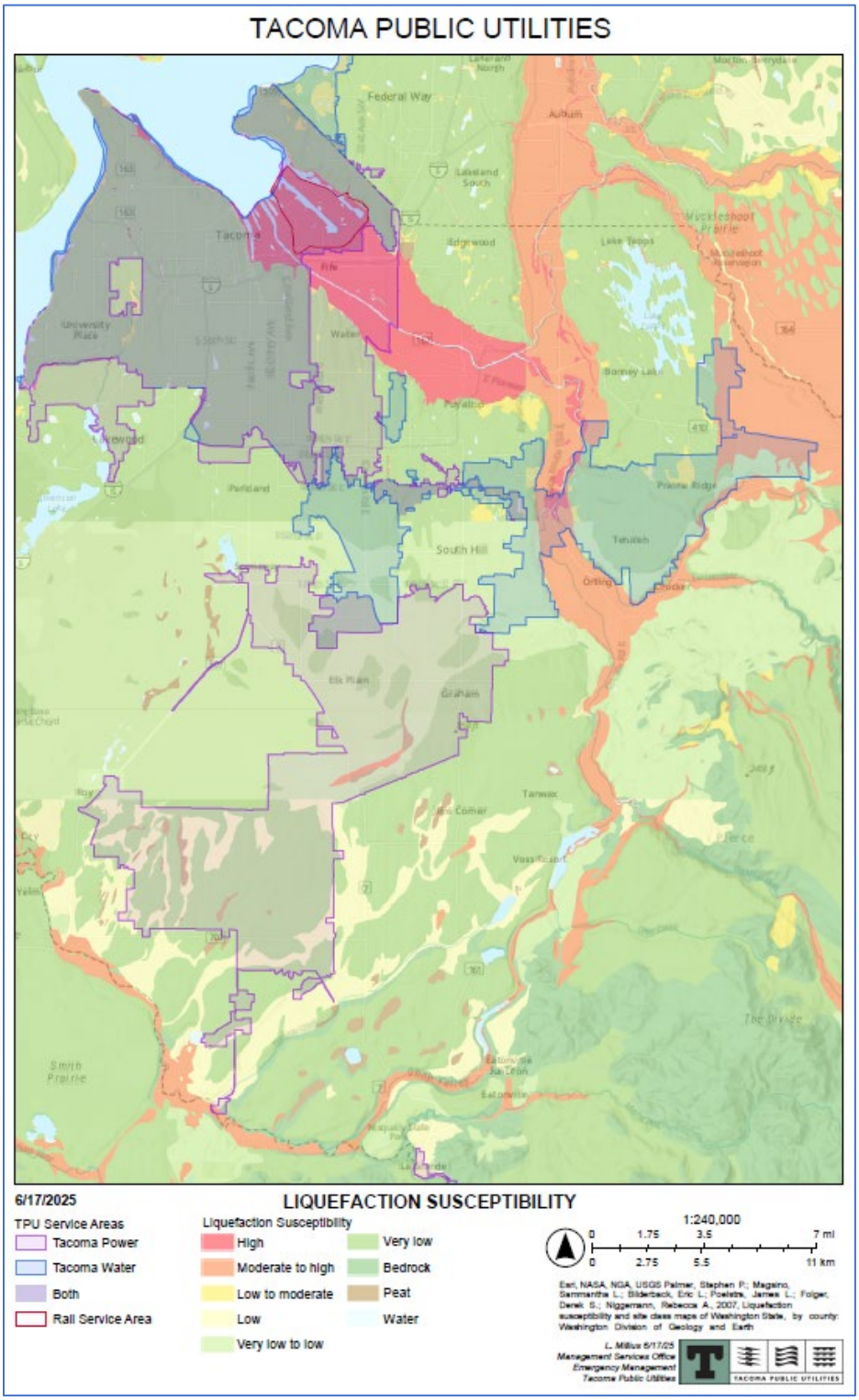
Tacoma Rail's infrastructure is not at risk for wildfires; however, personnel and equipment may be impacted by fire smoke.

TPU Hazard Locations: see *Map 9. Wildfire Hazard Areas* on page 33

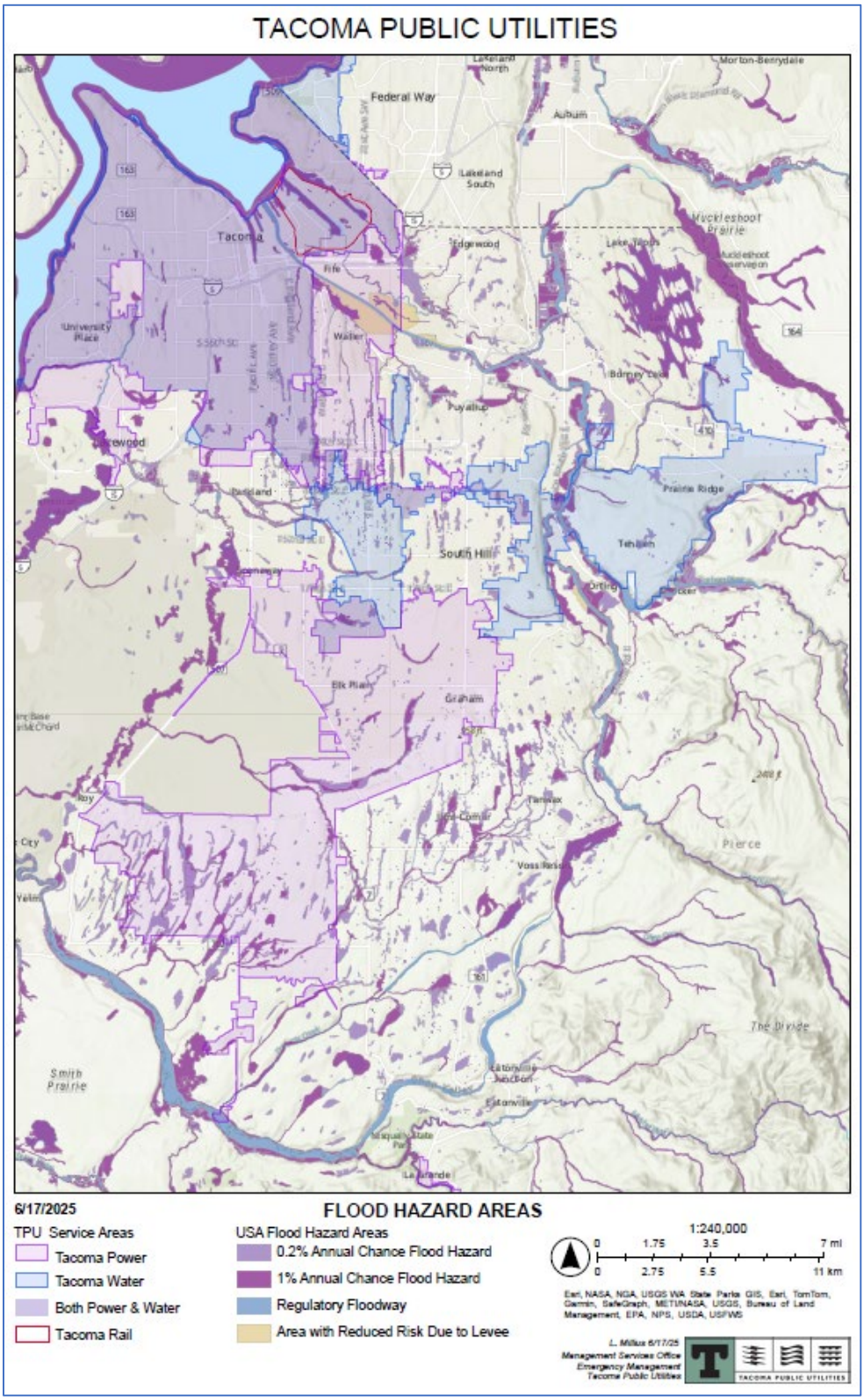
TPU Risk: *Some areas of Power and Water service fall within wildfire hazard zones. Operational facilities outside of Pierce County are vulnerable to wildfire due to their rural, forested locations.*

Hazard Maps – TPU Service Areas

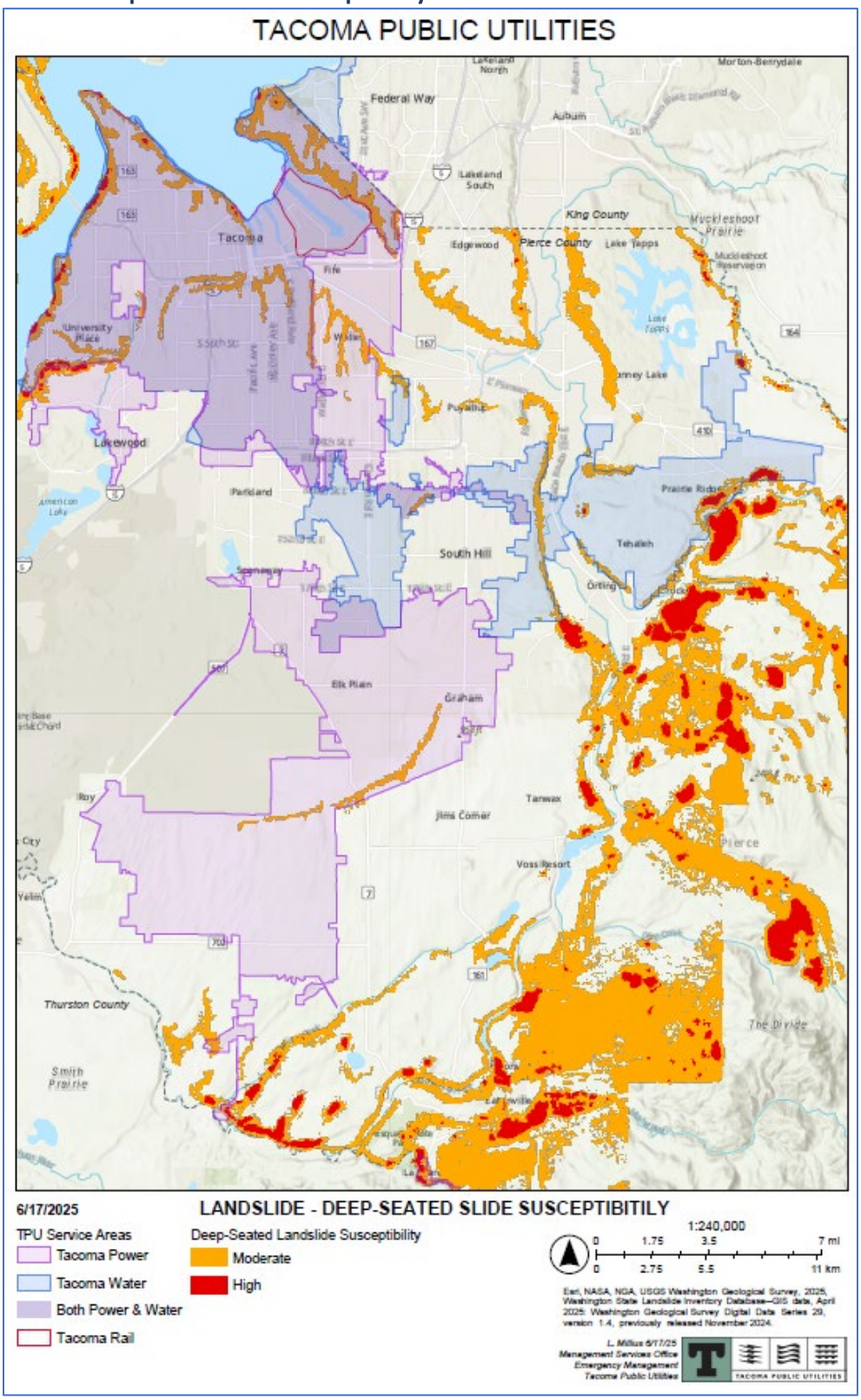
Map 3. Earthquake Hazards - Liquefaction Susceptibility



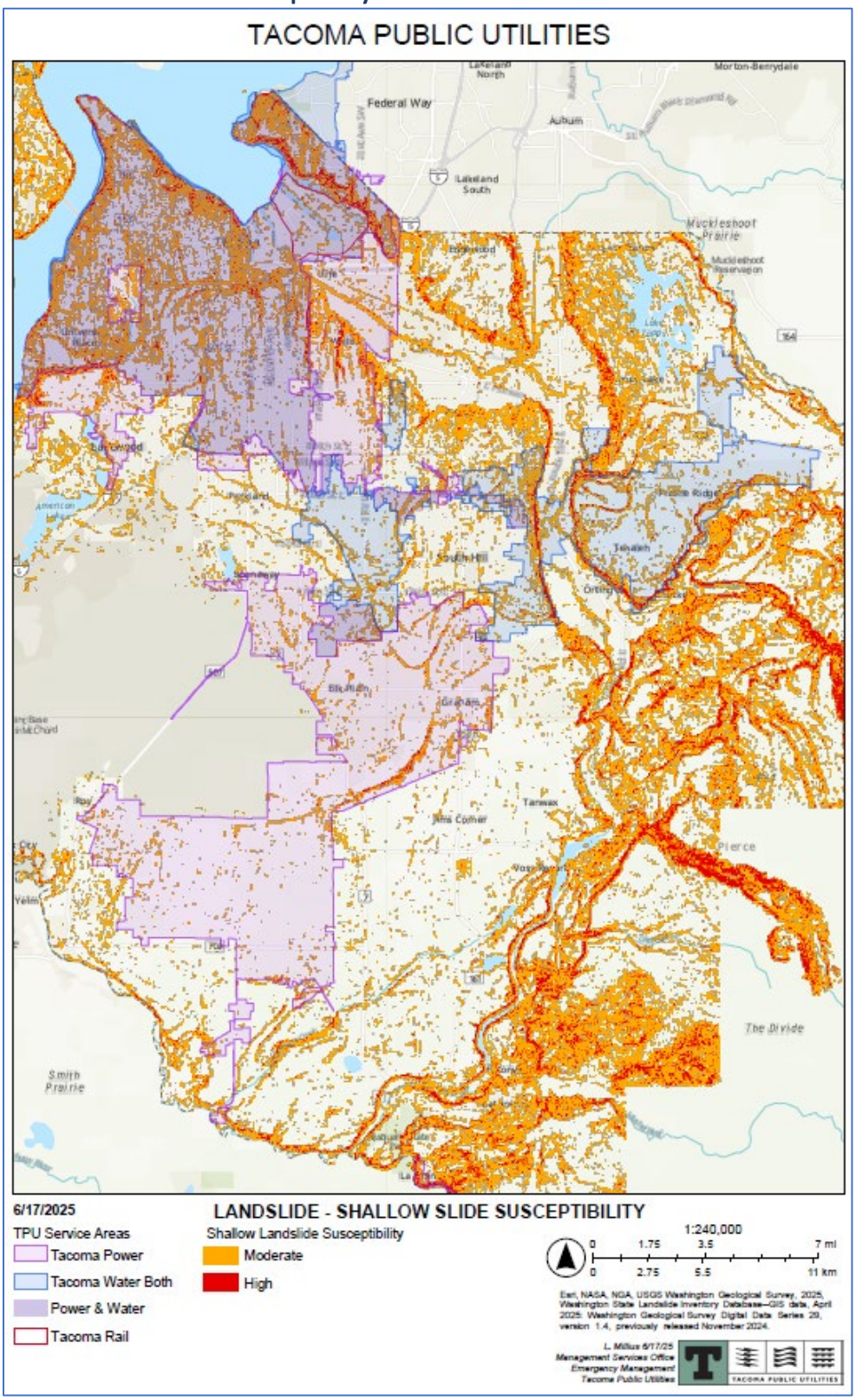
Map 4. Flood Hazard Areas



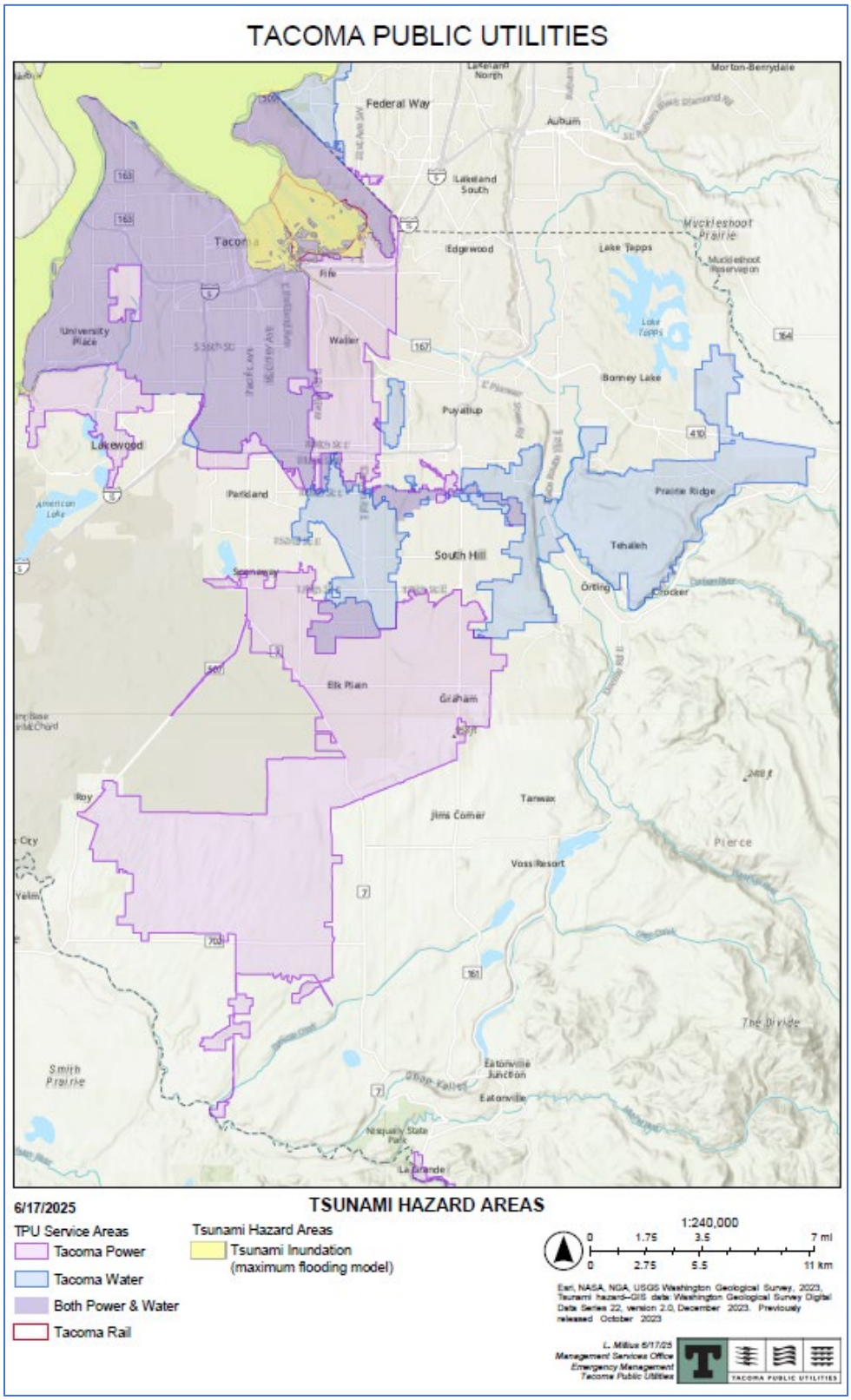
Map 5. Landslide - Deep-Seated Slide Susceptibility



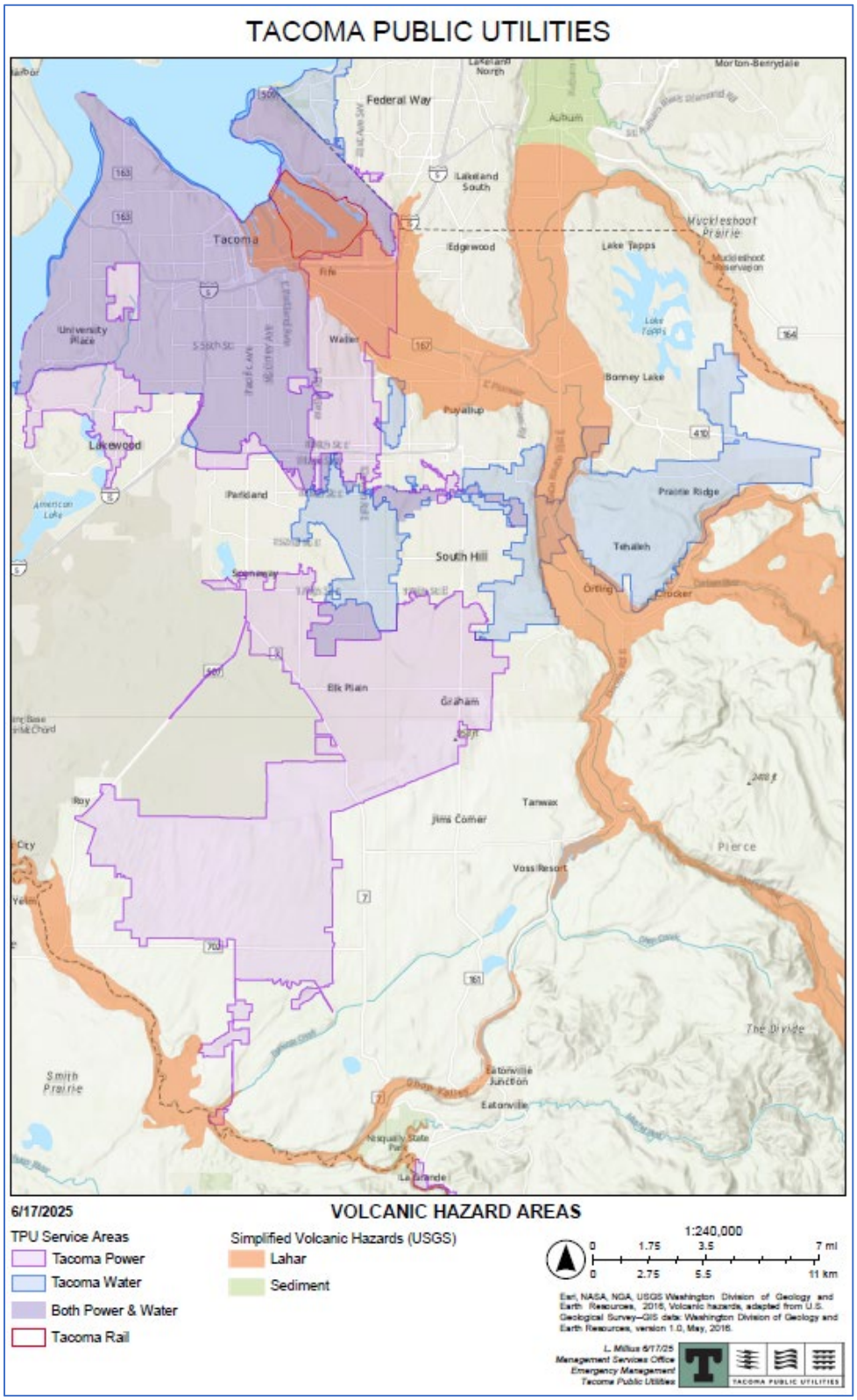
Map 6. Landslide - Shallow Slide Susceptibility



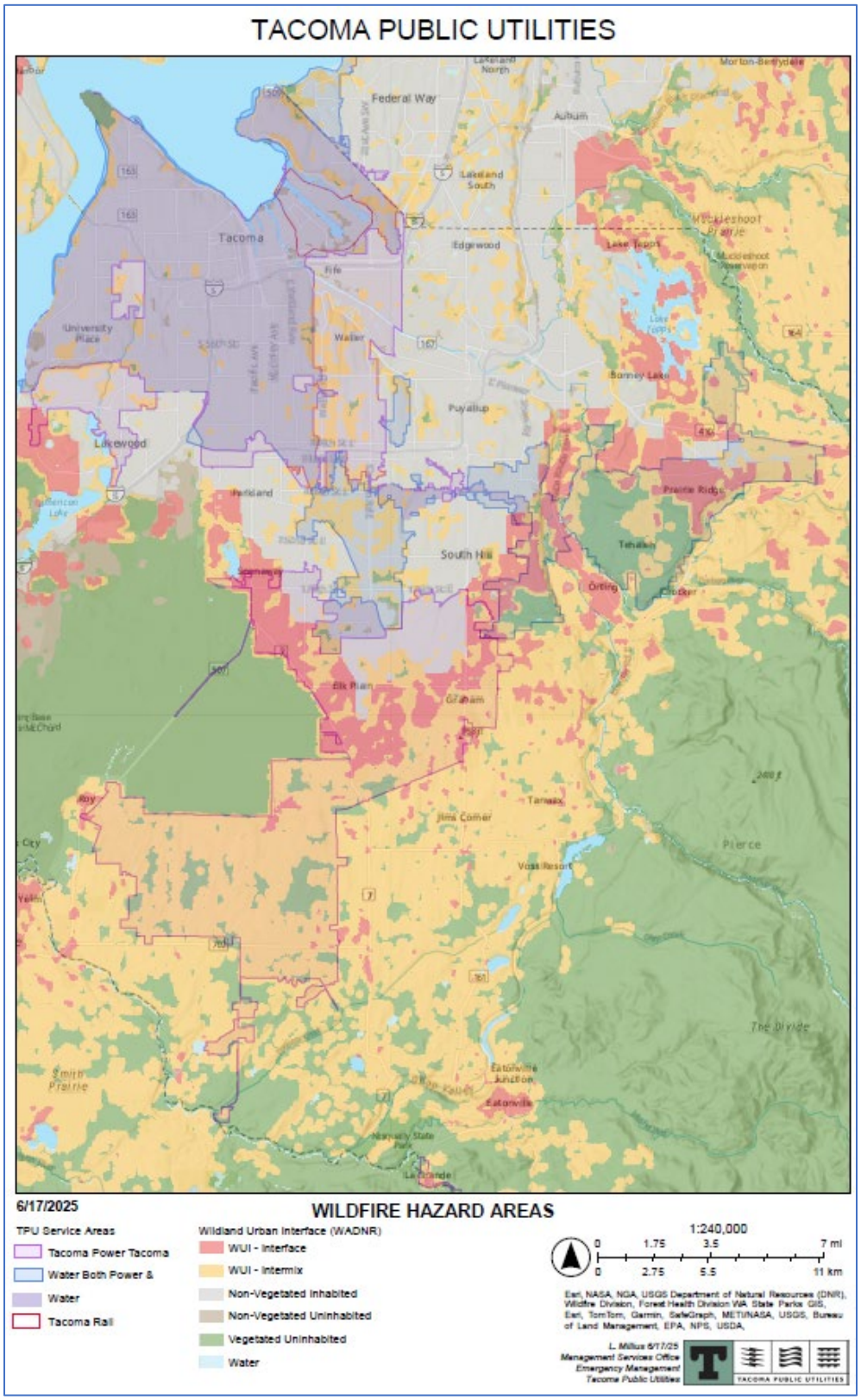
Map 7. Tsunami Hazard Areas



Map 8. Volcanic Hazard Areas



Map 9. Wildfire Hazard Areas



TPU's Hydroelectric Projects

Note: This section was included in lieu of the optional High Hazard Potential Dams section – TPU planners were not provided any guidance from the county, state, or FEMA – this information is included to support county emergency management agencies where the hydro projects are located.

Licensing and Oversight

Tacoma Power's four hydroelectric projects – **Cowlitz River Project in Lewis County, Cushman River Project in Mason County, Nisqually River Project in Pierce County, and Wynoochee River Project in Grays Harbor County** – are licensed separately by the Federal Energy Regulatory Commission (FERC) to ensure safe and efficient operation of power plants across the U.S. FERC's Hydropower Program includes Division of Hydropower Licensing, Division of Hydropower Administration and Compliance to ensure compliance of rules and regulations, and Division of Dam Safety and Inspections which develops and implements programs, and standards for dam safety, public safety, and hydropower security at and around jurisdictional projects[30]. Hydro projects are inspected every 5 years by independent consulting engineers approved by FERC – inspections include seismic evaluations.

Owner's Dam Safety Program (ODSP)

Tacoma Power's Owner's Dam Safety Program (ODSP) is a documented plan to ensure the safety of its dams and related structures. Its main goal is to protect downstream communities and reservoir users from hazardous events and ensure compliance with Federal Energy Regulatory Commission (FERC) requirements. Reviewed annually, the ODSP defines Tacoma Power's policies, structure, and technical resources needed to maintain safe, reliable hydroelectric facilities.[31] Tacoma Power's Dam Safety Program is responsible for the following plans.

Emergency Action Plans

Under FERC licensing, each hydroelectric project must file an Emergency Action Plan (EAP) *[Element A4-a]*. EAPs are designed to provide early warning to governing agencies of upstream and downstream inhabitants, property owners, operators of water-related facilities, recreational users, and other persons in the vicinity of the project who might be affected by a project emergency such as impending or actual sudden release of water at the project caused by natural disaster, accident, or failure of project works. Each year, TPU is required to submit an EAP Status Report to FERC[32].

Public Safety Plans

Public Safety Plans (PSPs) *[Element A4-a]* outline Tacoma Power's commitment to safety at its hydroelectric projects and associated recreational areas. Guided by federal regulations and FERC recommendations, the plans require the use of warning signs, lights, barriers, and other safety features[33] to protect the public on project lands and waters. Tacoma Power evaluates both designated recreation sites and other accessible areas to identify where safety measures are needed, giving special attention to structures critical to operations that may pose hazards. All safety devices are regularly inspected, maintained, and updated, with new measures installed as needed to ensure ongoing protection of public health and safety. The PSPs also promote public awareness and education to help reduce risk around hydro facilities.

Mitigation Strategy

Mitigation Goals

Mitigation measure ("project") development began with a review of the categories of goals, as outlined by FEMA, reflected in the Regional Hazard Mitigation Plan, and supporting TPU's Mission and Vision. TPU's mitigation measures should meet one or more of the following goals for incorporation into the Addendum: *[Element C3-a.]*

- **Protect Life and Property** – Measure reduces or eliminates long-term risk to people, property, infrastructure, and environment from the impacts of hazards.
- **Ensure Continuity of Operations** – Measure ensures the continuation of performing essential functions and delivering critical services during and after an emergency or disaster.
- **Promote Preparedness** – Measure raises awareness about potential hazards, how to address them, and steps individuals can take to improve personal emergency preparedness.
- **Promote a Sustainable Economy** – Measure assists businesses and the local economy to withstand and recover quickly from disruptions or disaster.
- **Preserve or Restore Natural Resources** – Measure incorporates nature-based solutions into strategies to leverage the protective and restorative capabilities of ecosystems.
- **Enhance Regional Capabilities** – Measure entails collaboration with city, county, state, Tribal, and federal organizations and agencies to leverage resources and expertise.

Prioritization of Measures

Department Emergency Managers were given the opportunity to provide measures (projects) for each utility via a form (see *Attachment 2. TPU Mitigation Measure Form*).

This form has two purposes: first, ensured that all measures met FEMA requirements and contained the same criteria parameters, and second for prioritizing and rating measures. **Table 3. TPU Mitigation Measures Table** describes the collective measures for TPU. *[Elements C4-a., C4-b., C5-b.]*

To determine implementation priorities for mitigation measures, TPU used a two-tiered evaluation process. **Tier 1–Priority** focused on three core criteria: Cost, Benefit, and Timeframe. Each proposed action was scored based on its financial impact, potential to reduce risk and protect critical assets, and the time required for implementation. This ensures that resources are directed toward high-impact, achievable projects. *[Element C5-a.]*

Tier 1–Priority was scored using the total points for Cost, Benefit, and Timeline as follows:

- Cost
  - Low – less than $100,000 = 3 points
  - Medium - $100,000 to $500,000 = 2 points
  - High – over $500,000 = 1 point
- Benefit
  - Immediate impact on the reduction of risk exposure to life and property = 3 points
  - Long-term impact on the reduction of risk exposure to life and property OR immediate reduction of risk exposure to property = 2 points
  - Long-term benefits of the measure are difficult to quantify in the short-term = 1 point

- Timeframe
  - Short – 1 to 2 years = 3 points
  - Ongoing – continuous = 2 points
  - Medium – 3 to 5 years = 2 points
  - Long – 5 or more years, or a phased project with extended timeframe = 1 point

Tier 2–Strategic Rating considered additional strategic factors such as alignment with TPU's mission and goals, relevance to identified hazards, environmental impact, and the potential to enhance continuity of essential services. Together, these tiers form a comprehensive prioritization approach that supports both immediate mitigation efforts and long-term resilience planning.

Tier 2–Strategic Rating was scored using the following point system:

- Hazards Addressed – 1 point per hazard, up to 9 total
- Goals Addressed – 1 point per goal, up to 6 total
- Rating Statements – 1-3 points each, up to 24 total

Measure Monitoring and Evaluation

Each measure will be monitored by the responsible Lead as identified in the Mitigation Measure Matrix beginning on the next page. Leads are expected to submit status reports each year to the Lead Planners. Status reports should include percentage of work completed, any obstacles, and changes to the scope of work, or reasons for cancelling or deferring measures. These reports will be reflected in the TPU Addendum of the next 5-year update to the Pierce County Regional Hazard Mitigation Plan.

Upon completion, measures will be evaluated to ensure goals, costs, and benefits met the mitigation expectation. Applicable plans should be updated with the incorporation measure completion or as an example. *[Elements D2-a., D2-b, D2-c, D3-c.]*

Mitigation Measures

Table 3. TPU Mitigation Measures Table

Measure		Impacted Hazard								
Item #	**Statement**	**Dam Failure**	**Drought**	**Earthquake**	**Flood**	**Landslide**	**Severe Weather**	**Tsunami/Seiche**	**Volcano/Lahar**	**Wildfire (WUI)**
#A-1 **Priority:** High **Rating:** 35 **Cost:** Low **Timeline:** Short	**TPU Hazard and Risk Analysis |** Conduct a comprehensive Hazard and Risk Analysis covering all TPU-owned and operated facilities and support improvements to emergency planning, response, and recovery, including updates to the Continuity of Operations Plan (COOP) and development of targeted resilience strategies. **Lead:** TPU Emergency Management **Partners:** TPU Subject Matter Experts, local jurisdictions, tribal, state, and federal partners	X	X	X	X	X	X	X	X	X
#P-1 **Priority:** Medium **Rating:** 30 **Cost:** High **Timeline:** Long	**Cowlitz River Project, Mossyrock Dam Spillway Flow Restriction – Removable Bulkhead* |** Identify necessary changes to the Mossyrock Spillway (upper dam) to effectively mitigate the consequences of spillway pier seismic failure modes. **Lead:** Power Generation, Dam Safety **Partners:** Power Generation, Engineering; Cowlitz Hydro-electric Project	X		X	X		X			
#P-2 **Priority:** Medium **Rating:** 28 **Cost:** High **Timeline:** Medium	**Cowlitz River Project, Mayfield Dam Remediation of Spillway Piers* |** Install anchorage (i.e., large tendon strand anchors) for the spillway piers, thrust blocks, and gravity sections of the Mayfield Dam (lower dam). **Lead:** Power Generation, Dam Safety **Partners:** Power Generation, Engineering; Cowlitz Hydro-electric Project	X		X	X		X	X		

*P-1 and P-2 are projects within Tacoma Power's larger Riffe Lake Restoration project. FERC-identified seismic safety concerns at Riffe Lake's spillway piers required lowering lake levels, which limited public access and reduced power generation capacity. Following extensive study, a series of projects will now move forward to meet FERC's safety requirements and allow the lake to be safely restored to its original level.[34]

Measure		Impacted Hazard								
Item #	Statement	Dam Failure	Drought	Earthquake	Flood	Landslide	Severe Weather	Tsunami/Seiche	Volcano/Lahar	Wildfire (WUI)
#P-3 **Priority:** High **Rating:** 27 **Cost:** Medium **Timeline:** Short	**Hydroelectric Project Spillway Warning Sirens |** Purchase and install spillway operation warning sirens at each Project. These sirens will notify communities downstream when a release of water is anticipated during operation of a spillway. **Lead:** Power Generation, Dam Safety **Partners:** Power Generation, Engineering; Hydro-electric Projects	X		X	X	X	X	X	X	X
#W-1 **Priority:** Low **Rating:** 25 **Cost:** High **Timeline:** Long	**Pipeline 1 Elevated Pipe & Water Crossing Seismic Resiliency** Pipeline 1 is a key transmission main with multiple river and stream crossings. Seismic failure of the bridges supporting the pipe could reduce water supply. Analyze seismic resiliency of existing crossings and elevated pipe, and upgrade as needed. **Lead:** Water Planning and Engineering Division; Assistant Division Manager **Partners:** Water Maintenance and Construction, Surface Water Treatment and Operations			X	X	X			X	
#W-2 **Priority:** Medium **Rating:** 23 **Cost:** Medium **Timeline:** Long	**Headworks Building Wildfire Resiliency |** The Green River Supply Headworks provides 95% of supply for Tacoma Water's supply. Headworks is susceptible to wildfire and there may be relatively greater chance of structure loss for older buildings. Analyze wildfire risk to existing buildings and, if necessary, implement physical improvements to increase resiliency. **Lead:** Water Planning and Engineering Division; Assistant Division Manager **Partners:** Water Maintenance and Construction, Surface Water Treatment and Operations									X
#W-3 **Priority:** Medium **Rating:** 23 **Cost:** High **Timeline:** Medium	**Seismic Resilient Piping at Pump Stations |** In a seismic event, seismically resilient facility, and process piping in our approximately 28 pump stations reduce the chance for injury to staff from a pipe break. Additionally, it may decrease facility downtime. Analyze seismic resiliency of existing facility and process piping and, if necessary, implement physical improvements to increase resiliency. **Lead:** Water Planning and Engineering Division; Assistant Division Manager **Partners:** Water Maintenance and Construction, Surface Water Treatment and Operations			X						

Endnotes

[1] Source: https://www.mytpu.org/about-tpu/public-utility-board/board-meetings/

[2] City of Tacoma, City Charter, Section 4.8 – The Public Utility Board https://cms.cityoftacoma.org/cityclerk/Files/Documents/CityCharter.pdf

[3] Source: Tacoma Public Utilities Real Property Services Office, received March 25, 2025

[4] Source: Tacoma Public Utilities Customer Data & Analytics Office, received February 7, 2025

[5] Source: https://www.mytpu.org/multicultural-child-and-family-hope-center-awarded-50000-renewable-energy-grant-by-tacoma-power-customers/

[6] Source: Tacoma Public Utilities Biennial Budget 2025-2026, received May 12, 2025

[7] Revised Code of Washington (RCW) 42.56.420 – Security. https://app.leg.wa.gov/rcw/default.aspx?cite=42.56.420

[8] FEMA Disaster Declaration, Washington Covid-19, EM-3427-WA. https://www.fema.gov/disaster/3427

[9] Washington Administrative Code (WAC) Oil Spill Contingency Plan – Railroad. https://app.leg.wa.gov/WAC/default.aspx?cite=173-186 and 49 CFR Part 130 Comprehensive Oil Spill Response Plan https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-B/part-130

[10] Tacoma Water – *Water Shortage Response Plan, 2018* – Droughts and System Emergencies *[Element A4-a]*

[11] Washington State Department of Ecology, Order and Determination by the Director. https://ecology.wa.gov/drought-2025-june-declaration-order

[12] Washington State Department of Ecology, news release https://ecology.wa.gov/about-us/who-we-are/news/2025/april-8-drought

[13] Physical Geology - H5P Edition Copyright © 2021 by Karla Panchuk

[14] Located in Commencement Bay, the Tideflats Subarea is comprised of over 5,000 acres of waterfront land and designated as the Port of Tacoma Manufacturing Industrial Center (MIC). https://tacoma.gov/project/tideflats-subarea-plan/

[15] Source: FEMA P-2181 Fact Sheet 4.3: Electric Power Generation, Transmission, and Distribution from the Hurricane and Flood Mitigation Handbook for Public Facilities https://www.fema.gov/sites/default/files/documents/fema_p-2181-fact-sheet-4-3-electric-power.pdf

[16] Sources: Flood Advise for Drinking Water Systems, Washington Department of Health, 2019 https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//331-300.pdf and FEMA P-2181 Fact Sheet 4.1: Drinking Water Systems from the Hurricane and Flood Mitigation Handbook for Public Facilities https://www.fema.gov/sites/default/files/documents/fema_p-2181-fact-sheet-4-1-drinking-water-systems.pdf

[17] Source: FEMA P-2181 Fact Sheet 5.2: Mass Transit Facilities from the Hurricane and Flood Mitigation Handbook for Public Facilities https://www.fema.gov/sites/default/files/documents/fema_p-2181-fact-sheet-5-2-transit-facilities.pdf

[18] Source: https://www.usgs.gov/programs/landslide-hazards/what-are-landslides-how-can-they-affect-me

[19] Ice accretion – the process by which a layer of ice builds up on solid objects that are exposed to freezing precipitation, supercooled fog, or cloud droplets. https://glossary.ametsoc.org/wiki/Ice_accretion

[20] Conductor gallop is the high-amplitude, low-frequency oscillation of overhead power lines due to wind. https://en.wikipedia.org/wiki/Conductor_gallop

[21] This information was derived from several legitimate online resources and common knowledge within specific utility sectors.

[22] Tacoma Power *Geomagnetic Disturbance Operations Plan, 2024* *[Element A4-a]*

[23] Source: Washington Sea Grant news blog – *Could a Tsunami Hit Puget Sound*? https://wsg.washington.edu/could-a-tsunami-hit-puget-sound/

[24] Volcanic ashfall impacts to power supply, water, and transportation https://volcanoes.usgs.gov/volcanic_ash/

[25] Turbidity is a measure of water clarity. High turbidity makes water appear cloudy or muddy. Changes in turbidity can affect water quality parameters. https://www.epa.gov/system/files/documents/2021-07/parameter-factsheet_turbidity.pdf

[26] Source: Tacoma Power 2024 Wildfire Mitigation Plan, Figure 4. Percent WUI Interface by District. https://www.mytpu.org/about-tpu/services/power/wildfire-mitigation-plan/ *[Element A4-a]*

[27] The full plan is located on TPU's website at https://www.mytpu.org/about-tpu/services/power/wildfire-mitigation-plan/

[28] Source: https://watersupplyforum.org/water-quality-risks/

[29] RCW 76.04 Forest Protection, https://app.leg.wa.gov/rcw/default.aspx?cite=76.04

[30] Source: *Hydropower Primer – A Handbook of Hydropower Basics*, FERC https://www.ferc.gov/sites/default/files/2020-04/HydropowerPrimer.pdf

[31] This is a brief synopsis of the Purpose and Scope of *Tacoma Power Staff Procedure D-3, Revision 3: December 19, 2091 – Subject: Owner Dam Safety Program*.

[32] Source: Federal Energy Regulatory Commission (FERC) Emergency Action Plan Program, July 2015 – Chapter 6 – Emergency Action Plans. https://www.ferc.gov/emergency-action-plan-eap-program

[33] Public Safety Plan requirement per FERC Safety Signage at Hydropower Projects https://www.ferc.gov/sites/default/files/2020-04/The-Federal-Energy-Regulatory-Commission-Safety-Signage-at-Hydropower-Projects.pdf

[34] For details on the Riffe Lake Restoration visit: https://www.mytpu.org/about-tpu/services/power/about-tacoma-power/dams-power-sources/cowlitz-river-project/riffe-lake-restoration/#pattern_3

ATTACHMENT 1: Acroynms

Attachment 1. Acronyms

APPA	American Public Power Association
ASLRRA	American Short Line & Regional Railroad Association
AWIA	America's Water Infrastructure Act of 2018
AWWA	American Water Works Association
CFR	Code of Federal Regulations
COOP	Continuity of Operations Plan
CWPP	Community Wildfire Protection Plan
EAP	Emergency Action Plan
EIM	(Western) Energy Imbalance Market
EMD	Emergency Management Division, Washington State
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information System
GMD	Geomagnetic Disturbance
HMP	Hazard Mitigation Plan
NERC	North American Electric Reliability Corporation
NFIP	National Flood Insurance Program
ODSP	Owner's Dam Safety Program
PCDEM	Pierce County Department of Emergency Management
PSP	Public Safety Plan
RCW	Revised Code of Washington
SB	State Bill
SME	Subject Matter Expert
TPU	Tacoma Public Utilities
WAC	Washington Administrative Code
WAWARN	Washington Water/Wastewater Agency Response Network
WSRP	Water Shortage Response Plan
WUI	Wildland Urban Interface

ATTACHMENT 2: TPU Bill Insert – Wildfire Readiness Survey

Attachment 2. TPU Bill Insert – Wildfire Readiness Survey

Help Shape Wildfire Readiness in Pierce County

Your input guides how we prepare together

Tacoma Public Utilities and Pierce County Emergency Management are partnering to enhance wildfire preparedness. Your feedback helps ensure local wildfire plans address your concerns and priorities. Take our quick survey to help protect what matters most: your family, your home, and your community.

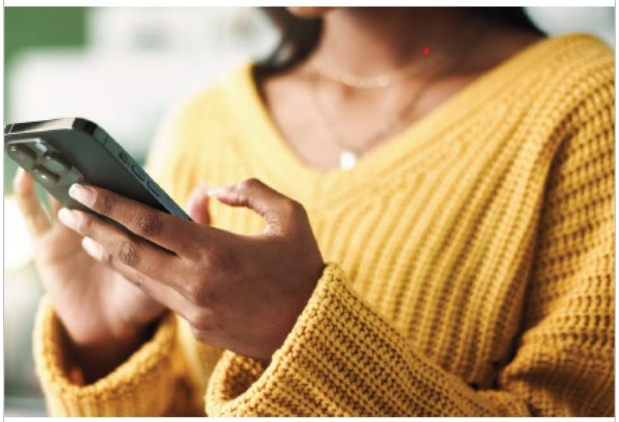
Scan the QR code to take our quick survey.

Pierce County Emergency Management

TACOMA PUBLIC UTILITIES

5746 0825

Stay safe with FREE Pierce County ALERT emergency notifications



Register to get customized alerts for home, work, school, and more.

We invite you to sign up for Pierce County ALERT. A free service that sends timely emergency alerts to your phone, email, text, or TTY. Select up to five key locations, such as your home or workplace.

Sign up online at **PierceCountyWa.gov/ALERT** or text "**PCALERT**" to **888-777**.

Pierce County Emergency Management

TACOMA PUBLIC UTILITIES

ATTACHMENT 3: [placeholder for PUB adoption document]

Attachment 3. Public Utility Board [adoption document]

placeholder

ATTACHMENT 4: TPU Mitigation Measure Form

Attachment 4. TPU Mitigation Measure Form

TPU MITIGATION MEASURE FORM

This form assists in ensuring mitigation measures (projects) listed in the TPU Addendum to the Pierce County Hazard Mitigation Plan have all the required elements of information. It also serves conformity across the utility.

Use a separate form for each mitigation measure to list in the plan.

1. NAME OF MEASURE

Instructions: Develop a unique name to identify the mitigation measure. A simple title for what will be accomplished. Less than one line.	
Name of Measure:	[enter here]

2. BRIEF DESCRIPTION OF MEASURE

Instructions: Write a brief description of what is to be accomplished (one or two sentences).	
Measure Description:	[enter here]

3. HAZARDS ADDRESSED

Instructions: Check the hazards that this measure addresses; some measures may address more than one hazard. For example, seismically retrofitting a building is primarily for earthquake but could also be for severe weather. Installing a generator is an all-hazard measure.

Measure addresses the hazard(s) as checked:	☐ Dam Failure	☐ Flood	☐ Tsunami and Seiche
	☐ Drought	☐ Landslide	☐ Volcano and Lahar
	☐ Earthquake	☐ Severe Weather	☐ Wildfire (WUI)
	Scoring: 1 point for each hazard checked		**Score**

4. LEAD RESPONSIBLE PARTY & PARTNERS

Instructions: This describes who is responsible for this measure. List the primary Section/Workgroup responsible and the position of the person (not their name) responsible for this measure. List any external partners involved in this measure.

Lead responsible party:	[enter Section here]; [enter responsible Position title here]
Partners:	[enter here]

5. GOAL(S) ADDRESSED

Instructions: Choose one or more goals that the measure addresses; what is the reason for accomplishing this measure?

Mitigation goal(s) as checked:	☐ Protect Life and Property	☐ Promote a Sustainable Economy	
	☐ Ensure Continuity of Operations	☐ Preserve/Restore Natural Resources	
	☐ Promote Preparedness	☐ Regional Capacity Building	
	Scoring: 1 point for each goal checked		**Score**

6. ESTIMATED COST

Instructions: Estimate the cost of the mitigation measure, regardless of funding source.	
Cost of measure (check one):	☐ **Low** – less than $100,000 *(3 pts)* ☐ **Medium** – $100,000 to $500,000 *(2 pts)* ☐ **High** – over $500,000 *(1 pt)*
	Score

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7. FUNDING SOURCE(S)

Instructions: Check all funding sources that may be applicable to this measure.	
Possible funding sources (check all that apply):	☐ Current or future budget ☐ State-sponsored loans/grants, list if known: ☐ Federal loans/grants, list if known:

8. BENEFIT

Instructions: Benefit is mainly to the organization, but others will benefit such as customers, the community, and/or the region. Check the benefit/impact that best describes the measure.	
Estimated benefit of the measure (check one):	☐ The measure will have an **immediate impact** on the reduction of risk exposure to life and property. *(3 pts)* ☐ The measure will have a **long-term impact** on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property. *(2 pts)* ☐ Long-term benefits of the measure are difficult to quantify in the short-term. *(1 pt)*
	Score

9. TIMEFRAME

Instructions: Estimate how long this measure would take to complete/implement as if all funding is available.	
How long will it take to implement? *(check one)*	☐ **Ongoing** – continuous *(2 pts)* ☐ **Short** – 1 to 2 years *(3 pts)* ☐ **Medium** – 3 to 5 years *(2 pts)* ☐ **Long** – 5 or more years or, a phased project with extended timeframe. *(1 pt)*
	Score

10. STRATEGIC RATING

Instructions: Rate each statement below using the scale below.	
Scale: **3** = STRONGLY AGREE **2** = SOMEWHAT AGREE **1** = NOT SURE AT THIS TIME	**Rating**
The measure aligns with the Utility's mission and values.	
The measure effectively avoids or reduces future losses, including disaster damage to property and infrastructure.	
The utility has the necessary capability—such as staff, technical experts, and funding—to implement the measure and/or can readily obtain additional resources if needed.	
The Public Utility Board, on behalf of our customers, will likely approve the measure.	
The mitigation measure has a technical, scientific, or legal basis and fits the hazard setting.	
The benefits of the measure outweigh the costs.	
The measure has a positive impact on the environment.	
The measure, when implemented, will increase the Utility's capability of continuing essential services.	
TOTAL RATING:	