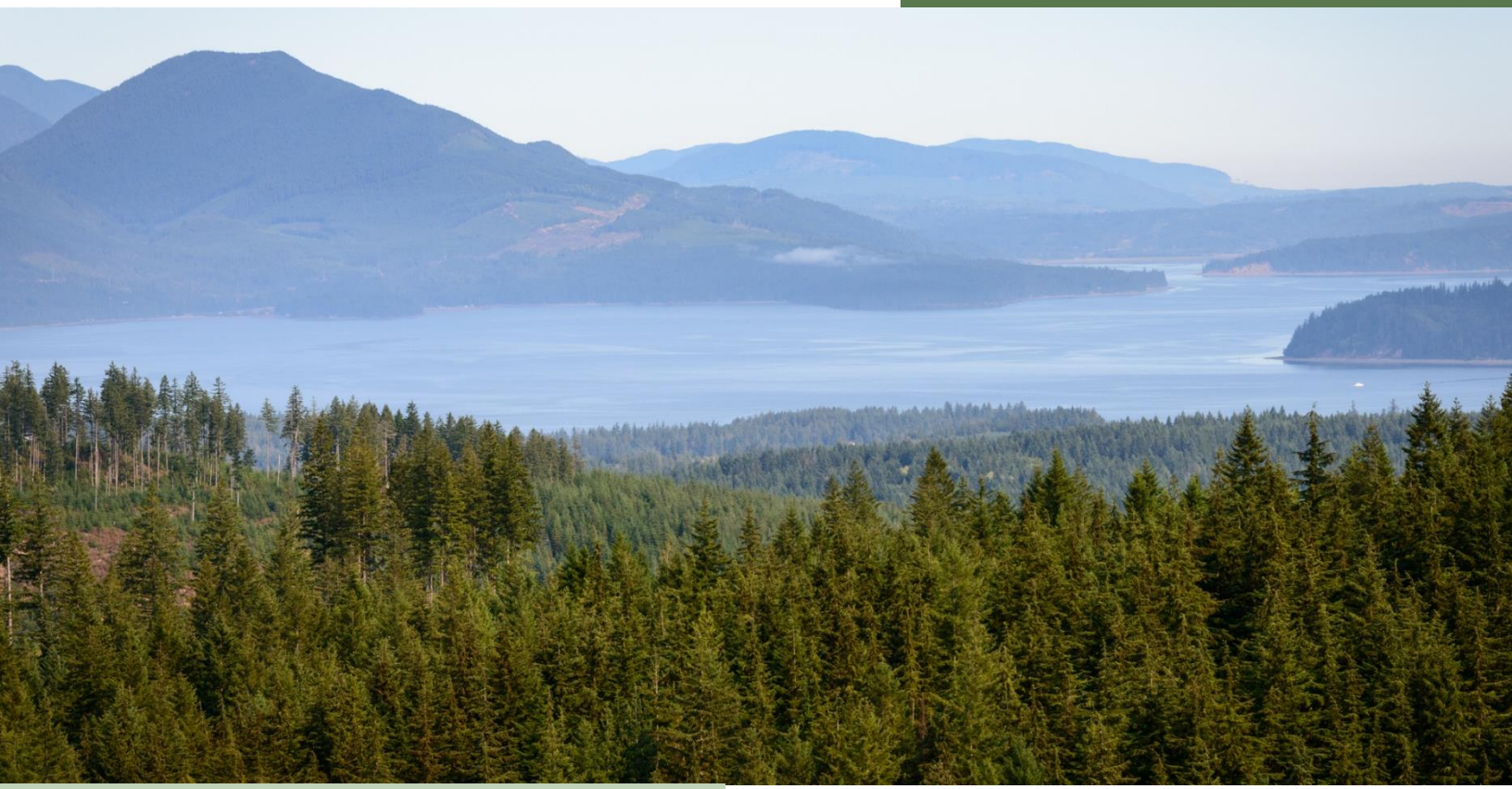
City of Bremerton DRAFT Utility Lands Management Plan

Prepared for
City of Bremerton Water Utility
Department of Public Works and Utilities



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Introduction

The City of Bremerton Public Works and Utilities Water Utility (Utility) is updating its Utility Lands and Forest Management Plan, last updated and adopted by City Council by resolution (#2592) in 1997 (EES et al. 1996). This update to the Utility Land Management Plan (plan) was completed by Mason, Bruce & Girard, Inc. (MB&G) under contract with the Utility. The Utility owns approximately 7,940 acres of land which contains numerous structures for Utility operations, forestry operations, and other special uses and acres of forested wildland. This plan defines Utility land management goals and uses the best available science to guide management practices.

History

The Utility acquired the Bremerton Water System in 1917 at which time it included 600 acres in the Gorst and Anderson Creek Watersheds. Since that time, the Utility acquired the remaining acreage managed under this plan through purchase and trade with the intent to develop and protect drinking water sources, both surface and groundwater. Currently, sources located within the management area of this plan include the Union River surface water supply, two emergency surface water supplies (Anderson Creek and Gorst Creek), and 11 active groundwater supply production wells. The Union River surface water supply is of such high quality, it is one of only a handful of surface water sources in the nation allowed to remain unfiltered. This results in significant savings for water customers.

Meeting surface and groundwater Source Water Protection Program requirements and the stringent watershed control requirements for the unfiltered supply, is the primary driver for Utility land management policies and objectives.

This plan update included periodic review and coordination with the Utility Land Management Plan Advisory Committee (ULMPAC). The ULMPAC was supported by MB&G, and facilitated by EnviroIssues, and the City of Bremerton. The purpose of the advisory committee is to review, comment, and make recommendations to the City and the consulting team. The ULMPAC reviewed draft plans, best available science, policy issues, and special topics. These issues were reviewed over a series of meetings with the City and consulting team, considering recommendations and comments from the ULMPAC. According to the City, “The ULMPAC is being convened specifically to consider changes to the existing plan, community impacts of these changes, scientific data collected during this process, policy implications of alternatives, and provide input and recommendations to the City of Bremerton. The ULMPAC will work to review and understand the scope of the issues, potential solutions, and tradeoffs of these options” (City of Bremerton 2023). The ULMPAC members include affiliations to City staff, tribal representatives, adjacent water purveyors, adjacent forestry property owners, Kitsap Public Health District (KPHD), State Department of Health (DOH), Washington State Department of Natural Resources (WADNR), Washington Department of Fish and Wildlife (WDFW), and Bremerton water customer/ratepayers.

There was also significant public engagement throughout the development of the plan update. This included two City Council Study Sessions that were open to the public, an ongoing ability of the public to comment on the Plan through the City website, and a public review and comment period for the proposed plan update.

Land Management Goals

In this update of the plan, the Utility established the following land management goals for Utility lands.

1. The Union River Reservoir and McKenna Falls Intake Subbasin will be managed to maintain the “unfiltered” water source status in conjunction with maintaining forest health.
2. The other Utility lands will be actively and adaptively managed to sustainably protect surface and groundwater resources and maintain forest health and resiliency while also generating revenue to reduce costs for utility rate payers.

Existing Conditions

Property Description

The Utility owns approximately 7,940-acres[1] in Kitsap County, Washington, in Townships 23 and 24-North and Ranges 1-West and 1-East. Most of the Utility land is forested, with small portions currently used for recreation and infrastructure. Figure 1 depicts the Utility ownership boundaries.

Most of the Utility land lies within the Union River and Gorst Creek Watersheds, forming a contiguous ownership, with a few dispersed parcels located in other drainages such as Anderson Creek Watershed and Lake Tahuya (Figure 1). Of the total ownership, approximately 7,441[1] acres are considered forestland and include portions of the Union River, Anderson Creek and Gorst Creek Watersheds; the Lake Tahuya block; and the biosolids application areas, as well as forestry road and riparian management zone (RMZ) acres. The remaining 499 acres of Utility land include Utility infrastructure and special uses as described in more detail in the Special Uses and Special Use Areas section.

The Utility ownership within the Union River and Gorst Creek Watersheds is split by West Belfair Valley Road, Highway 3, and the U.S. Navy railroad. The Anderson Creek Watershed ownership is east of Gorst at the head of Sinclair Inlet and south of Highway 16. The Tahuya Lake ownership is northwest of Green Mountain and is split by Gold Creek Road Northwest. The land and right-of-way associated with these highways and railroad are owned by the county, state, and federal governments, respectively, and are outside of Utility jurisdictional control.

Property Boundaries

As the Utility property consists of a large contiguous land base and a few scattered parcels to the northwest and southeast of the main ownership area, limited land surveys have been necessary to establish the perimeter of the ownership. However, some of the newer boundaries, established as a result of ownership changes since the 1970's, have not yet had a formal survey. For more information on property boundary updates and implementation, refer to Property Boundaries part of the Implementation Plan section.

[1] Acres Calculated using Geographic Information System (GIS). Acres reflected are Gross.

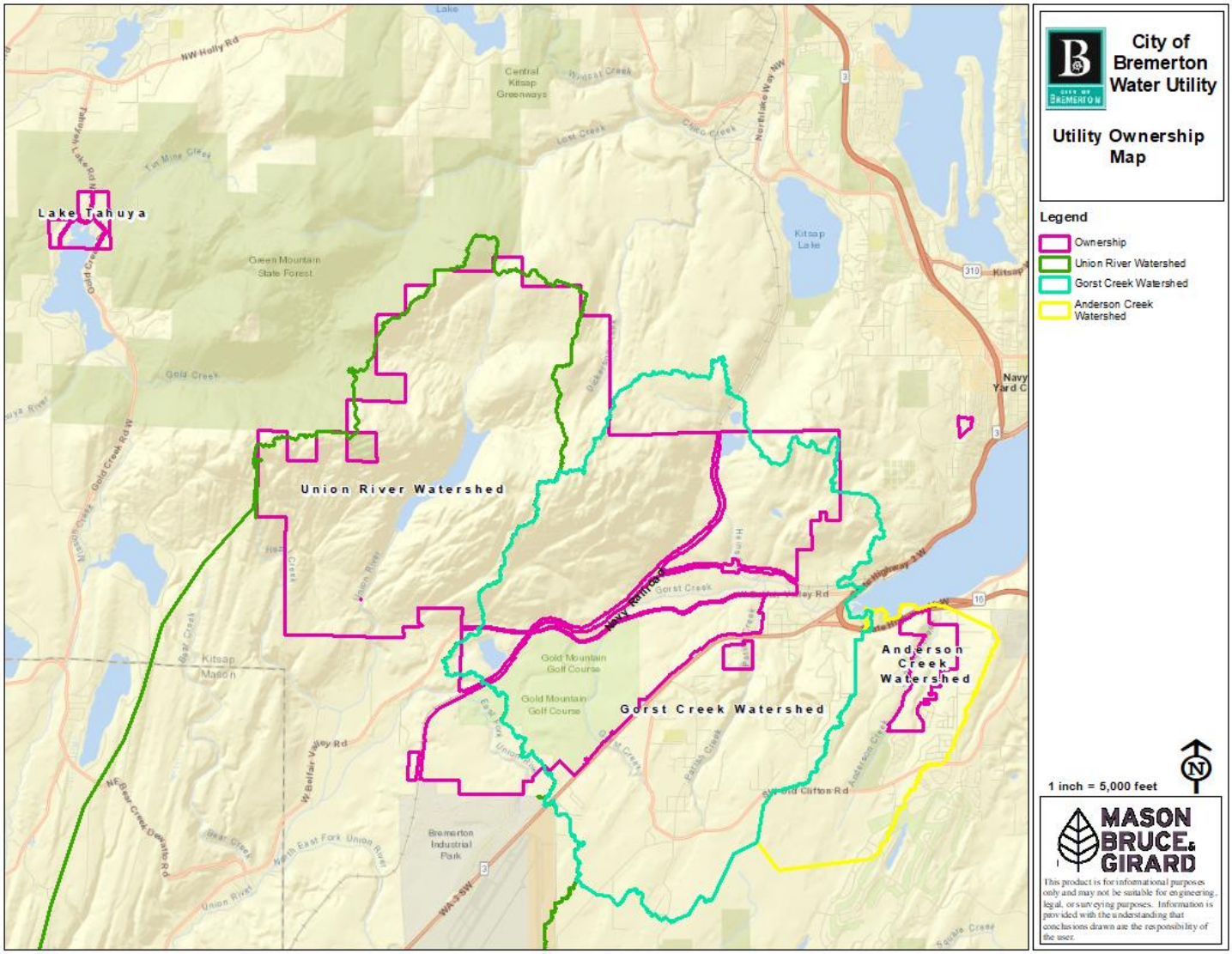


Figure 1. Utility Ownership

Water Utility Uses

The Utility has systems and structures in place to produce, treat, store, and distribute water throughout the City of Bremerton and portions of unincorporated Kitsap County (Figure 2). As stated in the 2020 Water System Plan, "The Utility treated water reservoirs provide storage, and booster stations and regulating stations control pressures within the system. Water is delivered to customers through 328 miles of distribution pipe" (Bremerton 2022b). Some of these critical sources and structures lay within the ownership governed by this plan.

Casad Dam and McKenna Falls Intake Facilities

Approximately 60 percent of the Utility water supply is provided by the Union River system through the McKenna Falls Intake Facilities. The main source is the Union River Reservoir, created by Casad Dam, a concrete arch structure that rises 130 feet above the river and impounds approximately 1.4 billion gallons of water. Casad Dam on the Union River was completed in 1956. Water flows from the reservoir down the natural streambed to the McKenna Falls Intake Facility. Three branches of the Union River meet near the intake facility. Water from the Union River Mainstem and West Branch (used seasonally) is blended at the McKenna Falls Intake Facility, where it is screened. Since 1992, the East Branch of the Union River no longer enters the intake but is used to meet downstream flow requirements.

Bremerton owns and controls 98 percent of the 2,964-acre catchment area that supplies the McKenna Falls Intake Facilities. This allows the Utility to effectively control the activities in the watershed and protect source water quality, meeting requirements to remain unfiltered.

Groundwater Wells

Groundwater supplies 40 percent of the water to the system with 11 active production wells and two future supply wells located within the ownership managed under this plan. Wells have a finite lifespan, and much of the Utility land ownership and underlying aquifers require protection as potential future sources and well sites when well replacement is required, or additional wells are needed to meet growing demand. There are also numerous monitoring wells throughout the Utility lands with wellheads that also require protection from contamination.

Treatment Facilities

The Utility's surface water supply is treated with ultraviolet disinfection and chlorine disinfection at the Advanced Disinfection Facility to meet the Surface Water Treatment Rule disinfection requirements for *Giardia lamblia*, *Crytosporidium*, and viruses. Groundwater wells are equipped with chlorination facilities for disinfection either co-located with the well or, in the case of the Anderson Creek Wellfield, a dedicated Hypochlorite Facility. In accordance with the Lead and Copper Rule, pH is adjusted at the Corrosion Control Facility using caustic soda for distribution system corrosion control. All treatment facilities are within the Utility land ownership managed under this plan.

Reservoirs

In addition to the Union River Reservoir, there are 2 raw water reservoirs, and 2 finished water reservoirs located within the Utility ownership managed under this plan. These include two above ground steel tanks, one below ground concrete reservoir, and Twin Lakes which receives diverted raw water from the Union River and recharges underground aquifers through infiltration.

Pump Stations and Transmission Mains

Three pump stations lay within the ownership, as well as critical transmission mains. The transmission mains are used to move large quantities of water from one area of the system to another, generally without service connections. Within the Utility lands managed under this plan these include mains running from the intake facilities to the Advanced Disinfection Facility and on to the Corrosion Control Facility and Reservoir 4, from Pump Station 17 to Kitsap Lake, and from Pump Station 3 to the West 517 Zone (Puget Sound Industrial Center-Bremerton).

Pipe Layout Yard

The pipe layout yard is a staging and storage area for Utility distribution and treatment equipment and houses equipment for forestry operations.

General Infrastructure

Currently, the Utility owns and maintains four forestry buildings, three biosolids roofed storage ponds, 37 gates, 56 miles of forestry road with 9 bridges, a spoils pit within Utility land, and one emergency storage area with roof coverings.

Special Uses and Special Use Areas

The Utility allows limited special uses of Utility land outside of Utility operations, contained to specific special use areas. Existing special uses include recreation, fisheries enhancement, utility rights-of-way, and commercial use, and are shown in Figure 3. Increased public use can however bring increased risk to water and forest resources and an increased need for management and monitoring. Therefore, the Utility must carefully consider potential impacts associated with these uses. Details outlining specific measures to ensure sufficient protection of resources can be found in the Water Quality Assessment section.

The Gold Mountain Golf Course is owned by the City and the property is managed by the Department of Parks and Recreation under a lease agreement with the Utility.

Jarstad Park is managed by Public Works and Utilities and serves as a space for public events and yearly education and outreach to the community, such as Kids Fishing Day and Salmon Tours. Through a lease agreement with the Utility, the Suquamish Tribe operates its largest salmon rearing facility on Gorst Creek at Jarstad Park. This has been the site of fisheries operations for several decades and enhances tribal and other recreational fishing.

Through a lease agreement with the Utility, the Bremerton Police Department manages the Sergeant Honsowetz Police Firearms Training Facility which provides firearms training facilities for regional law enforcement agencies.

Major regional power and natural gas providers and communication tower companies lease rights-of-way to bring critical services to the Bremerton region. These include Puget Sound Energy, Bonneville Power Administration, Cascade Natural Gas, and several tower management companies. Most of these entities serve the Water Utility, and these uses provide additional revenue to the Utility.

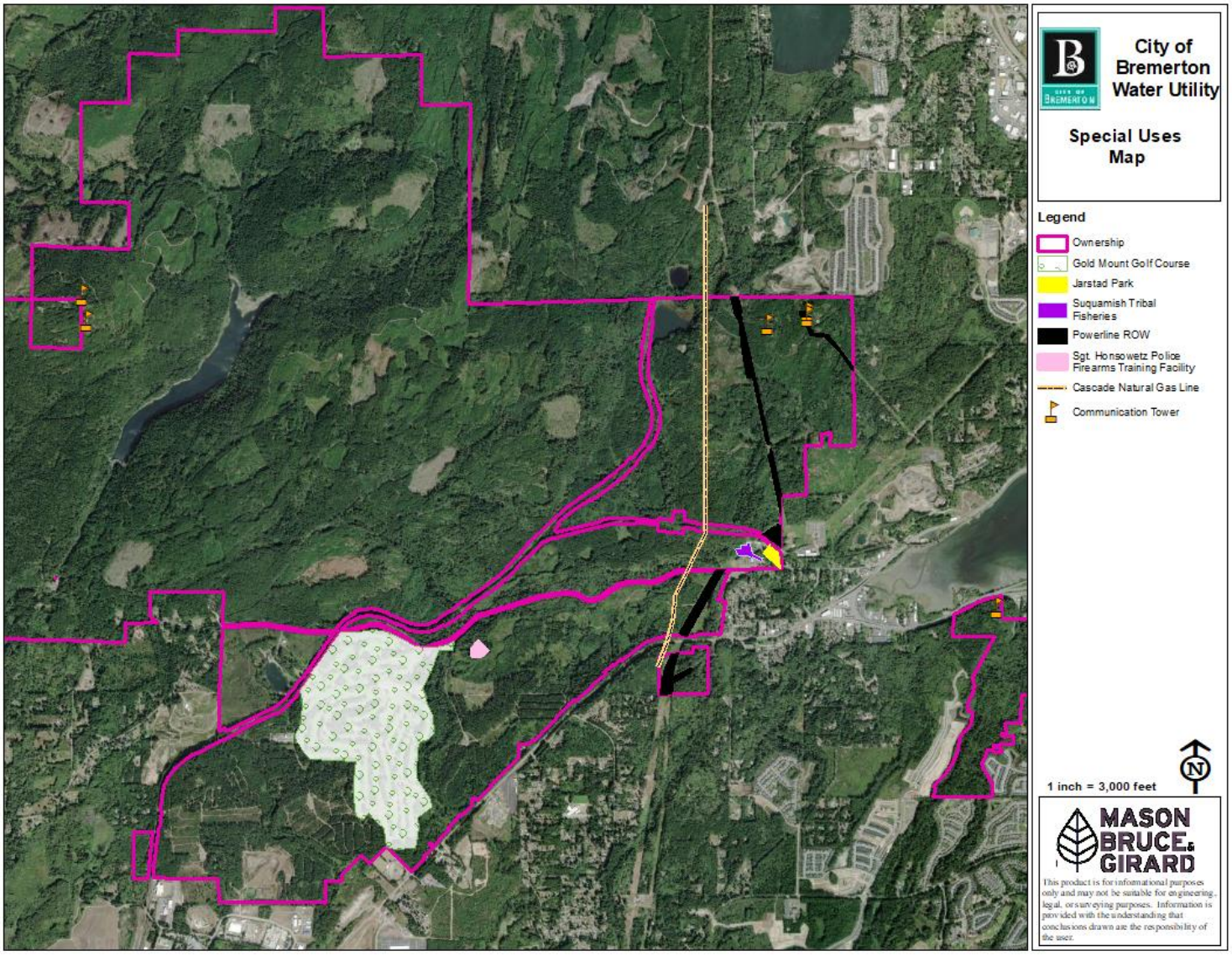


Figure 3. Special Use Areas

Watershed Assessment

The Watershed Assessment is an evaluation of the natural resources present, or potentially present, that need to be managed and protected with due care and concern for the environment.

Wildlife

The Utility lands are primarily undeveloped and home to the typical Pacific Northwest flora and fauna. The Utility lands consist of predominantly second growth forested ecosystem with Douglas-fir (*Pseudotsuga menziesii*) being the most common tree species (UW 2019). Some forested stands have mixed tree age and species with shrubs interspersed throughout containing species such as western hemlock (*Tsuga heterophylla*), red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllus*), western redcedar (*Thuja plicata*), Pacific madrone (*Arbutus menziesii*), and black cottonwood (*Populus trichocarpa*) in the overstory, and evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), western swordfern (*Polystichum munitum*), bracken fern (*Pteridium aquilinum*), oceanspray (*Holodiscus discolor*), red huckleberry (*Vaccinium parvifolium*), short Oregon-grape (*Mahonia nervosa*), Pacific rhododendron (*Rhododendron macrophyllum*), oso berry (*Oemleria cerasiformis*), and Nootka rose (*Rosa nutkana*) in the understory (UW 2019). Riparian and wetland habitat types also occur throughout the Utility lands. Various species of terrestrial and aquatic species are supported by

these forested and riparian ecosystems (USFWS 2024). Common wildlife species associated with forested, wetland, and riparian habitats in western Washington include mammals such as black tailed deer (*Odocoileus hemionus columbianus*), Cascade red fox (*vulpes cascadensis*), coyote (*Canis latrans*), mountain lion (*Puma concolor*), snowshoe hare (*Lepus americanus*), black bear (*Ursus americanus*), and spotted skunk (*Spilogale gracilis*); various species of cavity-nesting, seed-eating, and insectivorous birds; and amphibians including rough-skinned newt (*Taricha granulosa*), Pacific giant salamander (*Dicamptodon tenebrosus*), and Pacific treefrog (*Pseudacris regilla*).

According to the United States Fish and Wildlife Service (USFWS), the following wildlife species protected by the federal Endangered Species Act (ESA) have potential to occur within, or be affected by, activities within the Utility lands (USFWS 2024):

- Marbled murrelet, *Brachyramphus marmoratus* (Threatened)
- Yellow-billed cuckoo, *Coccyzus americanus* (Threatened)
- Northwestern pond turtle, *Actinemys marmorata* (Proposed Threatened)
- Suckley's cuckoo bumble bee, *Bombus suckleyi* (Proposed Endangered)
- Monarch butterfly, *Danaus plexippus* (Proposed Threatened)

Additionally, Beller's ground beetle has been found within Utility land property and is a candidate species on the Washington Endangered Species list (Washington Department of Fish and Wildlife (WDFW 2017a). WDFW also indicated a blue heron rookery occurs in the Sinclair Inlet just east of the Utility lands (WDFW 2019, WDFW 2017b).

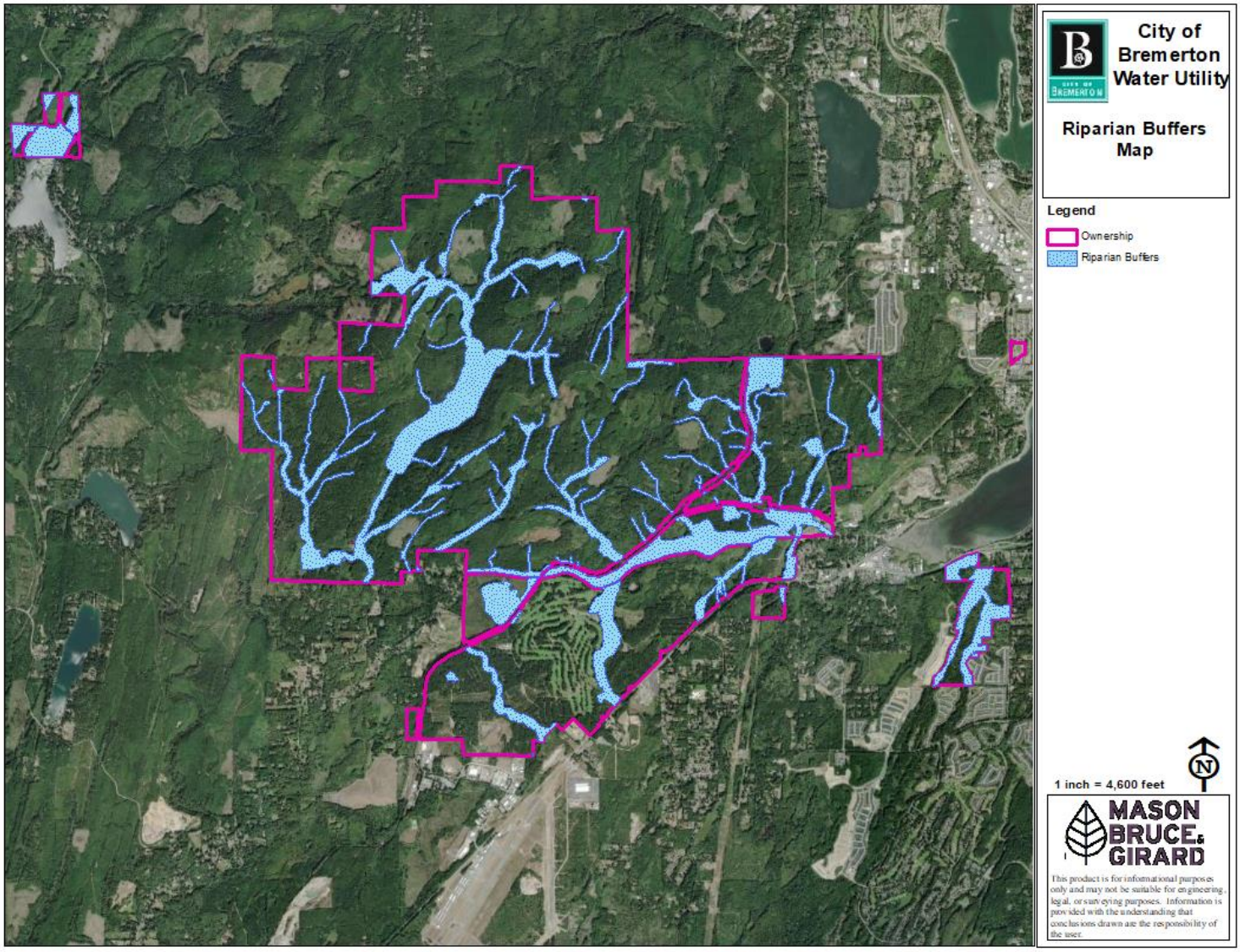


Figure 4. Riparian Buffers

Fish Habitat

According to the USFWS, the National Oceanic and Atmospheric Administration (NOAA), and the National Marine Fisheries Service (NMFS) the following fish species protected by the federal Endangered Species Act (ESA) have potential to occur within, or be affected by, activities within the Utility lands (USFWS 2024, NOAA 2025):

- Steelhead trout, Puget Sound DPS, *Oncorhynchus mykiss* (Threatened)
- Chum salmon, Hood Canal Summer Run ESU, *Oncorhynchus keta* (Threatened)
- Chinook salmon, Puget Sound ESU, *Oncorhynchus tshawytscha* (Threatened)
- Bull trout, *Salvelinus confluentus* (Threatened)
- Dolly varden, *Salvelinus malma* (Proposed Similarity of Appearance Threatened)

Streams listed as salmonid stock inventory streams are present within the Utility lands for coho salmon, chum salmon, and steelhead trout fish species (WDFW 2007). Figure 4 depicts riparian buffers throughout Utility lands. These buffers are beneficial to water quality and fish habitat, thus reducing impacts to potential listed species present. Figure 5 shows the approximate locations of the streams on Utility lands that may support the salmonid species listed above (WDFW 2007). WDFW also indicated a delta smelt spawning ground occurs in the Sinclair Inlet just east of the Utility lands (WDFW

2019). No species-specific surveys have been completed on Utility lands; however, as the Utility pursues projects within the Utility lands, surveys may be required.

The McKenna Falls Intake Subbasin is home to many streams and resident fish populations, but salmon habitat has not been observed in most of the area due to a natural barrier to migratory fish at McKenna Falls which drops 90 feet over the course of the falls downstream of the intake facilities. Figure 5 depicts cutthroat trout habitat within Union River and the Union River reservoir, but this seems unlikely given the natural barrier. ESA-listed chum salmon and steelhead trout critical habitat is designated along Union River below McKenna Falls as depicted in Figure 6. There are 14 fish passage barriers that exist within the McKenna Falls Intake Subbasin, but only one conveys a stream listed as salmon habitat.

In 2024, a restoration project was completed to improve access on forest road 5000 as well as reduce risk of erosion. The project replaced two aging bridges, eight culverts, and improved 1.5 miles of forest road within Utility lands.

The Gorst Creek Watershed is described as “one of the largest and most productive watersheds in the east WRIA-15 subregion” and “above river mile 1.0, is rated 23rd out of 95 salmonid refugia areas within Kitsap County” (May and Peterson 2003). It includes Jarstad Creek, which May and Peterson (2003) reported as having the greatest value for salmonid conservation in the watershed. The Sinclair Inlet estuary is fed by the Gorst Creek Watershed and is home to wildlife habitat for species such as juvenile salmon, bald eagles, waterfowl, and various other species. There are 18 fish passage barriers that exist within the Gorst Creek Watershed ownership, including six conveying streams with listed salmon species. In 2016, the Utility replaced two undersized forest road culverts with bridges to improve fish passage. A collaborative future project is also planned between the Utility and Suquamish Tribe to restore Gorst Creek near the Suquamish Fish Rearing Facility by removing fish passage barriers and restoring instream habitat.

The Tahuya Lake ownership contains coho salmon and cutthroat trout stream habitat (Figure 5). Critical habitat for ESA-listed steelhead trout exists within the Tahuya ownership Tahuya Lake and Tin Mine Creek.

The forested area that comprises the north and central portion of the Gorst Creek Watershed lies within a contiguous area that also contains Green Mountain and Tahuya State Forest. Taken together, this area comprises the largest open-space block in the Puget Trough Ecoregion of the Puget Sound Basin (May and Peterson 2003).

The City removed two historic dams on Anderson Creek in 2024 which opened access to three additional miles of salmonid habitat, including critical habitat for ESA listed steelhead trout. There are no other fish passage barriers within this ownership and coho salmon, chum salmon, and cutthroat trout habitat exists within Anderson Creek.

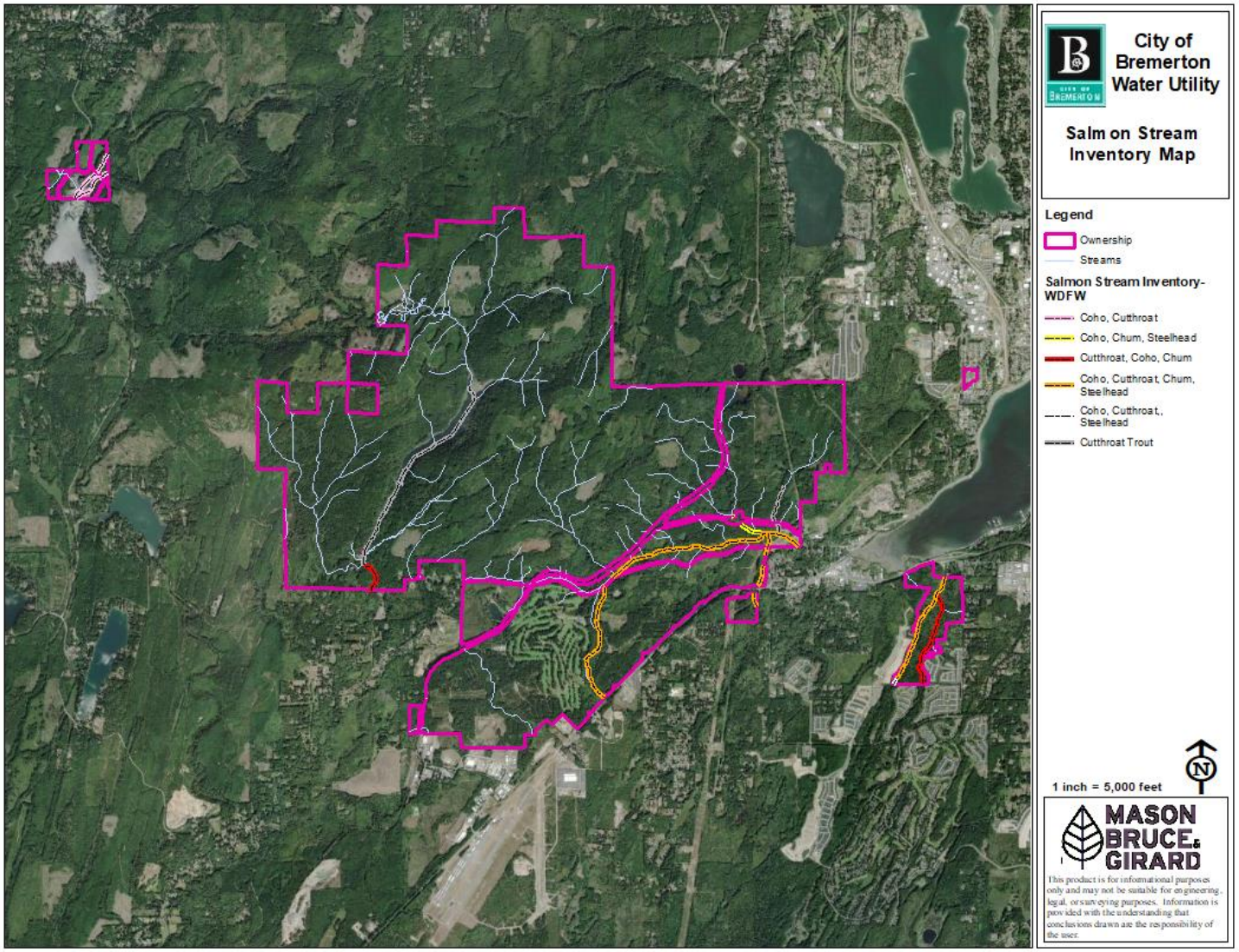


Figure 5. Salmon Stream Inventory

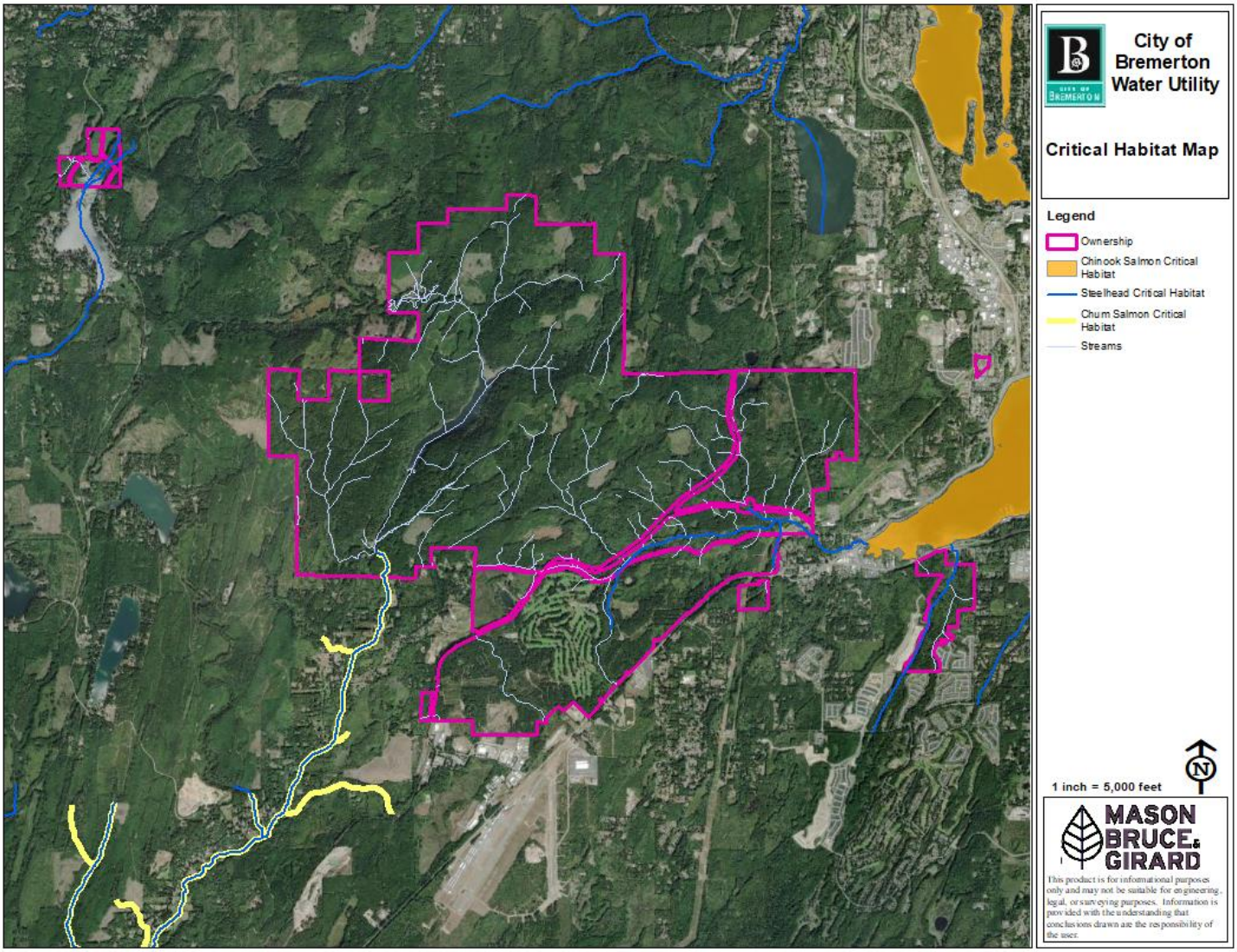


Figure 6. Critical Habitat

Riparian Areas

Streams, wetlands, and lakes on Utility lands have been mapped and classified by water type by the Washington Department of Natural Resources (WADNR). Current WADNR data was utilized for this report to approximate RMZ delineations. RMZs are required by the Forest Practices Rules of the State of Washington. Most streams are currently classified as fish-bearing (F) or non-fish-bearing (N), while fish use for some streams is unknown (U). Non-fish-bearing streams are further classified as perennial (Np) or seasonal (Ns). There are approximately 48-miles of mapped streams on Utility lands that have been delineated by WADNR. Table 1 provides a summary of the stream resources on Utility lands.

Table 1. Stream Resources (Total Length by Stream Type)

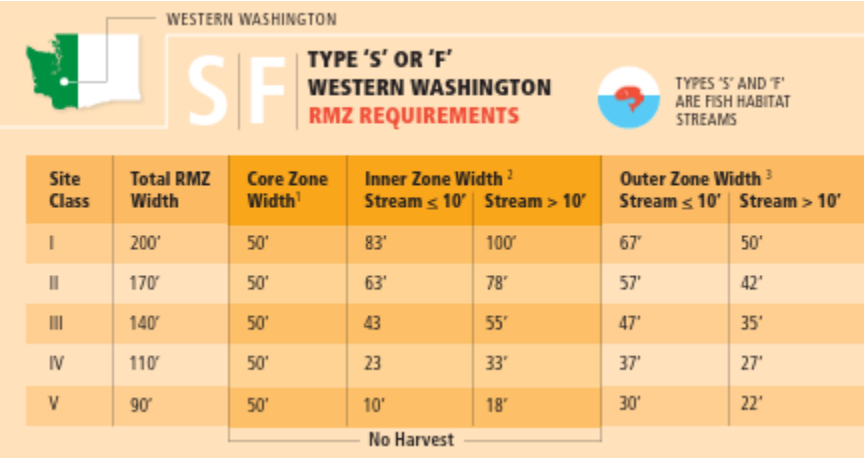
Stream Type	Total Property Distance (miles)	Percent of Total
Fish (F)	18.72	39%
Non-Fish (N)	24.01	50%
Unknown (U)	5.27	11%
Total:	**48.0**	**100%**

These stream distances were derived from WADNR stream data. Not all streams were field verified by WADNR. The WADNR uses a combination of LiDAR-Based stream modeling, historic stream data, and field verification to build their

WA-Hydro Database. All streams and stream buffer requirements must be field verified before operations can occur, in accordance with the Forest Practices Rules of the State of Washington.

Stream location, size, and riparian buffers were mapped using Geographic Information System (GIS) data and Aerial photography from WADNR hydrology layers. Buffer size and width vary by stream type, site class, and seasonality. Harvest parameters within riparian buffers are site specific and vary by timber harvest objectives, stream size, seasonality, and site class. Table 2 shows the requirements for Type "S" or "F" streams in Western Washington. Refer to the Washington Forest Practices Act (Washington Administrative Code (WAC) Chapter 222-08) for more information on specific riparian buffers for the various stream types within Utility land.

Table 2. Type F/S RMZ Requirements Western Washington- WADNR Forest Practices Rules Illustrated



Site Class	Total RMZ Width	Core Zone Width[1]	Inner Zone Width[2] Stream ≤ 10′	Inner Zone Width[2] Stream > 10′	Outer Zone Width[3] Stream ≤ 10′	Outer Zone Width[3] Stream > 10′
I	200′	50′	83′	100′	67′	50′
II	170′	50′	63′	78′	57′	42′
III	140′	50′	43	55′	47′	35′
IV	110′	50′	23	33′	37′	27′
V	90′	50′	10′	18′	30′	22′
		No Harvest				

Lakes within Utility ownership include Alexander Lake, Jarstad Lake, Union River Reservoir, northern end of Tahuya Lake, and Twin Lakes. Union River contributes approximately 60 percent of the Utility's water supply (Bremerton 2022b). Twin Lakes is located on high infiltrating soils and receives water diverted from the Union River supply at the Advanced Disinfection Facility where it recharges the underlying aquifer, which feeds nearby production wells. Alexander and Jarstad Lakes provide minor groundwater recharge and drainage via Heins Creek and Jarstad Creek to sustain Gorst Creek instream flows. All lakes and wetlands have exclusion zones and buffers from forestry operations. Buffer rules for lakes are similar to streams in terms of fish presence and bank protection. An additional 50 feet of buffer exists around Union River Reservoir (for a total of 250-foot buffer), exceeding the buffer requirements by the WADNR, as it is a direct supply of drinking water. Table 3 shows the Wetland Management Zone (WMZ) buffer requirements from WADNR.

Table 3. WMZ Requirements- WADNR FP Illustrated Manual

Wetland Type	Acres of Non-Forested Wetland*	Maximum WMZ Width (feet)	Average WMZ Width (feet)	Minimum WMZ Width (feet)
A (including bogs*)	Greater than 5	200′	100′	50′
A (including bogs*)	0.5 to 5	100′	50′	25′
A (bogs only*)	0.25 – 0.5	100′	50′	25′
B	Greater than 5	100′	50′	25′
B	0.5 to 5	No WMZ Required	No WMZ Required	25′
B	0.25 to 0.5	No WMZ Required	No WMZ Required	No WMZ Required
Forested	No WMZ required. Low impact harvesting allowed. Additional restrictions apply. * For bogs, both forested and non-forested areas are included.			

Forest Resources Assessment

Forest Inventory

For the purposes of forest resource assessment, the Utility lands can be described in terms of forested versus non-forested such that:

- McKenna Falls Intake Subbasin refers to all Utility forested lands within the Union River Reservoir drainage area.
- Other Utility Lands refers to forested lands outside of the McKenna Falls Intake Subbasin, which include the Gorst Creek Watershed, Anderson Creek Watershed, Lake Tahuya Block, and all other remaining Utility lands.
- Riparian Management Area (RMA) refers to stream and reservoir buffers.
- Non-Forested Areas refers to Utility land that may or may not be forested but would not be considered part of the “harvestable acres.” This includes inoperable areas, right-of-way zones, infrastructure, recreation zones, and scenic/riparian buffers.

Table 4. Utility Lands by Forest and Non-Forested Areas

Area	Gross Acres
Forested Areas	
Mckenna Falls Intake Subbasin	
McKenna Falls Intake Subbasin	2,863
Other Utility Lands	
Gorst Creek Ownership	2,278
Lake Tahuya Ownership	35
Anderson Creek Ownership	77
Biosolids Application Site & Remaining Utility Lands	721
Total Forested Acres	**5,974**
RMA Areas	
RMA Acres	**1,465**
Non-Forested Areas	
Jarstad Park	6
Gravel Pit	40
Powerline ROW	53
Structure	49
Gold Mountain Golf Course & Scenic Buffer	351
Total Non-Forested Area	**499**
TOTAL ACRES	**7,940**

Utility lands can be classified into the following categories:

- Net Forest Areas– Forest acres, excluding roads and RMZs.
- Net Riparian Areas– Riparian management zones, excluding roads and forest areas.
- Net Non-Forested Areas – Including structures, golf course, and any non-forest area. Excludes roads.
- Roads –WADNR roads layer, buffered by 20 feet and used to calculate road acreage.

Table 5. Utility Lands (All Lands)

Classification	McKenna Falls Intake Subbasin Acres	Other Utility Lands Acres	Total Utility Lands Acres
Net Forest Areas	2,812	3,054	5,866
Net Riparian Areas	538	895	1,433
Net Non-Forested Areas	16	479	495
Roads	71	75	146
Totals:	**3,437**	**4,503**	**7,940**

Acres in Tables 5 and 6 were calculated using GIS. Table 6 shows acres by age class within the McKenna Falls Intake Subbasin and all other Utility lands.

Table 6. Utility Lands - Total Forested Acres and Net Forest Acres by Age Class

Age Class / Land Use	McKenna Falls Intake Subbasin Acres	Other Utility Forest Lands Acres	Total Utility Forest Lands Acres
Regeneration (0 to 10-years-old)	309	396	705
Pre-Merchantable (11 to 24-years-old)	486	809	1,295
Merchantable (25 years and older)	2,014	1,846	3,860
Sub-Total Net Forest	***2,809***	***3,051***	***5,860***
Net Riparian	538	897	1,435
Roads	71	75	146
Totals:	**3,418**	**4,023**	**7,441**

Tree species composition on Utility lands consists predominantly of Douglas-fir, with minor components of western hemlock, white pine, black cottonwood, red alder, and bigleaf maple. Timber harvest over the last few decades has varied in size from 1-acre salvage harvests to 50+ acre clearcuts. Silviculture treatments have also been implemented, such as mechanical brushing treatments, pre-commercial thinning, slashing, commercial thinning, and nonnative species removal.

Figure 7 shows Site Classes across Utility lands. Site Class refers to the site's maximum vegetative productivity in terms of timber production. The site index is the average height of dominant trees within a stand at a given base age. For example, Douglas-fir with a site index of 125 using base age 100 should be approximately 125 feet tall at age 100. Site indexes are grouped into site classes ranging from I (highest) to V (lowest). The predominant site class for Utility lands is Site Class III as illustrated in Figure 7. Site class information is from WADNR and based on a base age of 100.

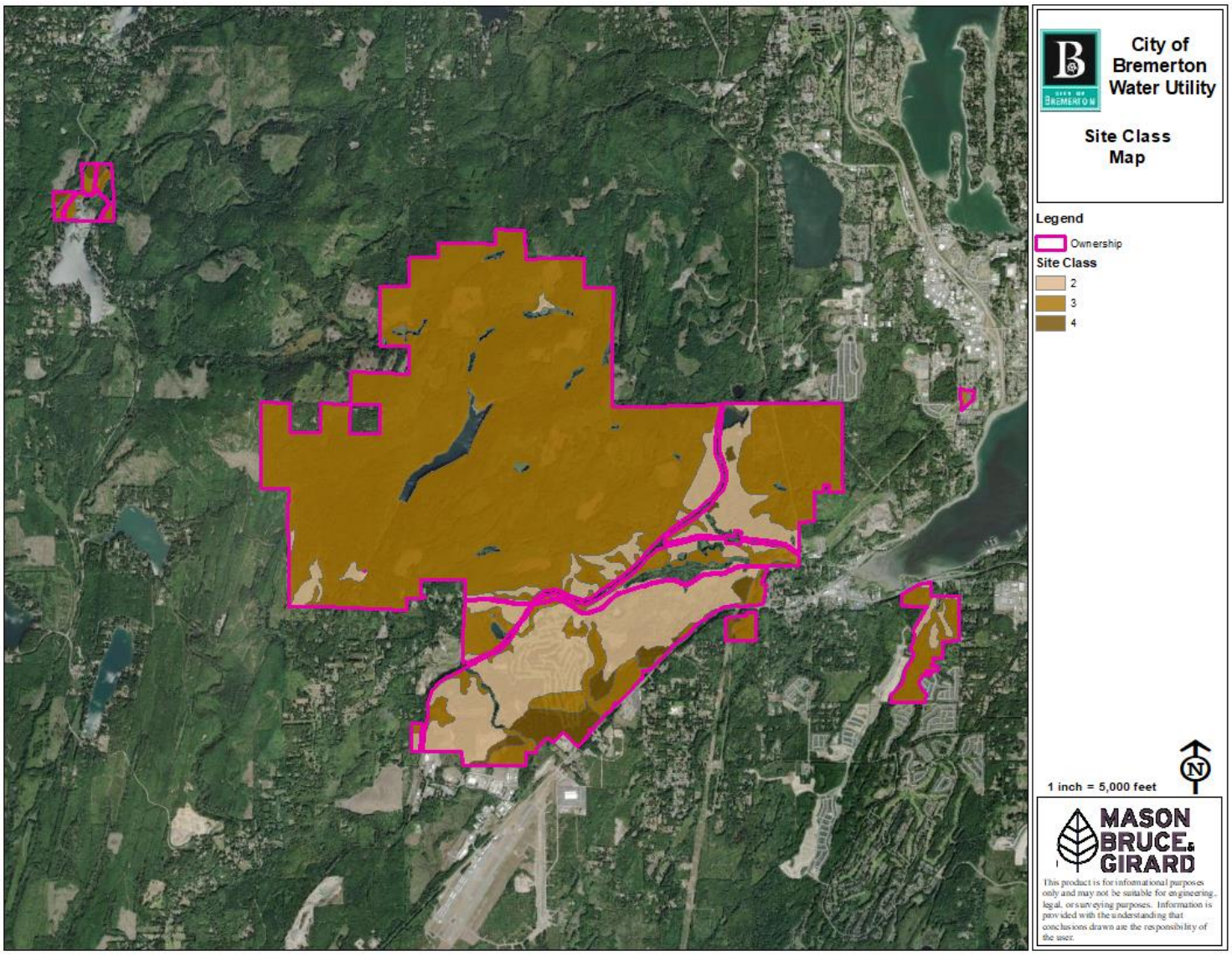


Figure 7. Vegetative Productivity Site Classes

Road System

Utility lands feature a well-maintained road system which represents less than 2% of land surface within Utility lands. Most roads are rocked, all season roads, with a small component of dirt spur-roads that are for seasonal use only. Based on a GIS analysis, there are approximately 56.6-miles of mapped roads within the Utility lands, not including some minor spur-roads or biosolids-application trails. There is a total of 26.4 miles of biosolids trails located on Utility property. This road system includes nine bridges, all of which have been field verified and confirmed to be sound and functional (Figure 8). Out of the nine bridges, one will need to be updated or replaced within the next 20-years. Below is photograph of an example bridge in good condition, located on Utility land.

Photo 1. Photo of Fully Functional Bridge Number 7

There are 256 mapped culverts on the Utility lands, varying in size from 18 to 66-inches in diameter. All mapped culverts and bridges include latitude and longitude, road location, elevation, diameter, length, and culvert-type information. There are 36 undersized or aging culverts identified for replacement by the Utility. A large portion of the culverts are corrugated metal pipes installed pre-Road Maintenance and Abandonment Plan (RMAP). They are currently not identified as needing to be replaced but they may require replacement depending on the condition as time progresses. Figure 8 presents the approximate locations of the bridges and culverts within the Utility property.

The Road Maintenance and Abandonment Plan (RMAP) was developed by the WADNR in 2001. This process allowed landowners to create an inventory of their forest roads and infrastructure with the purpose of improving forest roads and infrastructure to current practice standards. In 2001, the Forestry Division contracted Olympic Resource Management to complete road maintenance plans to meet the planning requirements of the RMAP. Per the 2001 RMAP Report, the information collected was used to identify areas that did not meet forest practices rule standards, and to schedule needed upgrades or repairs to be completed by 2016. The findings, recommendations, and detailed work plans for remediation can be found in the City's 2001 RMAP Report.

Road Maintenance and Abandonment Activities

After Olympic Resource Management conducted the road maintenance plan in 2001, the Forestry Division completed all identified projects and remedied any flagged issues within the original RMAP report. It was determined in the 2001 RMAP report that the overall condition of the road system within the Utility property was good, due to most of the roads being well constructed, receiving little winter-time traffic, and effectively handling high water flows. Some general recommendations at the time were to consider more relief culverts to help mitigate road surface erosion and potential for sediment delivery. A list of corrective actions was identified for all road-related problems. These actions were given a priority rating and can be found within the 2001 RMAP Report. A comprehensive action report of all RMAP related work/reviews planned or completed can be found in the Annual Accomplishment Report Through October 31, 2016.

Recent road maintenance and construction activities within Utility ownership include the installation of two new bridges in 2024. This effort was part of the 5000-Road Project to improve access as well as reduce risk of erosion. Photos of the Vessey (Photo 2) and Railcar (Photo 3) bridge replacements are shown below.

Project work also included the replacement of eight culverts, and improvement of approximately 1.5 miles of road. In 2016, two forest road culverts were replaced with bridges to improve fish passage on Gorst Creek. The Anderson Creek Dams Removal project removed two earthen and concrete dams along the upper west and east forks of Anderson Creek (Photo 4). Historically, these dams were retained as a public water supply for the Utility but were no longer in use and were removed to allow for fish passage and habitat restoration. This project was completed in 2024 and received an American Council of Engineering Companies Silver Award for complexity.

Photo 3. Vessey Bridge Replacement

Photo 2. Railcar Bridge Replacement

Photo 4. Anderson Creek Concrete Dam Removal Area

Forest Inventory Data Collection Methodology

A critical step in updating the Utility's forest inventory was the forest inventory cruise (cruise) of a specified list of stands within the Utility's forestland. The complete forest inventory is in Appendix A. The purpose of the cruise was to create a stand-based forest inventory for all stands on the property, which will yield statistically sound estimates of typical forest inventory metrics and provide the information necessary to calculate sustainable harvest levels and growth projections. This type of cruise should be done every 10-years to have accurate inventory information for planning purposes. For more details on implementing a forest inventory update, refer to the forest inventory part of the Implementation Plan section.

Stands were selected for cruising based on existing inventory data, targeting the highest volume stands. A total of 80 stands were selected to be cruised, 78 of which consisted of merchantable timber, and two that consisted of pre-merchantable timber. A total of 3,089 acres were cruised for this inventory update. The remaining merchantable stands were visited in the field and assigned stand level data of similar stand types. The un-cruised stands can be distinguished in the inventory summary information by the '<Null>' Cruise Date and Data Source of 'Copied', and feature estimates of volume, species, composition, and trees per acre.

All pre-merchantable and regeneration stand types were delineated using a combination of GIS/aerial photography and field verification to determine species composition, stocking, vigor, estimated age, and any silviculture treatments previously conducted or recommended.

The following data were collected for all forest stands (if applicable):

- Unique Stand ID
- Gross Acres
- Net Acres
- Harvest Year
- Birth Year
- Age

- Stocking
- Pre-Commercial Thinning (PCT) Year
- Silviculture Notes
- Timber Use
- Timber Type
- Cruise Date
- Major Species
- Timber Volume (Merchantable Age Class)

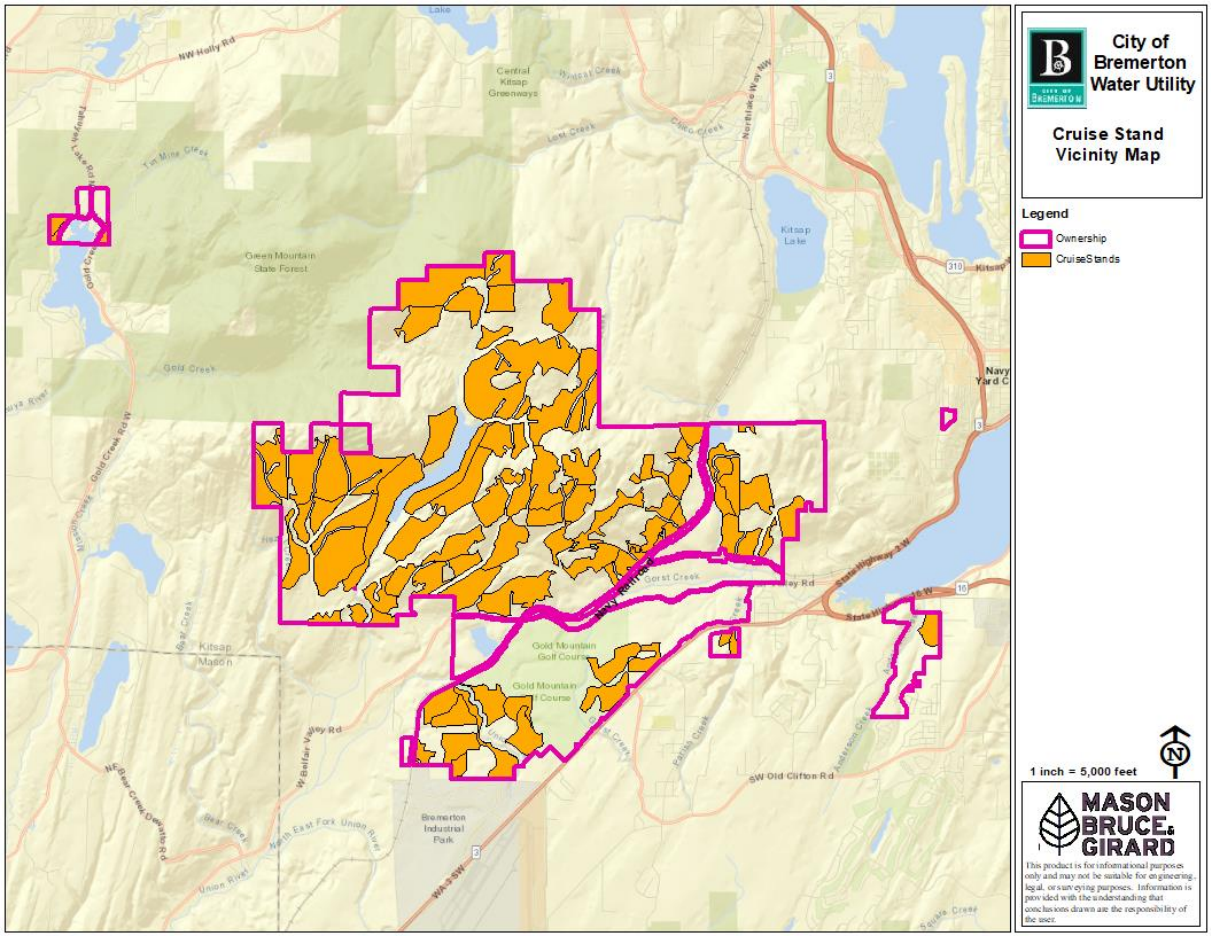


Figure 9. Cruise Stand Vicinity Map

Using GIS software, cruise maps were generated for all 80 stands to be cruised. Figure 9 shows the stands that were cruised for the 2024 Inventory. Plot spacing was determined by stand, based on stand acres; small stands had a greater plot concentration than large stands. Five to 30 plots were established in each stand and were established using a square grid with a random origin to ensure equal and unbiased distribution across the stand. The distance between plots ranged from-3 chains (198 feet) to 8.5-chains (561 feet). Below is an example plot map for a given stand (Figure 10).

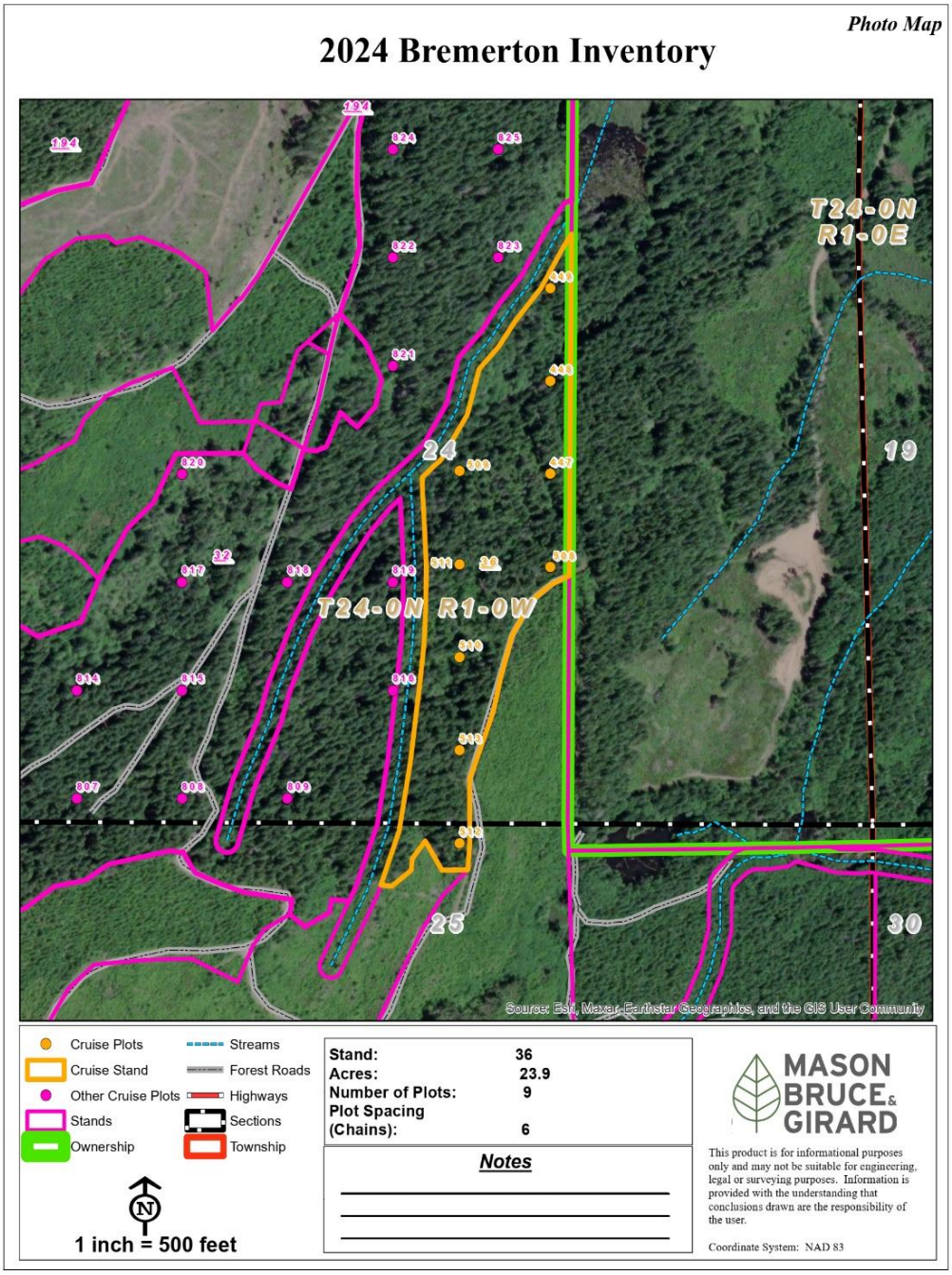


Figure 10. Example - Stand Plot Map

Timber cruisers collected data at each plot for all live trees, including seedlings, using a combination of fixed radius plots and variable radius plots. Tables 7 and 8 below show the cruise measurements recorded at each plot. Variable radius plots use a prism factor, where trees are selected based on size and distance from plot center. Fixed radius plots have a fixed area, where all trees that meet specifications within the fixed plot area are recorded. Variable radius plots are typically used for older forest types, while fixed radius plots are typically used for younger forest types (i.e. regeneration).

Table 7. Tree Data Collected on Fixed Radius Plots

Item	Frequency	Notes
Species	Every tree	2-character code
Tally	Every tree	Tally the number of trees by species and diameter class – Maximum of 10
Diameter Class	Every diameter class	Group tally to the nearest 1-inch diameter class. For trees less than 4.5 feet tall, record a diameter of zero inches
Component Code	Every tree	Description code of tree status (typical live tree, cull tree, or broken topped tree)
Average Height	Every species/diameter class	Determine the average height of each species/diameter class combination
Live Crown Ratio	Every tree greater than or equal to 4.5 feet tall	Determine the average live crown ratio by species and diameter class for trees that are greater than or equal to 4.5 feet tall

Table 8. Tree Data Collection on Variable Radius Plots

Item	Frequency	Notes
Species	Every tree	2-character code
Tally	Every tree	Only enter value greater than 1 for edge-plot trees
DBH (Diameter at Breast Height-4.5 feet)	Every tree	Nearest Inch
Component Code	Every tree	Description code of tree status (typical live tree, cull tree, or broken topped tree)
Live Crown Ratio	Same trees as measured for total height	Nearest 10% ocular estimate of percentage live crown
Total Height	1st and 3rd trees per species on each plot and trees with defect that impacts total height	Measure total heights across the range of diameter classes for all species to the nearest 1.0-foot
Broken Top Height	All trees with a broken top	Record in the total height column to the nearest 1.0-foot
Percentage Defect & Breakage by Tree Thirds (Bottom, Middle, Top)	Every tree with defect (No total height necessary)	Nearest 10% Minimum Length = 12-feet Minimum Diameter (Scale End) = 5-inches

Quality control was conducted by check cruising to ensure the data collected were consistent and accurate throughout the project. Check cruising was performed for each member of the cruising field crew (cruiser). A stand was selected at random and five continuous plots were selected from that stand, per cruiser. Table 9 below shows the check cruising tolerances and acceptable rates of error.

Table 9. Check Cruise Tolerances

Measurement	Description	Maximum Acceptable Rate of Error
Number of tally trees	Correct tally of trees within plot	0%
Tree Species	Correct species identification	0%
DBH (Diameter at Breast Height-4.5 feet)	Diameters measured with an accuracy of +/- 1.0 in.	5%
Total tree height	Heights measured with an accuracy of +/- 10%.	5%
Broken top height	Heights measured with an accuracy of +/- 10%.	5%
Tree Component code	Correct tree component code	0%
% defect	Record % defect with an accuracy of +/- 10%	10%

In the event of substandard work by any cruiser, the following steps were taken:

- On-site training and review of the instructions and protocols
- Visit a plot where measurements were out of tolerance and review cruise specifications.
- Return to cruise plots and remeasure.

The check cruiser determined if a cruiser's work needed to be redone. If substandard work continued, the check cruiser and project manager determined if a cruiser needed to be removed from the project.

A total of 20 plots were checked across three timber cruisers. There were some minor differences, but all work was considered acceptable. One cruiser had some measurements out of tolerance at the plot level, which led to additional plots being checked for that cruiser. All additional plots checked were within tolerance and showed acceptable rates of error.

Inventory Results

A "Stand Lister" spreadsheet, with a tabular data summary for each stand, and a shapefile of the Utility 'Stands' layer, was provided to the Utility.

Table 10 below displays inventory volume by area across all Utility lands. Volumes shown are in thousand-board-feet (mbf).

Table 10. Current Timber Volume Summary

Area	Volume (Timber over 35-years-old)
McKenna Falls Intake Subbasin	64,848
Other Utility Lands	50,636
Total:	**115,484**

Figures 11, 12, and 13 show the merchantability, age class, and volume distributions across all Utility lands. Note that over half the volume is within the McKenna Falls Intake Subbasin. This indicates a lower harvest level historically and reflects the primary management objectives for the subbasin, which are water quality protection and forest health.

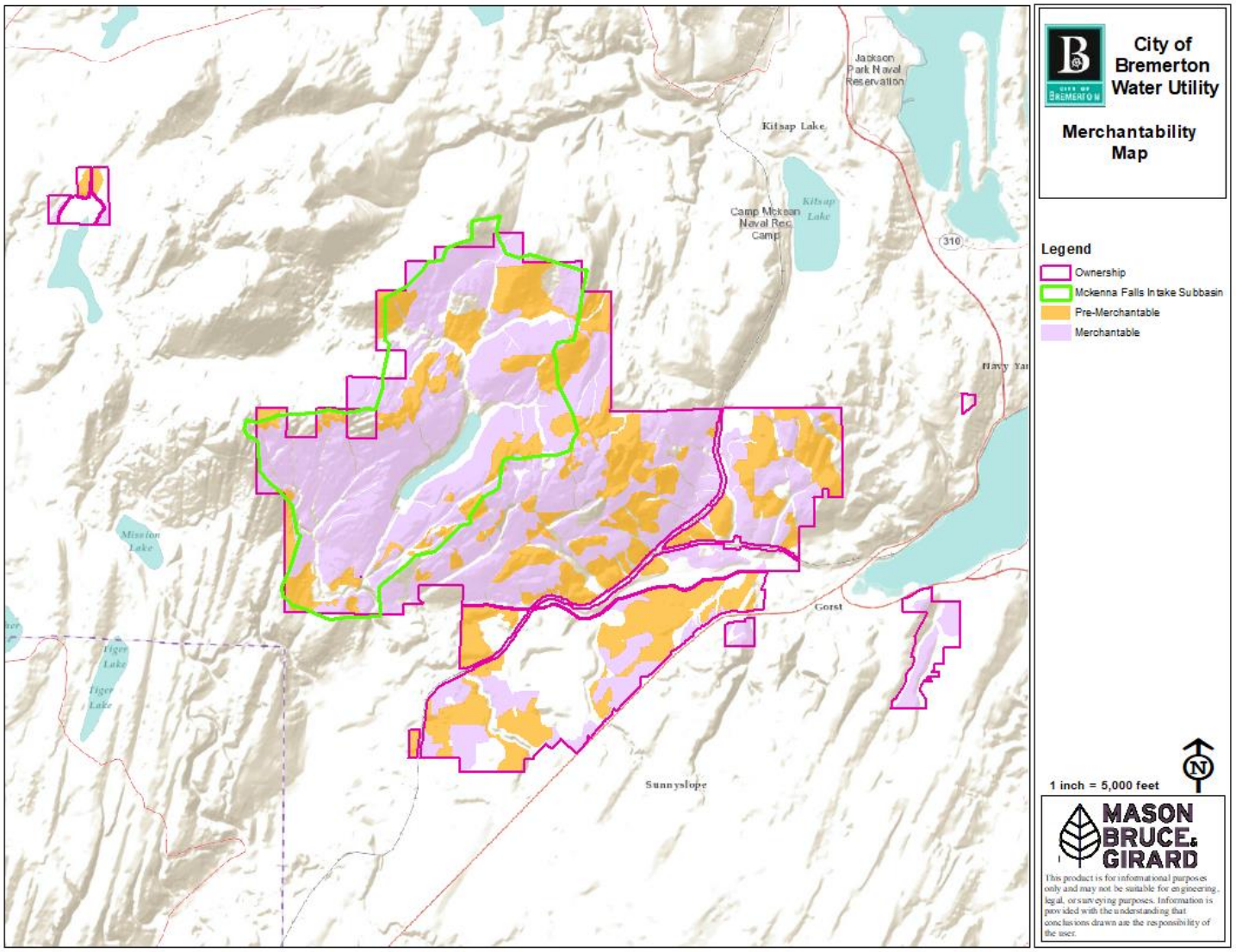


Figure 11. Merchantable and Pre-Merchantable Stands

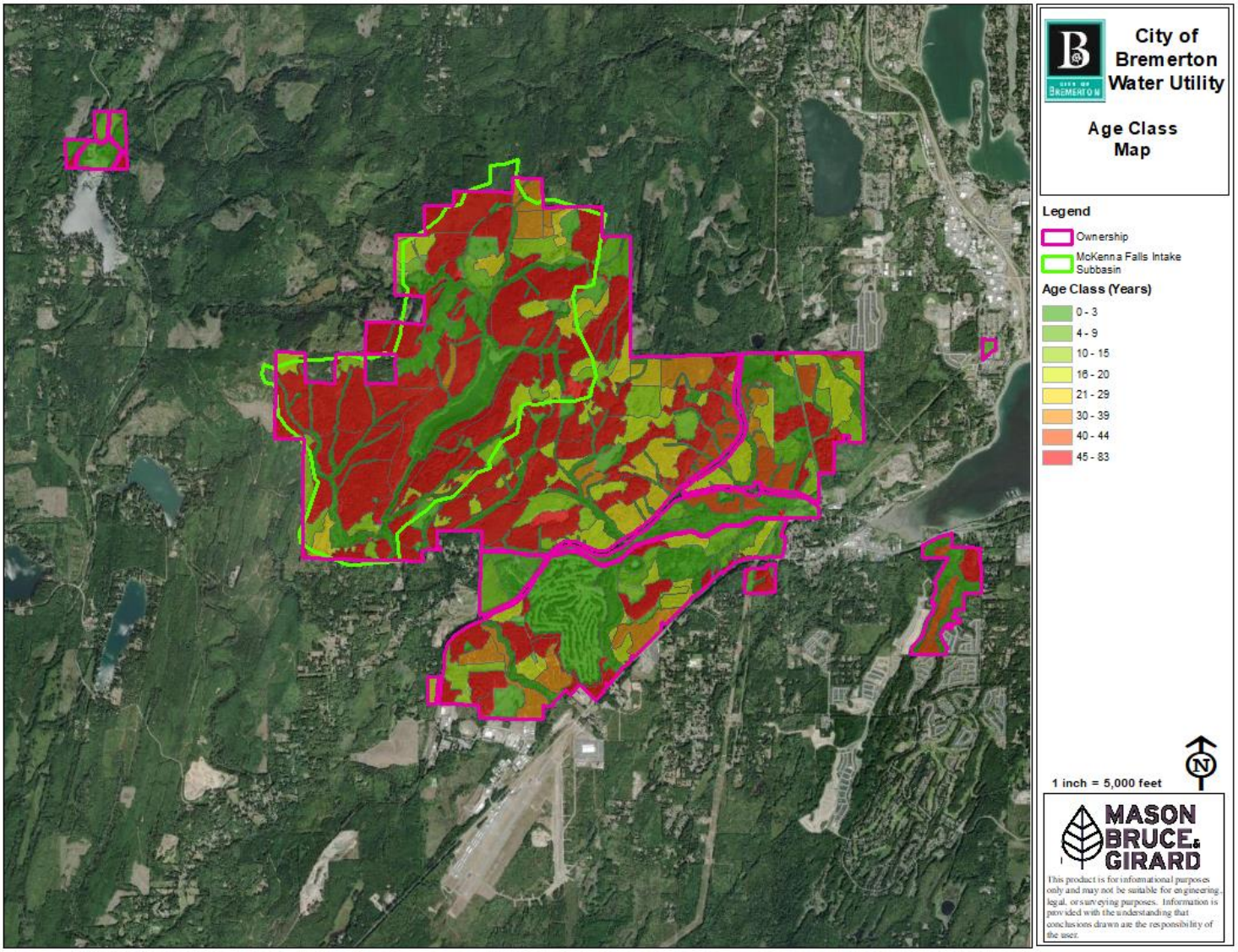


Figure 12. Age Class of Stands

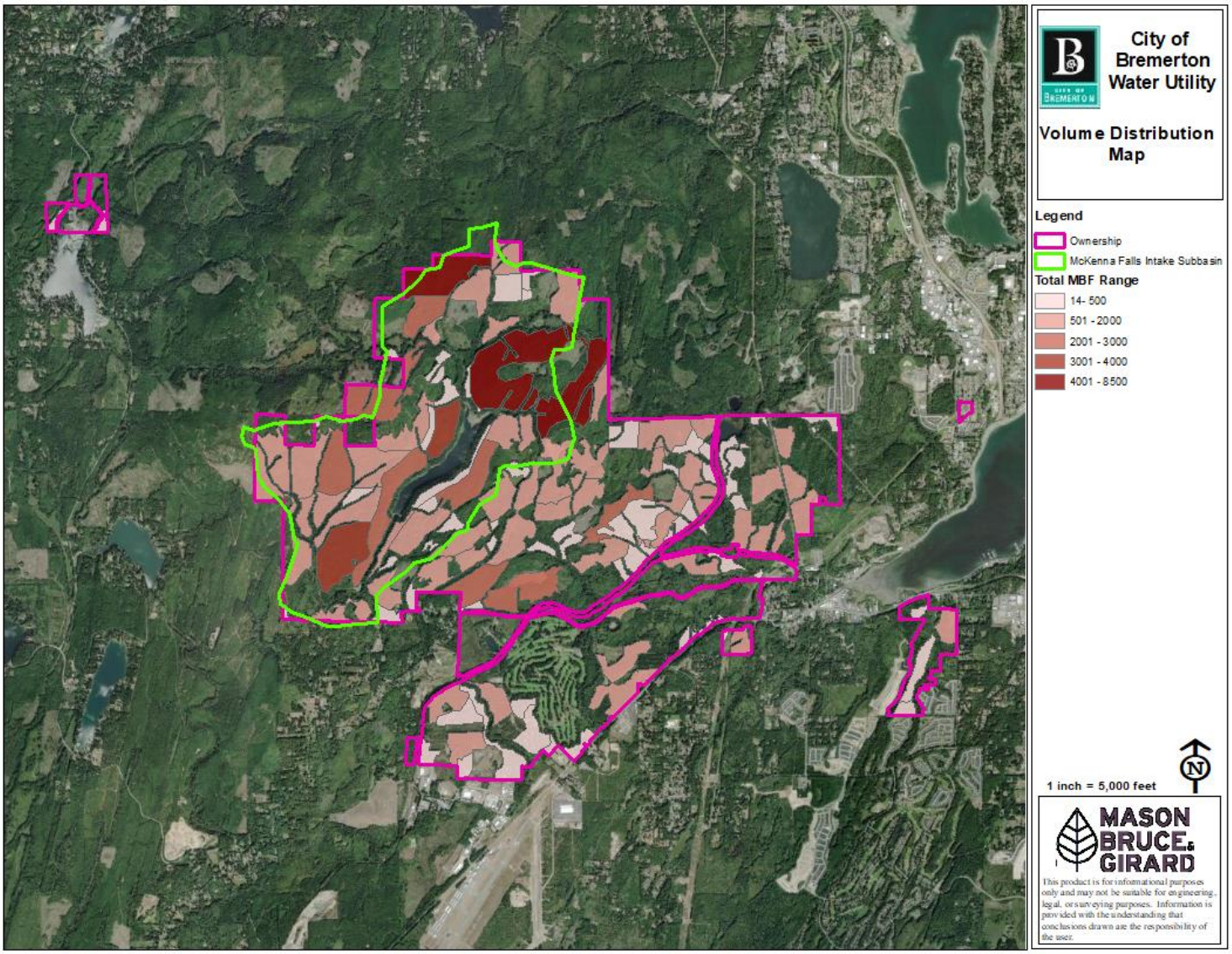


Figure 13. Merchantable Volume

Minor Forest Products

The Utility currently has a contract in place for the sale of minor forest products to I.E.F. Corporation – Golden Eagle Evergreens. The contract allows for the harvest and sale of salal and huckleberry as well as the boughs of western redcedar, western white pine, and Douglas-fir from specific areas within the Utility ownership. The contract stipulates that no entry is allowed during inclement weather, which is when roads, streams, and wetlands are at higher risk of damage. Entry is also prohibited within water intake areas, well head protection zones, and the Sergeant Honsowetz Police Firearms Training Facility, unless authorized by the Utility. A similar agreement is expected to be put in place for the Suquamish tribe to collect minor forest products such as western redcedar bark. Minor forest product sales when conducted in small amounts are not expected to impact water quality throughout Utility land. An increase in patrol of the harvest areas may be necessary to ensure compliance with the access permit rules and harvesting specifications.

Carbon Credit Sales

Carbon credit sales from Utility land is described in detail in the Carbon Project Considerations Special Topic Memo in Appendix B.

Forest Health

Forest health is generally defined as the overall ability of the forest to resist or contain potential forest pathogens, insects, and wildlife damage that can suppress growth or cause mortality. Figure 14, which features WADNR Forest Health Data, illustrates the general locations of various potential insect, disease, and other issues; note that observations on the ground revealed minor issues in most cases. Only routine amounts of mortality and blowdown, which are common in many mature forests, were found during the inventory cruise and other field inspections.

Laminated Root Rot

Laminated root rot is a common root disease, caused by the fungal pathogen *Phellinus weirii*, which results in tree mortality and significantly affects forest stands in the Pacific Northwest (USFS 1981, USFS 1995). Surveys were conducted in 2019 on Utility land and found laminated root rot throughout the ownership as depicted in Figure 15 (Semler 2019). Semler (2019) recommended allowing natural succession to occur and/or harvesting highly susceptible species within the infected pockets of trees where the disease is present. Buffer strips implemented around infected pockets, or stump removal are also effective methods of treatment. When reestablishing a recently harvested root rot area, disease-resistant species should be favored for planting (see Silviculture section for details). For those laminated root rot locations within the McKenna Falls Intake Subbasin, it is imperative these areas are monitored and aggressively treated as necessary to prevent stand disturbance from expanding due to blowdown and subsequent insect issues. Large disturbances to stands within the watershed could lead to water quality issues as soils become exposed and more susceptible to erosion.

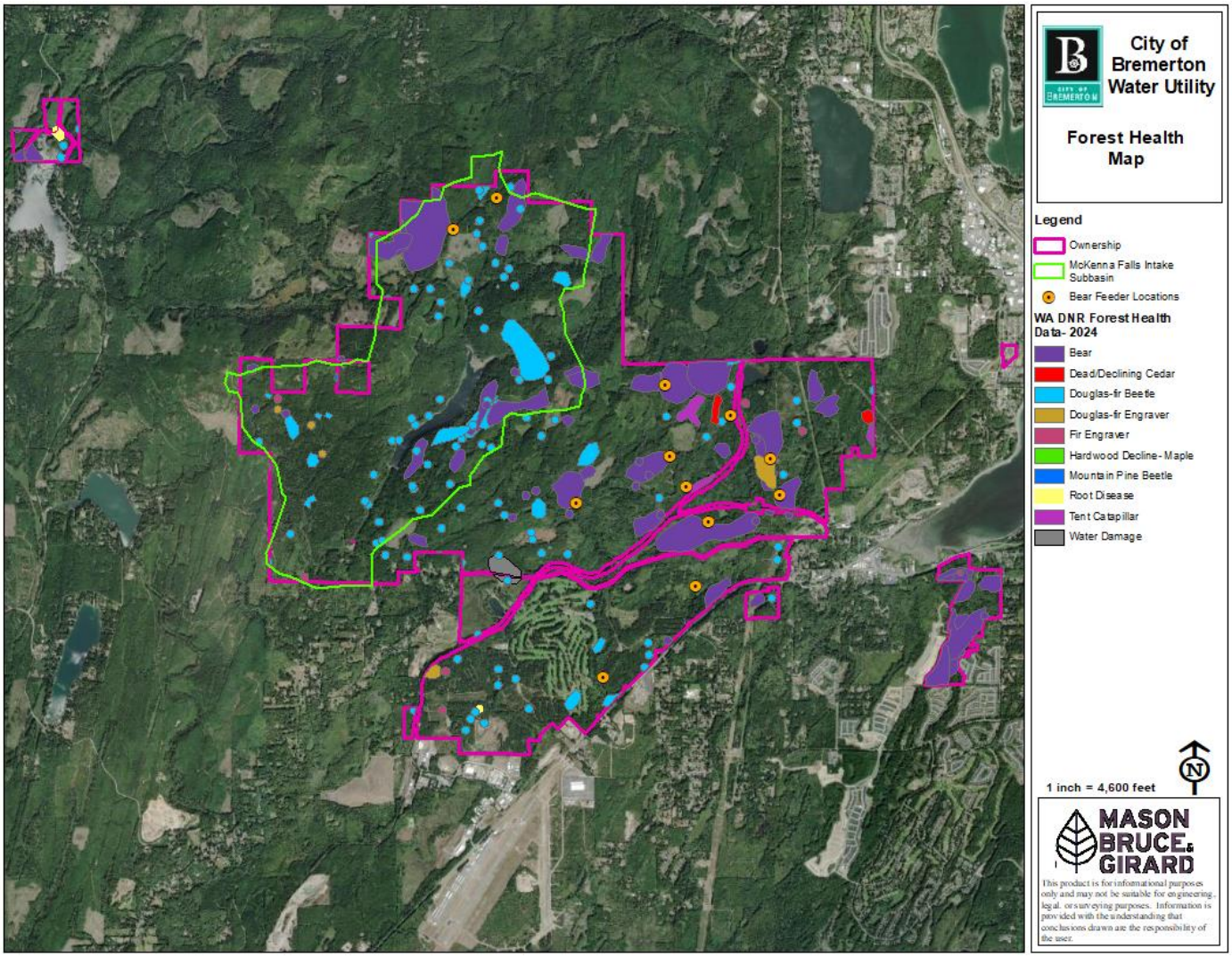


Figure 14. Utility Forest Health

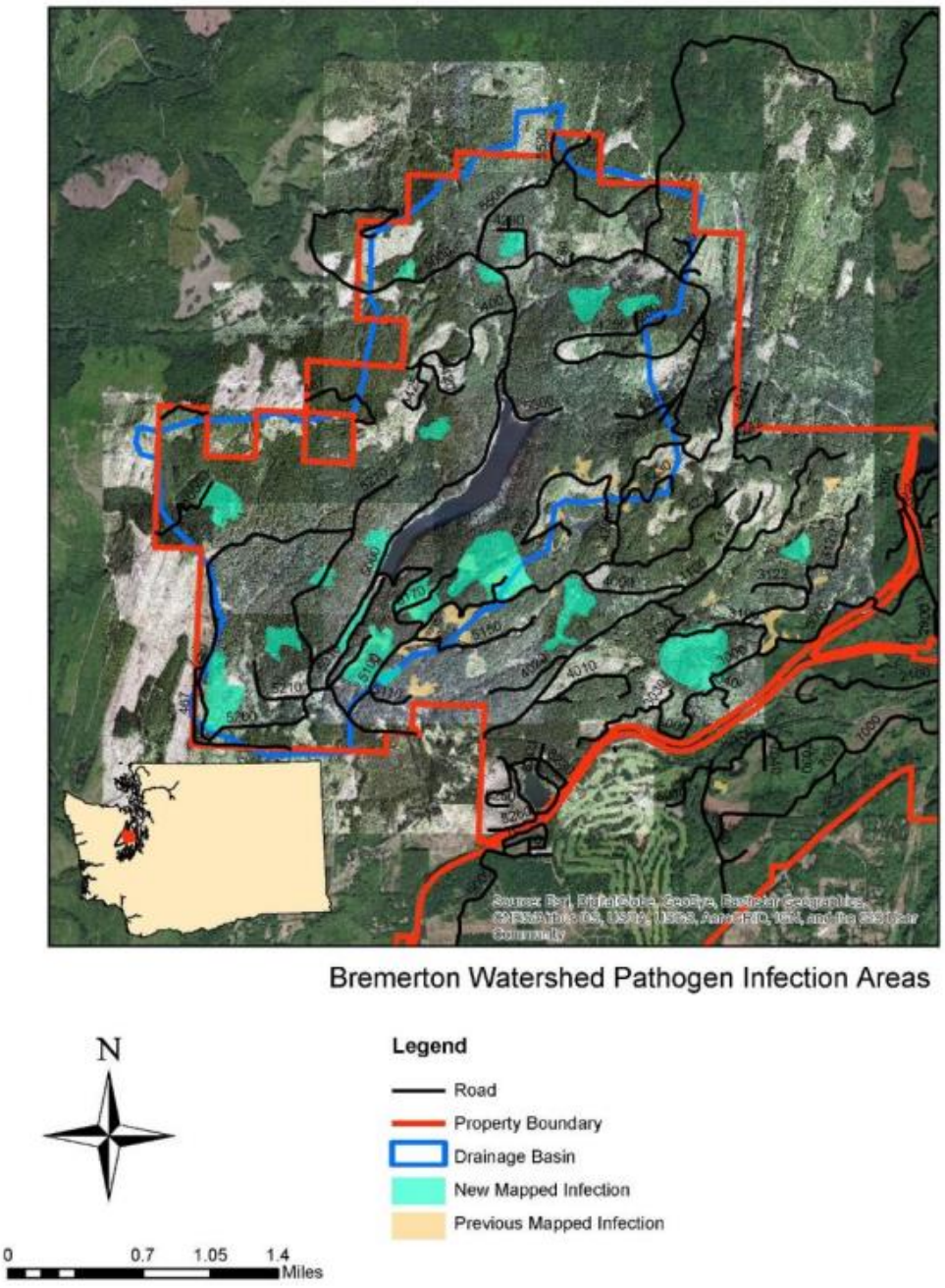


Figure 15. Laminated Root Rot as Mapped by Semler 2019

Nonnative Species Management

The primary nonnative species that must be addressed on Utility lands are Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus*), and knotweed (*Polygonum sachalinense*). Figure 16 shows the primary areas where Scotch broom concentrations exist, which lie mostly within the wellhead protection areas and within 1,600 feet of Twin Lakes. The use of broadcast herbicide is prohibited in these water protection areas per the City's Critical Areas Ordinance (BMC 20.14) and the City's adopted Integrated Vegetation Management Plan. Therefore, vegetation must be managed manually, which is very labor intensive and results in higher concentrations of nonnative species in these areas. Recently harvested units and younger plantations are at higher risk for nonnative species. Increased monitoring and mitigation are highly important during the first few years of stand establishment to ensure plantations are free-to-grow.

Bear Damage

Black bears are present on Utility lands and can have a significant effect on the health of Douglas-fir stands (See Figure 14). Bears will claw at the bark of trees to access and eat the cambium layer, which will at a minimum leave the tree defective on one side, or in the most severe instances will girdle and kill the tree. Feeding stations may be used in areas with high bear concentrations, where bears are fed nutritional pellets that contain higher amounts of sugar than they find in the tree cambium layer. This method of providing the bears with an alternative to tree cambium has mixed results. If bear damage becomes too widespread and is affecting the overall health of the forest, a method of bear removal may be necessary.

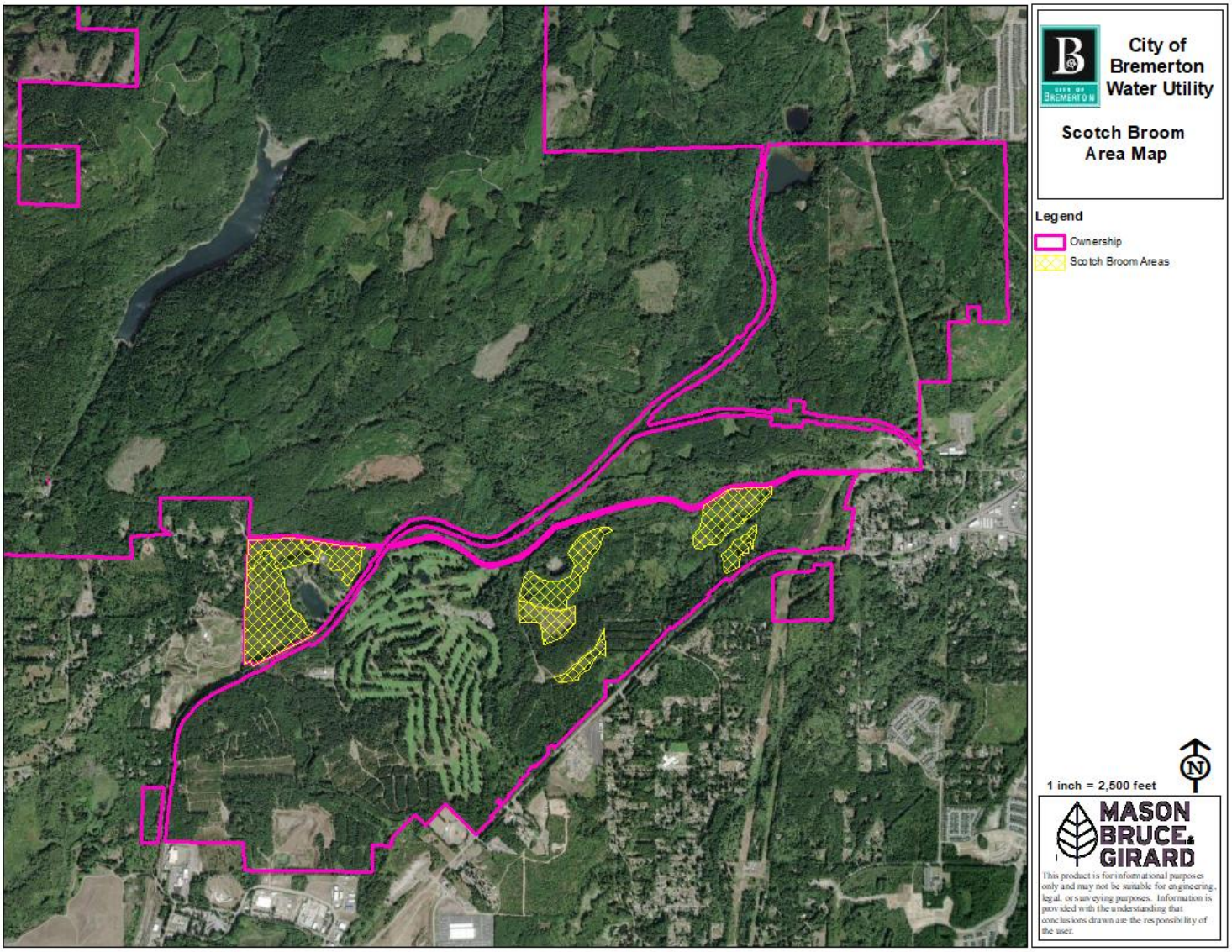


Figure 16. Scotch Broom Areas

Silviculture Practices

The U.S. Forest Service defines silviculture as “the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis” (Powell 2013). This is accomplished by applying different types of silvicultural treatments such as thinning, harvesting, planting, pruning, prescribed burning and site preparation. Intermediate treatments (thinning and pre-commercial thinning) are designed to enhance growth, quality, vigor, and composition of the stand after establishment or regeneration and prior to final harvest. A silvicultural prescription is a document which has a planned series of treatments designed to change current stand structure and composition of a stand to one that meets management goals. The prescription normally considers ecological, economic, and societal objectives and constraints.

Various silviculture applications have been used on Utility lands, including pre-commercial thinning, commercial thinning, final harvest, reforestation, salvage harvest, mechanical brushing, slashing, nonnative species removal, and herbicide treatments.

There are silviculture areas of concern throughout the property, both within the McKenna Falls Intake Subbasin and on other Utility lands. Concerns include under- or overstocked regeneration and pre-merchantable units, high concentrations of competing brushy vegetation, and areas of dense nonnative species. Figure 17 shows the primary Silviculture Concern Areas. Due to the high component of competing brushy vegetation within some of the regeneration units, interplanting and nonnative species mitigation must be a top priority.

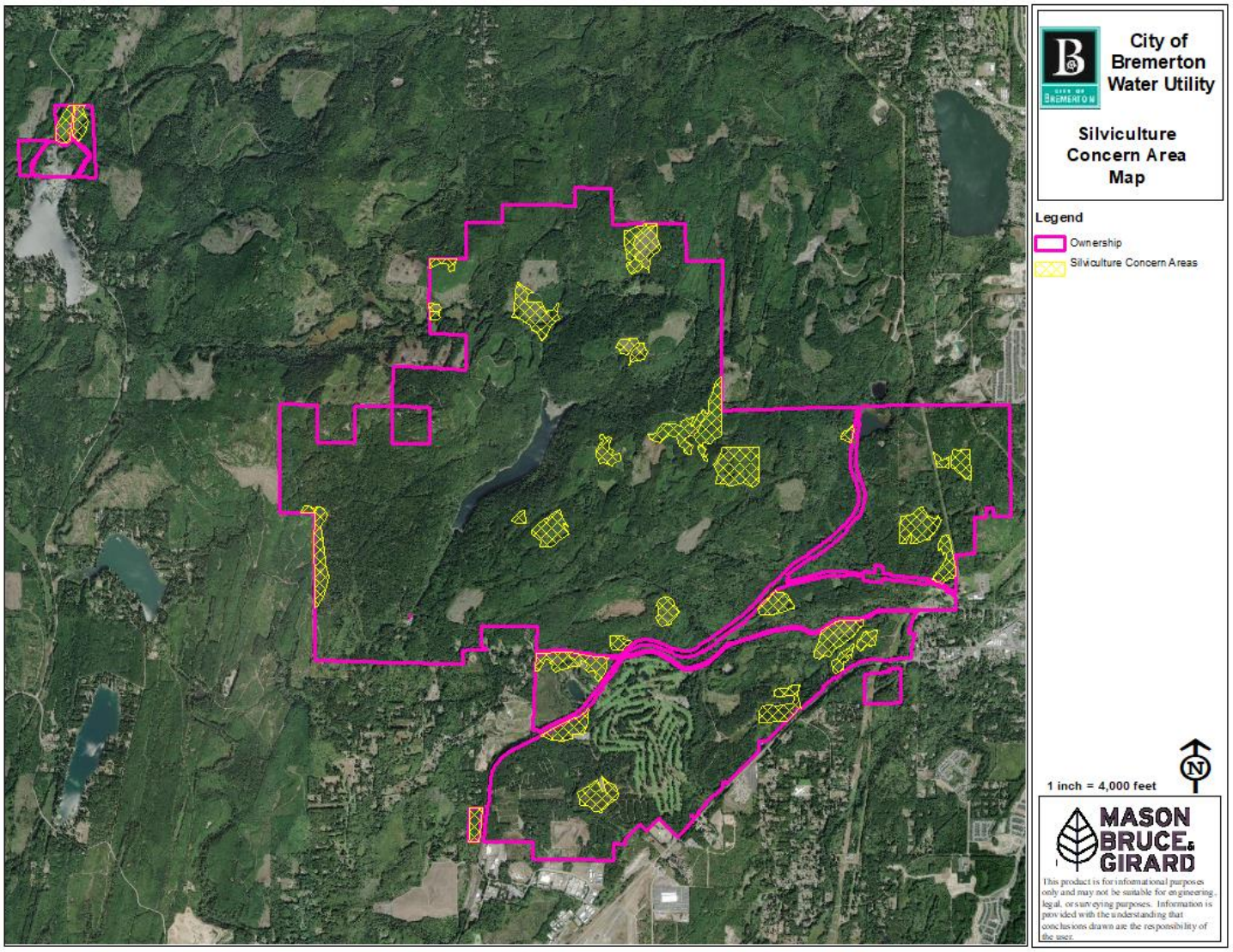


Figure 17. Areas of Silviculture Concern

Harvest Planning

Timber Harvest planning is a multifaceted endeavor that must consider over time the landowner's management objectives, resource protection, site conditions, harvest type, and economics. Prioritizing the Utility's objectives within the harvest planning process assures appropriate and successful management and stewardship of Utility forestland. Table 11 is a guide for harvest planning considerations.

Table 11. Harvest Planning Considerations.

Site Conditions	Economic Factors	Harvest Type	Resource Protection	Management Objectives

Water	Short- and Long-Term Income Needs	Even-aged Harvest	Water Quality/ Protection of Drinking Water	Maintaining "Unfiltered" Water Source Status
Topography	Logging Methods and Cost	Selective Harvest	Riparian and Wetland Management Zones	Riparian Protection
Soil	Reforestation Methods and Cost	Pole Harvest	Timing of Harvest	Protection of Surface and Ground Waters
Forest Health	Future Project Cost	Cable Logging	Fish and Wildlife	Maintaining Forest Health/Resiliency
Stand Type	Tax Considerations	Ground-Based Logging	Archaeological, Cultural, and Historical Sites	Minimizing Disturbance
Aspect	Log Market/ Timing	Salvage Logging	Threatened and Endangered Species	Timber Revenue

These considerations must be addressed when planning any harvest activity. This allows the Forestry Division to continually monitor and align the harvest plans with the Utility's management objectives. It is important for the Forestry Manager, in consultation with the Water Utility Manager, to conduct an annual review of completed harvests and future harvest plans to ensure harvests are aligned with the goals of the Utility.

Reforestation

Reforestation is the process of establishing a new forest either naturally by leaving seed trees or artificially by planting seedlings. This is a critical aspect of sustainable forest management, as it is establishing the forest life cycle and will in large part determine the success of a forest landscape. Timely reforestation and planting of trees suited to the site ensures that trees are established ahead of competing brush or nonnative species. The Washington Forest Practice rules require that three years post-harvest there are 190 free-to-grow trees per acre. Planting more trees than required by the Forest Practices Rules allows for the loss of trees due to deficient microsites, animals, and potential drought conditions.

Successful reforestation consists of three main planning categories: Site preparation, seed/tree selection, and correct planting preparation.

Site preparation is necessary when harvest units are left in a condition unsuitable for planting. Site preparation includes reducing competing vegetation and slash disposal, while minimizing soil disturbance. Certain aspects of site preparation are initiated before the timber has been cut, such as how slash will be piled during the harvest. Planning ahead allows the Utility to potentially choose harvest methods that will help create favorable conditions for planting.

The selection of appropriate trees for specific site conditions is critical for successful establishment of the new forest stand. Figure 18 is a Washington seed zone map for Douglas-fir.

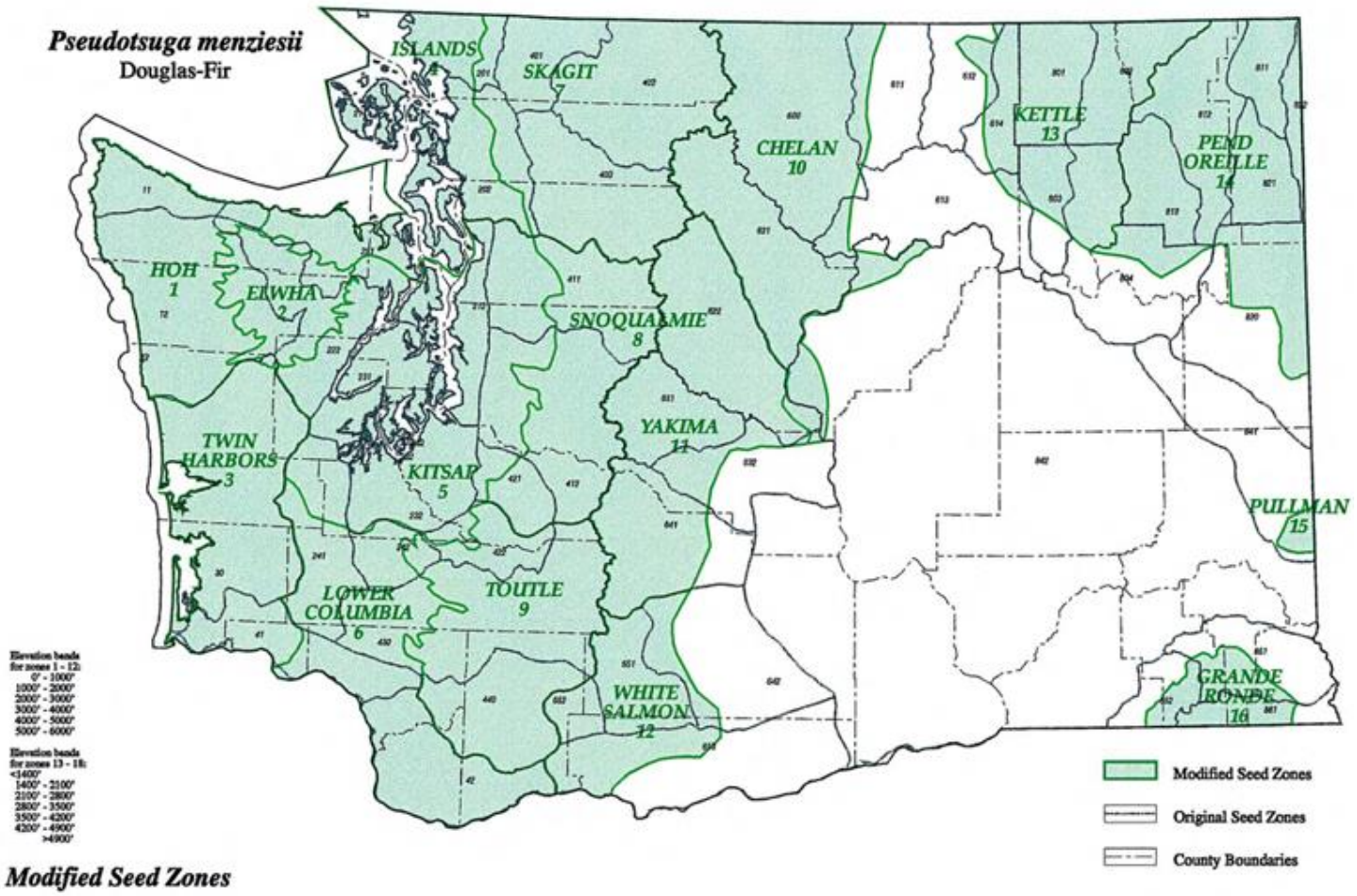


Figure 18. Washington Modified Seed Zones (WADNR 2002)

Planting alternative species for site specific reasons may be necessary to successfully establish the new forest stand. Planting western redcedar in wet areas or creek drainages where Douglas-fir may not thrive can ensure full establishment of the new stand. In areas severely infected with laminated root rot, using alternative species such as western redcedar or pine will ensure a healthy stand and improve the health and resiliency of the overall forest landscape.

Planting preparation is critical for reforestation success, and includes seedling care and handling, correct planting techniques, proper seedling storage, and planting timing. Weather, road conditions, contractor availability, seedling storage, and crew experience are examples of the many variables the Utility should plan for during planting season. One limiting factor when it comes to proper planting preparation is planter supervision. Assuming every aspect has been properly planned, it is important to have a forester, foreman, or trusted contractor present while trees are being packaged at the nursey, transported to storage, loaded for planting, and planted on site. Correct planting of the seedlings on a specific site can alone change the trajectory of reforestation success. Figure 19 shows planting errors to avoid when hand planting bare-root seedlings.

Figure 19. WADNR Forest Practice Rules Illustrated

Post Establishment Management of Vegetation

Post establishment management of vegetation includes pre-commercial thinning, commercial thinning, pruning, slashing, nonnative species control, herbicide applications, and managing competing brush. This range of management practices help to promote overall forest growth, health, and productivity. As a specific site on the forest landscape matures, these practices become less frequent or necessary. It is paramount for effective stand establishment to use tools like the ones listed above to ensure long-term sustainability, overall forest health and resiliency, and to optimize timber quality and value. These management practices are site specific and should be part of each years' planning process.

Biosolids Management Program

The Utility utilizes approximately 738 acres of Utility land at two separate sites for biosolids application (See Figure 20). This application is permitted by the Department of Ecology and administered locally by the Kitsap Public Health District and is the longest running forest application program in Washington State. The Forestry Division manages the biosolids application in full compliance with permit requirements. The process enhances tree growth in application areas and provides a cost-effective method of biosolids disposal, reducing wastewater treatment plant costs.

This program has been actively applying biosolids to a designated area of forestland since 1992. The permitted area of both sites is approximately 516 acres. Site 1, located west of Gold Mountain Golf Course, is approximately 361 acres and site 2, located east of Gold Mountain Golf Course, is approximately 155 acres (Figure 20). At the start of the program, application load limits were established and environmental monitoring indicated no known adverse impacts on soils, groundwater, or streams. Target nitrogen rates were developed with the consideration for silviculture nutrition, stand

age, site conditions, soil types and understory vegetation. Refer to the 2024 Biosolids Program Annual Report for specific amounts of applied dry tons/acre (Department of Ecology 2025).

The forest within the application area has historically shown a low-level increase of individual tree diameter and height growth over time. While research is still ongoing as to the benefits of biosolid applications, notable improvements to the forest structure and soils is quantifiable. "Typically forest soils have relatively small quantities of nutrients and organic matter, which can inhibit tree growth. Biosolids can play a valuable role by amending the soil, providing essential nutrients such as nitrogen and phosphorus, and improving soil structure. The fine particles and organic matter found in biosolids can quickly enhance soil moisture and nutrient-holding characteristics, and in the long-term continue a slow release of nutrients to the soil as the organic matter decomposes, permanently improving site productivity. Most tree species grow faster from the application of biosolids; however, some respond more dramatically than others. Douglas-fir, the Pacific Northwest's premier timber species, responds very well, with an increase in growth of up to 75 percent. Within six months of applying biosolids to a conifer forest, understory plants grow more vigorously and display a deeper green color than before the application. This understory vegetation is also typically higher in nutrients, serving as a better food source and habitat for wildlife. The lush understory is not only visually pleasing but can be of commercial value as quality alternative forest products are produced in the form of ferns, salal, and other vegetation for floral arrangements" (NW Biosolids 2018). Photo 5 shows a photo of an application vehicle and biosolids storage area.

Photo 5. Application Vehicle and Biosolids Storage Area (August 3, 2022)

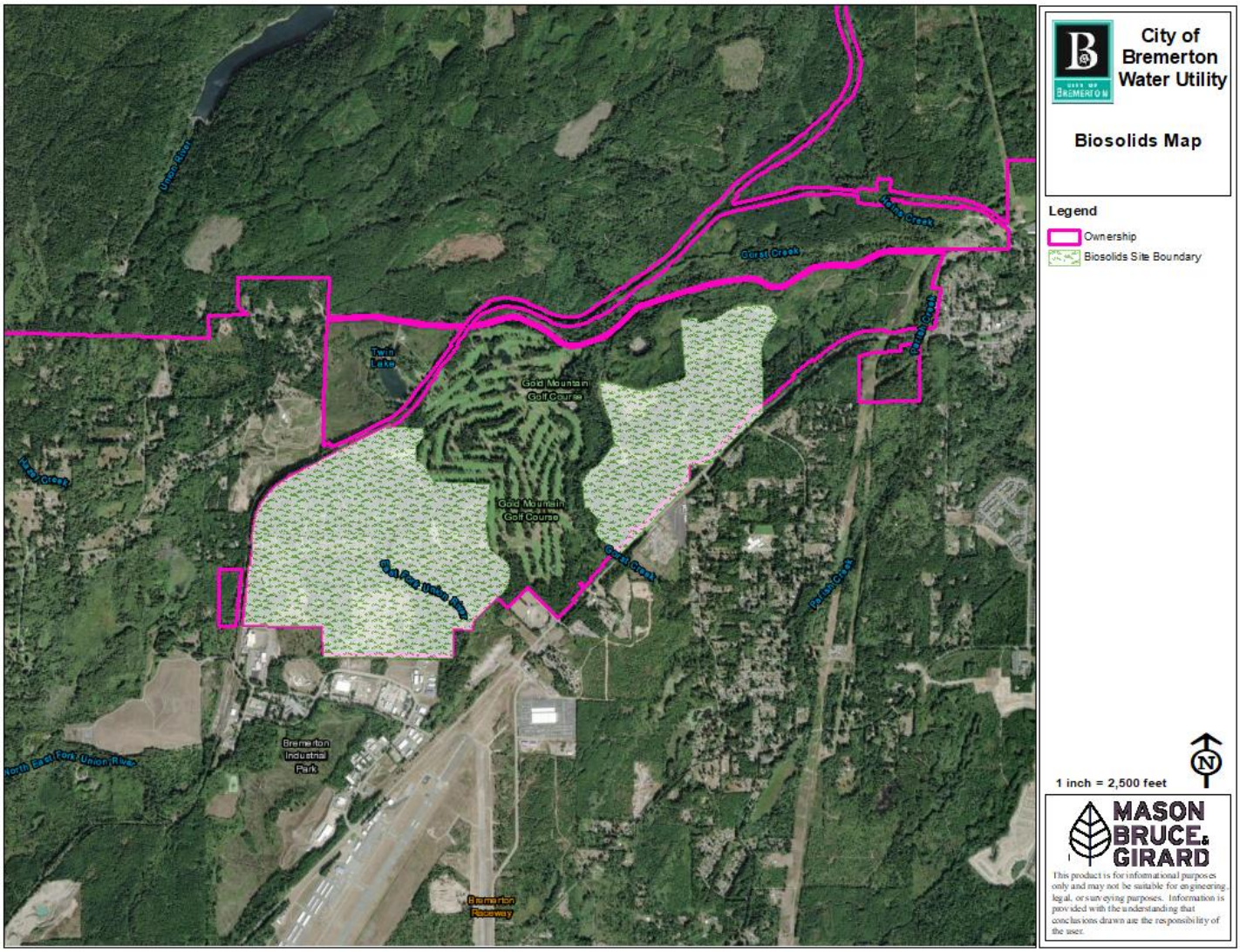


Figure 20. Biosolids Application Areas

Sustainable Harvest Level

Sustainable harvest is defined as the volume of timber that can be harvested annually from a given land base on a perpetual basis without reducing the total merchantable volume. Essentially a sustainable harvest can be boiled down to mean: "harvest equals growth". A key factor that must be considered when determining the sustainable harvest level is the rotation age. The lower the rotation age, the higher the annual harvest. Industrial forest owners that are tasked with maximizing net present value generally harvest when the discount rate exceeds the timber's growth rate, which is around age 40. Forest owners such as the Utility, with values and goals not strictly driven by economics, can set older rotation ages, which results in lower annual yields.

Primary forest management objectives must align with Utility land management goals:

- *The McKenna Falls Intake Subbasin will be managed to maintain the "unfiltered" water source status in conjunction with maintaining the forest health.*
- *The Other Utility Lands will be actively and adaptively managed to sustainably protect surface and groundwater resources and maintain forest health and resiliency while also generating revenue to reduce costs for utility rate payers.*

A 2019 analysis by the University of Washington (UW) provided the Utility with two separate guidelines for harvest from their timberlands (UW 2019). For land within the McKenna Falls Intake Subbasin, where source water protection is the main priority followed by forest health, the annual harvest level was set at 500,000 board feet or 30% of the annual growth of 1.7 million board feet (mmbf). Based on the 2005 inventory, this equated to a 100-year rotation within the subbasin. For lands outside the McKenna Falls Intake Subbasin the annual sustainable harvest level was set conservatively at 2.4-mmbf, which was based on modeling that showed sustainable average annual harvest volumes outside the McKenna Falls Intake subbasin could range from 2.5-3.0-mmbf while still protecting surface and groundwater supplies in those areas.

A 2016 analysis by Lusignan Forestry provided 10-year guidelines for sustainable harvest levels for all harvestable timber owned by the Utility, based on either a 50 or 60-year rotation (Lusignan 2016). The analysis assumed that all acres 30-years of age and greater were merchantable, and that all acres would be cut in a given timeframe. The results were sustainable annual harvests of 2.6 and 3.1-mmbf for 60 and 50-year rotations respectively. This practical approach was the basis of the analysis of sustainable harvest levels within this plan.

There are 5,864 total net harvestable forest acres owned by the Utility. There are 3,573-acres older than 35-years, which were considered merchantable for the purpose of this analysis of sustainable harvest level. It is important to note that the 35-year age break for this analysis was used as it is more conservative and practical than the 25-year break shown above in Table 6, where the term "merchantable" is a nominal term used to describe the general acres breakdown and for inventory design and planning. Note that the inventory shows no new stands were established (following a clearcut) from 1956 through 1979, which is why there is a gap between the 40 and 66+ year age classes. Figure 21 shows a breakdown of the net harvestable acres by age class.

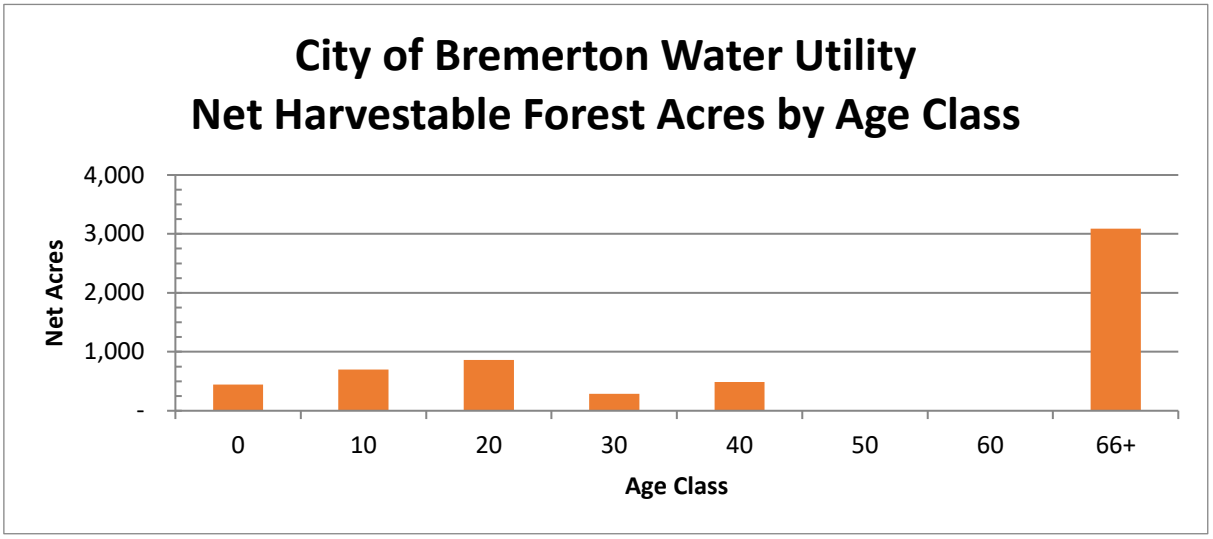


Figure 21. City of Bremerton Water Utility - Net Harvestable Forest Acres by Age Class

There is 115.5-mmbf of volume in the merchantable category, greater than 35-years of age. Based on the current merchantable and harvestable acreage of 3,573-acres, and a current total volume within that acreage of 115.5-mmbf, the even-flow sustainable harvest per year for the next ten years would be:

- **Based on a 60-year rotation: 3.2-mmbf per year**
- **Based on a 50-year rotation: 3.8-mmbf per year**

Checking these sustainable harvest levels against the "harvest equals growth" definition of sustainable harvest, the available harvestable forest acres would need to be growing 539 thousand board feet (mbf) per acre per year for

sustainable annual harvest of 3.2-mmbf on a 60-year rotation. For a 50-year rotation with a sustainable annual harvest of 3.8-mmbf, growth would need to be 647-mbf per acre per year. Based on the research done as part of the 2019 UW report, the Current Annual Increment (CAI) for all available acres is 724 board feet per acre per year. Therefore, the even-flow sustainable harvest levels for either a 50 or 60-year rotation shown above are well within the annual growth level of the Utility's available harvestable forest lands.

Harvest Levels in McKenna Falls Intake Subbasin and Other Utility Lands

The McKenna Falls Intake Subbasin contains 2,811-acres of harvestable forest, which is 48% of the total harvestable forest acres owned by the Utility, and contains 1,968-acres that are greater than 35-years of age, which is 55% of the total harvestable forest acres owned by the Utility that are greater than 35-years of age[2]. If harvest occurred in the McKenna Falls Intake Subbasin evenly over the next 10-years, 1.5 to 1.8-mmbf would be harvested from land within the McKenna Falls Intake Subbasin. This would more than triple the 500-mbf annual harvest level recommended in the 2019 UW report. If the Utility harvests 25-acres per year (0.75-mmbf) in the McKenna Falls Intake Subbasin, and the goal for the Other Utility lands remains either a 50 or 60-year rotation, the even-flow sustainable harvest per year for the next ten years would be:

- **Other Utility Lands 60-year rotation: 1.6-mmbf per year**
- **Other Utility Lands 50-year rotation: 2.0-mmbf per year**
- **McKenna Falls Intake Subbasin Fixed Harvest Level: 25-acres per year (0.75-mmbf per year)**

The McKenna Falls Intake Subbasin encompasses approximately 3,067 acres of the Utility ownership, which includes the catchment area of the Union River Reservoir. Using LiDAR, mapped streams, and stand level data, stands associated with the Union River Basin were classified as 'Union River Basin' within the Standlister. Throughout the rest of the Plan, the Union River Basin area is referred as the McKenna Falls Intake Subbasin. The 'Union River Basin' is approximately 2,879 acres (gross forest acres).

[2] Acres are based on associated stands as shown in Figure 11.

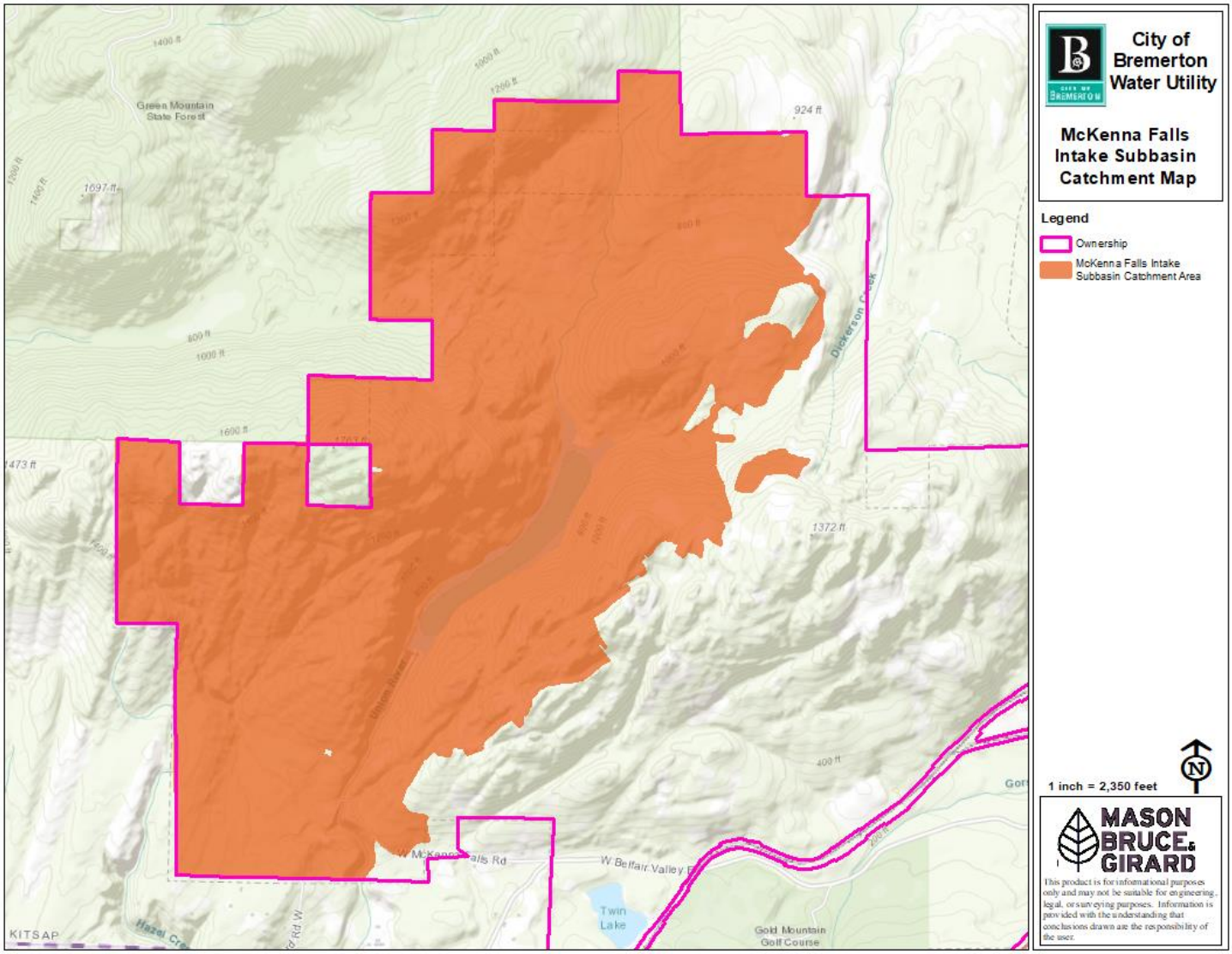


Figure 22. McKenna Falls Intake Subbasin Map

Figure 22 shows the stands that for practical purposes should be considered McKenna Falls Intake Subbasin stands. On the western edge of the actual boundary, all stands outside the boundary were included as they would likely only make practical operational sense to harvest as part of a stand within the McKenna Falls Intake Subbasin. On the eastern edge of the actual boundary, stands were included or excluded based on how much of the stand's acreage fell inside or outside the boundary. When considering stands for harvest along the boundary of McKenna Falls Intake Subbasin, adherence to set harvest limitations and determination of harvest boundaries must consider source water protection. All tactical harvest planning in and around McKenna Falls Intake Subbasin will require detailed field evaluation. Figure 22 shows the McKenna Falls Intake Subbasin and the associated stands.

Refer to the Sustainable Timber Harvest Alternatives and Associated Revenue and Water Rate Impacts Special Topic Memo in Appendix B for detailed historic harvest information and revenue projections.

Water Quality Risk Assessment

The Utility's surface and groundwater areas are particularly critical areas on Utility land in which activities can pose a risk to drinking water sources and/or infrastructure. This assessment evaluates risks to source water quality and quantity from existing conditions and uses. Any changes to existing uses or proposed new uses should be evaluated on a case-by-case basis for risk and compatibility with the established management policy and goals outlined in Appendix C. The Kitsap Lake

to Jarstad Park Trail Special Topic Memo that evaluates the risk and potential impacts of the proposed Kitsap Lake to Jarstad Park Trail is provided in the Appendix B.

Slope Analysis

Utility forestlands have been analyzed to determine areas that have potential for mass slope failure and to determine the severity of impact to infrastructure in the event of slope failure. Utility forestlands are generally composed of vegetated terrain that have slope grades less than 30%. However, there are some very steep areas, particularly in the McKenna Falls Intake Subbasin, surrounding the Union River Reservoir, and the ridge that separates the Union and Gorst Creek Watersheds. Figure 23 shows a slope classification across the ownership, based on percent slope. Extreme slopes are defined as greater than 70%. Moderate/High slopes are defined as between 40-70%.

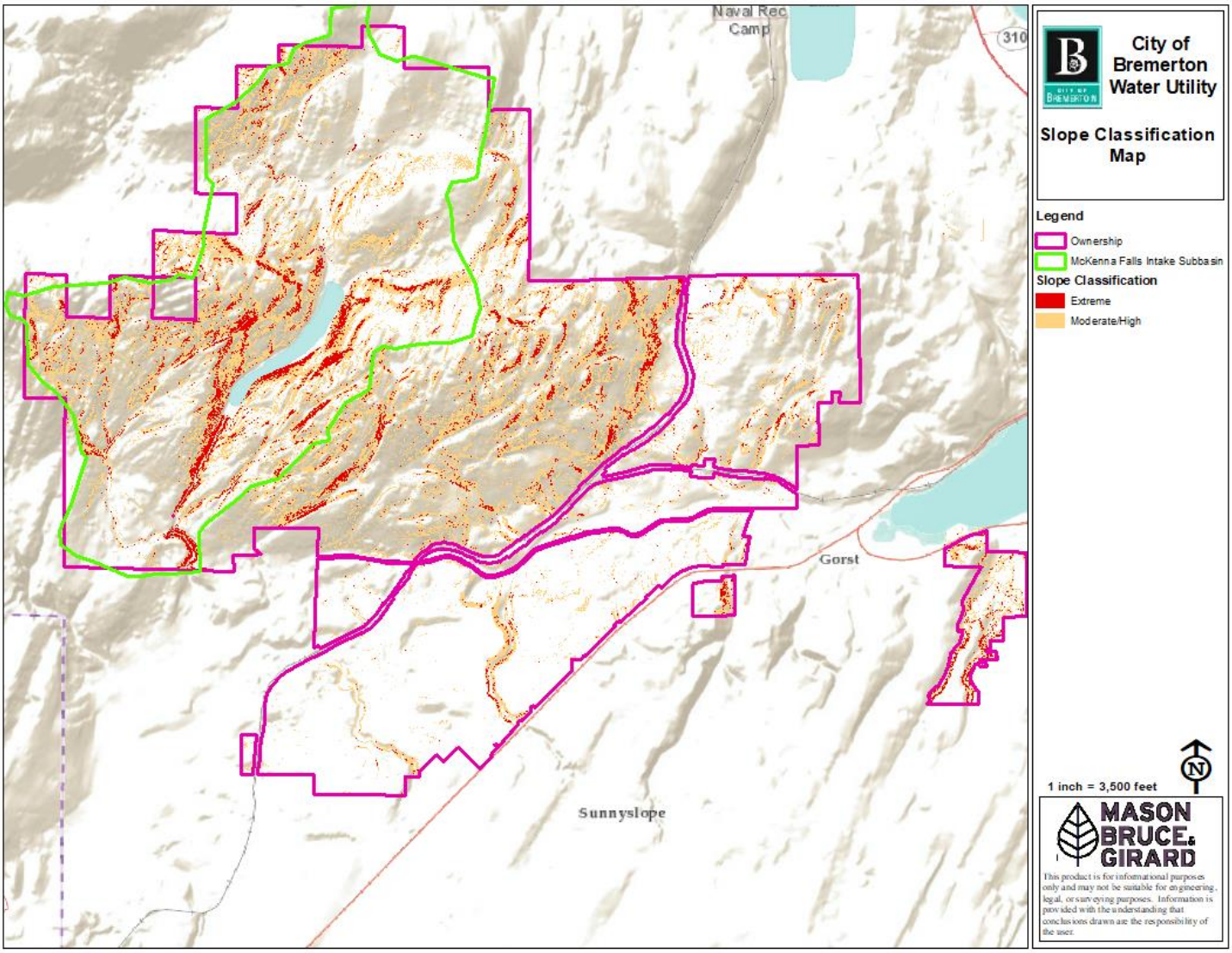


Figure 23. Slope Classification Map

Areas of potential instability as mapped by WADNR and displayed in Figure 24 generally correlate with the extreme slope classification in Figure 23. Table 12 displays total area by slope percentage across the entire ownership. Full or partial slope failure within the McKenna Falls Intake Subbasin could result in temporary or potentially long-term water quality concerns resulting from sediment delivery to waterways. If a large amount of sediment flowed into Union River Reservoir, increased turbidity would result in immediate surface water system shutdown. In the case of a full or partial failure, there could also be potentially negative impacts such as costly damage to infrastructure like intake facilities, transmission mains,

roads, culverts, and bridges. These impacts would likely cause extended periods of system shutdowns to both the Water Utility and Forestry Division operations. The likelihood of slope failure appears low given the lack of forestry operations within a 250-foot buffer of the Union River Reservoir. It is recommended winter-time operations on or near steep slopes be limited for any timber harvest operation or road maintenance/construction project.

Table 12. Percent Slope by Acres

Slope Percentage	Acres
Low Slopes (< 40%)	6,187
Moderate/High Slopes (40% - 70%)	1,441
Extreme Slopes (> 70%)	312
Total:	**7,940**

Figure 24 shows the Westside Slope Stability Model (FP)-2024, from Washington Department of Natural Resources. "Potentially unstable slopes are characterized by steep slopes, areas with bare soils, uneven topography, cracks in soil, hummocky or uneven terrain, or pistol-butted trees" (WADNR 2021).

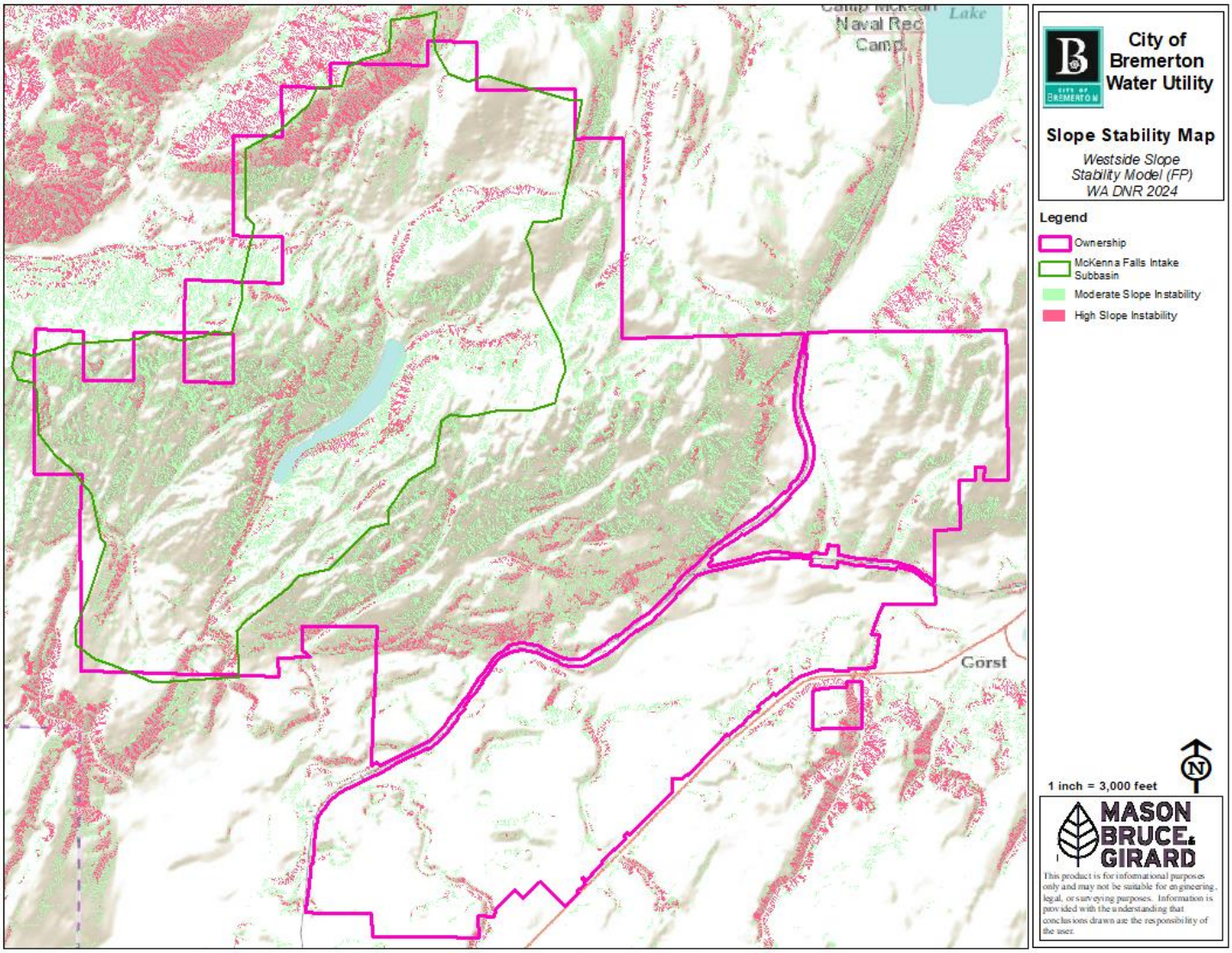


Figure 24. Slope Stability Map (Westside Slope Stability Model FP WADNR 2024)

Soils

The soil profile across Utility lands consists primarily of glacial drift. This is prevalent throughout Kitsap County and Northwest Washington. The most common soil types within Utility ownership consist of Basic Igneous Bedrock, Glacial Outwash, and Glacial Till (WADNR 2017). This parent material is typical in the surrounding areas and consistent for a local climate that features average annual precipitation of over 40 inches per year. The McKenna Falls Intake Subbasin receives an average of 63.5 inches of precipitation per year. The most common soil series on Utility lands is the 'Kilchis' complex, which are shallow, well drained, and weathered from basalt. The Utility land soil depth varies by elevation. Soils formed from glacial drift are commonly used for timber production, pastureland, crop production, wildlife habitat, and urban areas. "The natural vegetation associated with this soil profile is Douglas-fir, western hemlock, western redcedar, red alder with an understory of salal, Oregon grape, western bracken fern, western sword fern, Pacific rhododendron, red huckleberry, evergreen huckleberry, and orange honeysuckle" (Hipple 2011). Caution must be taken for operations that occur during the rainy season. Site specific considerations need to be considered when planning road construction or timber harvest activity. Following all state forest practice regulations regarding geological protection, and having adequate buffers on all waterbodies and geological features will continue to protect the Utility's quality drinking water. Figure 25 shows the major soil types within the Utility ownership.

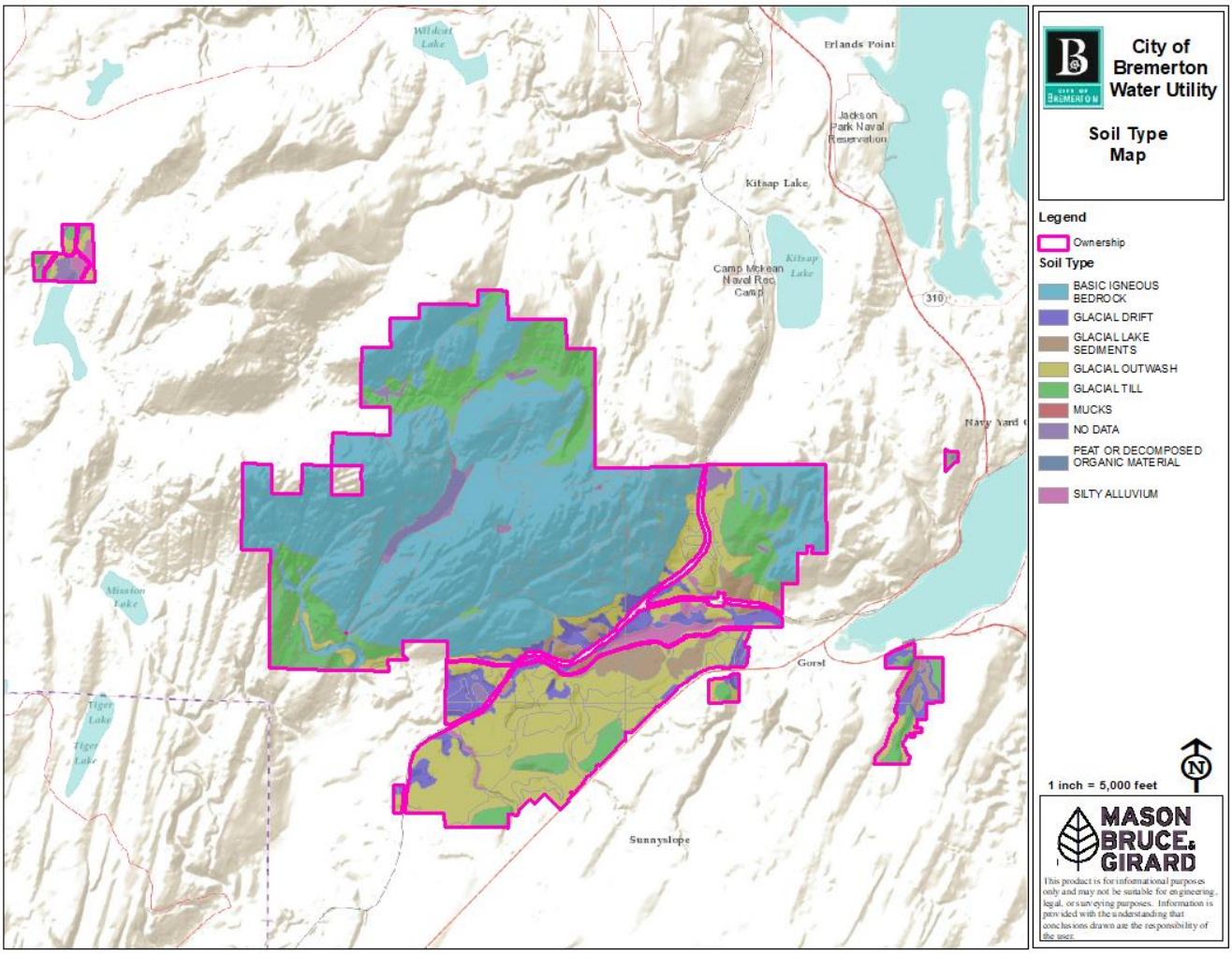


Figure 25. Soils Type Map (WADNR 2017)

Wildfire Risk Management and Response Plan

In 2019, the University of Washington produced a Forest Health Assessment and Forest Management Practices Recommendation Report for the Utility (Semler 2019). This report cites two main forest health concerns that may impact the risk of wildland fire on Utility property: laminated root rot and climate change. A large-scale outbreak of laminated root rot could dramatically increase the potential fuel load of dead and dying trees. Changes in the historical climate for this area will also increase the risk and intensity of large-scale wildfire. Climate change is expected to bring hotter, drier summers and, in turn, reduced soil moisture, which is expected to allow wildfires to start easier, burn hotter, and move quicker through the landscape. The 2019 UW report lists three options for treating laminated root rot, and three options for reducing fire risk. Refer to [Semler 2019] for more information on treatment options for laminated root rot and options for reducing fire risk within the Utility.

Other wildfire risk management considerations within the Utility ownership could include but are not limited to expanding forest roads to act as fire breaks, thinning/pruning treatments along forest roads, maintaining access on all roads for reduced response time, hazardous fuels management, increasing security, etc. Continued vegetation management, within recent harvest units and along roadsides, will dramatically lower fire response times and fuel loading. “Wildfire risk is based on several factors: likelihood, intensity, exposure, and susceptibility. Understanding which factors affect your landscape can help you prioritize risk reduction activities” (USFS 2025).

WA DNR-Wildfire Division is responsible, in partnership with local fire districts and the forestry staff, for the response and suppression of wildfire on Utility property. The Utility pays into the Forest Fire Protection Assessment (FFPA), through timber taxes on timber harvests and through the assessment fees of the total acreage owned. WADNR and Utility staff also work in coordination annually for fire training and preparedness.

The Utility’s Wildfire Management Guidelines features a partnership between the City Fire Department and the Public Works and Utilities Department to actively protect the drinking water supply and Utility assets.

The City of Bremerton Fire Response Map is shown in Figure 26.

Wellhead Protection Areas

The Safe Drinking Water Act requires every state to develop a wellhead protection program. The State Department of Health (DOH) administers the wellhead protection program in Washington. Washington’s wellhead protection requirements are designed to prevent contamination of groundwater used for drinking water. Public water systems must work with local governments and regulatory agencies to develop and implement their own local wellhead protection programs. In Washington, local wellhead protection programs must include the delineation of wellhead protection areas that account for movement of water to the well. These areas are divided into concentric zones based upon time of travel (time it would take for a contaminant to reach the well); typically, 6 Months, 1 Year, 5 Years and 10 Years. The Utility is required to impose restrictions upon any potential pollutant-generating activities within these zones.

The Utility updated its Wellhead Protection Program Plan in conjunction with the 2020 Water System Plan update, resulting in updated wellhead protection area delineations. Figure 27 shows the location of the Utility’s drinking water production wells and associated wellhead protection areas within the ownership managed under this plan. Bremerton’s Critical Areas ordinance (BMC 20.14) and Public Works and Utilities Policy Application of Pesticides, Herbicides, or Fertilizer in Critical Aquifer Recharge Areas establish prohibited, restricted, and allowed activities in these areas to ensure sufficient protection of groundwater supply sources.

There are also numerous monitoring wells within the ownership, and each wellhead requires protection from contamination. Prior to any activity, the location of all wells within the area must be documented and appropriate measures taken to prevent contamination.

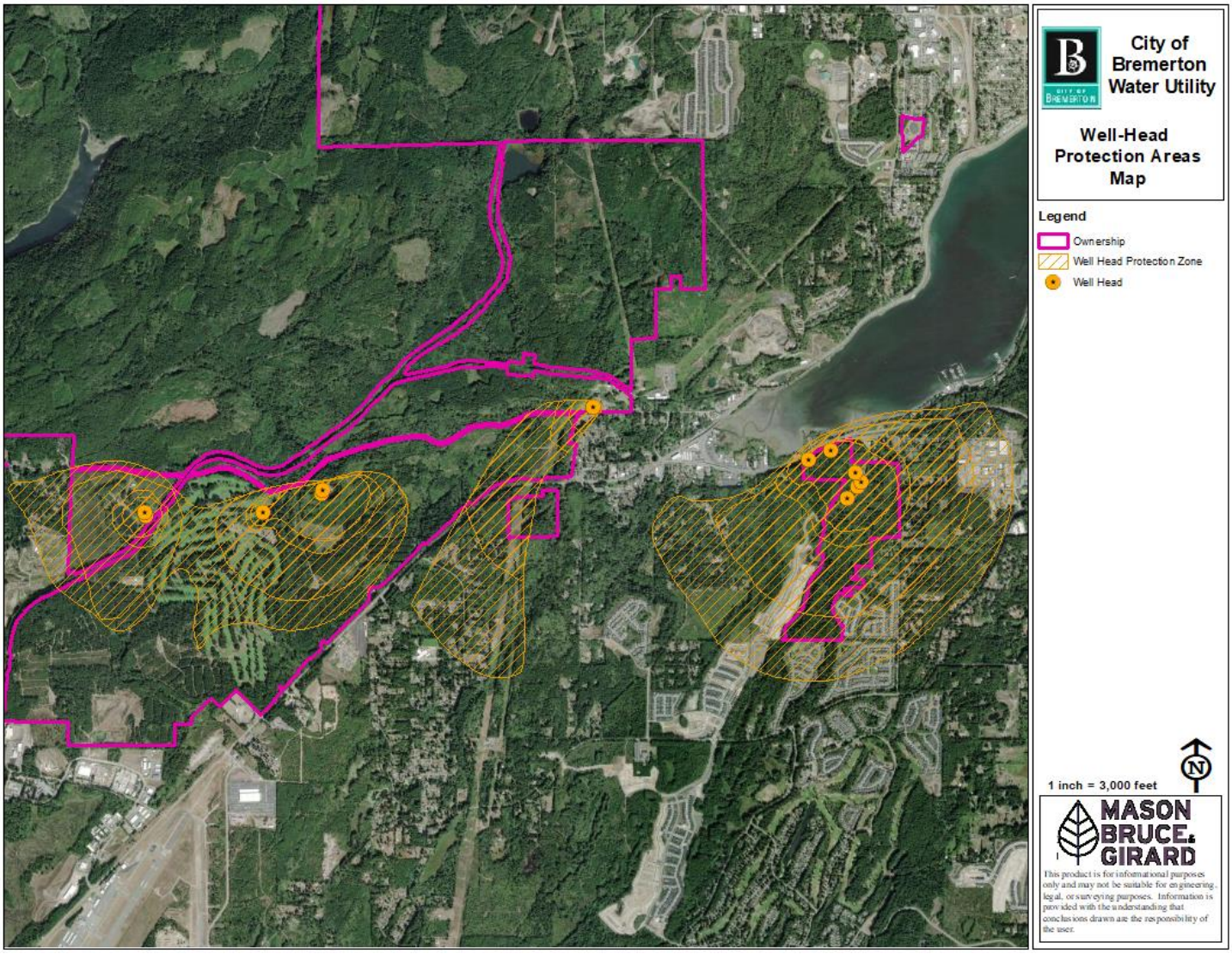


Figure 27. Utility Wells and Wellhead Protection Areas

Utility Uses

Activities that cause land disturbance such as road construction and maintenance or timber harvest are governed by Forest Practice Act Rules. Compliance with these rules and the best management practices stipulated in the Forest Practices Board Manual, as well as City codes and policies, will ensure resources are sufficiently protected. Activities in all sensitive areas such as riparian areas, wellhead protection zones, and steep slope areas should be limited.

The City of Bremerton Integrated Vegetation Management Plan (Bremerton 2022a) outlines mechanical, biological, chemical, and cultural methods for assessing, managing, and evaluating pest species within the Utility land that ensures any chemical controls are used in accordance with all environmental rules and in accordance with manufacturer instructions. The Utility ensures that all staff and contractors are properly licensed for pesticide application. Chemical and fungicide methods of treatment for pest species are restricted adjacent to waterways, within wellhead protection zones, and within 1,600 feet of Twin Lakes.

The Utility conducts soil, surface water, and groundwater monitoring as directed by the biosolids application permit; however, required monitoring under the application permit may not capture contaminants of emerging concern not yet regulated in biosolids such as polyfluoroalkyl substances (PFAS) that may pose a risk to the groundwater sources in those areas.

Non-Utility Related Uses

Special Uses

There is relatively little risk from existing special uses assuming users remain in compliance with governing rules and regulations.

The lease agreement with the Department of Parks and Recreation for the Gold Mountain Golf Course includes comprehensive and regulating conditions on water use and chemical use to ensure surface and groundwater sources are protected.

Likewise, the lease agreement with the Bremerton Police Department for the firearms training facility includes provisions to ensure line-of-sight firings, prohibit timber as backstops, prohibit shooting at trees, ensure no off-site incidents, require miscellaneous firing precautions, and berm maintenance/lead recovery to protect wellhead protection areas.

The lease agreement with the Suquamish Tribe also provides specific provisions related to fish rearing activities on site and general facility operation and maintenance.

Right-of-way and licensing agreements with regional power and natural gas providers and communication tower companies include provisions governing environmental protections, site and right-of-way maintenance, and site restoration, when necessary.

Increased non-utility use can bring increased risk to water and forest resources and increased need for monitoring and management. The Utility must carefully consider potential impacts when reviewing any requests for special use of Utility land. Appendix C provides guidance for considering new uses of Utility land.

Adjacent Land Uses

Utility property is adjacent to a variety of landowners with a range of purposes and goals. Most adjacent land ownership includes timber, rural residential properties, and Green Mountain State Forest. This diverse set of owners creates a mix of risks, impacts, and security concerns, particularly in areas adjacent to residential owners. Risks of fire, road degradation, and sanitary issues can all have a negative impact on water quality and thus, security and forest management measures must be considered to reduce the risk of negative impact (see Adjacent Land Use Special Topic Memo in Appendix B).

Transportation Corridors

Where the Utility ownership is split by West Belfair Valley Road, Highway 3, and the US Navy railroad, major incidents (spills, releases of chemicals, etc.) pose a risk to Utility and natural resources. The Utility should coordinate routinely with county, state, and federal emergency management personnel to ensure all parties are aware of the sensitive resources in the area and any potential spills or emergencies. Signs should be prominently posted along the rail and roadways to indicate Utility land ownership and sensitive resources.

Security

Adequately protecting and securing forest landscapes can vary dramatically based on landowner objectives. The Utility is responsible for the security and protection of approximately 7,940 acres of Utility lands, the forest ecosystems within those lands, and the quality of drinking water provided to Bremerton water customers. The specific details of the current

security processes and procedures can be found in the Security Processes and Procedures Special Topic Memo in Appendix B.

Implementation Plan

As it is the primary land management goal of the Utility to protect the unfiltered status of its surface water supply and to provide protection of groundwater supplies, it is critical that the Forestry Division continue to monitor all aspects of natural resource management and implement best management practices on Utility land to ensure water quality over time.

Forestry Staff and Equipment Resource Planning

Having a robust and knowledgeable staff that can actively maintain and monitor the current forest landscape and infrastructure, and implement future plans, is essential for continued stewardship of Utility property. With ever increasing regulation and complexity, it is important to annually review staff levels, performance, and production. Equipment must be consistently maintained or purchased as necessary to ensure staff have the tools they need to effectively maintain and manage the resources of Utility lands. All equipment resources should be evaluated annually as directed by the forestry manager to determine if the equipment is adequate. All staffing needs should be evaluated annually or as directed by the forestry manager. All Forestry buildings and structures should be evaluated annually or as directed by the forestry manager to determine maintenance required. An annual evaluation of the Capital plan must be done to ensure current and future needs are being met. All resource planning must include current and future staffing needs as described in the Staffing Special Topic Memo in Appendix B.

Harvest Planning

Harvest planning must be undertaken in the context of Bremerton's Goals for Utility lands:

1. The McKenna Falls Intake Subbasin will be managed to maintain the "unfiltered" water source status in conjunction with maintaining the forest health.
2. The other Utility lands will be actively and adaptively managed to sustainably protect surface and groundwater resources and maintain forest health and resiliency while also generating revenue to reduce costs for utility rate payers.

Considering these goals, there will be less harvest in the McKenna Falls Intake Subbasin than on other Utility lands. Sustainable harvest levels for each area are described in the Sustainable Harvest Level section and should be used as a guide when selecting and laying out harvest areas.

Harvest Method Options

The harvest methods below are included with the assumption that Utility lands are managed with an even-age management approach. The Utility may determine which method is best for harvest while also maintaining water resource quality.

Clearcut: All merchantable trees in harvest units are harvested at one time, except for trees left for wildlife or visual purposes. Unmerchantable trees are often also felled to eliminate competition with the regeneration. Regeneration of tree species is by the artificial process of hand planting seedlings. Clearcutting is the most cost efficient, productive method for the management of Douglas-fir.

Shelterwood: The mature stand is removed in a series of two or three cuts. The early cuts are designed to improve vigor and seed production of the remaining trees while preparing the site for new seedlings (seed cut). Mechanical ground scarification and site preparation (felling of sub-merchantable sized stems) are common, associated silvicultural practices especially when regenerating mid-tolerant species. The final harvest occurs when a sufficient amount of desirable

reproduction has become established and before the regeneration has reached 20 percent of its rotation age (Smith 1986). This method provides a partial cover of either large or small trees. When the shelter becomes a hindrance to the growth of the seedlings, rather than a benefit, it is necessary to remove the remainder of the mature stand (removal cut). This method should be considered if the goal is to promote natural regeneration or if clearcut aesthetics are an issue. The downside to the shelterwood method is that the trees left standing until the final cut are susceptible to wind, and it is more costly and inefficient to reenter the stand multiple times.

Commercial Thinning/Pole Harvest: A portion of the stand is removed and when the harvest is complete a healthy, durable stand remains for the future. To make a thinning efficient and profitable, it is necessary to balance cutting only defective timber to promote a healthy stand and cutting enough valuable timber to meet revenue goals. When targeting trees to harvest for utility or transmission poles, it is important to work within a prescribed outcome for the stand in terms of basal area and tree spacing, so large gaps in the stand do not develop.

Salvage: Only dead, dying, or downed trees are harvested. This can take place in conjunction with a nearby harvest or as a stand-alone project. Salvage operations work best in areas where the trees are consolidated. Traveling long distances between salvage trees is inefficient and oftentimes unworkable.

McKenna Falls Intake Subbasin

Timber volume from the McKenna Falls Intake Subbasin will be harvested in the form of salvage, small clearcuts, and thinning. As protection of the water resource is the primary management priority in the watershed, harvests must be planned to avoid soil impact and sediment delivery to streams and the reservoir. This can be done by considering low impact timber harvest methods such as pre-determined skid trail planning, cable logging systems on steep slopes, directional felling, and helicopter logging within high value areas. Harvests in the Subbasin should take place during the typically dry time of the year and strictly administered to ensure resource protection.

Other Utility Lands

Timber volume from other Utility lands may also be harvested in the form of salvage, small clearcuts, and thinning, but there will be greater flexibility in terms of timing and harvest size, and more of the volume will come from clearcuts. Most of the Utility land harvest volume and revenue will come from other Utility lands.

Planning Guidelines

A five-year harvest plan should be developed and then updated each year that considers the goals and objectives of the Utility lands and accounts for the following:

- Resource Protection
- Forest Health
- Site Conditions
- Revenue goals
- Log Markets
- Forest Inventory
- Silviculture
- Recent Harvests
- Forest Practice Rules

Forest Inventory

Updates to the Utility's forest inventory are critical for accurate decision making and forest planning processes, including harvest planning, silviculture, forest health monitoring, and budgeting. An inventory cruise should occur a minimum of

every 10-years in order to have accurate inventory information for planning purposes and the update of the Management Plan. The updated inventory will account for tree growth, changes in species composition, harvest updates, potential acquisition, forest health changes, and changes in overall stand value.

Property Boundaries

Accurate identification of property boundaries is critical for defining the land base, preventing disputes with neighbors, ensuring sustainable harvest practices, compliance with forest practice rules, accurate timber assessments, and for the protection of the forest resource. Identification of accurate property boundaries are best determined by a licensed surveyor. It is recommended that the Utility formally survey property boundaries, when necessary, as part of the timber sale process or when other operations occur near property boundaries. All surveys should be officially recorded with the County Surveyor. Field inspections and updates to the monumentation of property lines should be conducted every 3 to 5 years, or as needed, with fresh paint, flagging tape, boundary tags, and boundary posts.

Reforestation

As mentioned in the Silviculture section, reforestation is one of the most important aspects of sustainable forest management, as it is establishing the forest life cycle and will in large part determine the success of a forest landscape. Planning starts before timber harvest occurs. Early in the harvest planning process, plans should be made for procurement of seedlings. Seedlings may be purchased on the open market, ready to plant, or sown at the nursery from seed, depending on seedling availability and the harvest planning timeline.

Once the unit is harvested, conduct any necessary site preparation to prepare the site for planting. Planting should occur as soon as the site is ready. If herbicides are not used to control brush it is essential to plant the unit as soon as possible as the trees will be in competition with shrubs and grass that also occupy the site. The typical planting season for western Washington is January to April but is subject to change depending on weather and elevation. Below is a checklist to aid in reforestation planning and implementation.

Reforestation Planning Tips for Success

Before Harvest

- Contact nursery and initiate sowing request.
- Choose tree species and seed zones that are suited to the following site conditions:
    - Elevation
    - Precipitation
    - Aspect
    - Site Preparation
    - Disease/Insects Potential

After Harvest

- Site preparation as needed.
- Selection of planting contractor to plant the harvest area.
- Reforest during the first planting season after harvest if possible (January-April).
- Use forester or trusted contractor to oversee proper seedling storage, seedling handling, and planting procedures.
- Install animal damage protection if necessary.
- Generally, plant no less than 300 trees per acre, evenly spaced to account for mortality.
- Monitor reforestation units annually. Units should be considered free to grow if they have adequate stocking for two consecutive years.

Nonnative Species Treatment

To protect water quality on Utility lands, the Forestry Division limits the use of chemical treatment for nonnative species. This has resulted in an ongoing challenge with Scotch broom dominating certain regeneration units within Utility lands. Scotch broom is a nonnative species that was introduced to the west in the 1800's from Europe as a means for erosion control and for ornamental purposes. Scotch broom rapidly and frequently outcompetes native trees and plants, especially in disturbed areas. Scotch broom typically blooms in June and spreads by seed dispersal. Seeds can be dispersed up to 20 feet and each plant can spread as many as 10,000 seeds a year. The seed can remain viable in the soil from 5 to 60 years. (King County 2013) Once established, Scotch broom is incredibly difficult to remove from the landscape.

The Utility's primary method of treating Scotch broom is in the form of mechanical slashing. This requires a hand crew to manually cut each stalk of the plant off at the base with a chainsaw. This method of treatment is very labor intensive and costly compared to chemical treatment. Multiple treatments are usually required before the planted trees are able to outcompete the nonnative Scotch broom within a site. The average cost of mechanical slashing can range from $150-$250 per acre depending on the amount of Scotch broom, site, terrain, access, etc. This should be considered when selecting harvest units and factored into the annual silviculture plan and budget. Silviculture budgeting should also include future treatments in areas where there is Scotch broom nearby or close to public roads. Note that herbicide treatments are allowed only in certain areas of the Utility ownership. Refer to the City of Bremerton Integrated Vegetation Management Plan for further details.

Road Maintenance

As the landowner, road maintenance is the ongoing responsibility of the Utility. Using Best Management Practices (BMPs) and ensuring ditches, culverts, water bars, road surface material, and energy dissipaters are functioning is crucial for resource protection and longevity of the road infrastructure. Other BMPs for maintaining a functioning road system may include the use of locked gates to prevent unwanted use or access, not road grading during excessively wet or dry periods, installing or replacing culverts during the dry season, inspecting road surfaces prior to increased traffic, marking culverts before road work, limiting road use during extreme weather events, controlling roadside vegetation, and minimizing exposed soil. Paying particular attention to these issues before, during, and after forest activity is critical. Maintaining road access throughout the Utility ownership is particularly crucial for adequate fire and emergency response.

Bridge and Culvert Monitoring, Maintenance, and Replacement

All culverts and bridges should be marked in the field as is appropriate with paint, flagging, or a t-post. A semiannual inventory/inspection should be conducted on all culverts and an annual inventory/inspection should be conducted on all bridges. The typical lifespan of a railcar style bridge is approximately 50 years with proper maintenance. Material type, volume of traffic, design, and weather conditions can significantly extend or reduce the typical lifespan of a forest bridge. Monitoring of any previous culvert project or any new road construction or reconstruction activities should be done annually and after major weather events. A large amount of Utility land culverts are corrugated metal pipes that were installed pre-RMAP (before 2001) and are reaching the end of life. The typical lifespan of a plastic culvert pipe is 50 to 75 years. Proper installation, regular maintenance, and traffic loads can significantly alter the average life span of a typical high-density polyethylene (HDPE) corrugated pipe.

Any structures in or over fish bearing streams must be designed to ensure proper fish passage, erosion control, and long-term structural integrity, and to withstand 100-year flood events. All stream crossing structure construction requires a Forest Practices Application/Notification (FPA/N), through WADNR. Any installation or removal of a structure over a fish bearing stream requires engineered plans be submitted with the FPA/N. Typically, an FPA/N takes 30 days for approval, while some hydrologic plans may take an additional 30 days for approval, following review from WDFW. Planning around these review timelines and instream work periods must be considered when planning bridge or culvert maintenance and

replacement. Further details and requirements about crossing maintenance and replacement can be found in the Washington Forest Practice rules.

Stream Typing

Water typing is used by the WADNR to properly classify streams and other water bodies. This process is used to determine fish presence, permanent flow, and stream or waterbody size. The WADNR forest practice division maintains and updates all water type maps and data to show both field-verified, and non-field verified water data. The stream data used and maintained by the WADNR is derived from a combination of computer modeling and field observations. The model is based on multiple feature attributes such as stream slope, fish presence, modeled habitat, size, and drainage basin size.

It is the responsibility of the Utility as the forest landowner to determine in the field, the type of any regulated waters as identified in the forest practice rules within 200 feet of the proposed activity, prior to submitting an FPA/N (WADNR 2021). This is also the case with any installation or replacement of any stream crossing structure for road construction or maintenance. All stream types must be evaluated in the field prior to any forest activities that requires an FPA/N from WADNR. It would also benefit the Utility to field verify and GPS streams within the McKenna Falls Intake Subbasin to assist with planning and water monitoring.

Biosolids Management

The Utility continues to utilize the biosolids program that was established in 1992, with the Forestry Division overseeing the application and management of biosolids. This program provides the Utility with multiple benefits including increased tree growth within the application site and significant reduction in the cost of disposal of solids from wastewater treatment, saving the Wastewater Utility approximately $100,000-$200,000 per year. Unless determined to not be beneficial at some future time, this plan should continue to be implemented annually by the Forestry Division at the established application rates that are monitored by the Environmental Protection Agency (EPA) and Washington State Department of Ecology. The current allowable rates and application sites can be found in the 2024 Biosolids Annual Report (Department of Ecology 2025). The application rates are site specific and are applied in specific application areas within the biosolid sites.

Managing the stands within the biosolids application area will likely have an altered harvest schedule and silviculture plan. Due to the increased time invested in stand management, adaptive harvest scheduling should be used. This should include potentially extending rotation ages within the application areas due to historic and planned thinning, maximizing nutrient retention within application sites, and maximizing application areas within the permitted biosolid site. Other considerations for harvest scheduling of the biosolids area may include timing of applications, adjacency issues within the application area, and an increase in the complexity of harvest planning. Further research should also be undertaken to look at increased carbon storage by extending rotation age and continuing to apply biosolids.

Due to increased nitrogen from biosolids applications, a dramatic increase in competing brush and vegetation is likely to occur. Delaying biosolids application until after the new stand has been well established post-harvest will likely dictate the level of reforestation success. Since managing competing vegetation is limited to mostly mechanical treatment, increased planning well in advance of reforestation will be necessary. Planting trees in the planting season immediately following harvest will increase the likelihood of survival and bolster the establishment of the planted seedlings.

To optimize the biosolids program, additional considerations around stand management must be considered annually when determining the harvest schedule, reforestation plan, vegetation management, and application plan.

Building Construction and Maintenance

There are several buildings that the Forestry Division utilizes and for which it is responsible. These include the McKenna Falls Office located at 9600 McKenna Falls Rd, the biosolids ponds and structures, the Roll-Up building at the Utility pipe yard located at 4398 W. Belfair Valley Rd, and the Forestry Storage Building located at 4320 W. Belfair Valley Rd. These buildings are used by the Department of Public Works and the Forestry Division. For all buildings that are the responsibility of the Forestry Division, building improvements and new building construction have been budgeted and are identified in the Capital Improvement Plan section and 20-year Capital Improvement Plan Special Topic Memo in Appendix B.

Ongoing Gap Analysis

An ongoing gap analysis utilizing clear, realistic goals and asset management, should be conducted annually by the Forestry Division. This will allow the Forestry Division to identify any discrepancies where implementation, resources, or systems fall short of expectations laid out in the forest management plan. This process will help to develop solutions by creating targeted strategies to address gaps, such as through training, process improvements, or resource allocation. This process will monitor progress, evaluate the effectiveness of corrective measures, determine necessary adjustments, and ensure alignment with the Utility's goals. The ongoing nature of the analysis ensures that the Utility remain adaptable and proactive with their forest management.

The annual results of the analysis will help to inform the Forestry Division in the planning stages of the annual harvest schedules, road maintenance/construction plans, silviculture planning, capital improvement planning, and staffing resource allocations.

Adaptive Management Options

Adaptive management, as defined by the Washington Forest Protection Association as "a process of gathering and using scientific information to evaluate and improve forest management decisions and practices on the ground. It is a way of monitoring best management practices and regulations to ensure the objectives of restoring wildlife habitat and protecting water quality are being met. If these objectives are not met through existing practices, changes will be made based on scientific research" (WFPA n.d.). While adaptive management is being done at the state level with tools like the Washington Forest Practice Act, Forest and Fish Law, and continued forest management research conducted in federal, state and private landscapes, the Utility should regularly review their own management strategies in the context of their primary objectives. This can be done by ensuring forestry staff completes continuing education and research on current forestry topics such as climate change and advancing technology, and by reviewing measurable outcomes of management decisions.

The Forest Practices Act states, "The adaptive management process shall incorporate best available science and information, include protocols and standards, regular monitoring, a scientific peer review process, and provide recommendations to the board on proposed changes to forest practices rules to meet timber industry viability and salmon recovery" (RCW 76.09.370(7)).

Implementation of adaptive management into Utility forest management will be the result of problem solving with best management practices. By prioritizing items such as management plan updates every 10 years, continuing education, collaboration with federal, state, and private forest managers, and monitoring and adapting to the changing forest landscapes, adaptive management will become engrained in Utility land management.

Forestry Capital Improvement Plan

Capital improvement planning is critical for Utility land management to effectively manage, assess, and develop assets and infrastructure. Within the Utility's ownership there is a robust road system, biosolids storage sites and trails, forestry

equipment, storage facilities, office space, a Forestry Division compound, forest gates, and other assets that the Forestry Division manages and maintains. Forestry capital cost and future planning is done through the Forestry Division. All capital costs associated with Water Utility-owned properties and facilities, including forestry assets, are part of the master 20-year Water Utility Capital Improvement Plan (CIP) contained in the Water System Plan. The 20-year plan developed within the Capital Improvement Plan Special Topic Memo in Appendix B includes only those assets associated with the Forestry Division.

Water Rate Analysis

A water rate analysis was conducted to evaluate rates by rate modeling, assumptions, and future needs. A financial plan was developed as a multi-year rate strategy that generates sufficient revenue to cover Utility operating costs and execute the capital program. The water utility financial plan developed as part of the 2022 rate study update was used as the foundation for the financial evaluation completed as part of this plan. Refer to the Revenue and Water Rate Impacts Special Topic Memo in Appendix B for more information on data updates to the Forestry CIP and impacts to revenue from different harvest levels.

Forest Roads

The Utility Forestry Division is responsible for the maintenance and management of approximately 56.6 miles of rock and dirt spur forest roads. There is also a total of 26.4 miles of biosolids trails located on Utility property. To maintain this road system, annual strategic planning must occur, based on the Utility's existing RMAP and CIP, while considering the amount of funds that are available from the timber program. Road usage, upcoming forest activities, and achieving management objectives should all be considered when planning for annual capital improvements.

Forest Culverts

There are approximately 256 mapped culverts on Utility lands, varying in size from 18 to 66-inches in diameter. The Utility maintains culvert and bridge data including latitude and longitude, road location, elevation, diameter, length, and culvert-type. There is a total of 36 culverts that are identified to be replaced due to being undersized or ineffective. As mentioned in the roads and RMAP section, a large portion of the culverts are corrugated metal pipes installed pre–RMAP (before 2001). They are currently not identified as needing to be replaced but will likely require replacement in the near future. Annual updates must occur to culvert inventories and culvert status to strategically plan replacements or maintenance. Annual or semiannual updates to the culvert inventory will allow the Forestry Division to prioritize maintenance or repairs needed, along with any timber harvest-related culvert work.

Forestry Buildings

There are currently seven buildings the Forestry Division manages. The McKenna Falls Forestry Office, Pump Station #1 Storage Building located at 4320 W. Belfair Valley Rd, the Roll Up building at the Utility Pipe Yard, and four Biosolid Storage ponds with roof covers. Any improvements or maintenance that may need to occur within the next 20 years on these buildings, along with any future plans for new construction can be found within the Capital Improvement Plan Special Topic Memo in Appendix B.

Forestry Gates and Additional Security Measures

The Forestry Division currently manages 37 gates within the Utility's property. Each gate has specific cost maintenance and an upkeep amount based on use. High-traffic gates and gates that are near dense urban areas will likely have larger and more frequent maintenance costs and will need to be replaced more often. Annual tracking and updating of the status and condition of all the forestry gates, along with projected use, will allow the Forestry Division to better budget and plan for future maintenance and replacement needs. Additional security measures may become necessary to sufficiently secure Utility land and assets. This may include additional fencing, specifically around high traffic areas or areas of concern.

Fence construction and maintenance is labor intensive and costly. More detail can be found within the Security Processes and Procedures Special Topic Memo in Appendix B.

Forest Bridges

The Forestry Division is responsible for a total of nine bridges. The bridges vary in size, age, and bridge type. Annual assessment should be completed by the Forestry Division to ensure maintenance is scheduled, and to maximize the longevity of the bridge. More information about the bridges the Forestry Division manages and about the recommended bridge maintenance and replacement can be found in the Capital Improvement Plan Special Topic Memo in Appendix B.

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APPENDIX A

Stand Examination Plan

Standlister Document Excluded from this Appendix for Confidentiality

City of Bremerton
2024 Inventory Cruise Instructions

INTRODUCTION

MB&G will cruise a specified list of stands within the City of Bremerton's forestland. The purpose of the cruise is to create a stand-based forest inventory for all stands on the property, which will yield statistically sound estimates of typical forest inventory metrics and provide the information necessary to calculate sustainable harvest levels.

CRUISE DESIGN

Cruise Map and Plot Layout

MB&G will provide a vicinity map for the property to aid in general location of the stands, and individual stand maps are provided to show the plot locations. Each cruise map includes plots, roads, water features, sections, townships, contour lines, and stand boundaries.

Stands 1 to 24 years old

At each plot, collect data for all live trees/seedlings using a fixed radius plot. Choose a plot size that renders an average of 5-8 trees per fixed radius plot (Table 1). Count trees by species and diameter class, and unless there are major differences, record the average height for the species/diameter group. For those trees less than 4.5 feet tall, record a diameter class of zero. For hardwood clumps, record the three most dominant sprouts on a stump. Ignore large trees left from a previous harvest.

Table 1. Fixed Radius Plot Sizes

Fixed Plot	Radius (ft)
1/100th acre	11.8
1/75th acre	13.6
1/50th acre	16.7
1/20th acre	26.3

>>>> Do not establish fixed radius plots in distinguishable, but unmapped leave areas.

If it is necessary to relocate a mapped plot to avoid a conflict with this rule, the cruiser must backtrack the appropriate distance along the direction of travel and make note of the new plot location.

Stands greater than or equal to 25 years old

Tree data will be collected on a variable radius plot. Using an American Scale Relaskop, choose a BAF for the stand that renders an average of 5-8 trees per variable radius plot. Only one BAF may be used within a stand, although the BAF can change from stand to stand. Each plot will be a full circle sweep, sighting trees at DBH. The "prism sweep" should proceed from due north in a clockwise manner, recording all "in" trees in the order they are encountered. Record all live trees 5.0 inches DBH and larger.

For trees less than 5.0-inches DBH, use a 1/100th-acre fixed-radius-plot. Count trees by species and diameter class, and unless there are major differences, record the average height for the species/diameter group. For those trees less than 4.5 feet tall, record a diameter class of zero. For hardwood clumps, record the three most dominant sprouts on a stump.

Borderline Trees

If a tree is not obviously in or out of a plot, the cruiser will measure horizontal distance from plot center to the estimated center of the tree. The limiting distance should be calculated using the plot radius factor (PRF) corresponding to the appropriate BAF (Table 2). Multiply the PRF by DBH to calculate the limiting distance. If the calculated limiting distance is greater than the distance from plot center to the center of the tree, the tree is considered an "in" tree.

Table 2. Basal area factors (BAF) and their associated plot radius factors (PRF).

BAF	PRF
20	1.945
22.50	1.833
27.78	1.650
33.61	1.500
40	1.375
46.94	1.269
54.44	1.179
62.50	1.100
71.11	1.031
80.27	0.971
LD = DBH * PRF	

Roads and Streams

Plots will not be established in mapped roads or road right of ways. If a plot falls within a mapped road or road right of way, drop the plot. Note that the plot was dropped because it was within a mapped road or road right of way. If a plot falls within the forested part of a stand but is within one tree-length of a mapped road right of way, then the plot should be measured using the Edge Plot specifications described below.

Most major streams have been delineated from the stand boundaries so there should be minimal occurrence of plots falling in a stream. Plots that do fall in or near streams within stand boundaries should be considered valid plots and measured accordingly.

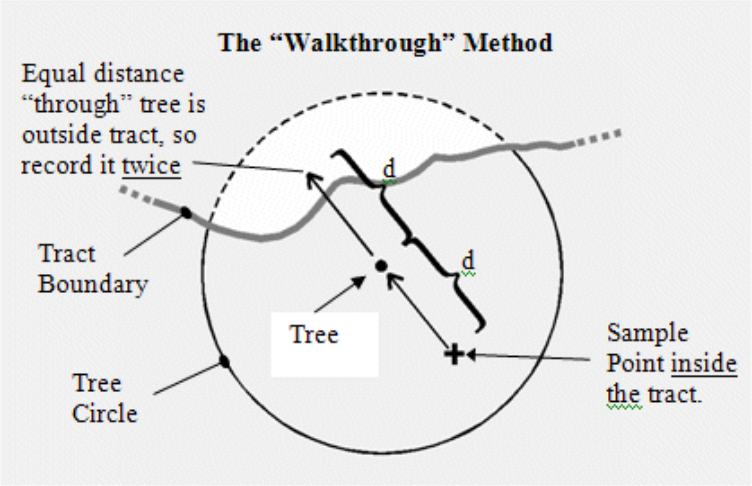
Edge Plots

If edge plots occur, do *not* avoid them, as the edge represents a considerable portion of any stand. For example, in a square 40-acre (20-chains x 20-chains) area, 20% of the total 40-acres is within one chain from the stand edge. Trees growing near the edge of a stand (such as near a road) grow differently than trees within the stand, especially if the surrounding area is non-forested. It is important to sample these trees during a cruise. If a plot falls on or near the edge, use the Walkthrough Method to establish the plot. Do not move the plot if it is on or near the edge of the stand.

The Walkthrough Method

- Establish the plot exactly where the plot center falls and measure and record all trees falling in the plot that are inside the stand boundary.
- For any "in" tree, measure the distance ("d" in Figure 1 below) from the sample point to the tree.
- Duplicate the distance, "d," on the other side of the tree towards the stand boundary.
- If you are outside the stand boundary at the end of this duplicated distance, record the tree twice. If you are inside the stand boundary at the end of this duplicated distance, record the tree once.

Figure 1: The Walkthrough Method



Monumentation

Plot centers will be monumented with a pink wire flag firmly placed in the ground. Four strips of red-and-white-striped flagging shall be hung over the plot and the following information should be recorded on one of the flags, in indelible ink:

- Stand #
- Plot #
- Date
- Cruiser Initials

CRUISE MEASUREMENTS

Tree Data

Table 3. Tree data to be collected on fixed-radius-plots.

Item	Frequency	Notes
Species	Every tree	2-character code (Table 8)
Tally	Every tree	Tally the number of trees by species and diameter class – Maximum of 10
Diameter Class	Every diameter class	Group tally to the nearest 1-inch diameter class. For trees less than 4.5 feet tall, record a diameter of zero-inches.
Component Code	Every tree	See Table 5
Average Height	Every species/diameter class	Determine the average height of each species/diameter class combination.
Live Crown Ratio	Every tree greater than or equal to 4.5 feet tall	Determine the average crown ratio by species and diameter class for trees that are greater than or equal to 4.5 feet tall.

Table 4. Tree data to be collected on variable radius plots.

Item	Frequency	Notes
Species	Every tree	2-character code (Table 8)
Tally	Every tree	Only enter value greater than 1 for Edge-Plot trees.
DBH	Every tree	Nearest Inch
Component Code	Every Tree	See Table 5
Live Crown Ratio	Same trees as measured for total height	Nearest 10% ocular estimate
Total Height	1st and 3rd trees per species on each plot and trees with defect, which impacts total height.	Measure total heights across the range of diameter classes for all species to the nearest 1.0-foot.

Item	Frequency	Notes
Broken Top Height	All trees with a broken top	Record in the Total height column to the nearest 1.0-foot
% Defect & Breakage by Tree Thirds (Bottom, Middle, Top)	Every tree with defect *(No total height necessary)*	Nearest 10% Minimum Piece = 12-feet Merchantable Top = 5-inches

Table 5. Tree Component Codes

Comp Code	Description	Remarks
..	Typical Live Tree	
C.	100% Cull Tree	Every log in the tree will be assigned to cull by the cruise compilation software, resulting in zero net volume.
BT	Broken Top Tree	Record height to point of breakage in the total height column.

Broken Top Trees

If a broken top has re-grown to a diameter at least half that of the diameter at the break, the tree should no longer be considered a broken top tree. Record defect related to the break accordingly. For trees with an actual broken top, enter a Component Code of BT and measure the height to the point where the top broke.

Defect & Breakage

Collect defect and breakage by tree thirds on all trees that contain defect or may potentially lose merchantable volume by breaking in the tree felling process.

When determining defect, do not think in terms of *merchantability*, but rather in terms of *recovery*. If portions of a tree will remain in the woods after harvest, subtract volume from the tree as defect. Examples of this situation are tops that will break when felled, or straight, but short “long-butts” that are left when defect is cut out above the sound wood, and what remains is a “long-butt” section that is too short to haul to the mill as a sawlog. Wood that is short or crooked, but sound enough for pulp must also be treated as cull material (i.e., “Pulp is cull”). Minimum piece = 12’, Merch Top = 5”

QUALITY CONTROL

Data Control

Cruise data must be appropriately relayed from the field to the field supervisor in a timely manner, in order to prevent any data loss or misplacement.

Check-Cruising

Quality is best achieved through check-cruising, to ensure that data are collected consistently and accurately throughout the duration of the project. Check-cruising will be done early in the project to identify and remedy any training deficiencies before they become a problem and will be conducted periodically throughout the project to ensure quality standards are always being met. Check-cruising is to be used as a teaching tool to ensure that the cruise instructions, measurement standards and other protocols are understood, and that work is consistent from cruiser to cruiser.

Cruisers are not told when their work will be checked and understand that their work may be checked at any time. The check-cruiser will visit each cruiser's established plots and conduct their own field measurements.

It is important to note that tree by tree and plot by plot comparisons are difficult to use when deciding if a cruiser's work is acceptable or unacceptable. For example, both the cruiser and check-cruiser must be on the exact same plot center and some observations such a percent defect are subjective. Therefore, while tree-by-tree and plot-by-plot comparisons are useful for teaching and training purposes, a cruiser's work will be considered acceptable if the work is within the tolerances outlined in Tables 6 and 7, for a batch of five plots.

Plot Location Tolerance

The first plot established in a stand must be within 100 feet (horizontal) radius of the location as depicted on the stand map. All other plots must be located within plus or minus 20% of the plot spacing, in terms of both the linear distance and the lateral distance perpendicular to the plot line.

Table 6. Cruising tolerances and acceptable rates of error.

Measurement	*Tolerance (+/-)*	*Maximum Rate of Error*
Number of tally trees	Correct tally of trees within plot	0%
Tree Species	Correct species identification	0%
DBH	Diameters measured with an accuracy of +/- 1.0 in.	5%
Total tree height	Heights measured with an accuracy of +/- 10%.	10%
Broken top height	Heights measured with an accuracy of +/- 10%.	10%
Tree Component code	Correct tree component code	0%
% defect	Record % defect with an accuracy of +/- 10%	10%

Table 7. Per Acre Check-Cruise Tolerances

Per Acre Attribute	*Tolerance (+/-)*
Live trees, by species	5%
Live basal area, by species	5%
Net volume, by species	5%

In the event of substandard work by any cruiser, the following steps will be taken:

- On-site training and review of the instructions and protocols
- Visit plots where measurements disagreed and discuss remedial action.
- Return to cruise plots to redo some or all of the measurements.

The check-cruiser will determine how much of a cruisers work may need to be redone. If substandard work continues, the check-cruiser and Project Manager will decide if a cruiser needs to be removed from the project.

Table 8. Species Codes

Code	Species
AC	Alaska Yellow Cedar
BC	Cottonwood Species
BM	Bigleaf Maple
CA	Cascara
CH	Cherry Species
CQ	Chinquapin
CX	Other Conifer
DF	Douglas-Fir
GF	Grand Fir
HX	Other Hardwood
MA	Madrone
MH	Mountain Hemlock
NF	Noble Fir
OA	Oregon Ash
OO	Oak species
PC	Port Orford Cedar
PD	Pacific Dogwood
PP	Ponderosa Pine
PY	Pacific Yew
QA	Quaking Aspen
RA	Red Alder
RC	Western Red Cedar
SF	Silver Fir
SS	Sitka Spruce
WF	White Fir
WH	Western Hemlock
WI	Willow
WL	Western Larch
XX	Unknown Species

Stand Lister Cheat Sheet

This "cheat sheet" was created to explain the various columns within the Stand Lister. The columns are defined as follows.

- **Shape***- The geometric form of a geographic feature, represented by a set of coordinates defining its boundaries. All stands are Polygons.
- **OBJECTID** - A unique, not null integer field used to uniquely identify rows in tables in a geodatabase assigned within GIS. ObjectID is an arbitrary number within the stand lister.
- **Stand_ID** – A unique integer used to identify the various stands within the stand lister/stands shapefile. Every stand has a unique stand id.
- **Gross_AC** - The total land area within a defined boundary, including all feature acres.
- **Net_AC** - The total land area within a defined boundary, excluding road acres.
- **Land_Use** – The functional description of how the land is classified, based on main use.
- **Timber_Use** – The classification of harvestable or non-harvestable. All typed land use of "forest" is assumed to be harvestable.
- **Timber_Type** – A stand type category classified into "regen, pre-merch, and merchantable" for forested stands, non-forest, and RMA buffer.
- **Area** – A classification of what geographic region the stand lies in within the Utility basins.
- **Harvest_Ye**ar – The year the stand was last harvested, if known. Derived from provided data from the Utility or from aerial imagery/GIS.
- **Year_Planted** – The year the stand was planted, if known. Derived from provided data from the Utility.
- **Stocking** – The estimated stocking level of a stand if the timber type is classified "regen or pre-merch". Classified as fully stocked, under stocked, overstocked, or no stocking. Stocking levels were derived from provided TPA data from the utility or from field verification.
- **PCT_YEAR** – The year the stand was pre commercially thinned, if known. Derived from provided data from the Utility.
- **Silviculture** – Any relative silviculture notes or recorded activities and year they were conducted. Derived from provided data from the Utility or field verification.
- **Cruise_Date** – The record date of the last know cruise. If <Null>, the stand was not cruised in the 2024 inventory update.
- **Major_SP** – The major two species within that stand type. Data derived from inventory results.
- **PGBYR** – Recorded birth year. Derived from provided data from the utility, inventory results, and stand age estimates.
- **Age**- Estimated stand age in years. Derived from provided data from the utility, inventory results, and stand age estimates.
- **TPA_UNDER_5"** – Trees per acre under 5 inches in diameter. Derived from inventory results.

- **TPA_OVER_8”** - Trees per acre over 8 inches in diameter. Derived from inventory results.
- **Update_YR** - The year stand information was updated. All stands show an updated year of 2024.
- **BdFtAc** - Board feet per acre. Derived from cruise results. If stand was not cruised, volume data was copied over from a similar stand type.
- **VAC_DFIR** – Total calculated DF volume (mbf). Derived from cruise results.
- **VAC_WhWD** - Total calculated WH volume (mbf). Derived from cruise results.
- **VAC_CEDAR** - Total calculated RC volume (mbf). Derived from cruise results.
- **VAC_PINE** - Total calculated WP volume (mbf). Derived from cruise results.
- **VAC_ALD** - Total calculated RA volume (mbf). Derived from cruise results.
- **VAC_HDWD** - Total calculated other hardwood volume (mbf). Derived from cruise results.
- **VAC_SPRUCE** - Total calculated SS volume (mbf). Derived from cruise results.
- **DFIR_VOL** – Board feet per acre of DF. Derived from cruise results.
- **WhWD_VOL** - Board feet per acre of WH. Derived from cruise results.
- **CEDAR_VOL** - Board feet per acre of RC. Derived from cruise results.
- **PINE_VOL** - Board feet per acre of WP. Derived from cruise results.
- **ALD_VOL** - Board feet per acre of RA. Derived from cruise results.
- **HDWD_VOL** - Board feet per acre of other hardwood. Derived from cruise results.
- **SPRUCE_VOL** – Board feet per acre of SS. Derived from cruise results.
- **TotMBF** – The total combined volume of all species within the stand (mbf).
- **Data_Sourc** – The source of the stand data. Either cruised in 2024, estimated by field verification, estimated from GIS/aerial imagery, or copied over from similar stands that were cruised.

APPENDIX B

Special Topic Memorandums

Security Processes and Procedures Special Topic Memorandum excluded from this Appendix for Confidentiality

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard, Inc.
Date: 5/27/2025
Re: Special Topic: Adjacent Land Use

Introduction

The City of Bremerton Utility Lands (Utility Lands) are centrally located, east of the town of Gorst, Washington, in Kitsap County, Townships 23 and 24-North and Ranges 1-West and 1-East. Of the 7,940 acres of Utility Lands, approximately 7,713-acres are in a central block, surrounding the McKenna Falls Intake Subbasin and Union River Reservoir. Approximately 180 acres of Utility land surround the Anderson Creek Wellfield. This wellfield also provides a significant source of clean drinking water to the City of Bremerton. Restriction of public access to the City's ownership of the water source is critical for protection and effective management of clean drinking water for the City of Bremerton. This memo will discuss adjacent land use and what steps the Utility can take to continue to protect and steward their land base and drinking water.

Background Information

The City's Utility Lands have a variety of adjacent landowners, varying in land use and management. The bulk of the adjacent ownership includes a mix of industrial timber properties and Green Mountain State Forest, which is managed by the Washington Department of Natural Resources (DNR). There is a component of rural residential properties, primarily located adjacent to the southern and eastern border of the Utility lands. These developed residential areas, specifically around the Anderson Creek Wellfield and North of Heins Lake, pose higher risks of potential trespassing, damage to utility property, and fire risk due to a greater element of Wildland Urban Interface (WUI).

Most of the adjacent landowners near the McKenna Falls Intake Subbasin are industrial timber properties and Washington DNR lands. This adds a wider layer of protection around the Union River Reservoir. Though the neighboring ownership is outside the Utility's control, it consists of a larger contiguous block of forest ownership that the Utility can effectively collaborate with for the continued protection and stewardship of clean drinking water.

The area directly south of the Union River Basin is primarily rural residential properties. The neighboring property northeast of Heins lake, north of Jarstad Park, and surrounding Anderson Creek Wellfield consist of high-density suburban homes. Figure 1 shows the adjacent lands surrounding the main block of the Utility Lands. The areas to the South and East of the Utility lands will become increasingly challenging for the City's forestry division due to multiple neighbors, mixed use properties, and varying levels of partnership between landowners.

The 180-acre block of Utility land that surrounds the Anderson Creek Well field is primarily high-density residential properties and also has the potential for increased risk of trespassing, vandalism, wildfire, and damage to utility infrastructure. Increased security evaluations near this area are necessary to ensure the same level of protection as the McKenna Falls Intake Subbasin.

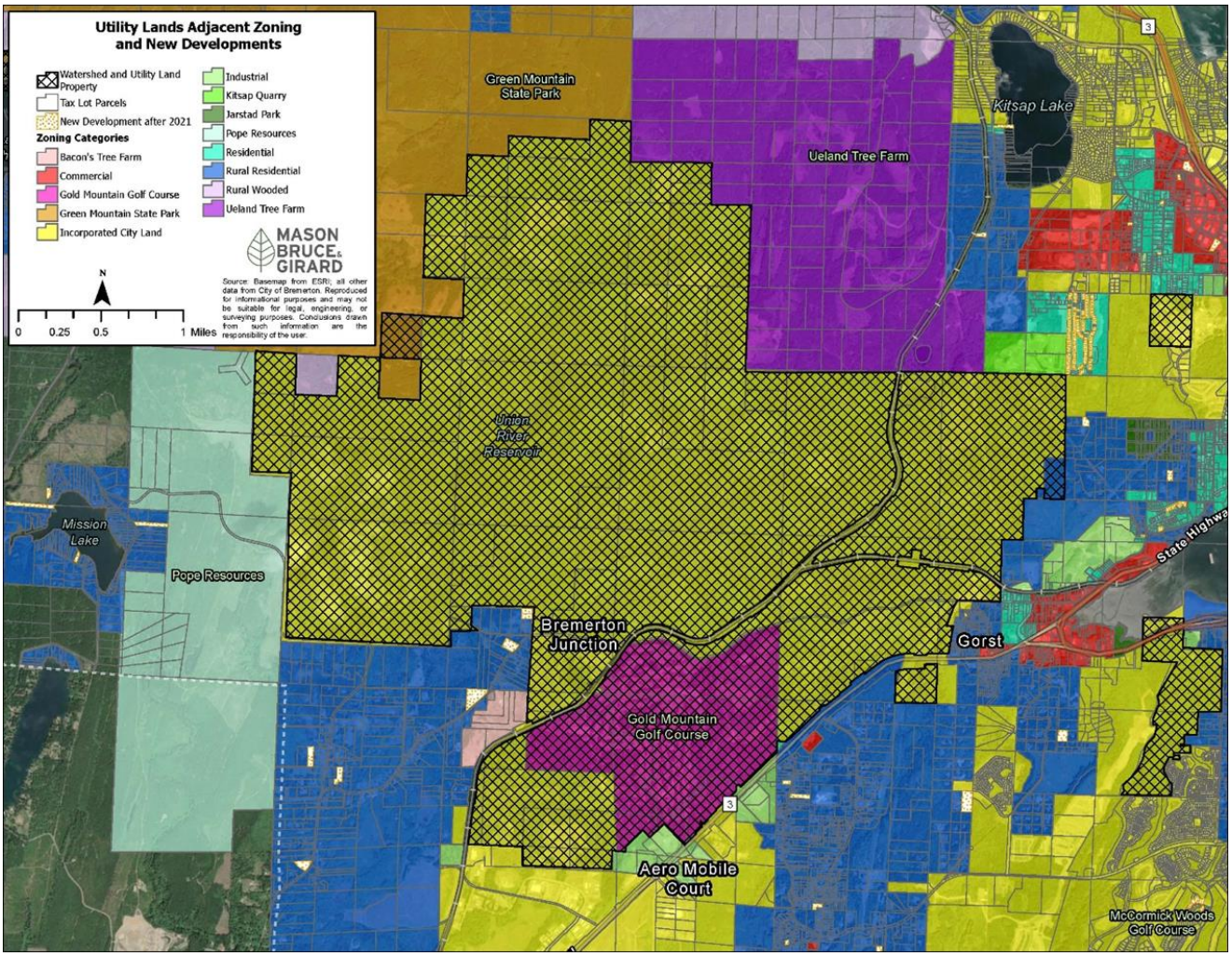


Figure 1. Owners Adjacent to City Property

Issue Assessment

The current land base protection and policies set in place by the Forestry Division and Water Utility Watershed Control Program will continue to ensure execution of the key management objective of drinking water protection. Potential future issues may include changes to the land use and development surrounding the Utility Lands, which could result in increased urban development. An increase in WUI poses several potential problems for the City of Bremerton. The uptick in development adjacent to the Utility Lands is problematic due to the likelihood for increased issues with trespassing, vandalism, theft, threat of wildfire, dumping, and other human activity associated with the WUI.

Forest Management in the WUI is an ever-increasing challenge for land managers. As more of the public engages with and establishes residences in and around rural areas, managing for the increased wildfire risk becomes particularly important. There are many different methods that can be utilized to mitigate the increased wildfire risk caused by an increase in WUI. Many of these methods are already being utilized by the Forestry Division such as public access restrictions, security patrols, locked gates, maintenance of established roads and infrastructure for greater access and better response time and having an established fire protection plan as outlined in the Water Utility's Watershed Control Program. Other recommendations to manage for WUI are defensible space on utility land, neighbor education and collaboration, and education on home and community defensible space near Utility lands.

While changing land use laws and increased urban development may be objectives of the City and County, it will create major challenges for the protection and stewardship of the Utility Lands and water supply as landowners within the Interface have conflicting objectives. An increase in WUI and development around the Utility lands will require additional security and updates to infrastructure (as mentioned in the security special topic). Figures 2 and 3 show a newer housing development (Soundview Estates) that borders Utility Lands, northeast of Heins Lake. This single development site currently has more than 300 lots within 900 yards of a main access point to Utility lands. Ongoing community outreach will be crucial to educate the public on watershed management and the importance of watershed protection, and to collaborate on security in terms of reporting trespassing and suspicious activities.

Figure 2. County Tax lot Map of Soundview Estates and Surrounding Landowners.

Figure 3. Photo of an access gate leading into Soundview Estates.

Findings and Recommendations

The forestry division should continue to collaborate with their neighbors in the context of watershed management, where the main priority is protection of the clean drinking water supply that the McKenna Falls Intake Subbasin and Anderson Creek Wellfield provides for the City of Bremerton. This includes working with the Washington DNR, industrial tree farms, Department of Defense, utility companies, tribal entities, and all rural/urban residential areas near Utility Lands. Education plays a very important role with all landowners, especially within the residential areas of the WUI. Figure 4 shows (purple) highlighted properties that are deemed “developable”. These specific properties should be considered for acquisition if possible.

Figure 4 Removed for Confidentiality

Figure 4. Map of "Developable" Properties that abut Utility Property

All neighboring lands abutting utility property should be monitored for potential land acquisition, which would expand the Utility lands and increase security and resource protection and provide for more effective watershed management. Acquiring neighboring properties, via land trades or direct purchase, is the most effective way to control and predict activity within and near the Bremerton Utility Lands, with an emphasis on properties near McKenna Falls Intake Subbasin and Anderson Creek Wellfield.

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard, Inc.
Date: 5/27/2025
Re: Special Topic: Kitsap Lake to Jarstad Park Trail

Introduction

A shared-use trail was proposed between the south end of Kitsap Lake in Kitsap County to Otto Jarstad Park in Bremerton (See Figure 1). This memorandum reviews the potential impacts the proposed trail route would have on security, the City's unfiltered surface water status, current operations, and staffing. This special topic memorandum also identifies security enhancements that must be considered should the City and the County choose to construct the trail.

Background Information

The initial location of this proposed trail was put forth in 2013, in the County's Non-Motorized Facility Plan, by the Kitsap County Non-Motorized Committee and the West Sound Cycle Club. The total proposed trail is roughly 3.16 miles. Approximately 1.99 miles of the proposed trail bisects City of Bremerton Utility Lands. Kitsap County led a preliminary feasibility study, performed by Fischer Bouma Partnership (FBP) in 2018, which included a City liaison who sat on the committee. The study was to better understand the proposed area, determine best planned route, and investigate alternatives and costs for the proposal. Many of the details in this Special Topic paper are referencing the findings of the 2018 Feasibility Study.

The 2018 Feasibility Study proposed a design strategy that the authors felt would minimize costs and disturbance to the Utility Lands. To achieve these goals, the study adopted the strategy of using existing logging roads (2000 Road) as the base of the shared-use path. The proposed path would be designed for an 18-mph speed, be either 10 or 14-feet wide, paved with a 2% maximum cross slope, and two-foot soft surface shoulders (typically gravel). Areas of disturbance in the corridor would range from 14-feet to 40-feet in width per the 2018 Feasibility Study by FBP. The project would also require the installation of a bridge.

The cost estimate of $4 million dollars did not include any grant funding but did account for the construction and design of the trail in such a way to maintain eligibility for grant funding in the future. Grant funding qualifications included specific maintenance, security/enforcement, and operations specifications, and a management plan.

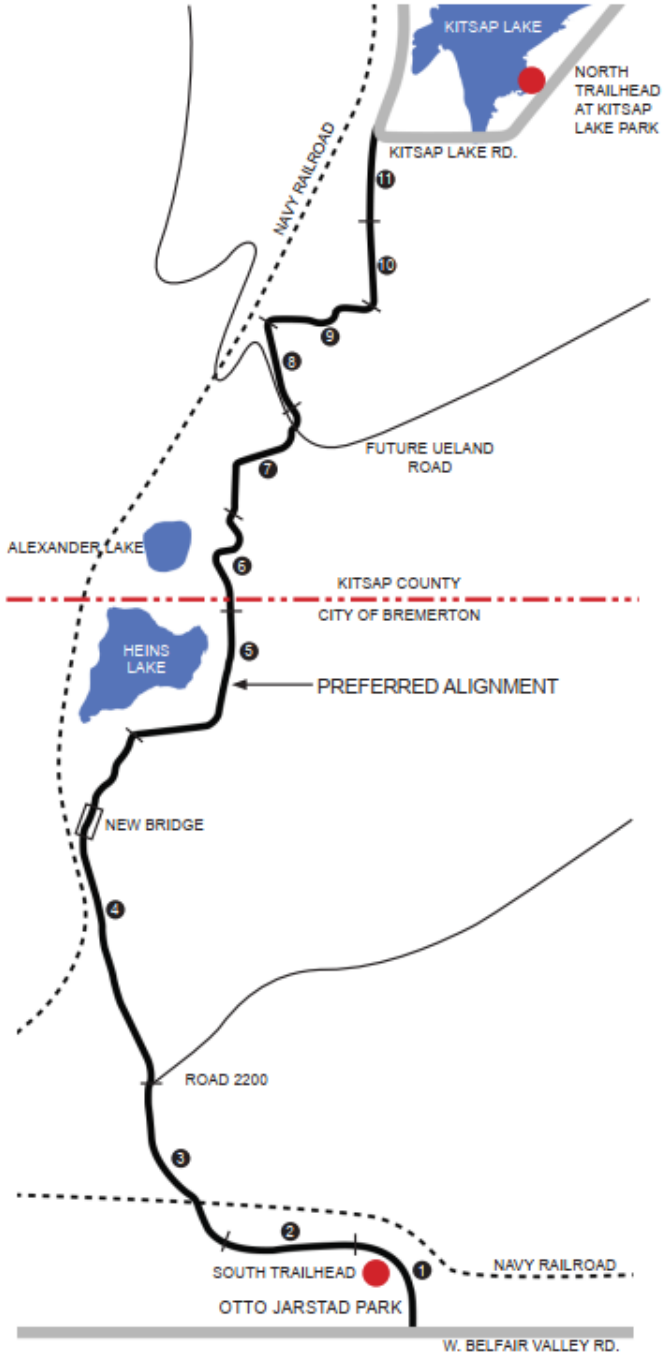


Figure 1. 2018 Feasibility Study Proposed Trail

Issue Assessment

Conflicting Use:

The 2018 Feasibility study noted some potential issues with the proposed trail system. Some of these issues specific to the City Utility Lands include the shared road/path on existing logging roads, the need for additional survey work, Navy right-of-way easements, conflicts with forestry operations, potential for needed transfer of ownership, upgraded facilities, increased staff and maintenance and potentially other unforeseen costs which are discussed in more detail under Cost.

Unfortunately, the study did not consider all the uses of the 2000 Road and major utility infrastructure that is aligned with, adjacent to, or crosses the road. The 2000 Road provides access to Water Utility staff for environmental monitoring, street spoils hauling, and communication tower access. This access is used frequently throughout all times of year. Major utility infrastructure that would require access for maintenance (everything from minor vegetation management to major capital repairs) include Cascade Natural Gas line, Bonneville Power Association power lines, Puget Sound Energy power lines and the 18-inch transition main that carries water from Pump Station 17 (pipe layout yard) to the Kitsap Lake area. The main is flushed and cleaned every year (pigging) with a pig port located on the proposed pathway between Alexander and Heins Lakes. Lastly, the south end of the proposed trail bisects the Suquamish Tribe Fisheries operation.

Security

Another significant issue with the proposed trail is the increase in security that would be required to try to prevent trespass onto Utility Land. This may include, but is not limited to, more police patrols, signage, security cameras, gates, fencing, and additional labor hours. A solid barrier between the trail and the Utility Lands has a high likelihood of keeping most of the public from illegally entering the Utility Lands. However, fence breeching through cutting or climbing are observed in other fenced utility properties and would be expected here at least occasionally. Additionally, fencing cannot block Navy railroad crossings, allowing trespassers easy access to Utility Lands at those crossings.

Threat to Unfiltered Source Water Status:

The existing controlled access points along the outer perimeter of the Utility Land ***are*** the access points to the City's unfiltered source of drinking water. There is no interior secured perimeter around the Union River Reservoir or McKenna Falls Intake Subbasin. Utility Land that surrounds the McKenna Falls Intake Subbasin inside the existing secure perimeter were acquired for buffering purposes to maximize the separation between the McKenna Falls Intake Subbasin and potential pollutant-generating activity (includes transportation and recreational activity such as hiking and biking) and risks associated with the Wildland Urban Interface. Acquiring additional buffer property is a top strategy identified in the Watershed Control Program Plan - a requirement under WAC 246-290-690(3)(e) to remain unfiltered - and has been utilized in the past to increase separation and improve level of protection. To allow a shared-use trail as proposed through the buffer area will reduce the buffer width. Fencing may be effective in keeping most trespassers out of the watershed, but it can do nothing to prevent other effects of moving

the WUI risks closer to the McKenna Falls Intake Subbasin such as wildfire risk from a carelessly discarded cigarette butt or illegal camping.

This proposed land use change of the buffer property and movement of potential risk closer to the McKenna Falls Subbasin could be viewed by regulatory agencies as a negative change in security posture and a reduction in protection of the unfiltered source (See Attached Department of Health Letter). This could result in the City's loss of unfiltered status and a significant cost to drinking water ratepayers as discussed in the Cost section below.

Comprehensive Planning Consistency/Environmental Considerations:

Any development or activity must be compatible with other City comprehensive plans. The Gorst Subarea Plan, led by Kitsap County and the City in partnership with state, federal and tribal agencies and adopted by City Council (Ordinance 5237, 2013), sets out a 20-year land use plan for the future of Gorst. The three-part study included an in-depth assessment of the ecological resources within the Gorst Creek Watershed (*Gorst Creek Watershed Characterization and Framework Plan, 2012*). The purpose of the subarea plan was, as stated in the plan, a "*cooperative planning effort…to develop a land use plan that is based on the ecological values and functions of the Gorst Creek Watershed in southeast Kitsap County*."

The characterization identified critical functions the Gorst Creek Watershed provides locally and within the context of the greater Puget Sound Region, and categorized subbasins within the watershed based upon each subbasins' function and importance. Those areas of the watershed that were zoned for maximum protection (Protection Zone) are delineated in Figure 2 and encompass nearly the entire proposed trail route through the Utility Lands. The report states, *"The **Protection Zone** supports recharge, discharge and storage processes which are critical to sustain a natural range of flows in Gorst Creek, including adequate low flows during summer and fall. Because recharge and discharge processes are sensitive to development and would be significantly degraded by impervious surfaces, buildings, roads, and drainage infrastructure, such development should be restricted in this zone."* (Page 4-2)

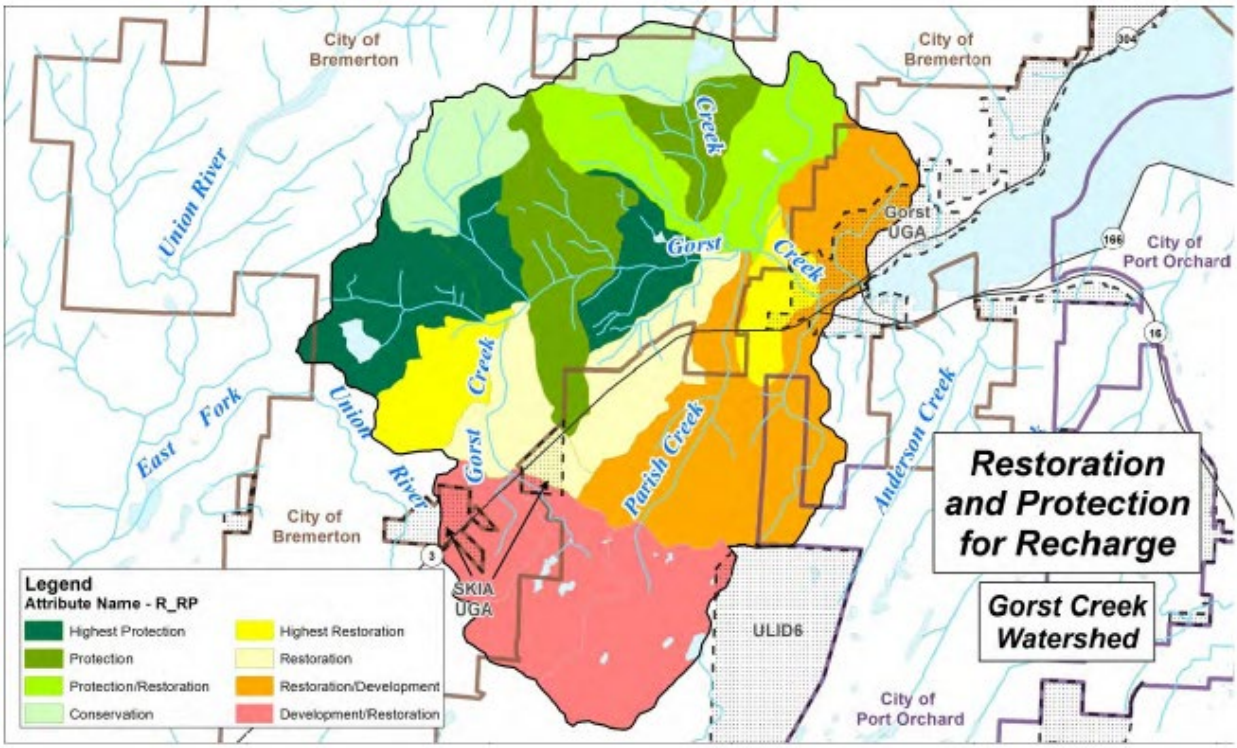


Figure 2. Gorst Creek Watershed Restoration and Protection Zones (taken from Gorst Subarea Plan – Gorst Creek Watershed Characterization and Framework Plan, page 3-6)

The characterization also highlighted the following critical watershed functions identified in May and Peterson's *Landscape Assessment and Conservation Prioritization of Freshwater and Nearshore Salmonid Habitat in Kitsap County* (2003):

The Gorst Creek Watershed is described as "*one of the largest and most productive watersheds in the east WRIA-15 subregion*" and "*above river mile 1.0, is rated 23rd out of 95 salmonid refugia areas within Kitsap County*".

The forested area that comprises the north and central portion of the Gorst Creek Watershed is publicly owned and lies within a contiguous area that also contains Green Mountain and Tahuya State Forest. Taken together, this area comprises the largest open-space block in the Puget Trough Ecoregion of the Puget Sound Basin.

Adding a trail with facilities and services such as additional parking areas, benches, handicap accessibility, and restrooms at trail heads may disturb salmon refugia areas, and security fencing along the length of the trail would truncate a significant portion of the open space in terms of movement of terrestrial species.

Cost:

All costs associated with the construction, maintenance, security and other needs including staffing associated with the proposed trail *cannot* be funded by the Water Utility as the trail does not support the

provision of drinking water. Therefore, all costs described here will be a General Fund expenditure. The only potential cost to the Water Utility, though it be by far the largest, would be the cost of implementing filtration should the proposed use result in the loss of unfiltered source status.

The project costs in today's dollars are almost certainly higher than the estimated $4 million in the 2018 Feasibility Study, which included engineering, construction, management, right-of-way easement cost, design, and a 20% contingency. Outside the estimated cost breakdown within the 2018 Feasibility Study, there are additional unforeseen costs. One major cost would be from the increase in staffing necessary to successfully maintain and operate a connecting trail of this size and to manage the complexity of the multi-use proposal. Duties related to the proposed trail would include coordination with utility operations on scheduling, security, community education/engagement, maintenance contractors, litter patrol, and other needs. This position would also closely work with Kitsap County, Bremerton Police, and Bremerton Fire.

There could also be a large amount of unforeseen cost needed for improved infrastructure. This could include facilities and services such as additional parking areas, benches, handicap accessibility, restrooms at trail heads, maps and kiosks, garbage service, adequate lighting at trailheads and parking lots.

A cost estimate to fence off either side of the trail with an 8-foot-tall standard cyclone fence is approximately $30 per linear foot, not including gates. This would be a total approximate cost of $650,000 to fence either side of the 1.99 miles of proposed trail across Utility lands. This cost does not include yearly maintenance of the fence line for down trees/branches, vandalism, etc. Additional gates may have to be installed along the fence for access and maintenance. The average cost of a new forestry gate installed is approximately $10,000, not including any road work associated with the gate. The typical forestry security camera is a heavy-duty cellular trail camera, secured by a steel beer box and lock. These would be strategically placed near main access points or high traffic areas of trespassing. The average cost of a typical security camera set up is approximately $500 per camera including accessories. These are only the minimal security measures identified; more may be necessary if these are not sufficient.

The greatest potential cost is associated with the loss of the unfiltered status of the drinking water supply if this action results in system failure to meet the criteria for unfiltered systems as detailed in WAC 246-290-691 or if the regulatory body determines that this action results in increased risk that cannot be sufficiently mitigated. Losing the ability to remain unfiltered would require the City of Bremerton to construct filtration facilities, either conventional coagulation/flocculation/filtration or membrane filtration. Either approach could cost the utility ratepayers 10's to 100's of millions of dollars for construction and over a million dollars or more a year to operate and maintain.

Recommendations

It is our recommendation that a comprehensive feasibility assessment, taking all issues discussed above into consideration, be completed before pursuing a project of this nature. Given the costliest potential impact, loss of unfiltered status of the drinking water supply, it is imperative that the City consult closely

with the State Department of Health to determine if equal or better protection of the water supply is reasonably achievable.

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER OPERATIONS
P.O. Box 47823 Olympia, Washington 98504-7823
PHONE (360) 236-3030 FAX (360) 236-3029

April 2, 2025

Cami Apfelbeck
City of Bremerton
100 Oyster Bay Avenue North
Bremerton, Washington 98312

Subject: City of Bremerton, ID #08200R, Kitsap County; Surface Water Treatment Rule (SWTR) – Union River Treatment Facility and Watershed Inspection 2025

Dear Cami Apfelbeck:

On March 25, 2025, Steve Deem and I conducted the annual inspection of the Union River watershed, McKenna Falls Intake, and Advanced Disinfection Facility (ADF), as required by WAC 246-290-691(3)(c). The inspection did not identify any deficiencies that would affect the City of Bremerton's (City) unfiltered status for the Union River supply.

During the inspection, we toured the watershed including an area that burned in a 2018 fire and the catchment area for the City's seasonal surface water source (S02, West Branch Union River). We also toured the Casad Dam, West Branch Intake, McKenna Falls Intake, and the Advanced Disinfection Facility (ADF). We discussed forestry management, security, safety, and concerns for future development.

The City's water system and watershed are well-managed, and the City proactively makes improvements. For example, we were pleased to see that the City completed two new bridge projects allowing larger fire-fighting vehicles to access more areas of the watershed. This will improve fire-fighting effectiveness and reduce the risk to the watershed. Another recently completed project was adding communication fiber to your facilities to improve communication reliability and security.

Based on the inspection and supporting documentation, our recommendations are:

1. We understand the City is considering adding a bicycle and pedestrian trail through the eastern part of the city-owned watershed control area. Although the proposed public access path is outside the hydrologic boundary of the surface water source, we have significant concerns about reducing the protective buffer that keeps people out of this valuable water supply. People, both well-meaning and not, present a risk to water quality. The primary concern is human started fire. We are also concerned the increased access may encourage people to attempt to access areas within the watershed and may make future development ideas seem more acceptable. Our recommendation is to find an

alternate alignment for the proposed trail that does not pass through the watershed control area. If the City chooses to construct the trail, you should carefully consider how you will mitigate the risks to the watershed. While we understand there would be public benefit to providing a safe pedestrian path, please do not undervalue the unfiltered status of this water supply when considering the accompanying risks.

2. We also discussed preparing a Harmful Algal Bloom Response Plan. Although you currently have low susceptibility to algal blooms, this may change as the climate trends warmer and drier. We recommend getting ahead of the issue by preparing a plan as outlined in our publication 331-654 Dealing with Cyanobacteria: Time to Make a Plan.

We continue to be impressed with the City's commitment to excellence in water system operations and watershed maintenance. Active management of the watershed is critical for maintaining both high water quality and stable watershed conditions.

If you have any questions, please contact me by phone at (564) 669-3170 or by e-mail at candida.granillo-dodds@doh.wa.gov.

Sincerely,

Candida Granillo-Dodds, P.E.
Office of Drinking Water, Regional Engineer

cc: Kitsap Public Health District
Jolyn Leslie, ODW
Scott Pollock, ODW

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard, Inc. Technical Team
Date: May 26, 2025
Re: Special Topic: Water Filtration Plant Rate Impacts

Introduction

The special topics memo on the Kitsap Lake to Jarstad Park Trail evaluated potential impacts of the proposed trail on security, the City's unfiltered surface water status, and current operating and maintenance costs. Given input from the Washington State Department of Health, the conclusion is that the proposed land use change could jeopardize the unfiltered status of the City's surface water source resulting in the requirement to construct a water filtration plant (WFP). Considering this potential impact on water system operations, the City contracted with Consor Engineers to develop budget level estimates of capital and operating costs for a WFP; see attached.

Since the type and size of contaminant to be removed determines the type of filtration facility required, the selection of treatment process must be preceded by a thorough water quality characterization, pilot testing, and alternatives analysis. As it is not possible to predict a specific contaminant but rather a suite of potential contaminants, this cost assessment considers both conventional filtration (low end costs) and membrane filtration (high end costs). These costs were then used to estimate resulting rate impacts.

Key Assumptions

The Current Harvest Financial Plan developed to evaluate the Timber Harvest Alternatives was used as the basis to complete the water filtration plant rate impacts evaluation. All financial assumptions remain the same with the exception of the following:

- Additional Annual operating costs will begin the year after construction (2031)
  - » Low alternative operating costs = $1.320 million per year
  - » High alternative operating costs = $16.060 million per year
- Capital Costs – construction to begin in 2026
  - » 30% design year 1 and year 2, costs split equally
  - » 70% construction year 3 through 5, costs split equally
  - » Low alternative capital costs = $ 84.7 million
  - » High alternative capital costs = $459.8 million
- Revenue bonds with a term of 20 years, 5.0 percent interest, 1.0 percent issuance costs assumed for all new debt proceeds required

Water Filtration Plant Alternatives

Two WFP alternatives were evaluated – low and high operating and capital costs. As noted previously the operating costs will begin the year after construction and total design and construction of the WFP will span five years. The capital funding approach is to use available resources first such as beginning reserve balances, rate funding and general facility charges before assuming new debt service. Due to the larger capital costs of a water filtration plant, new debt will be required for both alternatives.

Water Filtration Plant – Low Cost

This alternative assumes $1.320 million in additional operating costs beginning in 2031. Capital costs of $84.7 million ($96.4 escalated to year of construction) are spread over the five years with 30 percent for design averaging $13.5 million per year over the initial two years. The construction costs are spread over the final three years at an average of $23.1 million per year. The WFP low cost option requires external funding of $112 million, assumed as revenue bonds (4 issues in 2026, 2029, 2032 and 2035). The corresponding annual debt service ranges from a low of $4.4 million to a high of $9.9 million. The ten year change in rates is $39.09 ($72.43 less $33.34) or an average of $3.91 annual monthly change in rates. The rate impacts are front loaded during the design and construction of the WFP.

	Current	Projected									
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Rate Impact		20.00%	12.00%	12.00%	12.00%	7.00%	7.00%	3.00%	3.00%	3.00%	3.00%
SF Mo. Bill	$ 33.34	$ 40.01	$ 44.81	$ 50.19	$ 56.21	$ 60.14	$ 64.35	$ 66.28	$ 68.27	$ 70.32	$ 72.43
Change ($)		$ 6.67	$ 4.80	$ 5.38	$ 6.02	$ 3.93	$ 4.21	$ 1.93	$ 1.99	$ 2.05	$ 2.11

Table 1. Sample Single Family Monthly Bill – WFP Low Cost

Water Filtration – High Cost

This alternative assumes $16.060 million in additional annual operating costs beginning in 2031. Capital costs of $459.8 million are spread over the five years with 30 percent for design averaging $68.9 million per year over the initial two years. The construction costs are spread over the final three years at an average of $107.3 million per year. The WFP high cost option requires external funding of $396.4 million, assumed here as revenue bonds (3 issues in 2026, 2028, 2030). The corresponding annual debt service ranges from a low of $10.8 million to a high of $35.0 million. Due to the level of new debt proceeds required under this scenario, meeting the 1.50 debt service coverage ratio becomes a rate driver. This level of debt service coverage or higher may be needed to secure favorable bond interest rates, bond rating and to provide financial assurance that the City will meet the annual debt service payments. The ten year change in rates is $177.39 ($210.73 less $33.34). The initial six years during WFP design and construction have the largest annual impact before returning to more moderate rate changes.

	Current	Projected									
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Rate Impact		77.50%	50.00%	50.00%	15.00%	15.00%	15.00%	1.00%	1.00%	1.00%	1.00%
SF Mo. Bill	$ 33.34	$ 59.18	$ 88.77	$ 133.15	$ 153.12	$ 176.09	$ 202.51	$ 204.53	$ 206.58	$ 208.64	$ 210.73
Change ($)		$ 25.84	$ 29.59	$ 44.38	$ 19.97	$ 22.97	$ 26.41	$ 2.03	$ 2.05	$ 2.07	$ 2.09

Table 2. Sample Single Family Monthly Bill – WFP High Cost

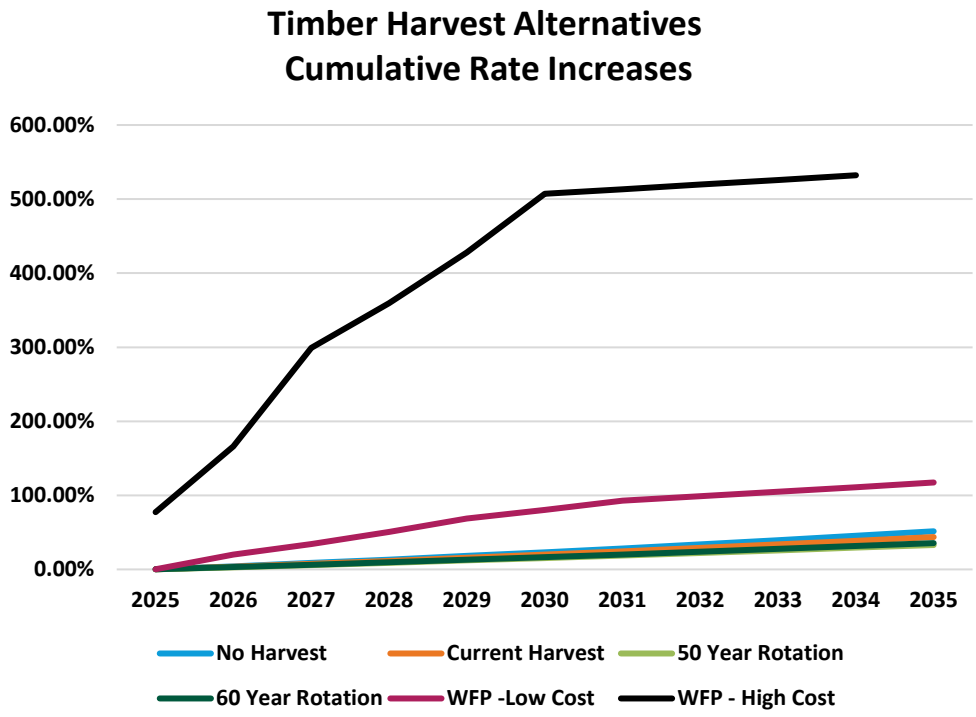
Comparison of Alternatives

Table 3 provides a summary of the monthly single family rate impacts for each Timber Harvest Alternative and WFP alternatives for comparison purposes. The main difference in the Timber Harvest Alternatives is the level of timber harvest revenue assumed. The last two scenarios assume the current harvest alternative with the addition of the water filtration plant operating and capital costs.

	Current	Projected								
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
No Harvest	$ 33.34	$ 34.76	$ 36.23	$ 37.77	$ 39.38	$ 41.05	$ 42.80	$ 44.62	$ 46.51	$ 48.49	$ 50.55
Current Harvest	$ 33.34	$ 34.57	$ 35.85	$ 37.18	$ 38.55	$ 39.98	$ 41.46	$ 42.99	$ 44.59	$ 46.24	$ 47.95
50-Yr Rotation	$ 33.34	$ 34.31	$ 35.30	$ 36.33	$ 37.38	$ 38.46	$ 39.58	$ 40.73	$ 41.91	$ 43.12	$ 44.37
60-Yr Rotation	$ 33.34	$ 34.37	$ 35.44	$ 36.54	$ 37.67	$ 38.84	$ 40.04	$ 41.28	$ 42.56	$ 43.88	$ 45.24
WFP -Low Cost	$ 33.34	$ 40.01	$ 44.81	$ 50.19	$ 56.21	$ 60.14	$ 64.35	$ 66.28	$ 68.27	$ 70.32	$ 72.43
WFP - High Cost	$ 33.34	$ 59.18	$ 88.77	$ 133.15	$ 153.12	$ 176.09	$ 202.51	$ 204.53	$ 206.58	$ 208.64	$ 210.73

Table 3. Summary of Timber Harvest and WFP Alternatives Monthly Bill Impacts

In addition to the monthly single family bill impacts, a graph of the cumulative rate increases is provided to show the range and spread of the timber harvest alternatives over time. As shown, the alternatives show a cumulative rate impact ranging from a low of 33 percent to a high of over 500 percent.



Summary

The City relies on the McKenna Falls surface supply for approximately 2/3 of our drinking water; this source is very high quality, and the capacity available is critical to meet our peak demands. Replacing the surface supply with additional wells is impractical and may not be possible.

The loss of unfiltered status for the City would bring large financial impacts to the water utility. The low construction cost estimate for the water filtration plant would over double (2.17x) the current rate. The high construction cost estimate would be over six times (6.32x) the existing water rates by 2035.

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard
Date: 12/9/2024
Re: Special Topic: Staffing

Introduction

The City's Forestry Division manages all aspects of forestry on the 7,940 acres of Utility Lands. This includes but is not limited to road maintenance, silviculture, harvest layout, contract administration, budgeting, harvest scheduling, wildlife management, biosolids applications, security, and other functions. The Forestry Division works closely with the Water Utility Manager on security management and drinking water source protection and works collaboratively with other City divisions on various projects as needed.

Background Information

There are currently a staff of four full time positions and one seasonal position within the Forestry Division. This includes a Forestry Manager, a Forestry Service Specialist Supervisor, two Forestry Service Specialists/Senior positions, and a seasonal Forestry Intern. The job descriptions are as follows.

Forestry Manager
Salary Range: $107,619.84-$131,124.24 Annually.
This position manages the Forestry Division of the Department of Public Works and Utilities. This position is responsible for all aspects of management of the Utility Lands outside the City's urban boundaries. Some of the duties of this position include but are not limited to Forestry Division management, biosolids program management, special project management, land management, and inter-departmental/agency coordination. This position also currently provides review of forest practices permits to support the City's Department of Community Development and provides support to Utility Land leases with tree removal/management (example, Gold Mtn Golf Course).

Forestry Service Specialist Supervisor
Salary Range: $45.36-$53.50 Hourly
This position works under the supervision of the Forestry Manager and manages on-the-ground operations. Some of the duties of this position include but are not limited to managing timber harvest activities, revenue generation, security management, supervising and training forestry service specialists and interns, road maintenance, special projects, water quality protection, and biosolids application.

Forestry Service Specialist/Senior
Salary Range: $28.20-$38.45 Hourly
This position works under the supervision of the Forestry Service Specialist Supervisor. Some of the duties include but are not limited to operating specialized heavy equipment, road construction and maintenance,

biosolids application, timber harvest activities, revenue generation, security management, special projects, and silviculture applications.

Forestry Intern
Salary Range: $20.00-$25.00 Hourly, Full Time Seasonal (4-6 Months)
This position works under the supervision of the Forestry Service Specialist Supervisor. Some of the duties include but are not limited to reforestation surveys, stream survey work, GPS work, road construction and maintenance, manual labor, operating hand tools, and operating small equipment to help maintain the forestry equipment, buildings, and grounds.

The budgeted personnel cost for the entire Forestry program, including benefits, overtime and the seasonal position is $622,649.

Issue Assessment

There are no identifiable issues with the current staffing level within the Forestry Division. Forest management by nature is extremely complex and ever changing due to multiple management objectives, advancing technology, increased or changing rules and regulations, and adjacent land use and development. The scale and level of complexity within the City's Utility Lands easily justifies the current staffing levels and cost to continue to ensure successful management of all aspects of forestry and protection of water quality. Continued use of the current staffing structure, outlined duties, and organization, and implementation of treatments and applications should ensure successful achievement of the City's management objectives.

Findings and Recommendations

It is our recommendation that the forestry staffing levels stay the same or increase based on the current needs of the forestry division. An increase in staff, specifically having two separate positions, a Forestry Equipment Specialist/Senior, and a Forestry Specialist/Senior, would create a more effective and self-contained workflow for the forestry division. Fitting staff to specific roles would allow individuals to focus on developing and mastering certain specialized skills versus a more general role where skills become less refined. This recommendation would improve the overall management of the watershed and improve the protection and stewardship of clean drinking water and successful fulfillment of the City's other management objectives.

The City should continue to actively monitor current pay scales for similar forestry positions within the region to stay competitive in terms of wages, specifically within other City divisions. This will help to minimize staff turnover and increase longevity and cumulative forestry experience within the Forestry Division staff.

We recommend increasing the minimum qualifying education and forestry specific experience, required for the Forestry Service Specialist position. This will ensure proper knowledge and experience when hiring new staff and will reduce the amount of training necessary during onboarding, which will reduce the workload of the Forestry Service Specialist Supervisor and Forestry Manager.

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard, Inc. Technical Team
Date: 5/27/2025
Re: Special Topic: 20-Year Capital Improvement Plan

Introduction

A critical aspect of forest management is the development and management of the infrastructure necessary to execute the forest operations that are conducted to achieve the overall goals for the forest, including resource protection. The main infrastructure on any forest property is the road system, which includes culverts, bridges, and the actual roads and road surfaces. Other infrastructure may include gates, fencing, security systems, and buildings. The Forestry Division is responsible for the installation, maintenance and upkeep of infrastructure, including working with the City Facilities Division to maintain the Forestry Division office and buildings at the City of Bremerton Pipe Yard located on Belfair Valley Road.

All capital costs associated with Water Utility-owned properties and facilities, including Forestry assets, are part of the master 20-year Water Utility Capital Improvement Plan (CIP). The 20-year plan developed here will include only those assets associated with the Forestry Division.

Background Information

City of Bremerton owned forest lands contain a robust and well-maintained road system. Most roads are rocked, all season roads, with a small component of trails and dirt spur-roads that are appropriate for seasonal use. There is a total of 64.9-miles of mapped roads within the City's Utility Lands, not including trails and minor spur-roads. This road system includes a total of nine bridges, all of which have been field verified and confirmed to be currently sound and functional. There are 256 mapped culverts on the City's Utility Lands, varying in size from 18 to 66-inches in diameter (See Figure-1)**.** Other assets include but are not limited to the biosolids storage sites and trails, forestry equipment and equipment storage facilities, the forestry division office building and compound, and forest gates. Table-1 shows planned capital improvements and costs from 2025 to 2045.

Table 1: Planned and Proposed 20-year Capital Improvements

Capital Asset Projects	Proposed Improvement	Estimated Total Project Budget	Description
Forestry Bridge Load Rating/Repairs	Bridge Assessments	$ 350,000.00	Biannual assessment from a licensed Engineer inspect all Forestry Bridges and provide recommendations on repairs or replacement. Also includes additional funds to have Forestry Staff conduct maintenance as recommended by Engineer.
2000 Road Culvert Replacement	Replace Culvert	$ 335,000.00	Replace undersized culvert that was recently determined to be Fish passable. This project is to replace it either with bridge or larger culvert depending on what contracted Engineer determines.
McKenna Falls Forestry Office Major Improvements	Roof Replacement	$ 20,000.00	Roof replacement for Forestry Office. Projects like this for Forestry managed structures are identified by the City's Facility Division and paid for out of the Water Capital budget.
Roll up building at City Pipe Yard(4398 W. Belfair Valley RD) Major Improvements	Fire Alarm Installation	$ 20,000.00	Installation of Fire Alarm system.
Biosolids Pond Roof Cover Structural Assessments & Repairs*	Assessment and Repairs	$ 80,000.00	Structural Engineer assessing all 3 Biosolid Pond Roof Covers and making recommendations for repairs.
Biosolids Pond Vehicle New Storage Buildings*	Building Construction	$ 240,000.00	Construction of three pole barn like structures that will be used for vehicle storage at the Biosolid Ponds.
Watershed / Utility Security Evaluation Plan and Enhancements	Security Evaluation, Proposed Gate Improvements	$ 2,150,000.00	To conduct the 5 Year Security Evaluation Plan as required by regulations. These funds are also available for Security improvements such as gate repairs/construction, new security cameras or other upgrades suggested by the plan.
Utility Land Management Plan	Utility Land Management Plan Update	$ 771,112.00	Updates to the Utility Land Management Plan every 10 years as necessary.
Forest Management Plan	Forest Management Plan Updates	$ 800,000.00	Updating the Forest Management Plan based upon recommendations from the Utility Land Management Plan Updates.
Union River Drainage Stream Mapping	Stream Mapping Assessment	$ 60,000.00	Have a consultant GPS and inventory all streams that feed into the Union River Reservoir on City of Bremerton Property.
Forest Bridge Replacement*	Replace 5400 Rd Bridge	$ 200,000.00	Licensed engineer to develop plans and installation of concrete bridge.
Culvert Replacement*	Replace Culverts	$ 15,000.00	Replace 6 culverts, flagged for replacement by forestry division.
Forestry Machinery/ Equipment	Equipment Funds	$ 525,000.00	Annual funds available for accessories or small equipment needed for Forestry owned equipment.
*New Proposed Projects			
2025 - 2045 Total		$ 5,566,112.00	

Issue Assessment

The culverts on City Utility Lands have been well maintained, are currently in good overall condition, and should be monitored periodically to ensure they are replaced when appropriate. Periodic culvert installation or replacement could be considered part of road maintenance and not necessarily a capital improvement as it is a relatively minor expense.

Bridges are a significant expense and improvement to the Utility Lands and should be considered a capital improvement. Out of the nine bridges on Utility Lands, one will need to be updated or replaced within the next 20-years. Bridge #9 (5400-Road Bridge) is located roughly one-half mile north of Union Reservoir (See Figures 2, 3, 4).

Timing and Cost

The bridge that will need to be replaced is currently functional and does not require immediate attention, but the replacement should be completed within the next 20-years as determined by the Forestry Manager. The cost for this replacement can fluctuate greatly as material costs can change dramatically over time. Bridge #9 is roughly 60-feet long and currently composed of wood and steel. We recommend replacing with concrete, which will be more durable than steel. The estimated cost of a single concrete bridge, including installation is approximately $175,000.00. In addition to the actual infrastructure cost, engineered plans will need to be developed by a licensed engineer as part of the permit process. The cost estimate for these plans is $15,000.00.

Figure-1. City of Bremerton Roads and Infrastructure Map

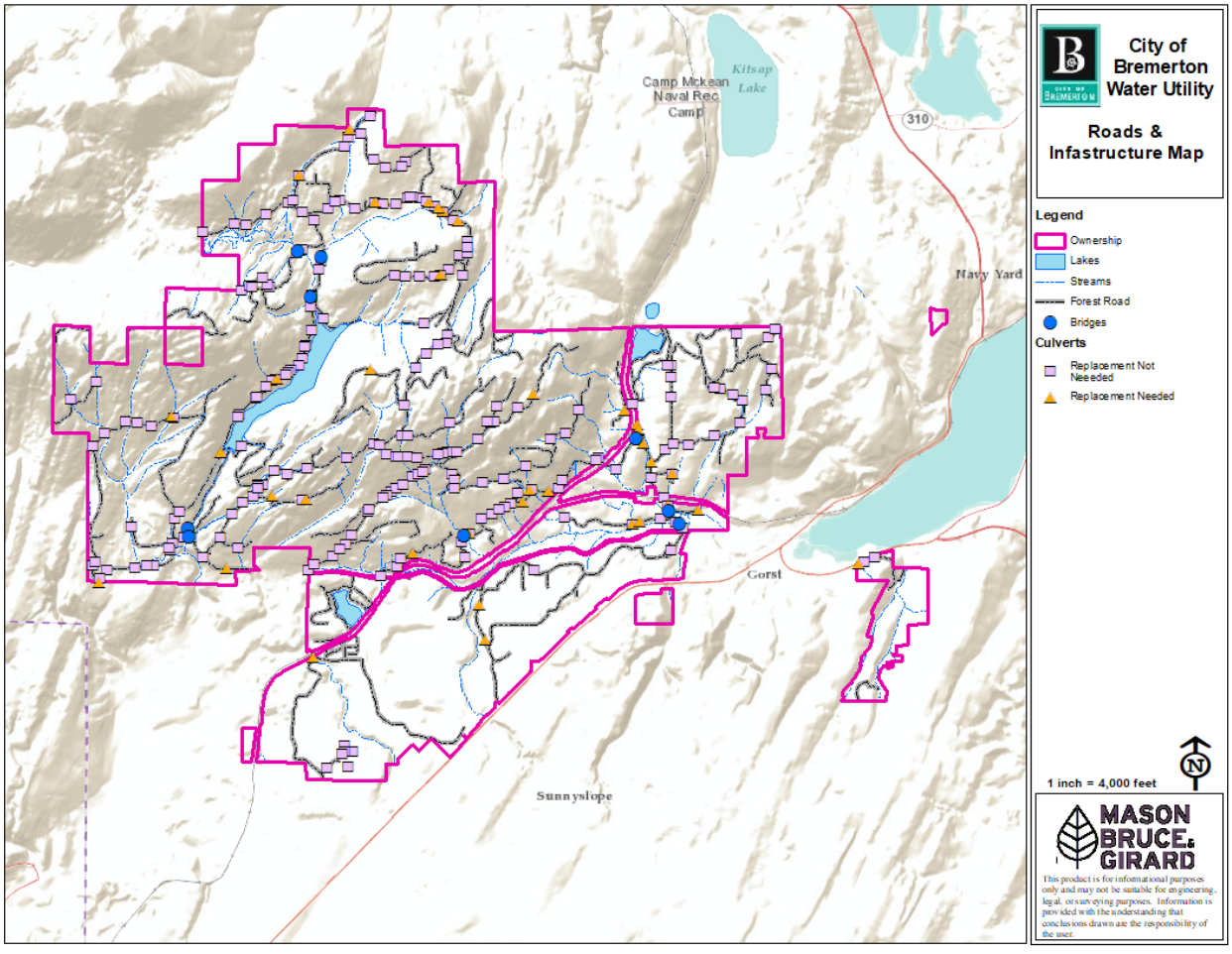


Figure-2. Map of Proposed Bridge Replacement

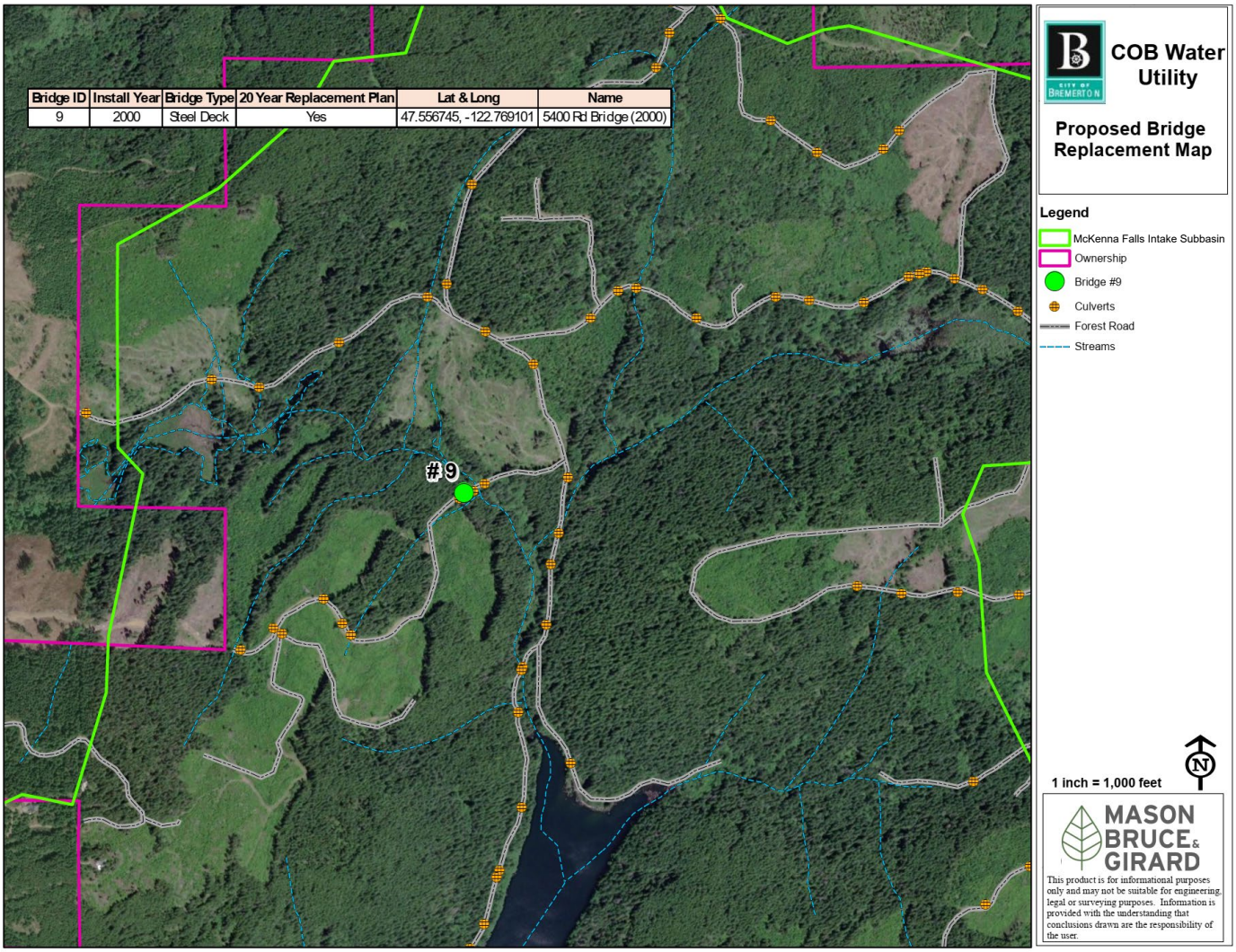


Figure-3. Bridge-9

Figure-4. Bridge-9

Figure-5. Bridge-9

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard, Inc. Technical Team
Date: 2/18/2025
Re: Special Topic: Carbon Project Considerations

Introduction

Carbon projects on forest lands provide land managers an option for generating revenue by increasing carbon stored in the forest. This memo provides background information on forest carbon projects, identifies key considerations for land managers interested in assessing carbon project opportunities, and provides a high-level assessment of the likelihood that a carbon project would result in additional revenue to the City of Bremerton.

How do carbon projects work?

Carbon projects, whether forest based or not, generate revenue through the creation and sale of "carbon credits." A carbon credit represents one metric ton of carbon dioxide equivalent or CO_2e.[1] The number of carbon credits generated by a forest project depends on multiple factors including the scale of the project, the growth rate of the forest in the project area, and the baseline condition which the project is assessed against. The baseline condition is defined by a "protocol." Under a carbon project, forest mangers implement practices that result in forest carbon stocks higher than the baseline. In carbon project terms, the project provides "additionality." Land managers engage a carbon developer (such as Anew, FiniteCarbon, or The Climate Trust) to develop a carbon project. The developer then works with a carbon registry (such as Verra or American Carbon Registry) to show compliance with the protocol. The developer then facilitates the sale of carbon credits on the carbon market.

Carbon credits are traded on two broad types of markets: compliance markets and voluntary markets. Currently, forest carbon projects in Washington State are eligible for both types of markets, if the project meets the requirements of eligible protocols for a given market.

Forest carbon projects have different commitment periods. Projects designed for the compliance market require a commitment of 100 years. Voluntary market projects generally have a duration of 20-years or more. These periods typically extend from the time of credit generation. As a result, a project that generates credits, for example, five years after the project starts will have to last at least 25-years. Projects can be structured to generate credits at different times. In most cases, revenue from the credits is

[1] Equivalent in the sense of equivalent climate change impact as 1 metric ton of CO_2.

generated following storage of carbon by the project, however, some projects can be structured so payments occur prior to carbon storage at a discounted price.

The price of a carbon credit depends on the market. Carbon credit prices from the auction in the second quarter 2024 for the Washington State compliance market were $29.92 per credit. This price is down from $63.03 per credit in the third quarter of 2023. Forest carbon projects in Washington are eligible to sell credits in the California carbon market, the largest U.S. compliance market. In that market, prices at the August 2024 auction were $30.24 per credit. In 2023, voluntary market-improved-forest-management-projects had an average carbon price of $12.34,[2] though prices vary by project and protocol.

Forest carbon projects require monitoring and reporting, which would be an additional cost for the City and additional time for the Forestry Division to manage. This monitoring includes the establishment and remeasurement of permanent forest inventory plots. The protocol defines the density of the plots across the property and the frequency of measurement needed to meet protocol-determined accuracy targets. These inventories are usually more intensive than those commonly used by forest land managers. Reporting requirements are defined by the protocol, but typical reporting includes high-level annual reports and periodic in-forest carbon re-measurement. The cost of the inventory depends on the complexity of the land base. Lands with a variety of different forest types will be most expensive. The cost can be estimated during project development.

Project Scale

Projects usually must exceed 3,000 to 5,000 acres[3] to generate enough credits to generate sufficient revenue to cover costs associated with the project, with better opportunities for revenue from projects over 10,000 acres. An exception to this would be protocols that allow aggregation of properties with different owners into a carbon project. However, no such protocol is applicable to Washington forest lands.

MB&G knows of one carbon project on municipal lands of similar scale to the City of Bremerton Utility Lands. The City of Astoria entered 3,700 acres in the city's Bear Creek watershed, the city's drinking water source, into a carbon project under an American Carbon Registry improved forest management protocol. Astroria reports generating $1,055,000 in net revenue in the first five years of the project to 2020, with expected future expenses of $108,500.[4]

[2] https://www.newprivatemarkets.com/data-snapshot-pricing-on-the-voluntary-carbon-market/
[3] E.g., a 3,500 acre project developed by the climate trust in coastal Oregon https://climatetrust.org/projects/coastal-edge-forest/
[4] The American Carbon Registry improved forest management protocol as been updated since Astoria developed a carbon project. These changes could affect both the potential revenue and potential costs of a carbon project. Astoria's costs and revenue projections may not be representative costs and revenue under other projects due to these changes in the protocol and site-specific considerations such as timber volume and growth rate.

Protocol Options

Two types of protocols are applicable to forested lands – improved forest management and avoided conversion protocols.[5] Of these, improved forest management is the only protocol potentially applicable to the City of Bremerton Utility Lands, since the lands have no risk of conversion to other use due to the need to protect the City's drinking water resource.

The improved forest management protocols do not specify particular management regimes for a project area, just the baseline. Forest managers then develop plans to manage in a manner to increase carbon storage on the property or maintain already existing carbon stocks above baseline levels. In the Pacific Northwest, extending harvest rotations is the most common method to do this.

Developing a Project

Land managers, in conjunction with a carbon project developer, can assess multiple potential management regimes against the baseline to calculate the number of credits that could be generated. Once a management regime is selected the land manager and project developer work with a "carbon registry" to get the project approved and credits issued. The registry ensures the proposed project complies with the protocol and that the additionality calculation is accurate for the project area. The registry also tracks ownership, issuance, retirement, and transfer of carbon credits.

Carbon Project Potential on City of Bremerton Utility Lands

In order to fully assess the potential of City of Bremerton Utility Lands for a carbon project, an in-depth analysis is needed. However, a preliminary analysis indicates that the net revenue generating potential of a carbon project on the Utility Lands is low. The total area of the Utility Lands is at or near the breakeven point beyond which the project would become profitable. In addition, as a public land manager, the baseline for these lands is likely to assume higher forest carbon stocks than for private lands in western Washington. The current harvest intensity on Bremerton's lands is relatively low. As a result, the potential additional carbon storage is lower than on more intensively harvested lands. Less potential additionality reduces the number of credits that can be generated and therefore the total potential revenue.

Certain changes to carbon protocols or carbon markets could increase the potential revenue from a project on in the Bremerton Utility Lands. For example, if carbon protocols that allow project aggregation for monitoring are introduced in Washington, the cost of project implementation could be reduced. Alternatively, a significantly increased carbon unit price would increase the revenue potential. If, or when, these protocol and market changes may occur is unknown.

[5] Afforestation protocols also exist but these are applicable to lands that have lost forest cover due to natural disturbance or conversion to another land use and would store more carbon if planted with trees.

Attachment 1

Follow-up questions from Advisory Committee Meeting #3, September 9, 2024

1) Initiative 2117 would repeal the 2021 Washington State Climate Commitment Act. It would prohibit state agencies from implementing any cap and trade or cap and tax programs. If the initiative passes, would a carbon credit program even be possible on the City's lands?

Yes. The City could develop a carbon program for the voluntary market or the California compliance market.

2) Is a carbon project permanent? Is there potential for the City to need to harvest for forest health in the future and then not be able to?

Carbon projects are not permanent. Projects have terms that generally range from 20 to 100 years depending on the protocol and market. Carbon projects are not strictly no harvest programs. The protocols allow for harvest to continue, though this does affect the number of carbon credits generated for sale. In the case of a forest health issue that would be resolved through harvest, if the harvest exceeds what can be done under the project, the number credits generated would be reduced or penalties may be incurred. The exact details would depend on the situation.

3) Is there research into what we could be doing to increase carbon sequestration or is the science still fairly new?

There is science available regarding carbon sequestration in forests and wood products and potential impacts of forestry on atmospheric carbon. The results differ depending on the scope of the analysis and the timescale. Significant research continues on this topic.

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard
Date: 05/27/2025
Re: Special Topic: Sustainable Timber Harvest Alternatives and Associated Revenue and Water Rate Impacts

Introduction

Sustainable harvest is defined as the volume of timber that can be harvested annually from a given land base on a perpetual basis without reducing the total merchantable volume. A sustainable harvest can be boiled down to mean: "harvest equals growth". A key factor that must be considered when determining the sustainable harvest level is the rotation age. The lower the rotation age, the higher the annual harvest. Industrial forest owners that are tasked with maximizing net present value generally harvest when the discount rate exceeds the timber's growth rate, which occurs around age 40. Forest owners with values and goals that are not strictly driven by economics will set older rotation ages, which results in lower annual yields.

In order for the City of Bremerton to determine the appropriate level of harvest from their forestland, it is important to understand the options for harvest in the context of sustainability and other goals, and how decisions on harvest levels will affect associated revenue and impact water-rates. While the focus of this memorandum is sustainable harvest, serious consideration must also be given to how the harvest level and location of harvests will affect resource protection and the unfiltered surface water status of the City's drinking water.

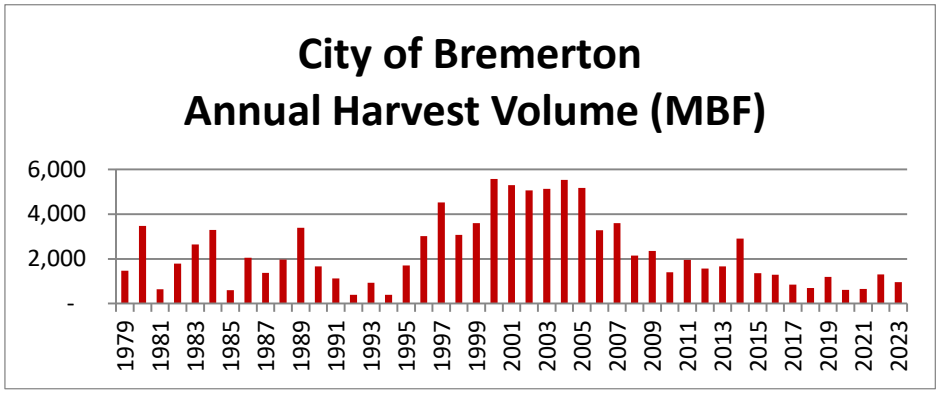
Background Information

Historic Harvest and Revenue Levels

Since 1979, the median[1] annual harvest level for the City of Bremerton is 1.8-million board feet (mmbf). Most of this volume has come from land outside the McKenna Falls Intake Subbasin, which is the catchment area that produces drinking water for the City. In the Subbasin, protection of the resource is the primary goal, while harvest goals are secondary. Figure-1 illustrates the annual harvest levels since 1979.

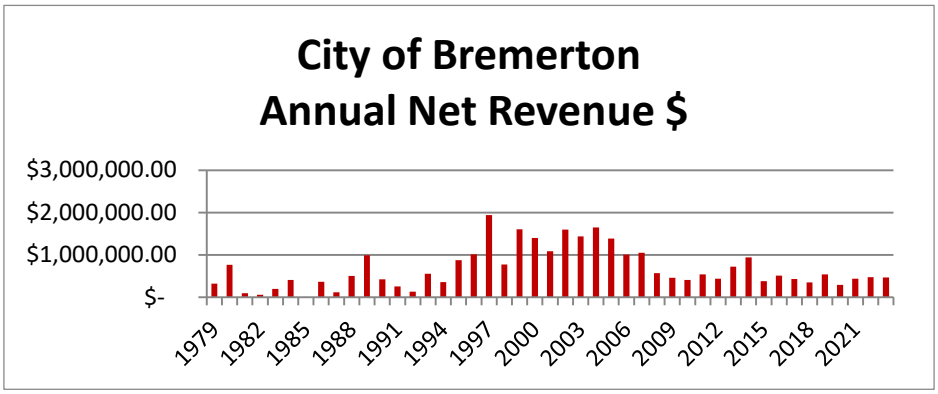
[1] Median instead of mean (average) values are used throughout this memo as the median is less sensitive to outliers and extreme values, which exist over the 45-year set of data.

Figure-1. Annual Harvest Volume[2] Since 1979



Since 1979, the median annual net revenue level for the City of Bremerton is $507,000.00 (nominal dollars). Figure-2 illustrates the annual net revenue levels since 1979.

Figure-2. Annual Net Revenue Since 1979



[2] MBF = Thousand Board Feet

In the last 10-years the median annual harvest volume and median annual net revenue levels have been 1.1-mmbf and $452,000.00, respectively. Figures 3 and 4 illustrate the fluctuation of harvest and revenue level by decade. Fluctuations were mainly a result of varying demands for revenue.

Figure-3. Median Annual Harvest Volume by Decade

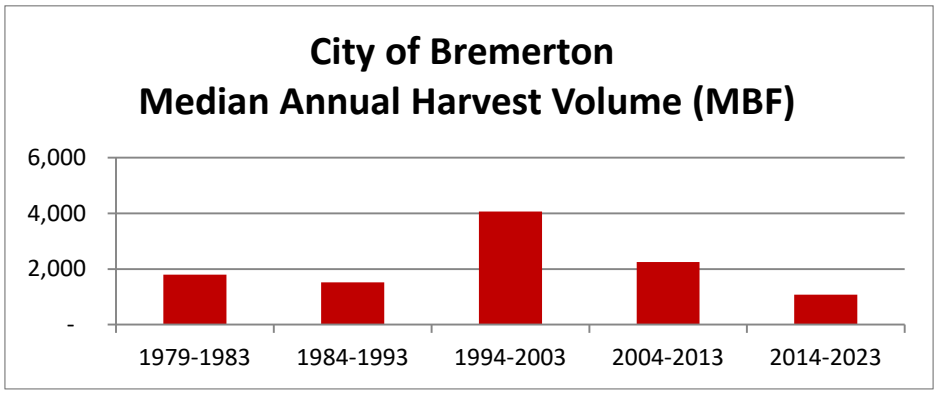
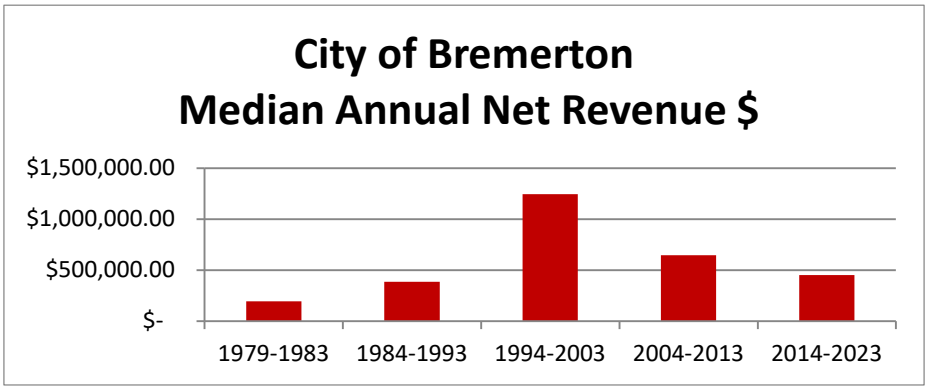


Figure-4. Median Annual Net Revenue by Decade



Historic Sustainable Harvest Calculations

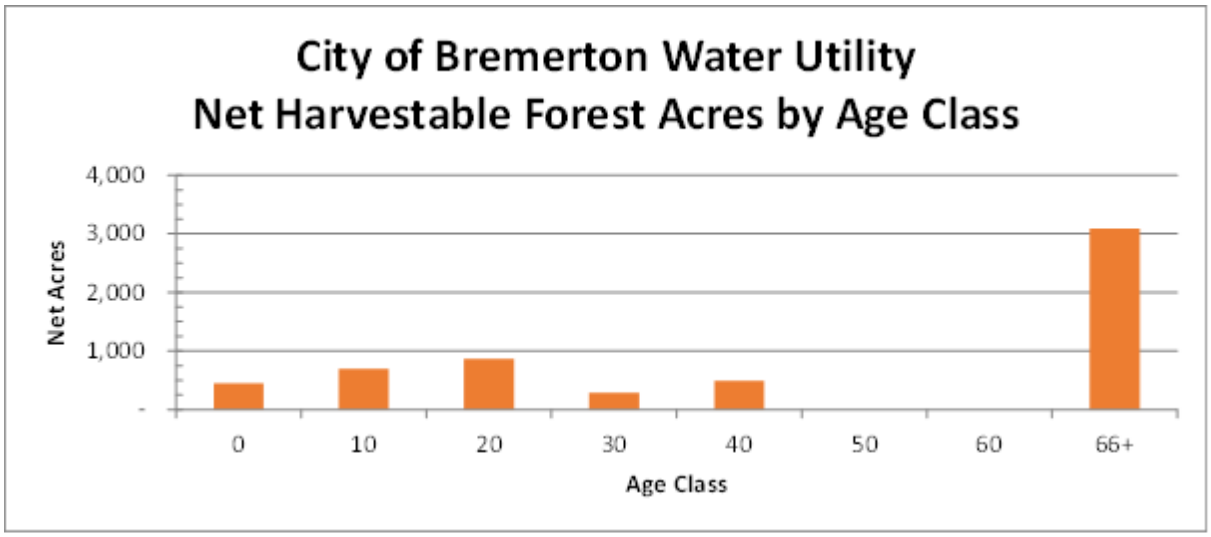
A 2006 analysis by the University of Washington (UW) College of Forest Resources, in conjunction with Washington Timber Management, Inc, using Landscape Management System (a forestry modeling program), provided the City with two separate guidelines for harvest from their timberlands. For land within the McKenna Falls Intake Subbasin watershed, where water production is the main priority, the annual harvest level would be set at 500,000 board feet or 30% of the annual growth of 1.7-mmbf. Based on the 2005 inventory, this equates to a 100-year rotation within the actual watershed. For lands outside the watershed the annual sustainable harvest level was set conservatively at 2.4-mmbf, which was based on modeling that showed sustainable average annual harvest volumes outside the watershed could range from 2.5-3.0 mmbf.

A 2016 analysis by Lusignan Forestry provided 10-year guidelines for sustainable harvest levels for all harvestable timber owned by the City, based on either a 50 or 60-year rotation. The analysis assumed that all acres 30-years of age and greater were merchantable, and that all those acres would be cut in a given timeframe. The results were sustainable annual harvests of 2.6 and 3.1-mmbf for 60 and 50-year rotations respectively.

2024 Sustainable Timber Harvest Alternatives

There are 5,864 total net harvestable forest acres owned by the City. Harvestable forest is defined as that which can be potentially harvested and excludes roads, riparian areas, and non-forested areas. There are 3,573-acres older than 35 years of age, which are considered merchantable for the purpose of analyzing the sustainable harvest level. Figure-5 shows a breakdown of the net harvestable acres by age class. Note that the inventory shows no new stands were established (following a clearcut) from 1956 through 1979, which is why there is a gap between the 40 and 66+ year age classes.

Figure-5. City of Bremerton Net Commercial Forest Acres by Age Class



There is 115.5-mmbf of volume in the merchantable category, greater than 35-years of age.

Based on the current merchantable and harvestable acreage of 3,573-acres, and a current total volume within that acreage of 115.5-mmbf, the even-flow sustainable harvest per year, across all harvestable Utility timberland, for the next ten years would be:

- **Based on a 60-year rotation: 3.2-mmbf per year**
- **Based on a 50-year rotation: 3.8-mmbf per year**

If we check these sustainable harvest levels against the "harvest equals growth" definition of sustainable harvest, the available 'commercial forest' acres would need to be growing 539 thousand board feet (mbf) per acre per year for sustainable annual harvest of 3.2-mmbf on a 60-year rotation. For a 50-year rotation with a sustainable annual harvest of 3.8-mmbf, growth would need to be 647-mbf per acre per year. Based on the research done as part of the 2006 report, the Current Annual Increment (CAI) for all available acres

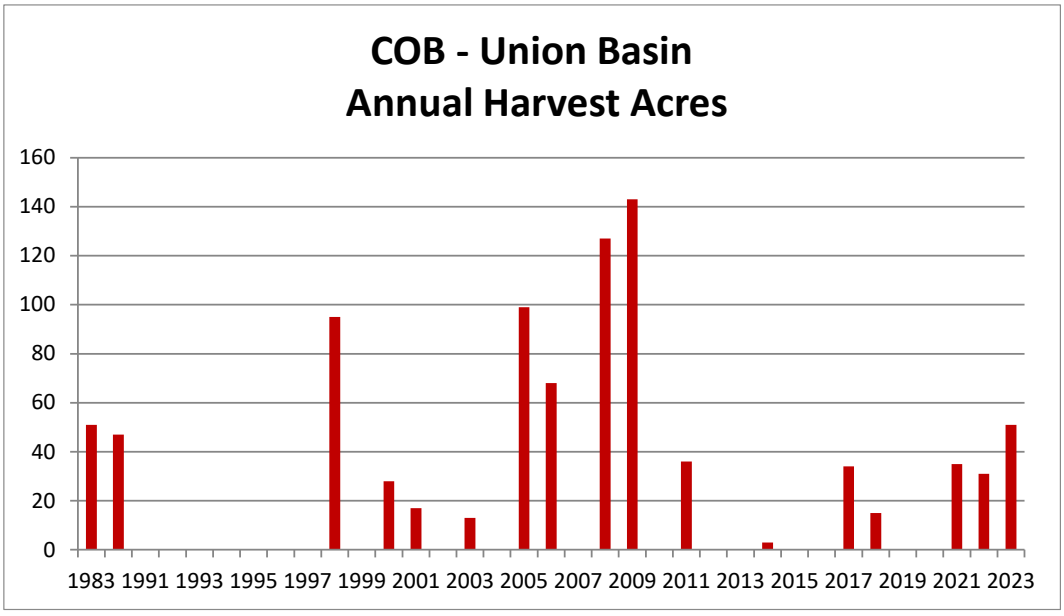
is 724 board feet per acre per year. Therefore, the even-flow sustainable harvest levels for either a 50 or 60-year rotation shown above are well within the annual growth level of the City's available 'harvestable forest' lands.

Harvest Levels in Union River Basin and Other Utility Lands

The McKenna Falls Subbasin contains 2,811 acres of 'harvestable forest', which is 48% of the total 'harvestable forest' acres owned by the City, and contains 1,968-acres that are greater than 35-years of age, which is 55% of the total 'harvestable forest' acres owned by the City that are greater than 35-years of age. If harvest occurred in the Union River Basin proportionally over the next 10-years, 1.5 to 1.8-mmbf would be harvested from land within the Union River Basin. This would more than triple the 500-mbf annual harvest level recommended in the 2006 UW report. Historically the City has harvested an average of roughly 25-acres per year within the Union River Basin, as shown in Figure 6. This represents an annual harvest within the Basin of roughly 750-mbf. Harvests within the Basin have been compatible with the resource protection necessary to maintain unfiltered surface water status of the City's drinking water. If the City continues to average 25-acres of harvest within the Union River Basin, and the goal for the Other Utility Lands remains either a 50 or 60-year rotation, the even-flow sustainable harvest per year for the next ten years would be:

- **Other Utility Lands 60-year rotation: 1.6-mmbf per year**
- **Other Utility Lands 50-year rotation: 2.0-mmbf per year**
- **Union River Basin Fixed Harvest Level: 25-acres per year (0.75-mmbf per year)**

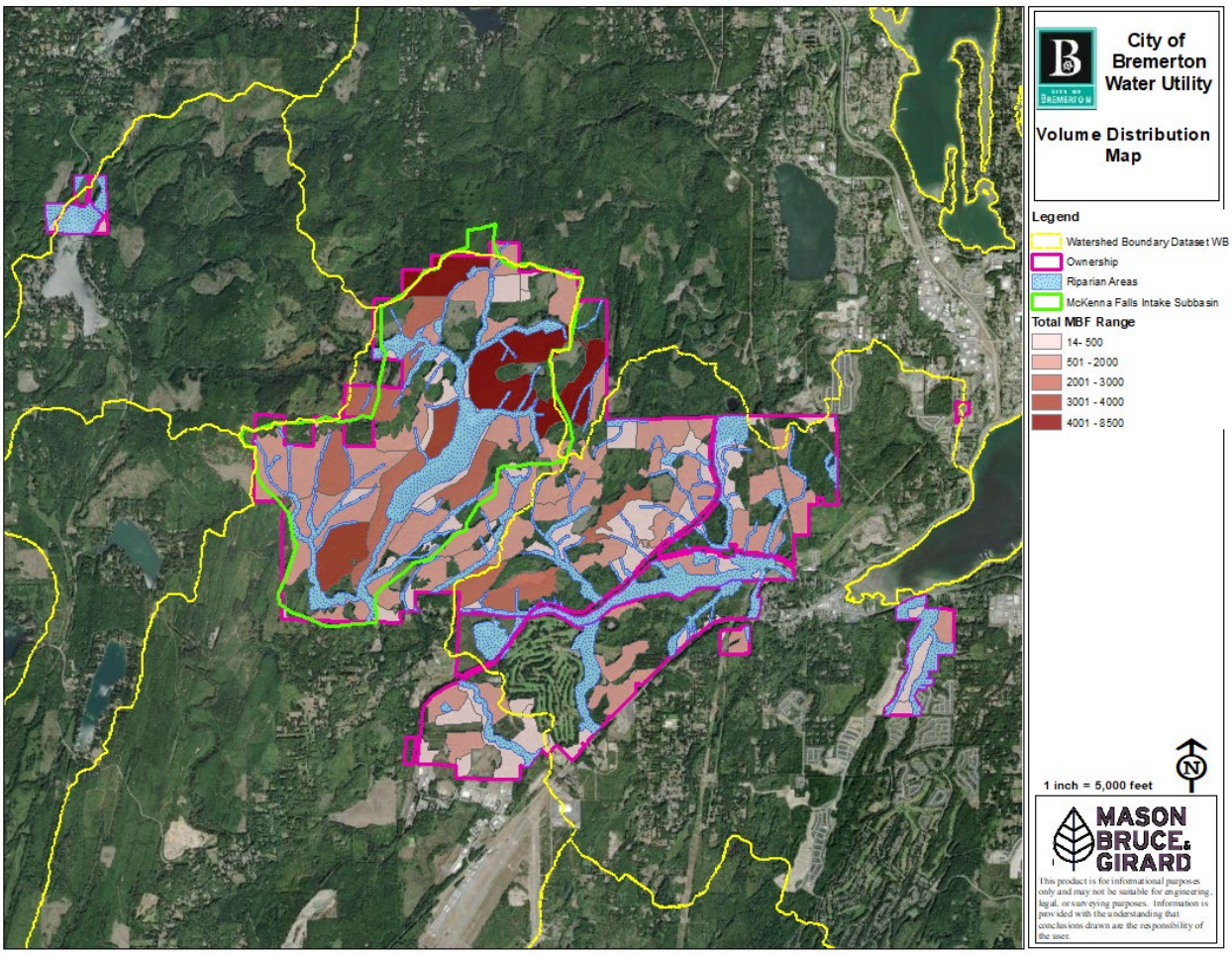
Figure-6. City of Bremerton Union River Basin Annual Harvest Acres



Harvest Alternatives and Revenue Impacts

Figure-7 shows the location of merchantable volume across City of Bremerton Utility Lands. There is a roughly equal distribution of merchantable volume within the McKenna Falls Intake Subbasin and outside the Subbasin on other Utility Lands.

Figure-7. Merchantable Volume Distribution Across Bremerton Utility Lands



Below are alternatives for the City to consider when planning the future direction of timber harvesting on their Utility Lands. The alternatives in Table-1 include those which limit the harvest volume within the McKenna Falls Intake Subbasin to 25-acres annually and lands outside the Subbasin are harvested on either a 50 or 60-year rotation. It is assumed that the value of the volume will equal the median per MBF value of the last 10-years, which is $465 per MBF.

Table-1. Bremerton Utility Lands Sustainable Harvest Alternatives

Sustainable Alternative	Annual Volume (MBF)	Annual Estimated Net Revenue
No Harvest	**0**	**$ 0**
Current Program	**1,100**	**$ 511,500**
50yr Rotation Limited McKenna Falls Intake Subbasin Harvest	**2,750**	**$ 1,278,750**
60yr Rotation Limited McKenna Falls Intake Subbasin Harvest	**2,350**	**$ 1,092,750**

Water Rate Impacts

The City has engaged FCS Group as a part of the MB&G Team to specifically assess the potential impacts of the alternative sustainable harvest levels on water rates. The water rate assessment will be completed by FCS Group based on the alternatives presented here as well as other economic data and assumptions explored during development of the revised Utility and Forest Land Management Plan (UFLMP). Results will be presented concurrently with the draft UFLMP.

MASON BRUCE & GIRARD
Natural Resource Consultants

To: City of Bremerton
From: Mason, Bruce & Girard, Inc. Technical Team
Date: April 18, 2025
Re: Special Topic: Revenue and Water Rate Impacts

Introduction

The City of Bremerton's (City) water utility is an enterprise fund responsible for funding all of its related costs through user fees. The primary source of funding for the water utility is derived from ongoing charges billed every month for service, with additional revenues coming from facilities leases, water connections, timber sales, other service charges and other miscellaneous fees. The City controls the level of user charges by ordinance, and subject to statutory authority, can adjust user charges as needed to meet financial objectives.

A key component of the Utility Land Management Plan (ULMP) Update is to understand the revenue and/or expense impacts that result from the timber harvest alternatives identified in the ULMP.

Background Information

The City evaluates rates on an annual basis. Every 5 to 7 years, the City also engages a consultant to review the rate model, assumptions, and future needs to ensure that the rate projections developed remain adequate. Any significant changes are incorporated into the financial plan and future rates are adjusted as needed.

The primary goal of the financial plan is to develop a multi-year rate strategy that generates sufficient revenue to cover the total operating costs of the water system and execute the capital program. The plan focuses on defining the amount of revenue needed to meet the water system's financial obligations including:

- Operation and maintenance costs
- Administrative and overhead costs
- Policy-based needs (e.g., reserve funding)
- Capital costs
- Existing/new debt service obligations

The water utility financial plan developed as part of the 2022 rate study update was used as the foundation for the financial evaluation completed as part of the ULMP. The following data were updated in the financial plan to ensure impacts reflect the current operations of the water system:

- Budget 2025 operating and capital beginning fund balances
- Actual 2024 and budget 2025 detailed line-item expenditures
- Actual 2024 general water sales and budget 2025 sales revenue - future years projected revenue based on 0.60 percent annual growth
- Annual debt service obligations including new loan draws and anticipated new debt issues
- 2025-2030 Water System Capital Improvement Plan , prior five year average used for 2031-2034

In addition to the updated components of the financial plan, any recommendations identified in the seven (7) special topic memoranda were incorporated. A summary of the findings and recommendations incorporated in the financial plan are as follows:

Special Topic Memorandum	Financial Impact
1. Carbon Project Considerations	N/A at this time
2. Adjacent Land Use	N/A at this time; consider reserve funding for future potential acquisitions
3. Kitsap Lake to Jarstad Park Trail	N/A; comprehensive feasibility assessment needed
4. Security Processes and Procedures	N/A; Included in current budget/capital plans
5. Staffing	N/A; remain at current staffing levels
6. 20-Year Capital Improvement Plan	$5.566M total identified; $4.151M is included in master 20-year water capital plan; additional $1.415M included in alternatives evaluation.
7. Sustainable Timber Harvest Alternatives (Net Revenue Presented)	4 alternatives evaluated No harvest - $0 revenue/yr. Current program - $511,500 revenue/yr. 50-year rotation - $1,278,750 revenue/yr. 60-year rotation - $1,092,750 revenue/yr. *Note – commercial timber landowners typically plan on a 30 to 40 year rotation*

Table 1: Summary of Special Topic Memoranda Financial Considerations

Issue Assessment

For over 45 years, the City has used revenue from timber sales to help fund essential projects that protect and maintain critical infrastructure in the Union River Watershed. The financial assessment evaluates the water rate impacts resulting from maintaining or changing timber harvest levels. The ULMP recommendations and alternatives under consideration are summarized in Table 1. The financial impacts

are determined by including known costs and revenue changes and determining the water rates that are required to cover current operating and capital needs, additional costs and/or revenue changes identified and maintaining the City's fiscal policy requirements.

Timber Harvest Alternatives

The timber harvest alternatives and resulting water rate impacts were calculated using the existing 20-year financial plan completed during the 2022 Rate Update. As noted previously, all key financial components have been updated to 2025 budget values. All the alternatives evaluated use consistent financial information and include the additional $1.415 million in Forestry Division capital projects identified in the Capital Improvement Special Topic Memo. Each year with the budget, the City reviews and approves a 6-year Capital Improvement Plan (CIP) for the Water fund. Expenditures for the first two years of the CIP are consistent with the Water Capital budget, and the remaining 4 years are a forecast that is used to evaluate the required future revenue. The current capital plan covers the period of 2025 – 2030. To remain consist with the 10-year time period the ULMP will be in effect, the annual CIP for 2031-2035 used the prior five-year annual average as an estimate ($5.9 million per year). The varying levels of timber harvest revenue under each alternative are expressed as "net" revenue, meaning the revenue generated is after associated logging costs and contractor costs are accounted for. The 10-year time period of 2026-2035 is the time period used to evaluate the rate impacts for each of the timber harvest alternatives.

Current Harvest

This alternative assumes the current level of $511,500 per year in timber sales revenue. The difference for this alternative compared to the current program is the addition of the $1.415 million in Forestry Division capital not currently accounted for in the 20-year water system capital plan. This alternative is slightly higher than the current rate projection due to the noted capital additions that are assumed to be cash financed. The ten year change in rates is $14.61 ($47.95 less $33.34) or an average of $1.46 monthly change in rates.

	Current	Projected									
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Rate Impact		3.70%	3.70%	3.70%	3.70%	3.70%	3.70%	3.70%	3.70%	3.70%	3.70%
SF Mo. Bill	$ 33.34	$ 34.57	$ 35.85	$ 37.18	$ 38.55	$ 39.98	$ 41.46	$ 42.99	$ 44.59	$ 46.24	$ 47.95
Change ($)		$ 1.23	$ 1.28	$ 1.33	$ 1.38	$ 1.43	$ 1.48	$ 1.53	$ 1.59	$ 1.65	$ 1.71

Table 2. Sample Single Family Monthly Bill – Current Harvest

No Harvest

This alternative assumes no revenue is generated from timber sales, leaving less revenue to cover operating costs. This alternative has the largest rate impact of the alternatives due to the loss of $511,500 per year or $5.1 million for the ten year period. The ten year change in rates is $17.21 ($50.55 less $33.34) or an average of $1.72 monthly change in rates.

	Current	Projected									
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Rate Impact		4.25%	4.25%	4.25%	4.25%	4.25%	4.25%	4.25%	4.25%	4.25%	4.25%
SF Mo. Bill	$ 33.34	$ 34.76	$ 36.23	$ 37.77	$ 39.38	$ 41.05	$ 42.80	$ 44.62	$ 46.51	$ 48.49	$ 50.55
Change ($)		$ 1.42	$ 1.48	$ 1.54	$ 1.61	$ 1.67	$ 1.74	$ 1.82	$ 1.90	$ 1.98	$ 2.06

Table 3. Sample Single Family Monthly Bill – No Harvest

50-Year Rotation

This alternative assumes a timber harvest of 2,750 million board feet (MBF), limited Union Basin Harvest and a 50-year rotation. The annual estimated revenue is $1.3 million ($1,278,750). This is significant as it is over double the current annual timber sales revenue planned to be received by the City. This alternative has the lowest rate impact due to the level of additional revenue assumed ($12.8 million during 2026-2035). The ten year change in rates is $11.03 ($44.37 less $33.34) or an average of $1.10 monthly change in rates. This rate is $2.66 lower than the City's current projected 2035 rate of $47.03.

	Current	Projected									
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Rate Impact		2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%
SF Mo. Bill	$ 33.34	$ 34.31	$ 35.30	$ 36.33	$ 37.38	$ 38.46	$ 39.58	$ 40.73	$ 41.91	$ 43.12	$ 44.37
Change ($)		$ 0.97	$ 0.99	$ 1.02	$ 1.05	$ 1.08	$ 1.12	$ 1.15	$ 1.18	$ 1.22	$ 1.25

Table 4. Sample Single Family Monthly Bill – 50-Year Rotation

60-Year Rotation

This alternative assumes a timber harvest of 2,350 MBF, limited Union Basin Harvest and a 60-year rotation. The annual estimated revenue is $1.1 million ($1,092,750). The 60-year rotation assumes less MBF per year than the 50-year rotation. The resulting revenue is slightly over double (2.13 times) the current Timber sales revenue planned to be received annually by the City. The ten year change in rates is $11.90 or an average of $1.19 monthly change in rates. This alternative is also below the current rate projection of the City with the addition of nearly $11.0 million in revenue during 2026-2035.

	Current	Projected									
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Rate Impact		3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%
SF Mo. Bill	$ 33.34	$ 34.37	$ 35.44	$ 36.54	$ 37.67	$ 38.84	$ 40.04	$ 41.28	$ 42.56	$ 43.88	$ 45.24
Change ($)		$ 1.03	$ 1.07	$ 1.10	$ 1.13	$ 1.17	$ 1.20	$ 1.24	$ 1.28	$ 1.32	$ 1.36

Table 5. Sample Single Family Monthly Bill – 60-Year Rotation

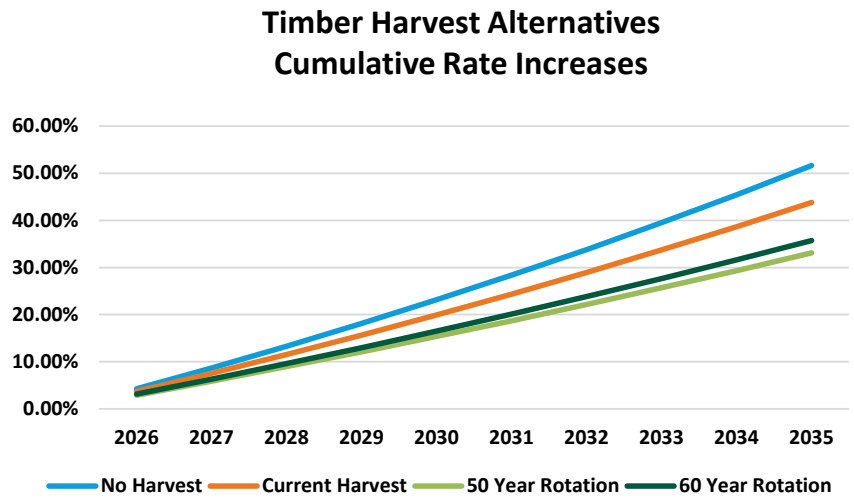
Comparison of Timber Harvest Alternatives

Table 7 provides a summary of the monthly single family rate impacts for each alternative for comparison purposes. The main difference in alternatives is the level of timber harvest revenue assumed. The water rate impacts range from a high of $50.55 in 2035 (no harvest) to a low of $44.37 (50-year rotation and max revenue potential). The rate difference between the alternatives is $6.18 in 2035. As indicated in the table, any timber harvest revenue received will help lower future water rates.

	Current	Projected									
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
No Harvest	$ 33.34	$ 34.76	$ 36.23	$ 37.77	$ 39.38	$ 41.05	$ 42.80	$ 44.62	$ 46.51	$ 48.49	$ 50.55
Current Harvest	$ 33.34	$ 34.57	$ 35.85	$ 37.18	$ 38.55	$ 39.98	$ 41.46	$ 42.99	$ 44.59	$ 46.24	$ 47.95
50-Yr Rotation	$ 33.34	$ 34.31	$ 35.30	$ 36.33	$ 37.38	$ 38.46	$ 39.58	$ 40.73	$ 41.91	$ 43.12	$ 44.37
60-Yr Rotation	$ 33.34	$ 34.37	$ 35.44	$ 36.54	$ 37.67	$ 38.84	$ 40.04	$ 41.28	$ 42.56	$ 43.88	$ 45.24

Table 6. Summary of Timber Harvest Alternatives Monthly Bill Impacts

In addition to the monthly single family bill impacts, a graph of the cumulative rate increases is provided to show the range and spread of the timber harvest alternatives over time. As shown, the alternatives show a cumulative rate impact ranging from a low of 33 percent to a high of 52 percent.



Summary

The water rate impacts were calculated using the existing 20-year financial plan completed during the 2022 Rate Update. The rate evaluation used the 2026-2035 time period for consistency with the time horizon of the ULMP. Updated 2025 financial data and consistent capital cost assumptions were used in each alternative. All alternatives developed meet total water system annual operating expenses, planned and recommended capital needs, and debt service obligations. In addition, all alternatives maintain minimum operating fund balance targets (44 days of O&M) and capital fund target of two percent of asset value.

For over 45 years, the City has used revenue from timber sales to help fund essential projects that protect and maintain critical infrastructure in the Union River Watershed. Maintaining existing harvest revenue levels or increasing revenue will continue to help lower future water rates, and contribute to increased reserves, allowing for flexibility in possible land acquisition if/when it may be available.

City of Bremerton
Water Rate Study
Summary
50-Year Rotation

Revenue Requirement	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Revenues											
Rate Revenues Under Existing Rates	$ 15,461,969	$ 15,554,740	$ 15,648,069	$ 15,741,957	$ 15,836,409	$ 15,931,427	$ 16,027,016	$ 16,123,178	$ 16,219,917	$ 16,317,237	$ 16,415,140
Timber Sales	511,500	1,278,750	1,278,750	1,278,750	1,278,750	1,278,750	$ 1,278,750	$ 1,278,750	$ 1,278,750	$ 1,278,750	$ 1,278,750
Non-Rate Revenues	2,860,466	2,428,308	2,355,589	2,427,487	2,502,449	2,580,548	2,661,920	2,746,708	2,853,760	2,945,845	3,041,807
Total Revenues	**$ 18,833,935**	**$ 19,261,798**	**$ 19,282,408**	**$ 19,448,194**	**$ 19,617,608**	**$ 19,790,725**	**$ 19,967,686**	**$ 20,148,636**	**$ 20,352,427**	**$ 20,541,831**	**$ 20,735,697**
Expenses											
Cash Operating Expenses	$ 15,075,914	$ 15,759,610	$ 16,246,500	$ 16,784,930	$ 17,352,483	$ 17,951,355	$ 18,583,947	$ 19,252,883	$ 19,964,248	$ 20,714,717	$ 21,510,925
Existing Debt Service	589,046	587,287	585,099	582,481	581,347	425,029	425,251	419,967	419,376	423,279	226,983
New Debt Service	116,396	295,643	295,643	295,643	313,573	385,292	385,292	1,320,235	1,320,235	1,320,235	1,761,246
Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 15,781,356**	**$ 16,642,540**	**$ 17,127,242**	**$ 17,663,054**	**$ 18,247,404**	**$ 18,761,677**	**$ 19,394,491**	**$ 20,993,085**	**$ 21,703,860**	**$ 22,458,232**	**$ 23,499,155**
Net Surplus (Deficiency)	**$ 3,052,579**	**$ 2,619,258**	**$ 2,155,166**	**$ 1,785,141**	**$ 1,370,205**	**$ 1,029,049**	**$ 573,194**	**$ (844,450)**	**$ (1,351,432)**	**$ (1,916,401)**	**$ (2,763,457)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ 3,052,579**	**$ 2,619,258**	**$ 2,155,166**	**$ 1,785,141**	**$ 1,370,205**	**$ 1,029,049**	**$ 573,194**	**$ (844,450)**	**$ (1,351,432)**	**$ (1,916,401)**	**$ (2,763,457)**
% of Rate Revenue	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**5.24%**	**8.33%**	**11.74%**	**16.83%**
Annual Rate Adjustment	**0.00%**	**2.90%**	**2.90%**	**2.90%**	**2.90%**	**2.90%**	**2.90%**	**2.90%**	**2.90%**	**2.90%**	**2.90%**
Cumulative Annual Rate Adjustment	**0.00%**	**2.90%**	**5.88%**	**8.95%**	**12.11%**	**15.37%**	**18.71%**	**22.15%**	**25.70%**	**29.34%**	**33.09%**
Rate Revenues After Rate Increase	$ 15,461,969	$ 16,005,828	$ 16,568,817	$ 17,151,608	$ 17,754,899	$ 18,379,410	$ 19,025,887	$ 19,695,104	$ 20,387,859	$ 21,104,982	$ 21,847,329
Additional In-Lieu of Taxes from Rate Increase	$ -	$ 92,604	$ 189,020	$ 289,387	$ 393,847	$ 502,546	$ 615,638	$ 733,281	$ 855,637	$ 982,876	$ 1,115,174
Net Cash Flow After Rate Increase	**$ 3,052,579**	**$ 2,977,742**	**$ 2,886,894**	**$ 2,905,404**	**$ 2,894,848**	**$ 2,974,485**	**$ 2,956,427**	**$ 1,994,195**	**$ 1,960,873**	**$ 1,888,468**	**$ 1,553,557**
Coverage After Rate Increases	**23.75**	**22.21**	**22.59**	**22.88**	**22.97**	**23.14**	**23.31**	**6.67**	**6.83**	**6.78**	**5.49**
Sample Residential Monthly Bill (5/8" Meter, x 6 ccf)	**$ 33.34**	**$ 34.31**	**$ 35.30**	**$ 36.33**	**$ 37.38**	**$ 38.46**	**$ 39.58**	**$ 40.73**	**$ 41.91**	**$ 43.12**	**$ 44.37**
Monthly Average Increase ($)		$ 0.97	$ 0.99	$ 1.02	$ 1.05	$ 1.08	$ 1.12	$ 1.15	$ 1.18	$ 1.22	$ 1.25

City of Bremerton
Water Rate Study
Summary
50-Year Rotation

Fund Balance	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Operating Reserve											
Beginning Balance	$ 8,754,254	$ 10,206,833	$ 1,899,789	$ 1,958,482	$ 2,023,389	$ 2,091,806	$ 2,163,999	$ 2,240,257	$ 2,320,895	$ 2,406,649	$ 2,497,117
plus: Net Cash Flow after Rate Increase	3,052,579	2,977,742	2,886,894	2,905,404	2,894,848	2,974,485	2,956,427	1,994,195	1,960,873	1,888,468	1,553,557
less: Transfer of Surplus to Capital Fund	(1,600,000)	(11,284,786)	(2,828,200)	(2,840,498)	(2,826,430)	(2,902,292)	(2,880,170)	(1,913,556)	(1,875,119)	(1,798,001)	(1,457,576)
Ending Balance	**$ 10,206,833**	**$ 1,899,789**	**$ 1,958,482**	**$ 2,023,389**	**$ 2,091,806**	**$ 2,163,999**	**$ 2,240,257**	**$ 2,320,895**	**$ 2,406,649**	**$ 2,497,117**	**$ 2,593,098**
O&M Target Balance	*$ 1,817,370*	*$ 1,899,789*	*$ 1,958,482*	*$ 2,023,389*	*$ 2,091,806*	*$ 2,163,999*	*$ 2,240,257*	*$ 2,320,895*	*$ 2,406,649*	*$ 2,497,117*	*$ 2,593,098*
Days	*247*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*
Capital Reserve											
Beginning Balance	$ 5,642,811	$ 5,393,512	$ 13,709,050	$ 14,030,906	$ 12,529,963	$ 10,111,453	$ 9,878,432	$ 7,067,350	$ 13,608,459	$ 9,408,471	$ 4,805,056
plus: Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	1,600,000	11,284,786	2,828,200	2,840,498	2,826,430	2,902,292	2,880,170	1,913,556	1,875,119	1,798,001	1,457,576
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	460,600	2,000,024	600	600	200,600	800,600	600	600	600	600	600
plus: General Facilities Charge Revenue	1,850,000	1,355,508	1,418,187	1,483,764	1,552,373	1,624,154	1,699,255	1,777,829	1,860,036	1,946,044	2,036,029
less: General Facilities Charge Towards Debt	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	1,335,101	2,999,135	-	-	300,000	1,200,000	-	10,600,000	-	-	5,000,000
plus: Interest Earnings	400,000	94,386	274,181	280,618	250,599	202,229	197,569	141,347	272,169	188,169	96,101
Total Funding Sources	**$ 11,288,512**	**$ 23,127,351**	**$ 18,230,218**	**$ 18,636,385**	**$ 17,659,965**	**$ 16,840,728**	**$ 14,656,026**	**$ 21,500,682**	**$ 17,616,383**	**$ 13,341,285**	**$ 13,395,362**
less: Capital Expenditures	(5,895,000)	(9,418,301)	(4,199,312)	(6,106,422)	(7,548,512)	(6,962,296)	(7,588,676)	(7,892,223)	(8,207,912)	(8,536,229)	(8,877,678)
Ending Working Capital Balance	**$ 5,393,512**	**$ 13,709,050**	**$ 14,030,906**	**$ 12,529,963**	**$ 10,111,453**	**$ 9,878,432**	**$ 7,067,350**	**$ 13,608,459**	**$ 9,408,471**	**$ 4,805,056**	**$ 4,517,684**
Minimum Target Balance	*$ 2,876,048*	*$ 3,064,414*	*$ 3,148,401*	*$ 3,270,529*	*$ 3,421,499*	*$ 3,560,745*	*$ 3,712,519*	*$ 3,870,363*	*$ 4,034,521*	*$ 4,205,246*	*$ 4,382,800*
COMBINED BEGINNING FUND BALANCE	**$ 14,397,065**	**$ 15,600,345**	**$ 15,608,838**	**$ 15,989,388**	**$ 14,553,352**	**$ 12,203,259**	**$ 12,042,431**	**$ 9,307,606**	**$ 15,929,354**	**$ 11,815,120**	**$ 7,302,173**
COMBINED ENDING FUND BALANCE	**$ 15,600,345**	**$ 15,608,838**	**$ 15,989,388**	**$ 14,553,352**	**$ 12,203,259**	**$ 12,042,431**	**$ 9,307,606**	**$ 15,929,354**	**$ 11,815,120**	**$ 7,302,173**	**$ 7,110,782**

City of Bremerton
Water Rate Study
Summary
60-Year Rotation

Revenue Requirement	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Revenues											
Rate Revenues Under Existing Rates	$ 15,461,969	$ 15,554,740	$ 15,648,069	$ 15,741,957	$ 15,836,409	$ 15,931,427	$ 16,027,016	$ 16,123,178	$ 16,219,917	$ 16,317,237	$ 16,415,140
Timber Sales	511,500	1,092,750	1,092,750	1,092,750	1,092,750	1,092,750	1,092,750	1,092,750	1,092,750	1,092,750	1,092,750
Non-Rate Revenues	2,860,466	2,428,308	2,355,530	2,427,428	2,502,390	2,580,489	2,661,860	2,746,648	2,853,701	2,945,785	3,041,748
Total Revenues	**$ 18,833,935**	**$ 19,075,798**	**$ 19,096,349**	**$ 19,262,135**	**$ 19,431,549**	**$ 19,604,666**	**$ 19,781,626**	**$ 19,962,576**	**$ 20,166,368**	**$ 20,355,772**	**$ 20,549,638**
Expenses											
Cash Operating Expenses	$ 15,075,914	$ 15,735,059	$ 16,221,938	$ 16,760,369	$ 17,327,922	$ 17,926,794	$ 18,559,386	$ 19,228,322	$ 19,939,687	$ 20,690,156	$ 21,486,364
Existing Debt Service	589,046	587,287	585,099	582,481	581,347	425,029	425,251	419,967	419,376	423,279	226,983
New Debt Service	116,396	295,643	295,643	295,643	313,573	385,292	385,292	1,320,235	1,320,235	1,320,235	1,761,246
Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 15,781,356**	**$ 16,617,989**	**$ 17,102,680**	**$ 17,638,492**	**$ 18,222,843**	**$ 18,737,115**	**$ 19,369,930**	**$ 20,968,524**	**$ 21,679,299**	**$ 22,433,671**	**$ 23,474,593**
Net Surplus (Deficiency)	**$ 3,052,579**	**$ 2,457,809**	**$ 1,993,668**	**$ 1,623,643**	**$ 1,208,707**	**$ 867,551**	**$ 411,696**	**$ (1,005,948)**	**$ (1,512,930)**	**$ (2,077,899)**	**$ (2,924,955)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ 3,052,579**	**$ 2,457,809**	**$ 1,993,668**	**$ 1,623,643**	**$ 1,208,707**	**$ 867,551**	**$ 411,696**	**$ (1,005,948)**	**$ (1,512,930)**	**$ (2,077,899)**	**$ (2,924,955)**
% of Rate Revenue	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**6.24%**	**9.33%**	**12.73%**	**17.82%**
Annual Rate Adjustment	**0.00%**	**3.10%**	**3.10%**	**3.10%**	**3.10%**	**3.10%**	**3.10%**	**3.10%**	**3.10%**	**3.10%**	**3.10%**
Cumulative Annual Rate Adjustment	**0.00%**	**3.10%**	**6.30%**	**9.59%**	**12.99%**	**16.49%**	**20.10%**	**23.83%**	**27.66%**	**31.62%**	**35.70%**
Rate Revenues After Rate Increase	$ 15,461,969	$ 16,036,937	$ 16,633,287	$ 17,251,812	$ 17,893,338	$ 18,558,720	$ 19,248,844	$ 19,964,632	$ 20,707,037	$ 21,477,049	$ 22,275,694
Additional In-Lieu of Taxes from Rate Increase	$ -	$ 98,990	$ 202,255	$ 309,958	$ 422,267	$ 539,357	$ 661,409	$ 788,612	$ 921,161	$ 1,059,258	$ 1,203,113
Net Cash Flow After Rate Increase	**$ 3,052,579**	**$ 2,841,016**	**$ 2,776,631**	**$ 2,823,540**	**$ 2,843,369**	**$ 2,955,486**	**$ 2,972,116**	**$ 2,046,894**	**$ 2,053,028**	**$ 2,022,655**	**$ 1,732,486**
Coverage After Rate Increases	**23.75**	**21.80**	**22.24**	**22.61**	**22.77**	**23.02**	**23.29**	**6.69**	**6.89**	**6.87**	**5.59**
Sample Residential Monthly Bill (5/8" Meter, x 6 ccf)	**$ 33.34**	**$ 34.37**	**$ 35.44**	**$ 36.54**	**$ 37.67**	**$ 38.84**	**$ 40.04**	**$ 41.28**	**$ 42.56**	**$ 43.88**	**$ 45.24**
Monthly Average Increase ($)		$ 1.03	$ 1.07	$ 1.10	$ 1.13	$ 1.17	$ 1.20	$ 1.24	$ 1.28	$ 1.32	$ 1.36

City of Bremerton
Water Rate Study
Summary
60-Year Rotation

Fund Balance	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Operating Reserve											
Beginning Balance	$ 8,754,254	$ 10,206,833	$ 1,896,829	$ 1,955,521	$ 2,020,428	$ 2,088,845	$ 2,161,038	$ 2,237,296	$ 2,317,935	$ 2,403,688	$ 2,494,156
plus: Net Cash Flow after Rate Increase	3,052,579	2,841,016	2,776,631	2,823,540	2,843,369	2,955,486	2,972,116	2,046,894	2,053,028	2,022,655	1,732,486
less: Transfer of Surplus to Capital Fund	(1,600,000)	(11,151,019)	(2,717,938)	(2,758,633)	(2,774,951)	(2,883,293)	(2,895,858)	(1,966,255)	(1,967,275)	(1,932,188)	(1,636,505)
Ending Balance	**$ 10,206,833**	**$ 1,896,829**	**$ 1,955,521**	**$ 2,020,428**	**$ 2,088,845**	**$ 2,161,038**	**$ 2,237,296**	**$ 2,317,935**	**$ 2,403,688**	**$ 2,494,156**	**$ 2,590,137**
O&M Target Balance	*$ 1,817,370*	*$ 1,896,829*	*$ 1,955,521*	*$ 2,020,428*	*$ 2,088,845*	*$ 2,161,038*	*$ 2,237,296*	*$ 2,317,935*	*$ 2,403,688*	*$ 2,494,156*	*$ 2,590,137*
Days	*247*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*
Capital Reserve											
Beginning Balance	$ 5,642,811	$ 5,393,512	$ 13,575,283	$ 13,784,202	$ 12,196,461	$ 9,719,801	$ 9,459,949	$ 6,656,185	$ 13,241,770	$ 9,126,604	$ 4,651,739
plus: Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	1,600,000	11,151,019	2,717,938	2,758,633	2,774,951	2,883,293	2,895,858	1,966,255	1,967,275	1,932,188	1,636,505
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	460,600	2,000,024	600	600	200,600	800,600	600	600	600	600	600
plus: General Facilities Charge Revenue	1,850,000	1,355,508	1,418,187	1,483,764	1,552,373	1,624,154	1,699,255	1,777,829	1,860,036	1,946,044	2,036,029
less: General Facilities Charge Towards Debt	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	1,335,101	2,999,135	-	-	300,000	1,200,000	-	10,600,000	-	-	5,000,000
plus: Interest Earnings	400,000	94,386	271,506	275,684	243,929	194,396	189,199	133,124	264,835	182,532	93,035
Total Funding Sources	**$ 11,288,512**	**$ 22,993,585**	**$ 17,983,514**	**$ 18,302,883**	**$ 17,268,314**	**$ 16,422,245**	**$ 14,244,861**	**$ 21,133,993**	**$ 17,334,516**	**$ 13,187,968**	**$ 13,417,907**
less: Capital Expenditures	(5,895,000)	(9,418,301)	(4,199,312)	(6,106,422)	(7,548,512)	(6,962,296)	(7,588,676)	(7,892,223)	(8,207,912)	(8,536,229)	(8,877,678)
Ending Working Capital Balance	**$ 5,393,512**	**$ 13,575,283**	**$ 13,784,202**	**$ 12,196,461**	**$ 9,719,801**	**$ 9,459,949**	**$ 6,656,185**	**$ 13,241,770**	**$ 9,126,604**	**$ 4,651,739**	**$ 4,540,229**
Minimum Target Balance	*$ 2,876,048*	*$ 3,064,414*	*$ 3,148,401*	*$ 3,270,529*	*$ 3,421,499*	*$ 3,560,745*	*$ 3,712,519*	*$ 3,870,363*	*$ 4,034,521*	*$ 4,205,246*	*$ 4,382,800*
COMBINED BEGINNING FUND BALANCE	**$ 14,397,065**	**$ 15,600,345**	**$ 15,472,112**	**$ 15,739,724**	**$ 14,216,889**	**$ 11,808,647**	**$ 11,620,987**	**$ 8,893,481**	**$ 15,559,705**	**$ 11,530,292**	**$ 7,145,895**
COMBINED ENDING FUND BALANCE	**$ 15,600,345**	**$ 15,472,112**	**$ 15,739,724**	**$ 14,216,889**	**$ 11,808,647**	**$ 11,620,987**	**$ 8,893,481**	**$ 15,559,705**	**$ 11,530,292**	**$ 7,145,895**	**$ 7,130,366**

City of Bremerton
Water Rate Study
Summary
Current Harvest

Revenue Requirement	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Revenues											
Rate Revenues Under Existing Rates	$ 15,461,969	$ 15,554,740	$ 15,648,069	$ 15,741,957	$ 15,836,409	$ 15,931,427	$ 16,027,016	$ 16,123,178	$ 16,219,917	$ 16,317,237	$ 16,415,140
Timber Sales	511,500	511,500	511,500	511,500	511,500	511,500	$ 511,500	$ 511,500	$ 511,500	$ 511,500	$ 511,500
Non-Rate Revenues	2,860,466	2,428,308	2,355,345	2,427,243	2,502,205	2,580,304	2,661,675	2,746,463	2,853,516	2,945,600	3,041,563
Total Revenues	**$ 18,833,935**	**$ 18,494,548**	**$ 18,514,914**	**$ 18,680,700**	**$ 18,850,114**	**$ 19,023,231**	**$ 19,200,191**	**$ 19,381,141**	**$ 19,584,933**	**$ 19,774,337**	**$ 19,968,203**
Expenses											
Cash Operating Expenses	$ 15,075,914	$ 15,658,337	$ 16,145,184	$ 16,683,614	$ 17,251,168	$ 17,850,040	$ 18,482,632	$ 19,151,568	$ 19,862,933	$ 20,613,402	$ 21,409,610
Existing Debt Service	589,046	587,287	585,099	582,481	581,347	425,029	425,251	419,967	419,376	423,279	226,983
New Debt Service	116,396	295,643	295,643	295,643	313,573	385,292	385,292	1,320,235	1,320,235	1,320,235	1,761,246
Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 15,781,356**	**$ 16,541,267**	**$ 17,025,926**	**$ 17,561,738**	**$ 18,146,088**	**$ 18,660,361**	**$ 19,293,176**	**$ 20,891,770**	**$ 21,602,545**	**$ 22,356,917**	**$ 23,397,839**
Net Surplus (Deficiency)	**$ 3,052,579**	**$ 1,953,281**	**$ 1,488,987**	**$ 1,118,962**	**$ 704,026**	**$ 362,870**	**$ (92,985)**	**$ (1,510,629)**	**$ (2,017,611)**	**$ (2,582,580)**	**$ (3,429,636)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ 3,052,579**	**$ 1,953,281**	**$ 1,488,987**	**$ 1,118,962**	**$ 704,026**	**$ 362,870**	**$ (92,985)**	**$ (1,510,629)**	**$ (2,017,611)**	**$ (2,582,580)**	**$ (3,429,636)**
% of Rate Revenue	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.58%**	**9.37%**	**12.44%**	**15.83%**	**20.89%**
Annual Rate Adjustment	**0.00%**	**3.70%**	**3.70%**	**3.70%**	**3.70%**	**3.70%**	**3.70%**	**3.70%**	**3.70%**	**3.70%**	**3.70%**
Cumulative Annual Rate Adjustment	**0.00%**	**3.70%**	**7.54%**	**11.52%**	**15.64%**	**19.92%**	**24.36%**	**28.96%**	**33.73%**	**38.68%**	**43.81%**
Rate Revenues After Rate Increase	$ 15,461,969	$ 16,130,266	$ 16,827,448	$ 17,554,764	$ 18,313,516	$ 19,105,063	$ 19,930,822	$ 20,792,272	$ 21,690,955	$ 22,628,482	$ 23,606,530
Additional In-Lieu of Taxes from Rate Increase	$ -	$ 118,150	$ 242,115	$ 372,151	$ 508,525	$ 651,516	$ 801,412	$ 958,518	$ 1,123,149	$ 1,295,636	$ 1,476,320
Net Cash Flow After Rate Increase	**$ 3,052,579**	**$ 2,410,657**	**$ 2,426,252**	**$ 2,559,617**	**$ 2,672,607**	**$ 2,884,989**	**$ 3,009,409**	**$ 2,199,947**	**$ 2,330,277**	**$ 2,433,030**	**$ 2,285,434**
Coverage After Rate Increases	**23.75**	**20.50**	**21.14**	**21.72**	**22.13**	**22.64**	**23.19**	**6.75**	**7.04**	**7.13**	**5.89**
Sample Residential Monthly Bill (5/8" Meter, x 6 ccf)	**$ 33.34**	**$ 34.57**	**$ 35.85**	**$ 37.18**	**$ 38.55**	**$ 39.98**	**$ 41.46**	**$ 42.99**	**$ 44.59**	**$ 46.24**	**$ 47.95**
Monthly Average Increase ($)		$ 1.23	$ 1.28	$ 1.33	$ 1.38	$ 1.43	$ 1.48	$ 1.53	$ 1.59	$ 1.65	$ 1.71

City of Bremerton
Water Rate Study
Summary
Current Harvest

Fund Balance	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Operating Reserve											
Beginning Balance	$ 8,754,254	$ 10,206,833	$ 1,887,580	$ 1,946,269	$ 2,011,175	$ 2,079,593	$ 2,151,786	$ 2,228,043	$ 2,308,682	$ 2,394,436	$ 2,484,903
plus: Net Cash Flow after Rate Increase	3,052,579	2,410,657	2,426,252	2,559,617	2,672,607	2,884,989	3,009,409	2,199,947	2,330,277	2,433,030	2,285,434
less: Transfer of Surplus to Capital Fund	(1,600,000)	(10,729,909)	(2,367,563)	(2,494,711)	(2,604,190)	(2,812,797)	(2,933,151)	(2,119,308)	(2,244,524)	(2,342,563)	(2,189,452)
Ending Balance	**$ 10,206,833**	**$ 1,887,580**	**$ 1,946,269**	**$ 2,011,175**	**$ 2,079,593**	**$ 2,151,786**	**$ 2,228,043**	**$ 2,308,682**	**$ 2,394,436**	**$ 2,484,903**	**$ 2,580,884**
O&M Target Balance	*$ 1,817,370*	*$ 1,887,580*	*$ 1,946,269*	*$ 2,011,175*	*$ 2,079,593*	*$ 2,151,786*	*$ 2,228,043*	*$ 2,308,682*	*$ 2,394,436*	*$ 2,484,903*	*$ 2,580,884*
Days	*247*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*
Capital Reserve											
Beginning Balance	$ 5,642,811	$ 5,393,512	$ 13,154,173	$ 13,004,295	$ 11,137,033	$ 8,468,423	$ 8,113,047	$ 5,319,638	$ 12,031,545	$ 8,169,423	$ 4,085,789
plus: Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	1,600,000	10,729,909	2,367,563	2,494,711	2,604,190	2,812,797	2,933,151	2,119,308	2,244,524	2,342,563	2,189,452
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	460,600	2,000,024	600	600	200,600	800,600	600	600	600	600	600
plus: General Facilities Charge Revenue	1,850,000	1,355,508	1,418,187	1,483,764	1,552,373	1,624,154	1,699,255	1,777,829	1,860,036	1,946,044	2,036,029
less: General Facilities Charge Towards Debt	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	1,335,101	2,999,135	-	-	300,000	1,200,000	-	10,600,000	-	-	5,000,000
plus: Interest Earnings	400,000	94,386	263,083	260,086	222,741	169,368	162,261	106,393	240,631	163,388	81,716
Total Funding Sources	**$ 11,288,512**	**$ 22,572,475**	**$ 17,203,607**	**$ 17,243,455**	**$ 16,016,936**	**$ 15,075,343**	**$ 12,908,314**	**$ 19,923,768**	**$ 16,377,335**	**$ 12,622,018**	**$ 13,393,586**
less: Capital Expenditures	(5,895,000)	(9,418,301)	(4,199,312)	(6,106,422)	(7,548,512)	(6,962,296)	(7,588,676)	(7,892,223)	(8,207,912)	(8,536,229)	(8,877,678)
Ending Working Capital Balance	**$ 5,393,512**	**$ 13,154,173**	**$ 13,004,295**	**$ 11,137,033**	**$ 8,468,423**	**$ 8,113,047**	**$ 5,319,638**	**$ 12,031,545**	**$ 8,169,423**	**$ 4,085,789**	**$ 4,515,908**
Minimum Target Balance	*$ 2,876,048*	*$ 3,064,414*	*$ 3,148,401*	*$ 3,270,529*	*$ 3,421,499*	*$ 3,560,745*	*$ 3,712,519*	*$ 3,870,363*	*$ 4,034,521*	*$ 4,205,246*	*$ 4,382,800*
COMBINED BEGINNING FUND BALANCE	**$ 14,397,065**	**$ 15,600,345**	**$ 15,041,754**	**$ 14,950,563**	**$ 13,148,208**	**$ 10,548,016**	**$ 10,264,832**	**$ 7,547,682**	**$ 14,340,227**	**$ 10,563,859**	**$ 6,570,692**
COMBINED ENDING FUND BALANCE	**$ 15,600,345**	**$ 15,041,754**	**$ 14,950,563**	**$ 13,148,208**	**$ 10,548,016**	**$ 10,264,832**	**$ 7,547,682**	**$ 14,340,227**	**$ 10,563,859**	**$ 6,570,692**	**$ 7,096,793**

City of Bremerton
Water Rate Study
Summary
No Harvest

Revenue Requirement	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Revenues											
Rate Revenues Under Existing Rates	$ 15,461,969	$ 15,554,740	$ 15,648,069	$ 15,741,957	$ 15,836,409	$ 15,931,427	$ 16,027,016	$ 16,123,178	$ 16,219,917	$ 16,317,237	$ 16,415,140
Timber Sales	511,500	-	-	-	-	-	$ -	$ -	$ -	$ -	$ -
Non-Rate Revenues	2,860,466	2,428,308	2,355,182	2,427,080	2,502,042	2,580,141	2,661,513	2,746,300	2,853,353	2,945,437	3,041,400
Total Revenues	**$ 18,833,935**	**$ 17,983,048**	**$ 18,003,251**	**$ 18,169,037**	**$ 18,338,451**	**$ 18,511,568**	**$ 18,688,528**	**$ 18,869,478**	**$ 19,073,270**	**$ 19,262,674**	**$ 19,456,540**
Expenses											
Cash Operating Expenses	$ 15,075,914	$ 15,590,821	$ 16,077,641	$ 16,616,071	$ 17,183,625	$ 17,782,496	$ 18,415,089	$ 19,084,024	$ 19,795,389	$ 20,545,858	$ 21,342,066
Existing Debt Service	589,046	587,287	585,099	582,481	581,347	425,029	425,251	419,967	419,376	423,279	226,983
New Debt Service	116,396	295,643	295,643	295,643	313,573	385,292	385,292	1,320,235	1,320,235	1,320,235	1,761,246
Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
Total Expenses	**$ 15,781,356**	**$ 16,473,752**	**$ 16,958,383**	**$ 17,494,195**	**$ 18,078,545**	**$ 18,592,818**	**$ 19,225,632**	**$ 20,824,227**	**$ 21,535,001**	**$ 22,289,373**	**$ 23,330,296**
Net Surplus (Deficiency)	**$ 3,052,579**	**$ 1,509,297**	**$ 1,044,868**	**$ 674,842**	**$ 259,906**	**$ (81,250)**	**$ (537,104)**	**$ (1,954,748)**	**$ (2,461,731)**	**$ (3,026,699)**	**$ (3,873,755)**
Additions to Meet Coverage	-	-	-	-	-	-	-	-	-	-	-
Total Surplus (Deficiency)	**$ 3,052,579**	**$ 1,509,297**	**$ 1,044,868**	**$ 674,842**	**$ 259,906**	**$ (81,250)**	**$ (537,104)**	**$ (1,954,748)**	**$ (2,461,731)**	**$ (3,026,699)**	**$ (3,873,755)**
% of Rate Revenue	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.51%**	**3.35%**	**12.12%**	**15.18%**	**18.55%**	**23.60%**
Annual Rate Adjustment	**0.00%**	**4.25%**	**4.25%**	**4.25%**	**4.25%**	**4.25%**	**4.25%**	**4.25%**	**4.25%**	**4.25%**	**4.25%**
Cumulative Annual Rate Adjustment	**0.00%**	**4.25%**	**8.68%**	**13.30%**	**18.11%**	**23.13%**	**28.37%**	**33.82%**	**39.51%**	**45.44%**	**51.62%**
Rate Revenues After Rate Increase	$ 15,461,969	$ 16,215,817	$ 17,006,419	$ 17,835,567	$ 18,705,140	$ 19,617,109	$ 20,573,541	$ 21,576,604	$ 22,628,572	$ 23,731,828	$ 24,888,873
Additional In-Lieu of Taxes from Rate Increase	$ -	$ 135,712	$ 278,856	$ 429,797	$ 588,922	$ 756,634	$ 933,356	$ 1,119,534	$ 1,315,633	$ 1,522,141	$ 1,739,573
Net Cash Flow After Rate Increase	**$ 3,052,579**	**$ 2,034,661**	**$ 2,124,362**	**$ 2,338,655**	**$ 2,539,715**	**$ 2,847,798**	**$ 3,076,065**	**$ 2,379,144**	**$ 2,631,291**	**$ 2,865,751**	**$ 2,860,405**
Coverage After Rate Increases	**23.75**	**19.37**	**20.19**	**20.97**	**21.61**	**22.37**	**23.19**	**6.84**	**7.23**	**7.42**	**6.22**
Sample Residential Monthly Bill (5/8" Meter, x 6 ccf)	**$ 33.34**	**$ 34.76**	**$ 36.23**	**$ 37.77**	**$ 39.38**	**$ 41.05**	**$ 42.80**	**$ 44.62**	**$ 46.51**	**$ 48.49**	**$ 50.55**
Monthly Average Increase ($)		$ 1.42	$ 1.48	$ 1.54	$ 1.61	$ 1.67	$ 1.74	$ 1.82	$ 1.90	$ 1.98	$ 2.06

City of Bremerton
Water Rate Study
Summary
No Harvest

Fund Balance	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Operating Reserve											
Beginning Balance	$ 8,754,254	$ 10,206,833	$ 1,879,441	$ 1,938,127	$ 2,003,033	$ 2,071,451	$ 2,143,643	$ 2,219,901	$ 2,300,540	$ 2,386,293	$ 2,476,761
plus: Net Cash Flow after Rate Increase	3,052,579	2,034,661	2,124,362	2,338,655	2,539,715	2,847,798	3,076,065	2,379,144	2,631,291	2,865,751	2,860,405
less: Transfer of Surplus to Capital Fund	(1,600,000)	(10,362,052)	(2,065,677)	(2,273,748)	(2,471,298)	(2,775,606)	(2,999,807)	(2,298,505)	(2,545,537)	(2,775,283)	(2,764,424)
Ending Balance	**$ 10,206,833**	**$ 1,879,441**	**$ 1,938,127**	**$ 2,003,033**	**$ 2,071,451**	**$ 2,143,643**	**$ 2,219,901**	**$ 2,300,540**	**$ 2,386,293**	**$ 2,476,761**	**$ 2,572,742**
O&M Target Balance	*$ 1,817,370*	*$ 1,879,441*	*$ 1,938,127*	*$ 2,003,033*	*$ 2,071,451*	*$ 2,143,643*	*$ 2,219,901*	*$ 2,300,540*	*$ 2,386,293*	*$ 2,476,761*	*$ 2,572,742*
Days	*247*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*	*44*
Capital Reserve											
Beginning Balance	$ 5,642,811	$ 5,393,512	$ 12,786,316	$ 12,327,194	$ 10,225,428	$ 7,405,695	$ 6,991,872	$ 4,242,696	$ 11,112,261	$ 7,532,768	$ 3,869,121
plus: Rate Funded System Reinvestment	-	-	-	-	-	-	-	-	-	-	-
plus: Transfers from Operating Fund	1,600,000	10,362,052	2,065,677	2,273,748	2,471,298	2,775,606	2,999,807	2,298,505	2,545,537	2,775,283	2,764,424
plus: Grants/ Donations/ CIAC	-	-	-	-	-	-	-	-	-	-	-
plus: Additional Proceeds (Costs)	460,600	2,000,024	600	600	200,600	800,600	600	600	600	600	600
plus: General Facilities Charge Revenue	1,850,000	1,355,508	1,418,187	1,483,764	1,552,373	1,624,154	1,699,255	1,777,829	1,860,036	1,946,044	2,036,029
less: General Facilities Charge Towards Debt	-	-	-	-	-	-	-	-	-	-	-
plus: Net Debt Proceeds Available for Projects	1,335,101	2,999,135	-	-	300,000	1,200,000	-	10,600,000	-	-	5,000,000
plus: Interest Earnings	400,000	94,386	255,726	246,544	204,509	148,114	139,837	84,854	222,245	150,655	77,382
Total Funding Sources	**$ 11,288,512**	**$ 22,204,617**	**$ 16,526,506**	**$ 16,331,850**	**$ 14,954,207**	**$ 13,954,169**	**$ 11,831,373**	**$ 19,004,485**	**$ 15,740,680**	**$ 12,405,350**	**$ 13,747,556**
less: Capital Expenditures	(5,895,000)	(9,418,301)	(4,199,312)	(6,106,422)	(7,548,512)	(6,962,296)	(7,588,676)	(7,892,223)	(8,207,912)	(8,536,229)	(8,877,678)
Ending Working Capital Balance	**$ 5,393,512**	**$ 12,786,316**	**$ 12,327,194**	**$ 10,225,428**	**$ 7,405,695**	**$ 6,991,872**	**$ 4,242,696**	**$ 11,112,261**	**$ 7,532,768**	**$ 3,869,121**	**$ 4,869,878**
Minimum Target Balance	*$ 2,876,048*	*$ 3,064,414*	*$ 3,148,401*	*$ 3,270,529*	*$ 3,421,499*	*$ 3,560,745*	*$ 3,712,519*	*$ 3,870,363*	*$ 4,034,521*	*$ 4,205,246*	*$ 4,382,800*
COMBINED BEGINNING FUND BALANCE	**$ 14,397,065**	**$ 15,600,345**	**$ 14,665,757**	**$ 14,265,321**	**$ 12,228,461**	**$ 9,477,145**	**$ 9,135,516**	**$ 6,462,597**	**$ 13,412,801**	**$ 9,919,061**	**$ 6,345,882**
COMBINED ENDING FUND BALANCE	**$ 15,600,345**	**$ 14,665,757**	**$ 14,265,321**	**$ 12,228,461**	**$ 9,477,145**	**$ 9,135,516**	**$ 6,462,597**	**$ 13,412,801**	**$ 9,919,061**	**$ 6,345,882**	**$ 7,442,620**

APPENDIX C

Guidance for Evaluating New Uses on Utility Lands

Guidance for Evaluating New Uses on Utility Lands

Management Goals

1. The McKenna Falls Intake Subbasin will be managed to maintain the "unfiltered" water source status in conjunction with maintaining the forest health.
2. The Other Utility Lands will be actively and adaptively managed to sustainably protect surface and groundwater resources and maintain forest health and resiliency while also generating revenue to reduce costs for utility rate payers.

Current Utility Land Use

The Utility has systems and structures in place to regulate and distribute water throughout the City of Bremerton. As stated in the 2020 Water System Plan, "The Utility draws surface water from the Union River Reservoir and groundwater from thirteen wells. Pump stations move water to higher pressure zones, treated water reservoirs provide storage, and booster stations and regulating stations control pressures within the system. Water is delivered to customers through 328 miles of distribution pipe." (Bremerton 2022). The following Utility land uses are present currently:

- The Utility owns, maintains, monitors, and operates reservoirs, wells, Casad dam, intake facilities, pump stations, water treatment plants and transmission mainline to supply drinking water to the City of Bremerton.
- Wellhead protection zones are established, monitored, maintained, and protected by the Utility.
- Two biosolid application areas are established, monitored, and maintained for biosolid disposal and to enhance tree growth in those areas.
- Road construction, and reforestation activities all take place in relation to timber harvest within specified areas of Utility land.
- Maintenance of the forest roads, bridges, culverts and other facilities related to ongoing O&M and to facilitate fire prevention and response.

Current Non-Utility Land Use

The Utility allows limited special uses of Utility land outside of Utility operations contained to specific special use areas. These uses include recreation, fisheries enhancement, utility rights-of-way, and commercial use. However, increased public use can bring increased risk to water and forest resources along with an increased need for management and monitoring. Therefore, the Utility must carefully consider potential impacts when considering these uses. These uses include recreation, fisheries enhancement, utility rights-of-way, and commercial use. The following land uses occur on Utility land:

- The Gold Mountain Golf Course is owned by the City of Bremerton (City) and managed by the Department of Parks and Recreation under a lease agreement with the water utility.

- Jarstad Park is a Public Works and Utilities park which serves as a space for public events and yearly education and outreach to the community such as Kids Fishing Day and Salmon Tours.
- Through a lease agreement with the Utility, the Suquamish Tribe operates its largest salmon rearing facility on Gorst Creek at Jarstad Park.
- Major regional power and natural gas providers including Puget Sound Energy, Bonneville Power Administration, Cascade Natural Gas, and several tower management companies lease right-of-way to bring critical services to the Bremerton region.
- The Sergeant Honsowetz Police Firearms Training Facility is used for regional police training.

Evaluation of New Land Uses

New land uses should be compatible with the management objectives outlined by the Utility above. Water source protection must be prioritized when future uses are considered. Consider the following questions below when evaluating a new land use:

- Would the proposed land use affect the future use of surface water sources?
- Would the proposed land use result in a higher level of water quality treatment?
- Would the proposed land use be compatible with the existing wellhead protection program for groundwater supplies?
- Would the proposed land use be a potential contaminant source as identified by the City of Bremerton Water System Plan (2020) in Table 4 and listed in the Potential Contamination Source List below? If yes, could the potential risk of contamination be adequately mitigated?
- Would the proposed land use take productive forest land out of production and adversely impact timber revenue?
- Would the proposed land use be compatible with existing wildlife and fisheries requirements such as high water quality, instream flows, protection of wetlands and potentially negatively affect Chinook salmon, steelhead trout or chum salmon habitat
- Would the proposed land use affect the viewscape currently afforded to the Bremerton community?
- Would the proposed land use affect other uses such as recreational activities, educational activities, right-of-way agreements, minor forest product sales contracts, and/or recycling of biosolids?
- How close to potential water intakes would the land use be?
- Would the proposed land use be located at a site needed for future Utility facilities?
- Would the proposed land use have potential to increase invasive species or pests on Utility lands?
- Would the proposed land use comply with the wildfire protection plan?
- Would the proposed land use reduce resiliency in relation to climate change?

Potential Contamination Source List from EES et. al 1996, Table E-2

- Above ground storage tanks
    - Hazardous and non-hazardous waste treatment
    - Hazardous and non-hazardous waste storage
    - Hazardous and non-hazardous material storage
- Animal feedlots
- Containers
    - Hazardous and non-hazardous waste storage
    - Hazardous and non-hazardous material storage
- Deep Injection Wells
    - Wastewater disposal wells
    - Oil and gas activity disposal wells
    - Mineral extraction disposal wells
- De-icing salts storage piles
- Fertilizer applications
- Graveyards
- Groundwater/surface water cross contamination
- Irrigation practices (return flow)
- Land applications
    - Wastewater application (spray irrigation)
    - Wastewater by-product (sludge) application
    - Petroleum refining waste application
    - Hazardous and non-hazardous waste application
- Landfills
    - Industrial hazardous and non-hazardous landfill
    - Municipal sanitary landfill
- Material transfer operations
    - Hazardous and non-hazardous waste transfers
    - Hazardous and non-hazardous material transfers
- Materials stockpiles
    - Hazardous and non-hazardous material
- Mining and mine drainage
- Natural leaching
- Open dumps
- Pesticide applications
- Pipelines
    - Hazardous and non-hazardous waste storage
    - Hazardous and non-hazardous material storage
- Radioactive disposal sites
- Salt water intrusion

- Septic tanks
    - Houses
    - Apartments
    - Small businesses
- Shallow injection wells
    - Agricultural drainage wells
    - Automobile service station disposal wells
    - Industrial process water disposal wells
- Storm water drainage wells
- Surface impoundments
    - Hazardous and non-hazardous waste cesspools, ponds lagoons, and other impoundments
- Transportation of materials
    - Hazardous and non-hazardous waste
    - Hazardous and non-hazardous material
- Underground storage tanks
    - Hazardous and non-hazardous waste treatment
    - Hazardous and non-hazardous waste storage
    - Hazardous and non-hazardous material storage
- Urban runoff
- Waste piles
    - Hazardous and non-hazardous waste piles
- Waste tailings
    - Heap leaching piles
    - Non-heap leaching piles

References

City of Bremerton (Bremerton). 2022. Department of Public Works & Utilities 2020 Water System Plan.

Economic and Engineering Services, Inc., Washington Timberland Management, Inc., Northwest Aerial Reconnaissance, Inc, and Shapiro & Associates, Inc. (EES et al.) 1996. Utility Land Management Plan, City of Bremerton Department of Public Works and Utilities, Volumes I and II.