PORTLAND WATER BUREAU
FILTRATION PROJECT
Habitat Impact Analysis

Prepared for Winterbrook Planning and the City of Portland **April 15, 2025**

819 SE Morrison Street
Suite 310
Portland, OR 97214
502.274.2010
esassoc.com

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EXECUTIVE SUMMARY
Habitat Impact Analysis

The Portland Water Bureau (Water Bureau) has proposed a water filtration project in Multnomah County that includes a filtration facility, raw and finished water pipelines, access roads, and a pipeline intertie (collectively, the Project). The purpose of this Habitat Impact Analysis is to determine the effect of the finished Project on wildlife habitat both within the Project area and on surrounding lands. To determine the nature of the effect of the Project on wildlife habitat areas, this analysis compares the resources and values of the wildlife habitat on and surrounding the Project area prior to construction of the Project to the expected resources and values of the wildlife habitat on and surrounding the Project area once construction is complete and the Project is in operation.

The property upon which the Filtration Facility will be built (Filtration Facility Site) has historically been used as commercial nursery land. The Project will convert just under 37 acres of the commercial nursery land to a water filtration facility that includes operational buildings and equipment, hardscaped areas, ornamental landscaping, and stormwater facilities (Filtration Facility). The remaining nursery land on the Filtration Facility Site will be converted to extensive areas of newly enhanced natural habitats. Both the existing on-site upland forest on the east side of the Filtration Facility Site and the established riparian trees at the southwest corner of the Filtration Facility Site will be protected and preserved.

The pipeline intertie near Lusted Road (the Intertie) will also be placed on land previously used for a commercial nursery. The Intertie area is approximately half an acre of land (Intertie Site). Approximately half of the Intertie Site will include an underground vault, a paved vehicle area, and an aboveground structure. The remaining area around the perimeter of the site will be landscaped and used for a stormwater pond. All pipelines needed to bring raw water to the Filtration Facility Site and carry filtered water from the site will be underground.

Methods for developing this Habitat Impact Analysis included reviewing existing information and conducting field surveys in 2021, 2023, and 2024 to assess site conditions. Methods also included conducting a Habitat Evaluation Procedures (HEP) analysis to quantify pre-construction and post-construction wildlife habitat conditions in the Project area, including habitat adjacent to the Filtration Facility Site and the Intertie Site. The HEP is a widely accepted, habitat-based approach for assessing environmental impacts of proposed development projects.[1] The HEP method can be used to document the quality and quantity of available habitat for selected wildlife species and provide a comparison to the relative value of the different areas at a future point in time with the overall goal of quantifying the impact of a proposed project on wildlife habitat. The quality of habitat is represented by the Habitat Suitability Index (HSI), which is then multiplied by the area containing that quality of habitat (both in the pre- and post-construction timeframes) to calculate Wildlife Habitat Units (WHUs). WHUs represent the "value" of an area for wildlife, again, considering both the quality and quantity of that area. WHUs can then be

[1] For example, the HEP is used by the U.S. Fish & Wildlife Service to assess the potential impacts of federal projects.

compared for the pre- and post-construction timeframes in order to quantify objectively the habitat changes resulting from the development.

For the Project, the quantified HEP analysis and pre- to post-construction comparison of the quantity and quality of habitat has been used to inform a recommendation for additional habitat enhancement in addition to habitat related conditions of approval suggested by the Water Bureau and memorialized in the initial Multnomah County land use approval. The final analysis presented in this report incorporates the additional habitat enhancements into the final calculations. Based upon the analysis, no additional habitat enhancements (above what was already included in the Project) are proposed along pipeline alignments or at the Intertie Site.

The HEP results summarized in this report demonstrate that the Project will not adversely affect wildlife habitat areas because – with the extensive proposed habitat enhancements at the Filtration Facility Site – the Project will result in a net increase in Wildlife Habitat Units (WHUs).

The pre-construction nursery land at both the Filtration Facility Site and the Intertie Site provided limited habitat quality (such as foraging and breeding opportunities for wildlife species), as they were both highly managed landscape with sparse cover and frequent intrusion / disturbance by humans. In contrast, the Water Bureau will establish dense wooded and vegetated buffers or hedgerows along the perimeter of the Filtration Facility and around the property edges, which will provide cover, foraging, movement corridors, and some breeding opportunities for wildlife species. Post-construction, nearly 40 acres of the Filtration Facility Site will consist of native forests and natural habitats – all to be located outside the Filtration Facility fence. A minimum of 2,027 trees will be planted in identified habitat areas outside of the fence in addition to thousands of shrubs and a variety of ground covers. An additional 16 acres of landscaping will be established within the Filtration Facility fence, including 458 trees along with shrubs and groundcover. A majority of the perimeter plantings at the Filtration Facility Site will be dense hedgerows consisting of native herbaceous, shrub, and tree species, with two small areas of ornamental landscaping near the entrance and emergency exits. Overall, the landscaping and planting plans show that a wide diversity of native species and high-quality habitats will be planted and maintained across the Filtration Facility Site in significant quantities of area.

Taking into consideration the wildlife habitat within and surrounding the Project area prior to construction in comparison to the post-construction habitat impacts and enhancement, the author concludes that the Project will not adversely affect wildlife habitat.

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Acronyms and Other Abbreviations

Abbreviation	Definition
BMPs	best management practices
CAD	computer-aided design
EPA	Environmental Protection Agency
ESA	Environmental Science Associates
GIS	geographic information system
HEP	Habitat Evaluation Procedures
HSI	Habitat Suitability Index
IPaC	Information for Planning and Consultation
LUBA	Land Use Board of Appeals
ODFW	Oregon Department of Fish and Wildlife
Analysis	Habitat Impact Analysis
ROW	right-of-way
SEC-h	Significant Environmental Concern for habitat or SEC-h
USFWS	U.S. Fish and Wildlife Service
WHU	Wildlife Habitat Unit

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PORTLAND WATER BUREAU FILTRATION FACILITY PROJECT

Habitat Impact Analysis

1. Introduction

The Water Bureau has proposed the Filtration Facility to filter water coming from the Bull Run water system to meet regional domestic water needs. Environmental Science Associates (ESA) has prepared this Wildlife Habitat Analysis to describe pre-construction conditions and analyze potential Project impacts on wildlife habitat resources that occur on and adjacent to the Project (**Figure 1**).

1.1 Project Overview and Location

The Project consists of constructing a new water filtration facility and associated pipelines to meet Environmental Protection Agency (EPA) water quality standards and to improve resiliency. The proposed Filtration Facility will remove sediments, microbes, and organic material from drinking water that nearly one million people rely on. Portland's water system serves the City of Portland and 15 wholesale water districts, including the Pleasant Home Water District, which serves the area directly around the Project.

As depicted on Figure 1, major components of the Project include the following:

- Filtration Facility: A new filtration facility on former commercial nursery land located south of SE Carpenter Lane and north of the Clackamas County line. The facility will be developed on approximately 37 acres of the approximately 94-acre Filtration Facility Site.
- Raw Water Pipeline: A raw water pipeline starting at SE Lusted Road and extending west underground for approximately 2,250 feet to the edge of the Filtration Facility, crossing in an easement under three private properties (two in joint ownership) and Dodge Park Blvd. The main properties relevant to analysis of the Raw Water Pipeline alignment are accessed off of SE Lusted Road and consist of rural residential and agricultural uses. The Raw Water Pipelines will pass under the third property deep (150+ feet) underground and will not disturb the surface of the property.
- Finished Water Pipelines: Approximately 4 miles of underground finished water pipelines will convey the filtered water from the Filtration Facility Site to existing Water Bureau pipelines and the Water Bureau's existing Lusted Hill facility. The majority of the Finished Water Pipelines will be located within the road rights-of-way (ROWs) and underground, with a set of above ground appurtenances. Approximately 0.5 miles of pipeline will follow an existing nursery farm road, and a short segment of pipeline will be located under the Water Bureau's Lusted Hill Treatment Facility Property.

Figure 1
Project Location

- Finished Water Intertie: The Intertie Site is located on the south side of Lusted Road in an existing nursery field. The Intertie includes a below grade concrete vault that connects several subsurface pipelines. The Intertie Site is approximately 0.5 acres. Approximately half of the site will include the vault, an above-ground electrical building, and a paved vehicle area. The remaining half will include a vegetated stormwater basin and a vegetated buffer ranging in depth from 15 feet to 30 feet in width.

1.2 Use History, Landscape Context, and Functions and Values

1.2.1 Use History

The City has owned the Filtration Facility Site parcel since 1975 and over the past five decades has leased the property to commercial nursery farming operations. Typical nursery stock and ground conditions are shown in **Photograph 1**.

Photograph 1. Looking south on the pre-construction Filtration Facility Site at ornamental shrubs and tilled ground (April 2021).

Just under 6 acres of upland forest is located on the Filtration Facility Site (**Photograph 2)** and is described in more detail in Section 3. The portion of the upland forest that occurs on the Filtration Facility Site and forest off-site to the east are mapped by Multnomah County as Significant Environmental Concern for habitat or SEC-h. The upland forest on-site consists predominantly of native shrubs and tree species; however, English ivy (*Hedera helix*) and English holly (*Ilex aquifolium*), are present in the groundcover and understory of the forest. These two non-native invasive plant species threaten the long-term health of the local ecosystem as they provide reduced habitat value for wildlife species compared with native plant species.

A small section of existing riparian habitat (0.2 acres) for the Johnson Creek headwaters is located in the southwest portion of the Filtration Facility Site (**Photograph 3**). The riparian forest overlaps with a portion of Multnomah County's SEC water resource (SEC-wr) mapping. No creeks or wetlands are located on the Filtration Facility Site parcel. However, two ponds are located on the Raw Water Pipeline properties near Lusted Road. Beaver Creek is located across SE Lusted Road from the Intertie Site.

Photograph 2. Looking east at upland forest (including SEC-h forest) along the eastern ridgeline of the Filtration Facility Site (June 2024).

Photograph 3. Looking south at a small portion of riparian forest in the southwest corner of the Filtration Facility Site (June 2024).

1.2.2 Landscape Context

Land use at the Filtration Facility Site and surrounding area is characterized by an agricultural community with small farms, commercial nurseries, rural residences, and natural areas including forest land and riparian areas (**Figure 2**). Just east of the Filtration Facility Site is a steep forested hillslope that extends down to a terrace west of the Sandy River (**Photograph 4)**. SE Dodge Park Boulevard, a Multnomah County designated collector and freight route, bisects the off-site forest, which extends down the slope to rural residences along SE Lusted Road. The off-site upland forest is a multi-layered mature forest containing bigleaf maple (*Acer macrophylllum*), Western redcedar (*Thuja plicata*), and Douglas-fir (*Pseudotsuga menziesii*), in addition to Oregon ash (*Fraxinus latifolia*), and red alder (*Alnus rubra*). Typical native understory species include Oregon grape (*Mahonia nervosa*), California dewberry (*Rubus ursinus*), vine maple (*Acer circinatum*), hazelnut (*Corylus avellana*), osoberry (*Oemleria cerasiformis*), and swordfern (*Polystichum munitum*). Portions of the upland forest have small occurrences of English ivy and English holly. Snags and downed wood are present in the off-site upland forest, which provide important hiding, resting, and feeding opportunities for wildlife species including invertebrates (insects), amphibians, reptiles, small to medium mammals, and birds.

Photograph 4. Upland forest (SEC-h forest) bisected by SE Dodge Park Boulevard, east and downslope of the Filtration Facility Site (April 2024).

The Sandy River is located about 0.4 mile northeast of the Filtration Facility Site and has an extensive riparian corridor on both sides of the mainstem east of SE Lusted Road. The foothills of Mount Hood National Forest are located east of the Sandy River.

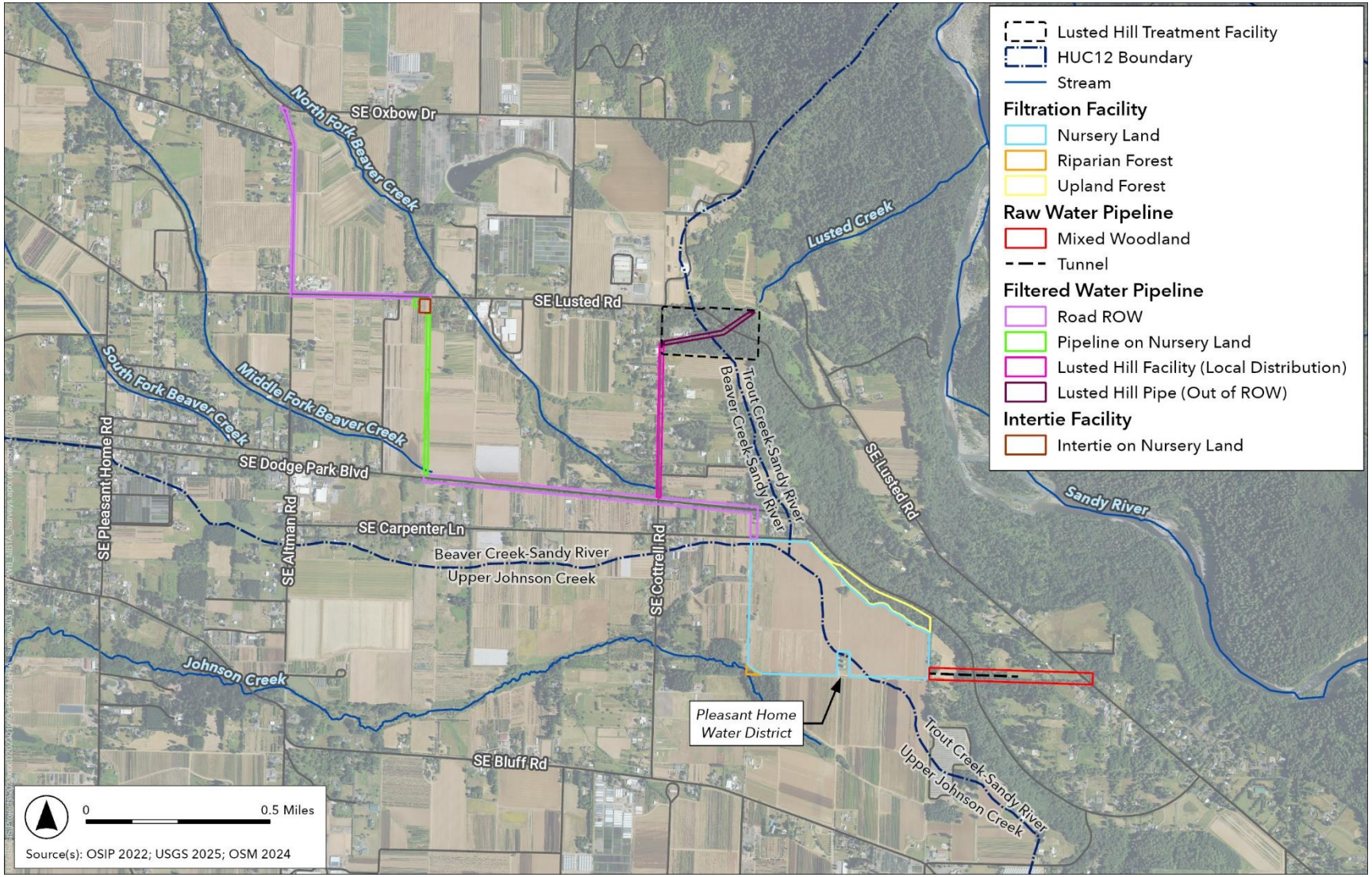


Figure 2
Project Setting

1.2.3 Functions and Values of the Project Site and Vicinity

Habitat functions and values of the subwatersheds that overlap with the Project site and vicinity (as shown on Figure 2) are outlined below. The Project site includes all elements of the Project, including the Filtration Facility Site, pipeline alignments, and the Intertie Site. A subwatershed, or Hydrologic Unit Code (HUC 12), is the smallest level of watershed identified by the U.S. Geological Survey for the purposes of watershed management and conservation efforts.

The eastern half of the Filtration Facility Site and the Raw Water Pipeline Alignment are within the Trout Creek-Sandy River subwatershed (HUC 12) (Oregon Explorer 2025). Significant habitat functions and values of the Trout Creek-Sandy River subwatershed include: streams and rivers, fish habitat (anadromous and resident species), riparian habitat, upland forests, and wildlife movement corridors (greenways along waterways and ridgelines).

The western portion of the Filtration Facility Site is within the Upper Johnson Creek subwatershed (HUC 12) (Oregon Explorer 2025). The Upper Johnson Creek subwatershed consists of several small headwater streams that feed into the mainstem and provide the following habitat functions and values: riparian corridors, wetland habitat, fish habitat, and wildlife movement corridors

The Finished Water Pipelines, the Intertie, and the Lusted Hill Facility are within the Beaver Creek-Sandy River subwatershed (HUC 12) (Oregon Explorer 2025). The Beaver Creek subwatershed originates in the northwest portion of the Filtration Facility Site and includes large swaths of agricultural and rural land within Multnomah County. Major habitat functions of this subwatershed include small tributary streams and associated wetlands and riparian areas as well as wildlife movement corridors.

2. Methods

Methods for developing this Habitat Impact Analysis included reviewing existing information and conducting field surveys in 2021, 2023, and 2024 to assess site conditions. Methods also include conducting a Habitat Evaluation Procedures (HEP) analysis to quantify pre- and post-construction wildlife habitat conditions in the Project area, including habitat adjacent to the Filtration Facility Site in order to inform if additional habitat enhancement measures are needed beyond what was previously proposed by the Water Bureau and memorialized as conditions of approval through the initial Multnomah County land use approval. Supporting information for this Analysis is provided as follows:

- Appendix A: HEP Methodology and Representative Wildlife Species Evaluated
- Appendix B: HEP Data and Results Tables
- Appendix C: HEP Assumptions
- Appendix D: Pre-Construction and Post-Construction Habitat Comparison Table
- Appendix E: Planting Plans
- Appendix F: Existing Conditions of Approval Related to Habitat
- Appendix G: Tree Planting Table

Pre- and post-construction conditions were assessed for distinct vegetation communities or habitat types within each type of project component. The different habitat types were determined based on the dominant vegetation structure and the tallest over-story. For example, upland forest located on the Filtration Facility Site is categorized based on the canopy trees (tallest vegetation layer) determined through a review of aerial imagery and confirmed from site visits. Refer to **Section 3.0** for a detailed discussion of pre- and post-construction habitat descriptions organized by Project component.

2.1 General Habitat Assessment

The assessment of general habitat and existing conditions was based on field visits by ESA in 2021, 2023, and 2024. Site visits were also used to characterize the vegetation communities or habitat types that are present in the project area for use in the HEP analysis.

As part of due diligence prior to project approval and site construction, site-specific surveys for the federally threatened streaked horned lark (*Eremophila alpestris strigata*) were conducted at the Filtration Facility Site and pipeline alignments in 2021 (ESA 2021). Although data from the U.S. Fish and Wildlife Service (USFWS) indicate that streaked horned larks occur in Multnomah County, no streaked horned larks were detected during protocol-level surveys. The field surveys involved 3 different days of 4- to 5-hour site visits from April to mid-July. Observations of other species during this time were recorded to inform the analysis of existing habitat conditions. Observations of the types of plant species growing at the Filtration Facility Site and adjacent areas were also made.

ESA conducted site visits in 2023 to document existing habitat conditions along SE Dodge Park Boulevard and along the proposed Raw Water Pipeline alignment west of SE Lusted Road. ESA made additional site visits to the Filtration Facility Site, the raw pipeline alignment, and adjacent road ROWs in

the early spring and summer of 2024 to conduct pre-construction bird nest surveys prior to vegetation removal.

This Analysis was also developed based on a review of the sources listed below.

- Oregon Department of Fish and Wildlife's (ODFW) "Living with Wildlife" series, (various citations, ODFW 2025, See Section 6, *References and Source Material*).
- Oregon Explorer (2025).
- Raw Water Pipeline Wildlife Conservation Plan (Winterbrook 2022).
- Distribution Main Wildlife Conservation Plan (Winterbrook 2022).
- Information for Planning and Consultation (IPaC) database (USFWS 2025a).
- Relevant studies (see Section 6, *References and Source Material*).
- Aerial imagery, GoogleEarth, 1995–2024.

2.2 Indirect Effects Assessment

Indirect effects to wildlife species include potential impacts from operation of the Filtration Facility and Intertie, including potential loss of foraging and breeding habitat and noise, light, vibration, and human disturbance. Indirect effects were included in this analysis particularly by examining pre- and post-construction conditions within 1,000 feet of the Filtration Facility Site to determine if noise, light, and an overall change in land use at the site would affect adjacent wildlife. The 1,000 feet width was conservatively selected because it accounts for relatively large habitat patches suitable for some of the medium to large wildlife species that require extensive habitat (such as the bobcat and Roosevelt elk).

3. Pre- and Post-Construction Habitat Descriptions, Potential Impacts, and Habitat Enhancement Measures

This section summarizes pre-construction habitat conditions (**Figure 3**), potential project impacts, anticipated post-construction conditions, and specific habitat enhancement measures.

3.1 Filtration Facility Site

3.1.1 Pre-Construction Habitat

Commercial Nursery Land. The dominant pre-construction land cover or habitat type at the Filtration Facility Site is commercial nursery land totaling approximately 89 acres, including dirt roads. Ornamental bareroot trees and shrubs, as well as a wide range of ball and burlap (B&B) trees and shrubs were grown on the property for the landscaping industry. The site was organized in long rows of single species that were planted and staked close together to maximize inventory. The rows of nursery stock formed blocks that were spaced to allow trucks and tractors to access the plants for periodic maintenance, which sometimes occurred on a daily or weekly basis by nursery staff. Field planting occurred in the spring or fall. After planting, year-round management was needed. Bareroot trees that were grown on-site were harvested generally on a 3-to-4-year rotation. In some areas after fall harvesting, a cover crop was planted to rest the fields until the next growing season. The B&B plant spacing was wider as the trees grew to a larger size as they were left in the ground for 5 years or longer. The larger/older specimens represented a relatively small portion of the nursery stock (< 5 to 10 percent) grown on-site.

Soil preparation at commercial nurseries can include adding lime or other soil amendments, fumigation, and sub-soil plowing followed by disking or rototilling. Pre-emergence herbicide applications were commonly applied in the winter or early spring. Rodent control was done using chemical rodenticides. For a more complete description of the accepted farm practices for these types of nurseries, see pages 32 to 38, Multnomah County Exhibit A.33 Compatibility Study. (LUBA REC-7160-7166).

Upland Forest. The next largest land cover or habitat type at the Filtration Facility Site is upland forest which covers approximately 5.8 acres. The upland forest on the site is a mix of evergreen and deciduous trees dominated by Douglas-fir and bigleaf maple as canopy trees with red alder and sweet cherry (*Prunus avium*) as subcanopy trees. Understory species include osoberry, Oregon grape, vine maple, hazelnut, and swordfern. English ivy, a non-native invasive species, is dominant in the groundcover and is growing on several tree trunks within the on-site upland forest. Other non-native invasive plant species such as evergreen blackberry (*Rubus laciniatus*) and Himalayan blackberry (*Rubus armeniacus*) are found at the interface of the relatively unaltered forest and the adjacent nursery land.

Riparian Forest. A small area of existing riparian forest (0.2 acres) is located in the southwest corner of the Filtration Facility Site and extends off-site to the south on private property. Johnson Creek is located on that neighboring property and does not cross the Filtration Facility Site itself. The overstory of the existing riparian forest on the southern end of this SEC zone consists of Douglas-fir, western redcedar, red alder, and bigleaf maple. The understory is multiple layers of saplings, tall shrubs, and native groundcover species. The northern (top) 140 feet of this zone is former agricultural field with native shrubs planted throughout.

Site Surveys. Wildlife species observed on nursery land during 2021 on-site surveys and during 2024 spring surveys include: white-crowned sparrow, savannah sparrow, American robin, Steller's jay, American crow, red-tailed hawk, European starling, common raven, American kestrel, and Cooper's hawk (ESA 2021). Overall, these species are relatively common in rural settings and, with the exception of the common raven and the American kestrel, also in urban/suburban environments.

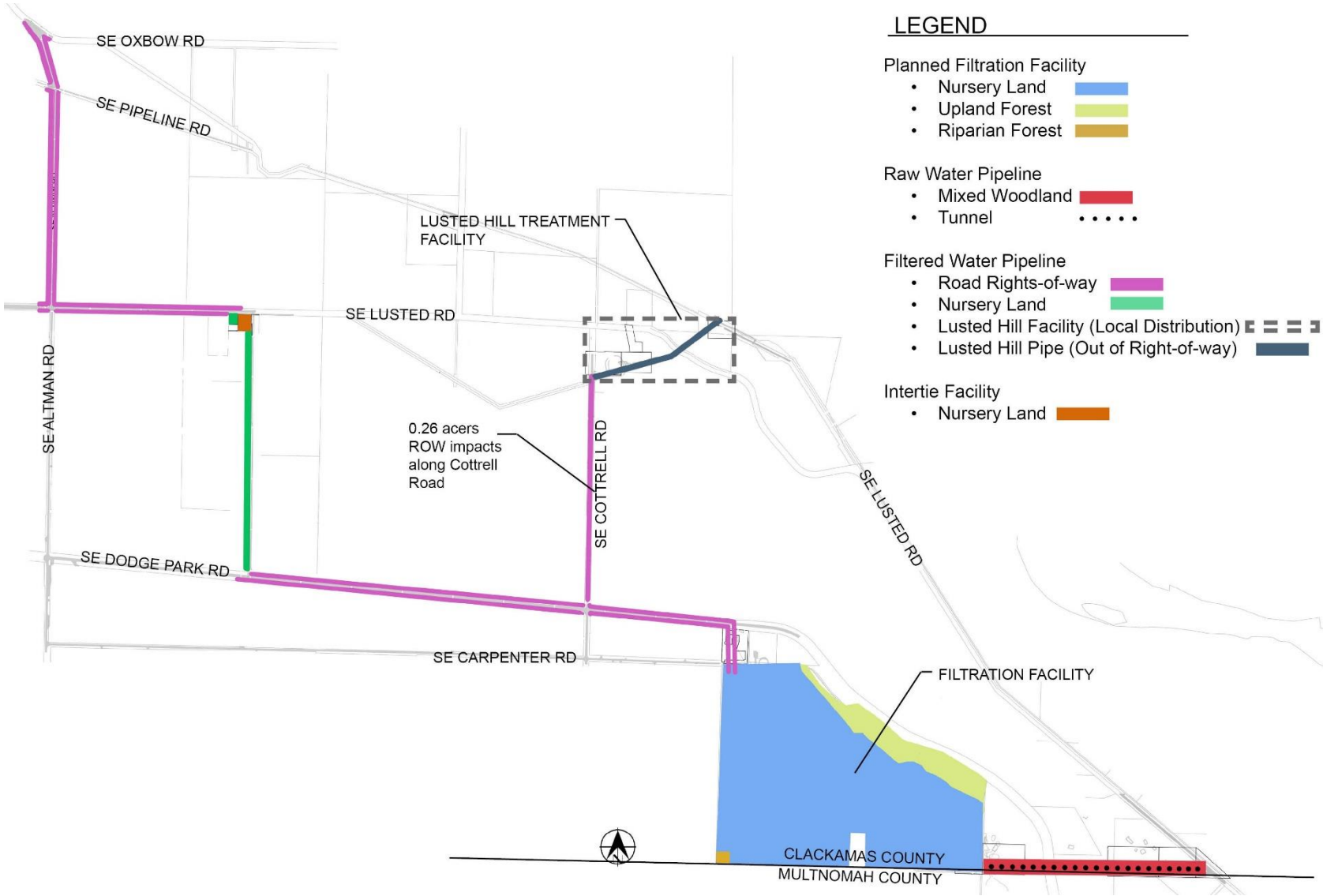


Figure 3

Pre-Construction Conditions by Project Component

3.1.2 Potential Project Impacts

The proposed Project will convert commercial nursery land to a mixture of office and operational buildings, paved areas, ornamental landscaping, stormwater facilities, and enhanced, natural habitats. No clearing or construction will occur in the on-site upland forest or the riparian forest. The Filtration Facility will cover approximately 37 acres within an 8-foot-high fence for security purposes.

Operation of the Filtration Facility has the potential to increase light, noise, vibrations, and human presence at the Filtration Facility Site and in the vicinity.[2]

Human Presence

Human presence and activity, including vehicle trips, will primarily be limited to the fenced Filtration Facility area. Periodic patrols and facility checks and occasional maintenance will occur on the perimeter road outside of the Filtration Facility fence. The Filtration Facility will operate 24-hours a day, 7 days a week. No more than 10 employees will be present at the Filtration Facility Site per shift pursuant to land use conditions of approval. The approved parking lot includes 24 vehicle parking stalls. The Filtration Facility will generate an average of 9 truck trips per day for deliveries and hauling. Both employees' vehicles and trucks will enter and exit the Filtration Facility via the primary entrance from Carpenter Lane on the north edge of the Filtration Facility Site.

Noise

The Filtration Facility will emit a combination of intermittent and continuous noise. As described in detail in the Bull Run Filtration Facility Exterior Noise Analysis prepared for the project (MC A.49; REC-6843-6860), during normal operations, noise levels exceeding 50 dBa will almost exclusively be contained to within the Filtration Facility fence line. Additionally, as detailed in the Exterior Noise Analysis and the Operational Noise Response (MC J.69, REC-453-454) noise levels in close proximity to the fence line will be below daytime background noise levels and will be at or below the median nighttime background noise levels.

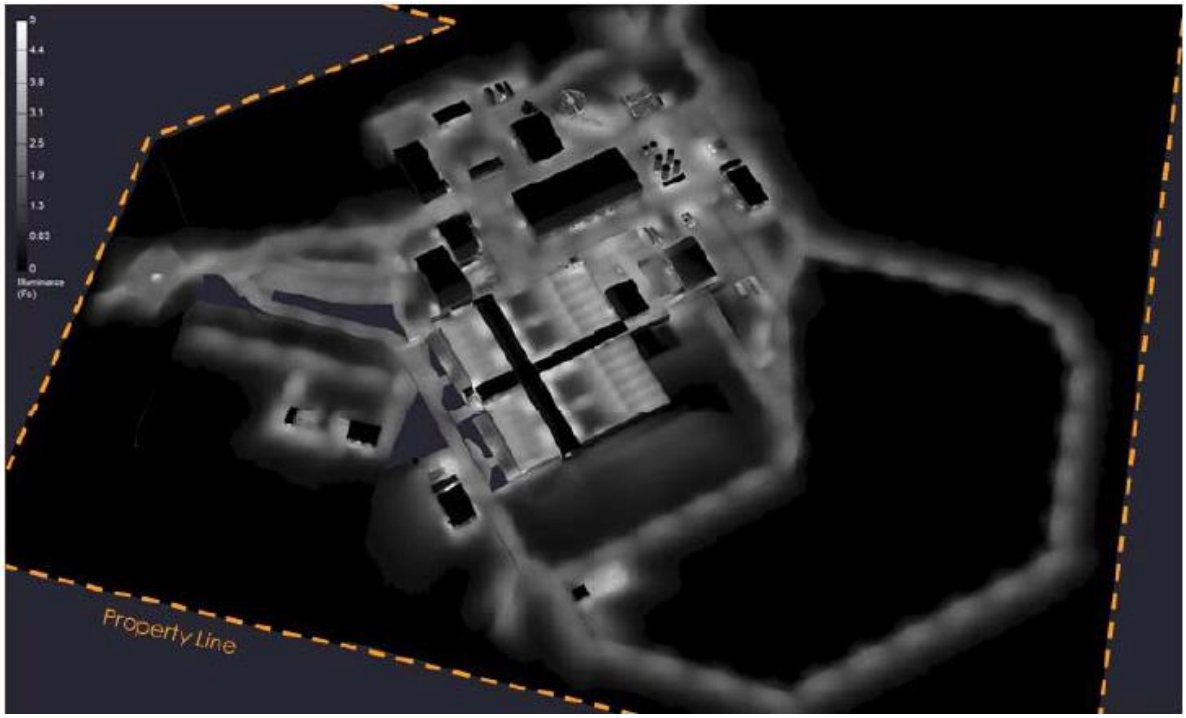
[2] Potential air quality impacts and aquatic habitat impacts are described in separate memoranda (ESA 2025, BioHabitats 2025).

A-49 Figure 4 - Noise Contours; Bull Run Filtration Facility-No Emergency Generators or Fire Pumps

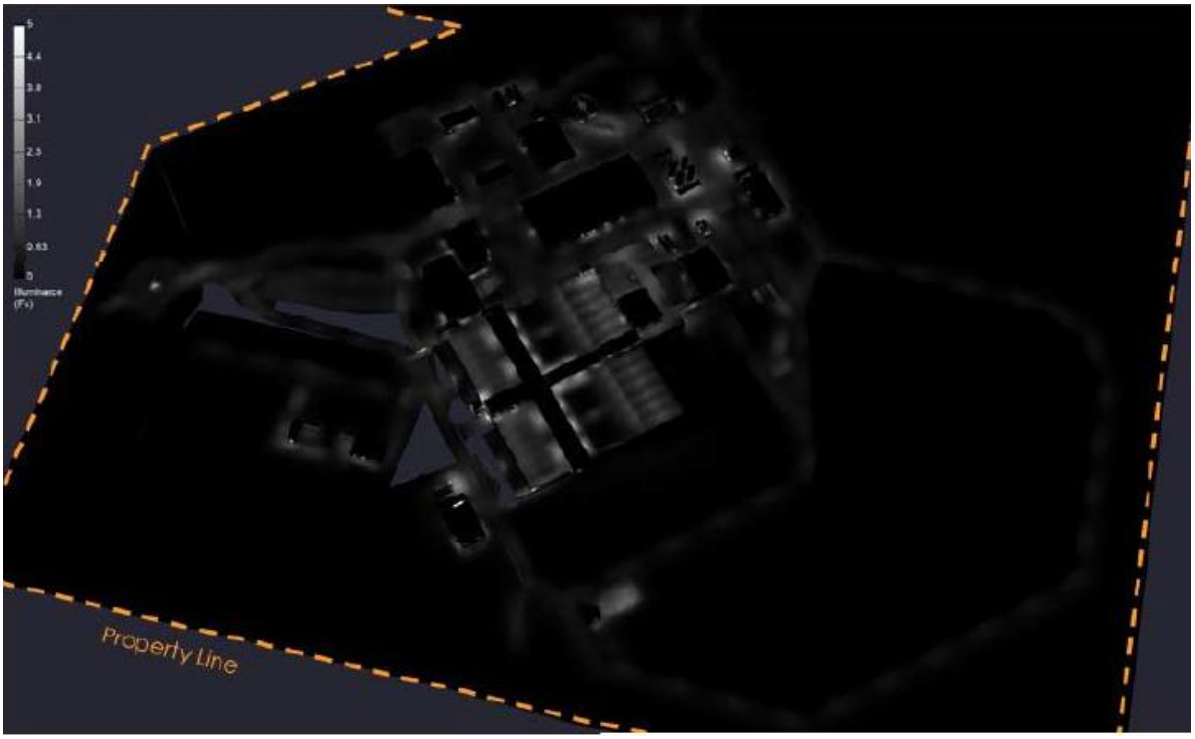
The noise analysis also measured predicted noise levels during emergency equipment operation. Under the highest noise levels generated by all systems being operated simultaneously, including emergency systems, the predicted noise levels were near or below daytime background levels at the perimeter of the site, including points closest to the Filtration Facility fence line on the north and east site boundaries. The emergency system is only operated for periodic testing during daytime hours and during actual emergencies. Therefore, the highest noise levels would occur only periodically and for short durations during the day except in cases of actual emergencies.

Light

The Filtration Facility will have lighting inside the Filtration Facility fence that meets or exceeds Multnomah County Dark Sky Lighting standards. As described in the Impacts of Lighting at the Bull Run Filtration Facility memo (MC J.70, REC-455-462) and the Land Use Light Report (MC A.47, REC-6862-6949) the default lighting condition during nighttime hours will be a dimmed mode with full light output only triggered manually or via motion sensor when needed for a task. The graphic below was created by the lighting engineers to inform the illuminance plans in the Lighting Report and depict the relative location and intensity of lighting under the two lighting scenarios. As demonstrated by J.70 Figures 1 and 2 below, the light at grade is primarily contained within the Filtration Facility fence and has limited if any spill into the habitat areas outside of the Filtration Facility fence. This is further supported by the specific footcandle measurements included in the reports.



J.70 Figure 1 – Simulation of Facility lighting with all fixtures at full brightness.



J.70 Figure 2 – Simulation of Facility lighting with all fixtures dimmed.

Vibration

According to the Project engineers at Stantec, equipment within the Filtration Facility that could generate vibration is mounted with appropriate mass and base isolation to limit vibration. While the mounting prolongs service life and reduces maintenance for the equipment, it also limits the areas where equipment vibration can be perceived to those areas immediately adjacent to the equipment (within the same interior room or closer than 10 feet away outdoors). Therefore, vibrations from the operation of the Filtration Facility will not be perceived outside of the Filtration Facility fence line.

3.1.3 Post-Construction Habitat

After construction, the Filtration Facility Site will consist of multiple cover types / habitat types, as shown in **Figure 4**.

New Habitat Types. New habitat types and/or cover types on the Filtration Facility Site post-construction include: Savanna/Oak Woodland, Wooded/Shrubby Buffer, Grassland, Ornamental Landscaping, Hard Surfaces, and Stormwater/Overflow Basins. Refer to Appendix C for descriptions of the post-construction habitats that will be created at the Filtration Facility Site.

Upland Forest. The on-site upland forest will expand slightly in size from 5.8 acres to 6.8 acres with several native plantings proposed and described elsewhere in this report. The wildlife habitat functions provided by the existing forest are judged to be moderate in quality (Winterbrook 2022) and will be improved with the project. Limiting factors for habitat that will not change with the project include forest fragmentation and proximity to SE Dodge Park Boulevard, which passes through a portion of the forest. The upland forest habitat on-site and off-site will continue to provide forage, cover, movement corridor, and nest sites for birds and small to medium mammals.

Riparian Forest. Post-construction conditions for the on-site riparian habitat include a significant expansion in size from about 0.2 acres to 1.9 acres with native plantings proposed for the area. Details for these plantings are provided in a separate memorandum (BioHabitats 2025).

3.1.4 Habitat Enhancements

Several habitat enhancements that exceed the requirements of the existing conditions of approval are proposed at the Filtration Facility Site, as shown on Figure 4 and summarized below.

- Remove English ivy and English holly, non-native invasive species that degrade biodiversity, from approximately 5 acres of the on-site upland forest. This includes removal from the forest groundcover layer and from the trunks of trees manually or mechanically.
  - Maintain / monitor the 5-acre ivy/holly removal area for up to 5 years with the performance standard as follows:
    - 1st year cover < 60 percent; i.e. no more than 40 percent English ivy & holly cover should be present in the forest using visual estimates.
    - 2nd year cover < 50 percent
    - 3rd year cover < 40 percent
    - 4th year cover < 30 percent

    - 5th year and beyond < 20 percent cover
  - Replace English ivy (and other non-native invasive shrubs and trees that may be removed from the 5-ac upland forest area) with native shrub and tree species where native cover is less than 70 percent.
  - Replace interplanted species if needed to achieve 60 percent survival rate of replaced vegetation.
  - Remove ivy and holly during winter months only to limit impacts to native groundcover, nesting birds, and amphibians.
- Retain/install downed logs and log/brush piles in the woody buffer for their wildlife value.
- Install bat boxes throughout the Filtration Facility Site to benefit native bat species.
- Remove remnant elk deterrent fencing along the eastern ridgeline of the Filtration Facility Site to improve wildlife movement.
- Prohibit dogs on the Filtration Facility Site to avoid the impact of domestic dogs on deer/elk populations (or other wildlife) on Site.
- Prohibit the recreational use of off-road motor vehicles at the Filtration Facility Site. Motorized vehicle use outside of the fence line will only be allowed for management or emergency fire vehicle access.
- As shown on **Figure 4**, the proposed landscaping / habitat restoration maintains north/south deer/elk and other wildlife movement corridors along the western and eastern Filtration Facility Site boundaries, providing connectivity from riparian habitat along Johnson Creek to the upland forests along the eastern property line.

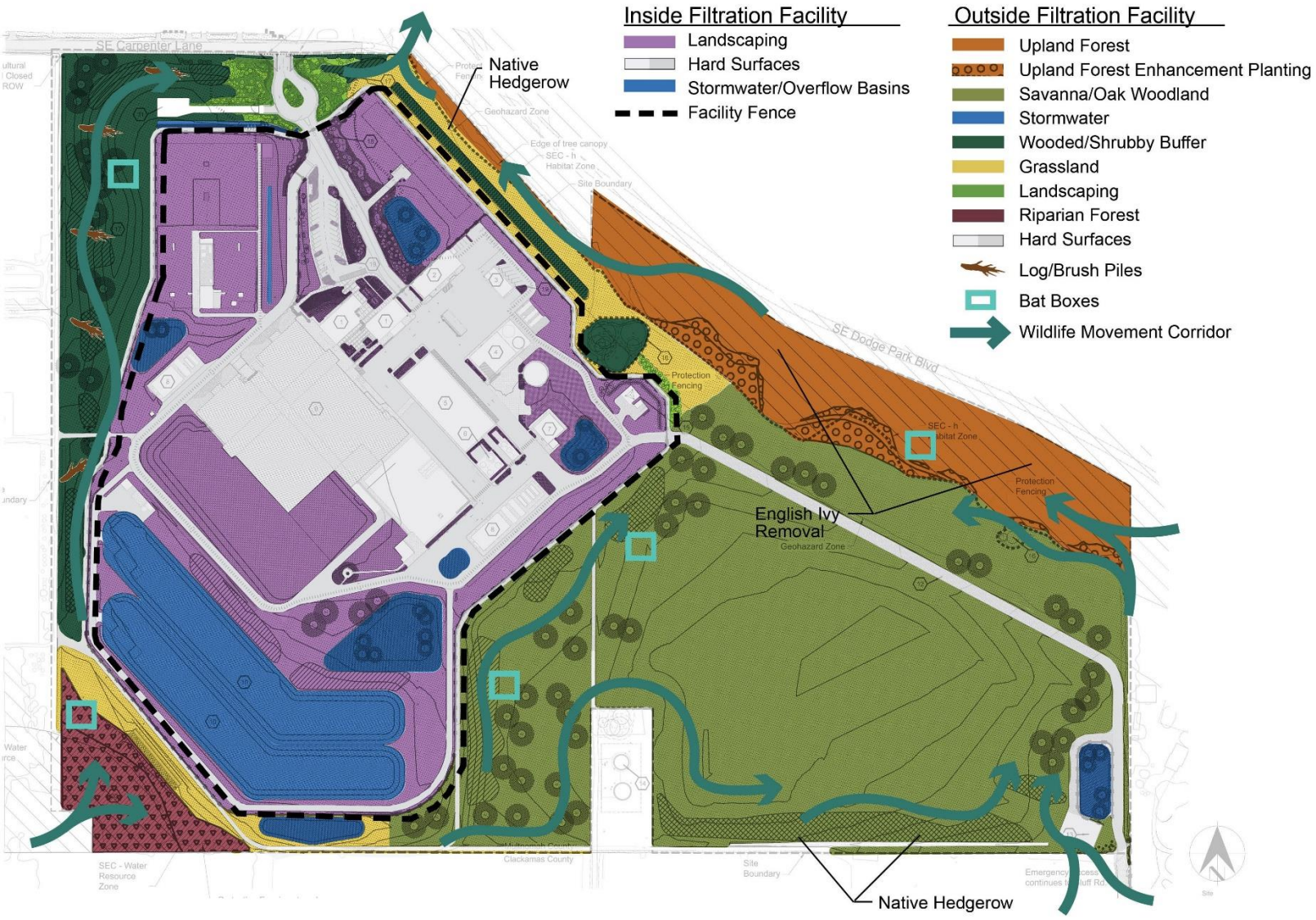


Figure 4

Post-Construction Conditions at the Filtration Facility Site

3.1.5 Updated Landscaping Plan

An updated Filtration Facility Site Landscape Plan is attached at **Appendix E**. The updated plan merges the original Landscape Plan (00-LU-302) and related Plant Species and Sizes (00-LU-409), and Planting Details (00-LU-410)) submitted with the original land use application with the Mitigation Plan (00-LU-30M) and Mitigation Planting Details (00-LU-40M) submitted as attachments to the Potential Wildlife Habitat Impacts memo submitted into the record during the post-hearing evidentiary periods. (MC I.96, REC 1810-1811). The updated and merged plan included in Appendix E is described in detail in Section 4, HEP Analysis and Discussion, below.

3.2 Intertie Site

3.2.1 Pre-Construction Habitat

Commercial Nursery Land. The dominant pre-construction land cover or habitat type at the Intertie Site is commercial nursery land adjacent to the SE Lusted Road right-of-way totaling approximately 0.5 acres (**Photograph 5**). Typical habitat conditions are similar as those described for the nursery operations at the Filtration Facility Site and consist of frequent disturbance due to crop rotation/harvesting and management such as irrigation and pesticide/herbicide application. Beaver Creek is located across SE Lusted Road from the Intertie Site.

Photograph 5. Looking east at the proposed Intertie Site on private nursery land (February 15, 2023).

3.2.2 Potential Project Impacts

The Intertie will control the flow of finished water to the water transmission system. The Intertie Site will contain an underground vault, an above-ground operations building, above-ground mechanical equipment, a small, paved area for maintenance vehicles, and landscaping. The Intertie Site will have very limited human presence, but does include noise and light at the Intertie Site.[3]

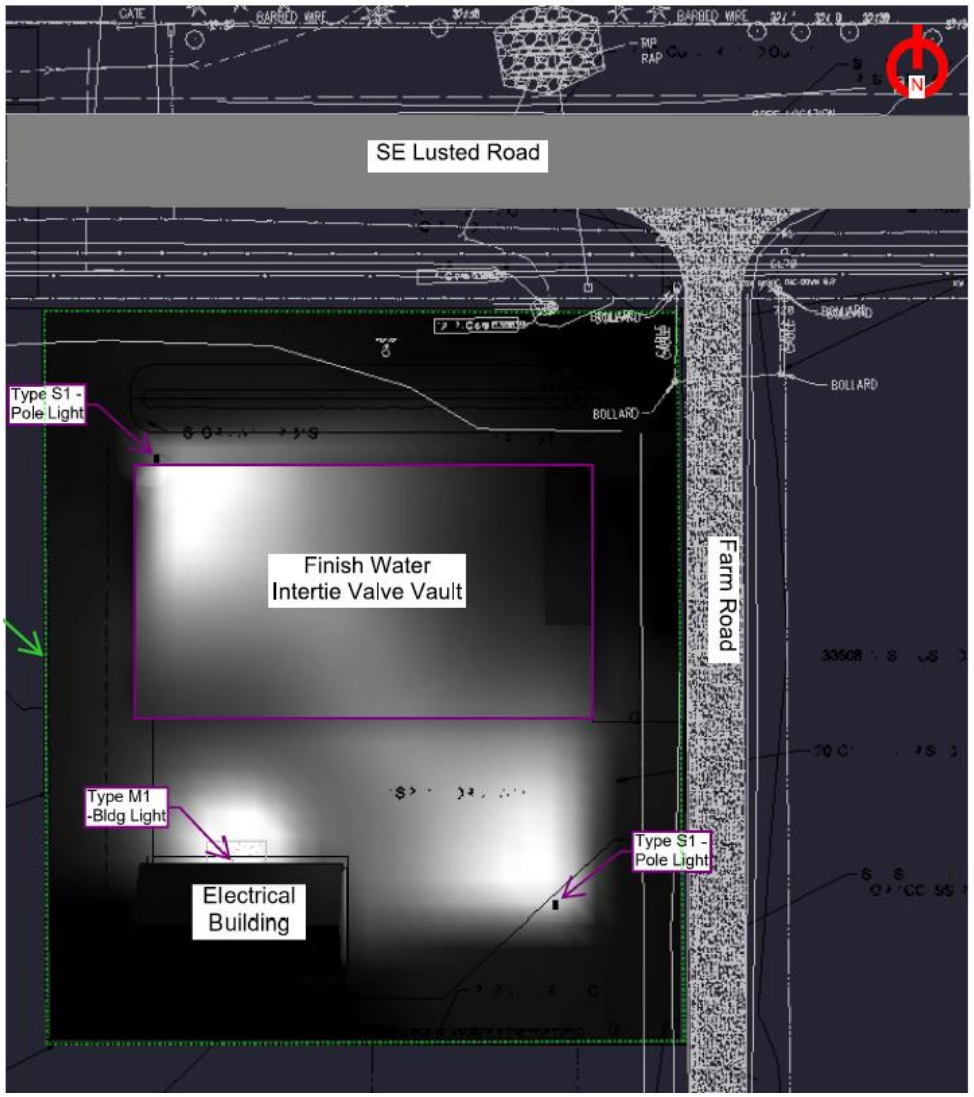
Noise

The Intertie Site will emanate sound, but as described in detail Intertie Acoustical Analysis (MCA.65, REC-6746-6755), the sound is controlled with silenced air inlets and exhaust mufflers. The predicted noise volume for normal operations is limited to 40 to 45 dBa at Beaver Creek, across SE Lusted Road from the Intertie. That level of sound (40 to 45 dBa) is approximately the sound level of a refrigerator hum.

Light

As detailed in the Exterior Site Lighting Analysis Finish Water Intertie Facility (MC A.63, REC-6757-6776), lighting at the Intertie Site will use sharp cutoff lighting. As a result, the Intertie Site will not illuminate areas beyond the facility perimeter and no adverse impacts to wildlife will result. The cutoff lighting also directs lighting to the developed interior of the site to effectively avoid illumination of the landscaped on-site buffer. Refer to the graphic below for a rendition of the proposed lighting.

[3] Potential aquatic habitat impacts in and around Beaver Creek are described in a separate memorandum (BioHabitats 2025).



MC A.63 – Intertie Light Rendering

3.2.3 Post-Construction Habitat

Post-construction, the Intertie Site will include about 0.25 acres of ornamental and native landscaping (primarily tall shrubs) in addition to hard surfaces. The landscaping will provide a combination of screening and wildlife habitat.

3.2.4 Habitat Enhancements

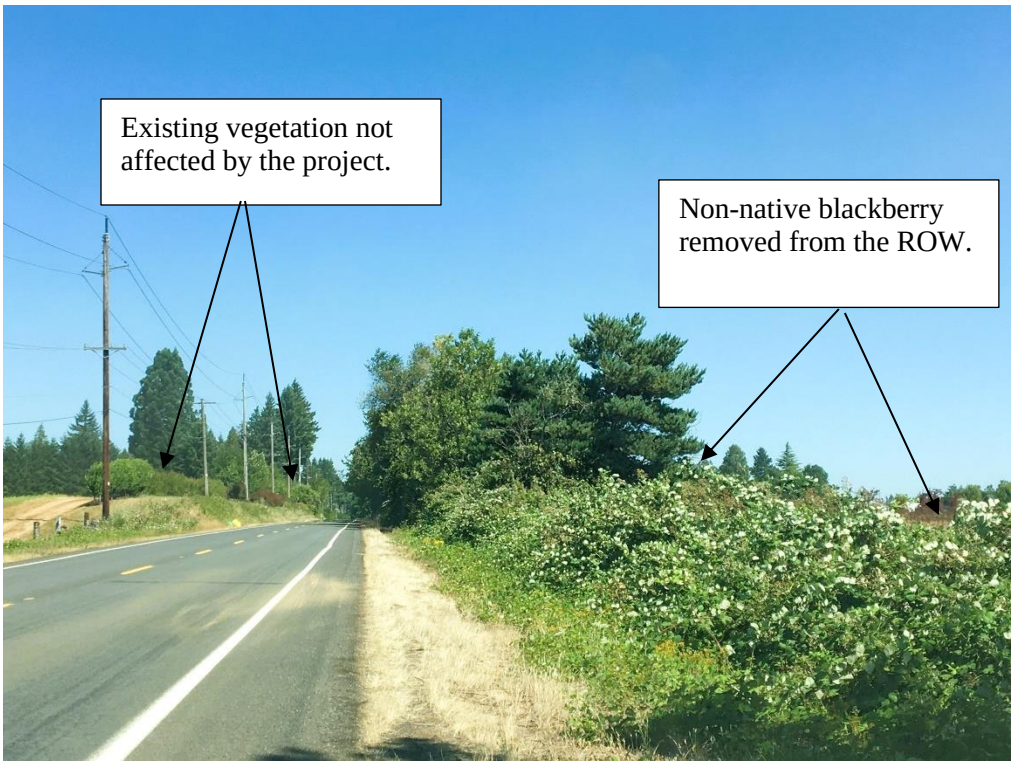
No formal habitat enhancements are proposed for the Intertie Site due to its small size; however, the proposed landscaping will provide some limited habitat functions for a small number of wildlife species. Refer to the HEP results in Appendix B for more details.

3.3 Finished Water Pipelines

3.3.1 Pre-Construction Habitat

Road rights-of-way (ROWs). The dominant land cover or habitat type within the Finished Water Pipeline alignments is road ROWs along SE Dodge Park Boulevard, SE Lusted Road, SE Altman Road, and SE Cottrell Road. Land use along road ROWs consists of commercial nursery land, agricultural land, or rural residences. The ROWs consist of two traffic lanes, narrow graveled shoulders, ditch lines, and, in some locations, rows of shrubs and trees (typically one shrub or tree crown wide [**Photograph 6]**, but occasionally wider where multiple shrubs and young trees have established). Himalayan blackberry and other non-native invasive species are abundant along some sections of ROW [**Photograph 7**].

Photograph 6. A single row of shrubs/trees on the south side of SE Dodge Park Boulevard removed during construction (August 2023)**.**



Photograph 7. Looking east at dense Himalayan blackberry (non-native invasive plant) in the foreground which has been removed from the south side of SE Dodge Park Boulevard (August 2023). Vegetation on the north side of SE Dodge Park Boulevard will not be affected by the project.

One section of ROW along SE Dodge Park Boulevard east of the intersection with SE Cottrell Road had a row of mature trees with shrubs and groundcover (Photograph 8). This section consisted of a continuous band of vegetation for approximately 800 feet on the south side of SE Dodge Park Boulevard.

Photograph 8. Looking west at mature trees and understory which have been removed from the south side of SE Dodge Park Boulevard (April 2023). Vegetation on the north side of SE Dodge Park Boulevard will not be affected by the Project.

An approximate 5-acre section of the Finished Water Pipeline alignment will follow a private nursery farm road. Additionally, an approximate 0.25-mile length of finished water pipeline will be bored under / across the Lusted Hill Facility for local distribution.

3.3.2 Potential Project Impacts

During construction, the proposed project will temporarily impact 11.87 acres of road ROWs and 5 acres of nursery land to install below-ground water pipelines. The pipeline located at the Lusted Hill Facility will be bored and no disturbance to vegetated areas will occur. Construction of the finished water pipelines requires the removal of 337 trees, with the majority of those trees being removed along the south side of SE Dodge Park Road. Following construction and prior to Filtration Facility operation, all temporarily disturbed surface areas along the alignment will be restored using an approved groundcover seed mix. As discussed below, trees removed from the pipeline alignment cannot be replaced within the pipeline easement. The operating, pressurized pipelines are silent. A slight noise could occasionally be heard at air release valves, but this noise will be infrequent and at minimal noise levels.[4]

3.3.3 Post-Construction Habitat

After construction, the finished water pipeline alignments will function the same as pre-construction, with areas of road ROWs, private nursery land, and the Lusted Hill Facility. As noted above, no trees can be

[4] Temporary construction impact to wetland in the Finished Water Pipeline alignment is described in a separate memorandum (Winterbrook 2025).

planted in the road ROWs where the new pipelines are proposed due to potential interference with pipeline integrity. The area of most intense tree removal – in the ROW along the south side of SE Dodge Park Road – will be altered from the pre- to post-construction condition. This change is reflected in the HEP analysis and discussion below. Trees removed within the ROW will be replaced within the Filtration Facility Site at a replacement ratio at or exceeding the 1.5:1 required by an existing condition of approval included in Appendix F.

3.3.4 Habitat Enhancements

Other than revegetation with the groundcover seed mix, no formal habitat enhancements are proposed for the Finished Water Pipeline alignments. The 5-acre portion of finished water pipeline on private land will be returned to pre-construction condition. Because the Lusted Hill Facility pipeline will be bored, limited surface area disturbance will occur and all disturbed areas will be returned to previous conditions following construction. The reasons for not enhancing the ROWs following construction, other than reseeding disturbed areas with suitable grasses and forbs, are as follows:

- The Water Bureau does not own the road ROWs or control vegetation growth or maintenance within the road ROWs in the Project area.
- Tree roots can interfere with pipeline integrity and thus trees cannot be planted over pipelines.
- Road ROWs can be hazardous for wildlife species and people due to the potential for collisions, limiting the habitat quality.
  - Studies estimate the rate of vehicle collisions for passerines[5] at 33 to 100 birds per mile of road per year (Erickson et al. 2005).
  - The UC Davis Road Ecology Center (2024) estimates that more than 48,000 deer and thousands of amphibians are killed every year in collisions with vehicles.

As detailed in the HEP assessment, the loss of the resource value for habitat within the ROW is fully compensated by the increase in habitat values on the Filtration Facility Site. Off-setting the resources that occurred within the ROW at the Filtration Facility Site will provide more habitat benefits in the long-term because vegetation replacement at the Filtration Facility Site will concentrate natural habitats in larger areas that will reduce habitat fragmentation and will reduce the wildlife hazard risk that is posed to humans and animals by enhancing hedgerows within ROWs.

[5] A passerine is any bird of the order Passeriformes, which includes more than half of all bird species.

3.4 Raw Water Pipeline

3.4.1 Pre-Construction Habitat

Mixed Woodland. The dominant land cover or habitat type within the alignment of the Raw Water Pipeline is characterized by mixed woodland, which is a mosaic of tree stands, shrubby areas, and thickets intermixed with small ponds and pastures (**Photographs 9** and **10**). The mixed woodland habitat type includes a small pond (< 0.10 acre) that was originally constructed and stocked with non-native fish to serve as an indicator of water quality in the runoff from adjacent farm fields. The pond is fringed with native and non-native grasses, herbs, and shrubs.

Photograph 9. Facing east near Raw Water Pipeline alignment (February, 2 2024).

Photograph 10. Private property where the Raw Water Pipeline would be bored underground and in a deep tunnel to avoid clearing SEC-h forest on the hillslope (August 2023).

3.4.2 Potential Project Impacts

The Raw Water Pipeline construction will temporarily disrupt mixed woodland on private property but tree removal during construction is limited. Construction activities include removal of a total of 21 trees on the private property. Trees removed along the Raw Water Pipeline alignment are included in the minimum 1.5 to 1 replacement at the Filtration Facility Site. All areas temporarily disrupted during construction will be restored to pre-construction conditions resulting in no post-construction impacts to habitat quality or quantity. Post-Construction Habitat.

After construction, temporarily disrupted areas will be restored to pre-construction conditions and the mixed woodland habitat and wetlands will function as they did prior to construction.

3.4.3 Habitat Enhancements

Limited planting and site rehabilitation to restore pre-construction conditions will occur in the Raw Water Alignment, but no additional habitat enhancements are proposed due to the limited disturbance footprint and avoidance measures that have been incorporated into the project design – namely, a trenchless crossing beneath the pond and tunneling of the raw water line to avoid clearing surface vegetation and trees within the SEC-h forest on the steep hillside.

4. HEP Analysis and Discussion

This section summarizes results from the HEP Analysis (**Appendices A and B**) and identifies the reasoning for concluding that the Project will not adversely affect wildlife habitat.

The HEP is a widely accepted, habitat-based approach for assessing environmental impacts of proposed development projects.[6] The HEP method can be used to document the quality and quantity of available habitat for selected wildlife species and provide a comparison to the relative value of the different areas at a future point in time with the overall goal of quantifying the impact of a proposed project on wildlife habitat. The quality of habitat is represented by the Habitat Suitability Index (HSI), which is then multiplied by the area containing that quality of habitat (both in the pre- and post-construction timeframes) to calculate Wildlife Habitat Units (WHUs). WHUs represent the "value" of an area for wildlife, again, considering both the quality and quantity of that area. WHUs can then be compared for the pre- and post-construction timeframes in order to quantify objectively the habitat changes resulting from the development.

4.1 HEP Analysis – Pre- and Post-Construction Comparison

Habitat quality for representative wildlife species pre- and post-construction are summarized in **Table B-1** and **Table B-3,** and the resulting WHUs when multiplying the habitat quality index by acreage are shown in **Table B-2** and **Table B-4** (Appendix B). Pre- and post-construction conditions within 1,000 feet of the Filtration Facility Site were also evaluated using HEP to determine if noise, light, and an overall change in land use at the Filtration Facility Site would affect wildlife. The 1,000 feet width was conservatively selected because it accounts for relatively large habitat patches suitable for some of the medium to large wildlife species that require extensive habitat (such as the bobcat and Roosevelt elk). Refer to **Tables B-5** to **B-8** (Appendix B) for HSIs and associated wildlife habitat units. The approximate habitat areas are shown in **Figure C-1 (Appendix C).**

Results from the HEP Analysis for pre- and post-construction conditions for the major project components are shown in **Figure 5** and pre- and post-construction conditions for the areas within 1,000 feet of the Filtration Facility Site are shown in **Figure 6**.

WHUs tallied pre-construction and post-construction for the different habitat types are summarized in **Table 1**. Overall, the analysis shows a net gain of about 18 WHU's for the entire Project area and a grand total net gain of about 25 WHUs when accounting for benefits to wildlife habitat off-site. The analysis considers the time period 3 years post-construction and site planting, which is a conservative analysis, as the quality of the extensive areas of added habitat will continue to grow as the landscape matures over the life of the Project. The increase in WHUs for the Project is driven by establishment of native species, increased wooded buffer along the exterior of the Filtration Facility Site, and habitat features such as log/brush piles and bat boxes for breeding/roosting. Although many woody species will have limited establishment by year 3, the native groundcover species and native shrubs proposed will be beginning to provide foraging and breeding benefits for wildlife species. Over time, benefits to wildlife species will continue to increase and the gain in WHUs with the Project will continue to increase as well.

[6] For example, the HEP is used by the U.S. Fish & Wildlife Service to assess the potential impacts of federal projects.

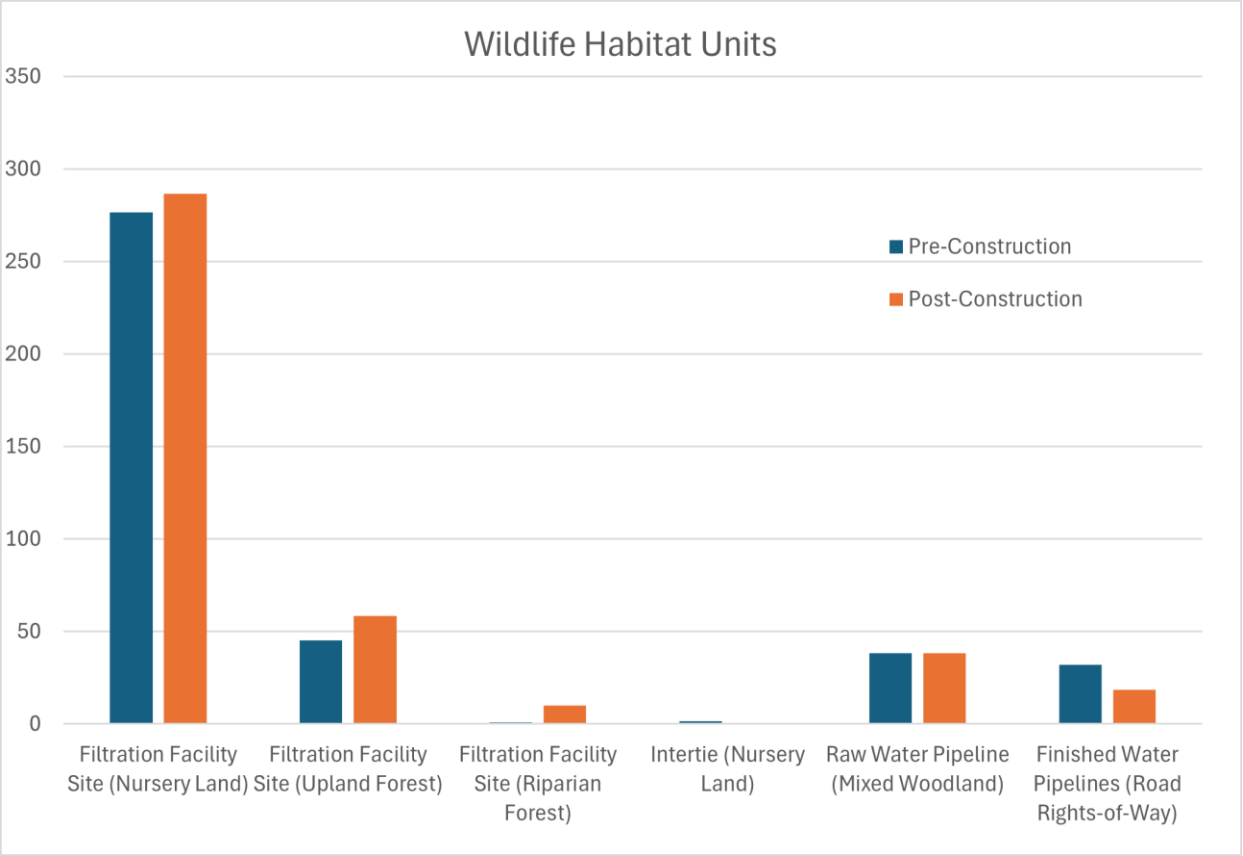


Figure 5

Pre- and post-construction habitat conditions for the major project components show an overall gain in WHU's, despite minor reductions in WHU's along Finished Water Pipelines and the Intertie.

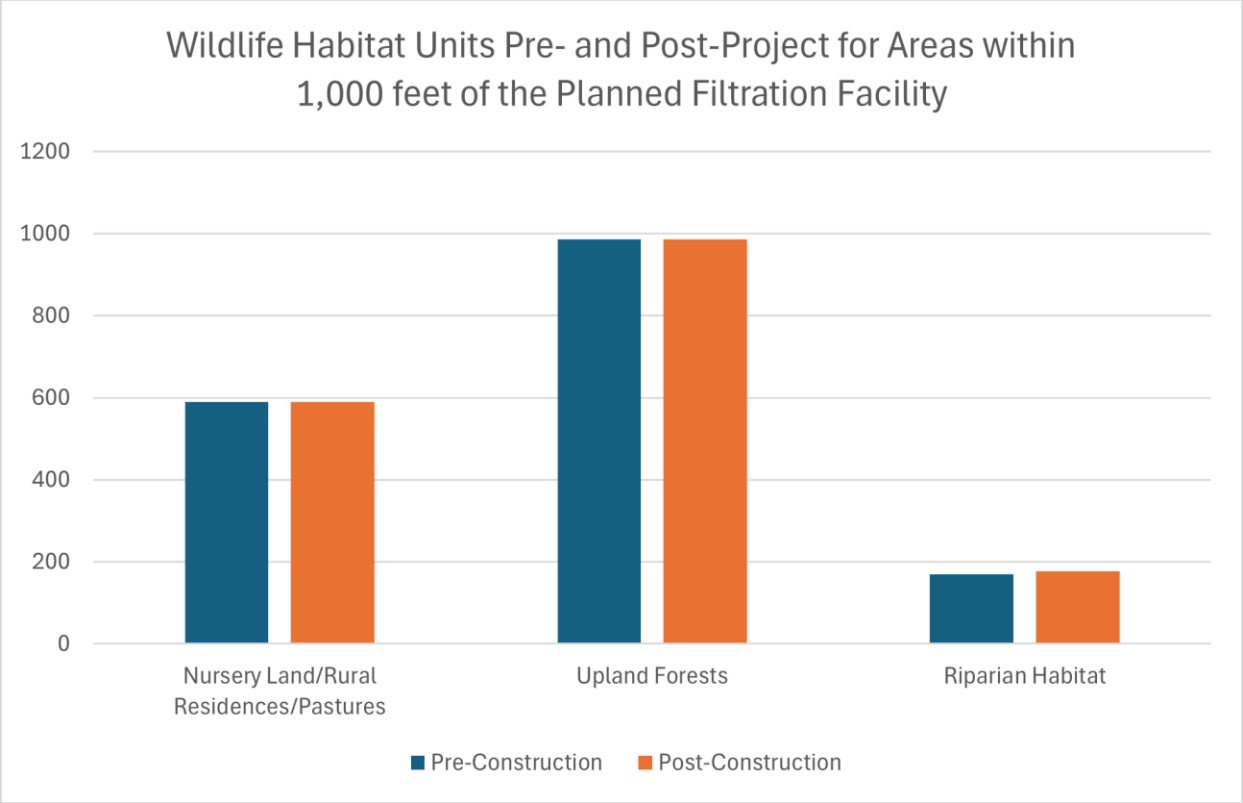


Figure 6
Pre- and post-construction habitat conditions within 1,000 feet of the Filtration Facility Site, showing a slight gain in benefits in off-site riparian habitat due to on-site improvements of movement corridors / red-legged frog refugia.

The HEP results summarized in **Figures 5 and 6** and **Table 1** indicate that the project will not adversely affect wildlife because a net increase in WHUs is expected. This result is largely due to the fact that the existing nursery land provides limited foraging and breeding opportunities for wildlife species, as it is a highly managed landscape with sparse cover and frequent intrusion / disturbance by humans, including harvesting ornamental plants on a 3- to 4-year cycle.

No or limited beneficial habitat features are generally present on commercial nurseries that would provide cover or nesting sites such as tall/complex shrubs or trees, undisturbed brush piles, leaf litter, humus, standing or downed wood, rock piles, or other microhabitats that could be used for denning or refugia. Management activities at commercial nurseries, such as pest control and use of fertilizers, also limit the abundance of rodents that could be taken as prey, thereby limiting the habitat suitability for larger predators such as red-tailed hawks. Soils are anticipated to be heavily altered and generally do not provide underground habitat features such as burrows that could be used by rodents (prey base for red-tailed hawks) or the western bumble bee (breeding habitat).

TABLE 1
PRE- AND POST-CONSTRUCTION WILDLIFE HABITAT UNITS (WHUS) BY HABITAT TYPE

Habitat Types – Pre-Construction	Pre-Construction Conditions		Habitat Types – Post-Construction	Post-Construction Conditions		Change in WHUs post-construction
	Acreage	WHUs		Acreage	WHUs	
Filtration Facility Site (Nursery Land)	89.2	276.52	See below	0	See below	
Filtration Facility Site (Upland Forest)	5.8	45.24		6.8	58.48 **(+)**	
Filtration Facility Site (Riparian Forest)	0.2	0.82		1.9	10.07 **(+)**	
Intertie (Nursery Land)	0.5	1.45		0.5	0.65 **(-)**	
Finished Water Pipelines (Road Rights-of-Way, portion of Nursery Land and Lusted Hill Facility)	16.87	32.05		16.87	18.56 **(-)**	
Raw Water Pipeline (Mixed Woodland)	4.0	38.4		4.0	38.4	
			Filtration Facility Site (Outside the 8-ft fence)	38.6	270.2 **(+)**	
			- Savanna / oak woodland			
			- Woody buffer / hedgerow / grassland			
			- Upland forest / riparian forest			
			Filtration Facility Site (Inside the 8-ft fence)	23.3	16.31 **(+)**	
			- Landscaping			
			- Storm ponds			
Project Totals	**116.57**	**394.48**		**91.97***	**412.67 (+)**	**18.19 (+)**
Indirect Effects (within 1,000 ft) of the Filtration Facility Site	**300**	**1,745**		**300**	**1,752.5 (+)**	**7.50 (+)**
Grand Total	**416.57**	**2,139.48**		**391.97**	**2,165.17**	**25.69 (+)**

NOTES:

* Post-construction acreage is less than pre-construction because hard surfaces within the facility fence are not included in the HEP analysis.

4.2 Discussion

The most substantial change from the Project is the conversion of the approximately 94-acre former commercial nursery operation at the Filtration Facility Site to a mix of land cover types including enhanced natural habitats. Post-construction conditions at the Filtration Facility Site will result in an overall reduction of acreage of impervious surface, but will result in a sizable increase in the habitat quality with the proposed savanna / oak woodland, wooded buffers/hedgerows, and native grassland to be created outside of the Filtration Facility fence.

During Project operation, potential impacts on wildlife habitat due to the Filtration Facility will be negligible for reasons discussed below.

A wildlife movement corridor along the top of the slope will be shielded by a hedgerow of shrubs purposefully placed along the eastern edge of the Filtration Facility Site to create a vegetated buffer between the Filtration Facility and the wooded upland. Trees within the savanna habitat and wooded/shrubby habitat along the western property line will provide additional cover within the enhanced movement corridors.

As described in previous natural resource memoranda (ESA 2023a, 2023b), no direct impacts on the upland forest (includes SEC-h forest) will occur as part of the Project. Indirect adverse impacts from the Filtration Facility operation on adjacent forest lands will also be avoided because:

- The fenced Filtration Facility is concentrated towards the northwest portion of the site. This provides perimeter buffer areas for wildlife movement and an expansive habitat area on the southeast quadrant of the site. The Filtration Facility will be set back more than 100 feet from the top of the forested slope where the existing upland forest is located.
- Noise levels outside of the Filtration Facility fence, including near the eastern site boundary will be similar to or lower than existing background conditions, which are influenced by periodic traffic on SE Dodge Park Boulevard and nearby rural residences. Similar to lighting, species that occur in the Project area are expected to be accustomed to the background noise levels created by surrounding residential use, agricultural activities including tractors and nursery trucks, and passing traffic.
- Although lights will illuminate the parking lot and walkways at the facility and several studies have shown that excessive lighting can negatively affect wildlife behavior (Burt et al. 2023), the project will implement a Dark Sky policy that directs light down and effectively contains light spill to the Filtration Facility area within or directly adjacent to the fence line. Additionally, wildlife species that occur in the Project area are expected to be accustomed to some amount of night lighting from businesses and residences / outbuildings throughout the area with lights that are not shielded.

The planned Filtration Facility will be largely screened from view of wildlife species on the hillslope and traveling along the southern edge of the Filtration Facility Site due to topography and vegetation. Elk, deer, coyotes, raccoons, and the occasional black bear, mountain lion, or bobcat as well as other species observed by residents in the area will continue to use the off-site upland forest (SEC-h forest) as a migration corridor and as foraging and as breeding habitat because minimal sound, light, or human disturbance from the Filtration Facility would be detectable on the slope. The wildlife species present in the Project area are anticipated to already be adapted to human presence which includes vehicular activity and regular farming noise and practices. Species such as the white-crowned sparrow, red-tailed hawk,

black-tailed deer, etc. are adaptable to a variety of conditions, and are expected to return to the Filtration Facility Site once construction is completed.

Studies have shown that vegetative screening decreases the distances at which nesting birds flush, meaning that visually blocking the disturbance (such as pedestrians and other human activity) removes or significantly reduces the disruption response by wildlife (Fernandez-Juricic et al. 2001). There is also evidence that smaller birds such as songbirds are more tolerant than larger birds of human intrusion, especially if escape cover is nearby (Weston et al. 2012). The songbirds that nested on the nursery land at the planned Filtration Facility Site (such as the white-crowned sparrow) were accustomed to human presence (nursery staff and equipment) and will continue to nest in the herbaceous and wooded buffer areas proposed at the facility post-construction.

Temporary impacts from construction of the Project will be offset as a result of the availability of habitat in the Project vicinity. For example, white-crowned sparrows that were observed at the Filtration Facility Site in the spring of 2024 are expected to shift to neighboring land as the facility and pipelines are being constructed. Once habitats at the Filtration Facility Site are established, songbird and other wildlife habitat will be restored and improved above pre-construction conditions.

The Water Bureau will establish dense wooded and vegetated buffers or hedgerows along the perimeter of the Filtration Facility and around the property edges, which will provide cover, foraging, movement corridors, and some breeding opportunities for wildlife species. Just under 40 acres of the planned Filtration Facility Site will consist of native forests and habitats outside the facility fence across the distinct habitat areas identified in Figure 4. and the Filtration Facility Site will also include 16 acres of landscaping within the facility fence. A majority of the perimeter plantings within the facility fence will be dense hedgerows consisting of native herbaceous, shrub, and tree species, with two small areas of ornamental landscaping near the entrance and emergency exits. The landscaping and planting plans, found in Appendix E, show that a wide diversity of native species and habitats will be planted and maintained by Water Bureau staff. The tree and shrub planting approach for the Project is designed to accomplish key ecological and site-specific objectives, including the protection and enhancement of sensitive areas, increasing overall tree and vegetative cover, selecting appropriate species for ecological suitability, and ensuring compatibility with the surrounding landscape. A total of 2,485 trees will be planted at the Filtration Facility Site, in addition to thousands of shrubs and a mixed variety of ground cover. Refer to Appendix G for a summary of the proposed tree plantings by area within the Filtration Facility Site.

In addition to the landscaping originally proposed across the varied habitats on the Filtration Facility Site, during the prior land use review the Water Bureau committed to replacing trees removed during construction at a minimum ratio of 1.5:1, irrespective of the size of the tree removed. As noted in Section 3.1.5, a Mitigation Plan submitted in the prior land use proceeding (MC I.96, REC- 1810-1811)) included additional landscaping areas in the upland forest, riparian forest, and a new hedge row area. The additional trees proposed in these areas are now reflected in the updated Landscape Plan included in Appendix E, and are included in the total tree count of 2,485 trees. The total tree removal during construction for all Project components is expected to be 433 trees. The tree removal includes trees removed along the pipeline alignments (the vast majority within the public ROW), tree removal during road improvement, and limited tree removal on the filtration facility. If the original landscaping trees are

considered in addition to the special planting areas described above, the tree replacement ratio on the Filtration Facility Site for trees removed as part of construction activity would be more than 5.5:1. Beyond tree replacement ratios related to construction activities, the combined effect of the trees and other native shrubs and plantings on the Filtration Facility Site enhance the overall resource and functional value of the Project. A more detailed description of each habitat area and the corresponding habitat value is provided in Appendix C.

The largest habitat area on the Filtration Facility Site is the savanna / oak woodland that will cover almost 30 acres in the southeast portion of the site and contribute to the restoration of an Oregon Conservation Strategy habitat type once prevalent in the Willamette Valley. This includes establishment of Oregon white oak tree and shrub clusters spaced at a distance to create an open oak woodland. In the spaces between tree clusters, a diverse native seed mix using species endemic to the Willamette Valley will be established.

Mowing will be done in the fall/late summer to avoid the peak breeding season to minimize impacts on songbirds that may be nesting in the grassland. That mowing will mimic the disturbance regime of historic savannas that were grazed and periodically burned. Native meadow habitats with their abundant wildflower composition provide essential habitat for numerous insects, birds, and mammals. The space between proposed bunchgrasses will provide crucial nesting areas and cover for wildlife species such as sparrows, voles, and moles. These areas will have an abundance of native wildflowers that provide habitat for pollinators, including bees and butterflies.

5. Conclusions

The HEP analysis shows that the Project will result in a gain in WHUs. This is primarily due to the restoration of native habitats on the Filtration Facility Site, including extensive native shrub and tree plantings. The HEP analysis also considers the additional habitat enhancements described above. The Filtration Facility Site will provide a diversity of vegetation community types and improve wildlife habitat for a multitude of native species compared to pre-construction conditions. Taking into consideration pre-construction conditions and all post-construction habitat impacts and improvements, the author concludes that the Project will not adversely affect wildlife habitat.

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Appendix A

HEP Methodology and Representative Wildlife Species

Habitat Evaluation Procedures (HEP) Methodology and Representative Wildlife Species

The USFWS developed Habitat Evaluation Procedures (HEP) for analyzing the impacts of development on water and land resources (USFWS 1980). The HEP methodology assesses the quality and quantity of available habitat for representative wildlife species. Using HEP, the relative value of habitat at a site before and after project construction can be quantified and compared to determine the impact of land use changes.

In the absence of specific habitat assessment methodology requirements by Multnomah County, HEP was determined to be an appropriate method for comparing the relative quality and quantity of habitat for a range of wildlife species in the project area. No site-specific species presence/absence data are required, and habitat suitability can be evaluated based on the vegetation communities present and land use cover types (e.g., forest land, grassland, etc.).

Standard HEP methods rely on existing habitat models that rate habitat suitability according to a few optimal characteristics; however, this Plan applies a modified HEP approach where habitat suitability is ranked according to expected use of habitats by selected wildlife species that are known or suspected to occur in the project area and vicinity. The following eight species were chosen to represent a range of behaviors, life histories, and habitat needs: little brown bat, bobcat, Roosevelt elk, downy woodpecker, red-legged frog, red-tailed hawk, white-crowned sparrow, and western bumble bee. Because streaked horned larks were not detected in the project area and are a rare species with specific habitat requirements of open grassland and no trees, they were not included as a representative species for the HEP analysis.

Under the HEP evaluation the value of a habitat for a selected species or the value of a community can be described using a Habitat Suitability Index (HSI). This HSI value (which ranges from 0 to 1.0) is multiplied by the area of available habitat to obtain Wildlife Habitat Units (WHUs). The area of pre- and post-project wildlife habitats adjacent to the planned Filtration Facility Site was calculated using aerial imagery and geographic information systems (GIS). The area of the pre- and post-project habitats at the planned Filtration Facility Site was calculated using surveyed parcel boundaries and computer-aided design (CAD).

HSIs for this analysis were formulated according to anticipated use / expected habitat suitability of the different habitat types present in the project area both pre- and post-construction. Scores were generated based on best professional judgment and the author's understanding of the foraging and breeding requirements of the selected species. Conservative assumptions were made for the HSI assignments; meaning, pre-construction conditions were assumed to be at least somewhat favorable for the species if there was any justification or likelihood of occurrence. A summary of the habitat needs for each species. Habitat quality was categorized using the following scale:

0 No or negligible habitat use and/or no habitat suitability.

0.1 Very low and/or degraded habitat suitability.

0.3 Some to moderately low habitat use and/or marginal habitat suitability.

0.7 Moderately high habitat use and/or moderately high habitat suitability.

1.0 High habitat use and/or high habitat suitability.

Habitat use was divided into foraging habitat and breeding habitat to capture a range of uses for the different habitat types. For example, the use / quality of foraging habitat for the little brown bat over the nursery land (pre-construction conditions) was judged to be moderately high (0.7), whereas breeding habitat was judged to be zero (0) due to a lack of suitable hollow trees and/or structures that could be used by breeding females. A few large trees and a couple snags are present in the upland forest edge, and the potential breeding habitat for the wooded areas on the Filtration Facility Site are accounted for under the forest category. With a quantity of 89 acres of nursery land at the Filtration Facility Site, the resulting WHU would be 63 [(0.7 x 90 acres) + (0 x 90 acres)]. By tallying the total WHU pre- and post-project, the gain or loss of WHUs was determined to assess project impacts and inform mitigation measures. An overall gain in WHUs post-project would be interpreted as a gain in habitat suitability for the selected wildlife species, whereas an overall loss of WHUs would indicate that additional habitat mitigation measures may be needed.

Habitat requirements for representative wildlife species and the habitat evaluation criteria used in the HEP analysis are provided below. The focus of the habitat descriptions is on foraging and breeding habitat requirements of each of the eight species.

Little Brown Bat

Little brown bats (*Myotis lucifugus*) can be found in several different types of habitat throughout Oregon, although they appear to prefer forests and wooded areas (Maser 1998). Bats in the *Myotis* genus are the most common bats in Oregon (ODFW 2025b). They feed at dusk over lawns, meadows, forest edges, and over woodlands. Diet includes flies, midges, moths, and beetles. Little brown bats migrate to winter hibernation sites, which typically have high humidity and remain above freezing. They breed in the fall and have delayed fertilization. Young are born in the spring or early summer and can fly after 3 weeks of age. Attics are a preferred location for maternal colonies, as are hollow trees.

Little brown bats are expected to occur in the project vicinity in the forest and wooded habitats. Although they prefer to use human structures for breeding, wooded areas are considered suitable breeding habitat for the purposes of the HEP analysis. Bats will also use constructed boxes for roosting and for establishing maternal colonies. Boxes should be mounted on a high pole or high on a structure and be situated in at least partial sun. Bats are expected to forage for insects over the fields, pastures, waterbodies, and forests in the project area.

Bobcat

Bobcat (*Lynx rufous*) are found throughout Oregon in many different habitat types: montane forest, meadows, riparian areas, rural communities, and occasionally suburban communities that border natural areas. As strict carnivores, their diet consists mainly of small mammals and birds (ODFW 2025c). They will occasionally hunt larger prey such as fawn. Bobcats use a variety of features as den sites, including hollow trees, large brush or log piles, or areas under logs.

Bobcat are presumed to be present in the project vicinity, in large part due to the relatively close proximity of the Sandy River and its extensive riparian forests. No breeding habitat for bobcat is presumed present on nursery lands because of the managed character of the terrain and lack of undisturbed natural features such as large brush piles, hillocks, berms and logs that could potentially serve as den sites.

Roosevelt Elk

Roosevelt elk (*Cervus canadensis roosevelti)* are found primarily on the western slopes of the Coast Range and the Cascade and Blue Mountain Ranges. Roosevelt elk are one of two subspecies of elk found in Oregon, with an estimated population of 59,000 in the state (ODFW 2025d). Foraging habitat consists of pastures, meadows, wetlands, woodlands, dense forests, and riparian habitat. They are strict herbivores that feed on twigs, shrubs, leaves, grasses, forbs, lichen, and fungi. The breeding season or "rut" typically extends from October to December (ODFW 2025d). Gestation lasts about 255 days. Because mating occurs in relatively large groups, breeding habitat is considered a mixture of open habitats with adjacent dense forests and away from human disturbance (including dogs). Roosevelt elk are darker in color than other elk subspecies and the largest in terms of body size, with bulls generally weighing 700–1,100 pounds. Adult bulls join groups of cows and calves only during the rutting season. Cows are at least 2 years old when they give birth to a calf in the spring; twins are a possibility (Maser 1998). Elk calves can stand and nurse within 30 minutes of birth. Predators of newborn calves or sick/injured elk included coyotes, dogs, bears, bobcats, and humans.

Elk have been observed in the project vicinity, although they are presumed to have been deterred from foraging on the planned Filtration Facility Site during daylight hours when nursery operations were running. Statements from neighbors in the record indicate that deer and elk regularly crossed the planned Filtration Facility Site when it was a nursery. Roosevelt elk may possibly be confused with a deer; however, elk are much larger with a heavy mane and larger antlers with the points coming from a single beam unlike those of a mule deer (Ingles 1965). A remnant fence exists along the eastern boundary of the planned Filtration Facility Site and could be a hazard to wildlife and/or a minor impediment to wildlife movement. Elk and deer are often in conflict with homeowners in agricultural or rural communities due to their habitat of browsing in gardens and on landscaping.

Downy Woodpecker

The downy woodpecker (*Picoides pubescens*) is a small, black and white woodpecker native to western Oregon. They nest in cavities in snags and trees and typically select a new cavity each breeding season. They require dead or partially dead trees that are at least 6 inches in diameter at breast height (6 dbh) (USFWS 1983) for breeding habitat. Downy woodpecker nesting habitat consists of mixed deciduous/coniferous woodlands and forests, and riparian forests.

Their diet consists largely of insects (beetles, ants, and caterpillars) although they will eat fruit, seeds, and sap from sapsucker holes. Downy woodpeckers typically feed by digging into bark with their bills to extract insects and will occasionally flycatch to capture insects on the wing (USFWS 1983). Suitable foraging habitat consists of hedgerows, thickets, riparian habitat, and forests. The

male and female will incubate for approximately 12 days and young fledge after 20 to 25 days (Erlich et al. 1988).

Downy woodpeckers are year-round residents in the wooded areas and rural residential yards surrounding the planned Filtration Facility Site.

Northern Red-legged Frog

Red-legged frogs (*Rana aurora*) are a state sensitive / strategy species in Oregon that use streamside vegetation, riparian forests, upland forests and woodlands, as well as dense brush and logs. Red-legged frogs spend many months on land and are able to venture far from ponds (1 to 2 miles) as long as the temperature is not too hot and dry. Foraging habitat consists of natural, dense vegetation with abundant downed wood, leaf litter, and humus for insect productivity. Red-legged frogs are insectivores and the presence of invasive species such as English ivy, English holly – reduce the abundance and diversity of invertebrate prey required by the red-legged frog. The waxy leaves of ivy and holly are inedible to insects and degrade the abundance/availability of food resources. These nuisance plant species threaten the long-term health of the upland forest.

The northern red-legged frog is the largest native pond-breeding amphibian in Oregon. Suitable breeding ponds are at least 2 to 3 feet deep or deeper with aquatic vegetation for oviposition sites and inundation through the spring. Suitable ponds or slow-moving water for breeding habitat needs to have persistent water for at least 5 months. In early spring, adult females lay eggs in jelly-filled sacs that take on the appearance of a grape cluster in shallow still water or slow-moving water. Tadpoles hatch after a few weeks and juvenile frogs disperse into adjacent habitats 2 months later, typically by June or early July. Ideally, breeding ponds have low abundance of predacious fish and the non-native bullfrog, but there is evidence red-legged frogs can tolerate these predators at breeding sites. Stormwater ponds are generally not considered suitable breeding habitat due to the potential presence of toxins and fluctuating water levels.

The small pond(s) located on the property where the raw pipeline is proposed and the small patch of riparian habitat adjacent to the headwaters of Johnson Creek in the southwest corner of the planned Filtration Facility Site provide suitable habitat Northern red legged frogs. The headwater stream(s) are off-site. Downed wood is important as refugia for native amphibians such as the red-legged frog and can provide essential thermal protection during the warm summer months.

Red-tailed Hawk

The red-tailed hawk (*Buteo jamaicensis*) is a bird of prey often seen perched on telephone poles or fences in the open countryside and along roadsides. Red-tailed hawks are adapted to suburban and urban areas, but are most commonly associated with rural terrain, including grasslands, agricultural land, woodlands, riparian areas, and mature forests. They soar and circle above fields and thickets, searching for prey, such as voles, mice, squirrels, and rabbits. Rodents constitute a large portion of the red-tailed hawk diet, although they will take songbirds, pigeons, reptiles, and invertebrates. Red-tailed hawks build large stick nests in the canopy of mature deciduous or coniferous trees. Both adults will incubate eggs, which require approximately 30 days to hatch. The young fledge after about a month and a half and remain with their parents for another several weeks

until fall migration. While some red-tailed hawks are residents in western Oregon, many migrate several hundreds of miles to wintering grounds. Females return to previous nest territories in subsequent breeding years (Ehrlich et al. 1988).

Red-tailed hawks were commonly observed soaring above the planned Filtration Facility Site during 2021 surveys and in subsequent site visits. They are expected to hunt in the fields and commercial nursery land, although the prey base in the commercial nursery areas is expected to be limited due to pest control. No active red-tailed hawk nests have been observed during site visits, but they are likely breeding in the wooded areas along the forested slope east of the planned Filtration Facility Site and potentially in the riparian habitat of Johnson Creek.

White-crowned Sparrow

The white-crowned sparrow (*Zonotrichia leucophrys*) is a small songbird of thickets, fields, shrubland, open wooded lands, gardens, and parks. The female builds a cup nest made of grass, twigs, and leaves either on the ground or in low shrubs and thickets. Up to five or six eggs are laid in the nest, and the young hatch about 12 days after the last egg has been laid. Nestlings are fed a diet of insects, and adults also consume seeds and berries. The young fledge 7 to 12 days after hatching (Ehrlich et al. 1988) and require parental care for another few weeks.

Several white-crowned sparrow pairs were observed during the spring/summer of 2024 at the planned Filtration Facility Site prior to construction mobilization. Potential nesting cover consisted of blackberry brambles, Canada thistle patches, red clover, and tufted grasses among the fallow nursery fields. During previous nursery operations at the Filtration Facility Site, some level of use by white-crowned sparrows is assumed for the HEP analysis but not at the level observed prior to 2024 construction because this was 2 years after nursery operations ceased and is not representative of typical commercial nursery land conditions.

Native Bumble Bee – Western Bumble Bee

The western bumble bee (*Bombus occidentalis)* is an important pollinator of crops and flowering plants (forbs, shrubs, grasses), and was once common throughout Oregon, Washington, northern California, interior western states, and western Canada. Western bumble bees feed on a variety of nectar sources and are considered generalist foragers (Xerces Society 2025). Little is known about the types of burrows needed by bumble bees to successfully reproduce, but recent evidence suggests they will use abandoned rodent burrows and construct nests up to 3 feet below ground (USFWS 2025b). Western bumble bees are declining due to disease, pesticide/herbicide use, and habitat loss.

Appendix B
HEP Data and Results Tables

TABLE B-1
PRE-CONSTRUCTION HSIS FOR THE FILTRATION FACILITY SITE, PIPELINES, AND INTERTIE

	Filtration Facility Site - Nursery Land		Finished Pipelines - Road Rights-of-Way		Filtration Facility Site - Upland Forest		Raw Pipeline - Mixed Woodland		Filtration Facility Site - Riparian Habitat		Intertie (Nursery Land)	
	F	B	F	B	F	B	F	B	F	B	F	B
Little brown bat	0.7	0	0.3	0	1	0.7	1	0.3	1	0.1	0.7	0
Bobcat	0.3	0	0.1	0	1	0.1	0.3	0	0.3	0	0.3	0
Elk	0.3	0	0.1	0	0.7	0	0.7	0.3	1	0	0.1	0
Downy woodpecker	0.1	0	0.3	0.1	1	0.7	1	0.3	0.3	0.1	0.1	0
Red-legged frog	0	0	0	0	0.1	0	1	0.7	0.1	0	0	0
Red-tailed hawk	0.3	0	0.3	0	0.3	1	0.7	0.3	0.3	0.1	0.3	0
White-crowned sparrow	0.7	0.3	0.3	0.3	0.3	0.3	1	0.7	0.3	0.1	0.7	0.3
Native bumble bee	0.3	0.1	0.1	0	0.3	0.3	0.3	1	0.3	0.1	0.3	0.1

NOTES: F – foraging habitat; B – breeding habitat.

TABLE B-2
PRE-CONSTRUCTION WILDLIFE HABITAT UNITS (WHUS) FOR THE FILTRATION FACILITY SITE, PIPELINES, AND INTERTIE

	Filtration Facility Site - Nursery Land (89.2 acres)		Finished Pipelines - Road Rights-of-Way (10.87 acres)		Filtration Fac. Upland Forest (5.8 acres)		Raw Pipe - Mixed Woodland (4.0 acres)		Filtration Fac. Riparian Habitat (0.2 acre)		Intertie (0.5 acre)		WHUs (116.57 acres)
	F	B	F	B	F	B	F	B	F	B	F	B	
Little brown bat	62.44	0.00	5.06	0.00	5.80	4.06	4.00	1.20	0.20	0.02	0.35	0.00	
Bobcat	26.76	0.00	1.69	0.00	5.80	0.58	1.20	0.00	0.06	0.00	0.15	0.00	
Elk	26.76	0.00	1.69	0.00	4.06	0.00	2.80	1.20	0.20	0.00	0.05	0.00	
Downy woodpecker	8.92	0.00	5.06	1.69	5.80	4.06	4.00	1.20	0.06	0.02	0.05	0.00	
Red-legged frog	0.00	0.00	0.00	0.00	0.58	0.00	4.00	2.80	0.02	0.00	0.00	0.00	
Red-tailed hawk	26.76	0.00	5.06	0.00	1.74	5.80	2.80	1.20	0.06	0.02	0.15	0.00	
White-crowned sparrow	62.44	26.76	5.06	5.06	1.74	1.74	4.00	2.80	0.06	0.02	0.35	0.15	
Native bumble bee	26.76	8.92	1.69	0.00	1.74	1.74	1.20	4.00	0.06	0.02	0.15	0.05	
WHUs	**240.84**	**35.68**	**25.31**	**6.75**	**27.26**	**17.98**	**24.00**	**14.40**	**0.72**	**0.10**	**1.25**	**0.20**	**394.48**

NOTES: F – foraging habitat; B – breeding habitat.

HSIs for representative wildlife species following project development at the planned Filtration Facility Site and project components are summarized in **Table B-3,** and the resulting WHUs are presented in **Table B-4**. Foraging habitat is symbolized by the letter "F" in the tables, and breeding habitat is symbolized by the letter "B." Changes to expected wildlife use of adjacent habitats (HSIs) compared to pre-construction conditions are shown in bold with either a (+) or (-), depending on if the value increased or decreased.

TABLE B-3
POST-CONSTRUCTION HSIS FOR THE PLANNED FILTRATION FACILITY SITE, PIPELINES, AND INTERTIE

	Filtration Facility Site – Former Nursery Land (outside the facility fence)*		**Filtration Facility Site – Former Nursery Land (inside the facility fence, excludes hard surfaces)**		**Finished Pipeline - Road Rights-of-Way**		**Filtration Facility Site - Upland Forest**		**Raw Pipeline - Mixed Woodland**		**Filtration Facility Site - Riparian Habitat**		**Intertie (Hard Surfaces and Landscaping)**	
	F	**B**	**F**	**B**	**F**	**B**	**F**	**B**	**F**	**B**	**F**	**B**	**F**	**B**
Little brown bat	**1 (+)**	**0.7 (+)**	0.3	0	0.3	0	1	0.7	1	0.3	1	**0.7 (+)**	**0.1 (-)**	0
Bobcat	0.3	0	**0 (-)**	0	0.1	0	1	**0.3 (+)**	0.3	0	0.3	0	**0 (-)**	0
Elk	0.3	0	**0 (-)**	0	**0 (-)**	0	0.7	0	0.7	0.3	1	0	0.1	0
Downy woodpecker	0.1	0	**0 (-)**	0	**0.1 (-)**	**0 (-)**	1	0.7	1	0.3	0.3	0.3	0.1	0
Red-legged frog	**0.3 (+)**	0	0	0	0	0	**0.3 (+)**	0	1	0.7	**0.3 (+)**	0	0	0
Red-tailed hawk	**1 (+)**	0	**0 (-)**	0	0.3	0	0.3	1	0.7	0.3	0.3	0	**0.1 (-)**	0
White-crowned sparrow	**1 (+)**	**1 (+)**	0.3	**0 (-)**	**0.1 (-)**	**0.1 (-)**	0.3	0.3	1	0.7	0.3	0.1	**0.3 (-)**	0.3
Native bumble bee	**1 (+)**	**0.3 (+)**	0.1	**0 (-)**	0.1	0	**0.7 (+)**	0.3	0.3	1	**0.7 (+)**	0.1	0.3	**0 (-)**

NOTES:

F – foraging habitat; B – breeding habitat.

*Includes Savanna / Oak Woodland habitat; Wooded/Shrubby Buffer; Grassland; and some managed Landscaping areas

(+) indicates an expected increase in habitat suitability compared to pre-construction conditions.

(-) indicates an expected decrease in habitat suitability compared to pre-construction conditions.

TABLE B-4
POST-CONSTRUCTION WILDLIFE HABITAT UNITS (WHUS) FOR THE PLANNED FILTRATION FACILITY SITE, PIPELINES, AND INTERTIE

	Filtration Facility Site – Former Nursery Land (38.6 acres outside the facility fence)*		Filtration Facility Site – Former Nursery Land (23.3 acres inside the facility fence, excludes hard surfaces)		Finished Pipeline - Road Rights-of-Way (16.87 acres)		Filtration Facility Site - Upland Forest (6.8 acres)		Raw Pipeline - Mixed Woodland (4.0 acres)		Filtration Facility Site - Riparian Habitat (1.9 acres)		Intertie (0.5 acres)		WHUs (91.97 acres)
	F	**B**	**F**	**B**	**F**	**B**	**F**	**B**	**F**	**B**	**F**	**B**	**F**	**B**	
Little brown bat	38.60	27.02	6.99	0.00	5.06	0.00	6.80	4.76	4.00	1.20	1.90	1.33	0.05	0.00	
Bobcat	11.58	0.00	0.00	0.00	1.69	0.00	6.80	2.04	1.20	0.00	0.57	0.00	0.00	0.00	
Elk	11.58	0.00	0.00	0.00	0.00	0.00	4.76	0.00	2.80	1.20	1.90	0.00	0.05	0.00	
Downy woodpecker	3.86	0.00	0.00	0.00	1.69	0.00	6.80	4.76	4.00	1.20	0.57	0.19	0.05	0.00	
Red-legged frog	11.58	0.00	0.00	0.00	0.00	0.00	2.04	0.00	4.00	2.80	0.57	0.00	0.00	0.00	
Red-tailed hawk	38.60	0.00	0.00	0.00	5.06	0.00	2.04	6.80	2.80	1.20	0.57	0.19	0.05	0.00	
White-crowned sparrow	38.60	38.60	6.99	0.00	1.69	1.69	2.04	2.04	4.00	2.80	0.57	0.19	0.15	0.15	
Native bumble bee	38.60	11.58	2.33	0.00	1.69	0.00	4.76	2.04	1.20	4.00	1.33	0.19	0.15	0.00	
WHUs	**193.00**	**77.20**	**16.31**	**0.00**	**16.87**	**1.69**	**36.04**	**22.44**	**24.00**	**14.40**	**7.98**	**2.09**	**0.50**	**0.15**	**412.67**

NOTES:

F – foraging habitat; B – breeding habitat.

*Includes Savanna / Oak Woodland habitat; Wooded/Shrubby Buffer; Grassland; and some managed Landscaping areas

Pre- and post-construction effects on wildlife in the vicinity of the planned Filtration Facility Site are presented in **Tables B-5** to **B-8.** Changes to anticipated wildlife use of adjacent habitats (HSIs) compared to pre-construction conditions are shown **in bold** with either a (+) or (-), depending on if the value increased or decreased.

TABLE B-5
PRE-CONSTRUCTION HSIS FOR THE AREA WITHIN 1,000 FEET OF THE FILTRATION FACILITY SITE

	Nursery Land/Rural Residences/Pastures		Upland Forest		Riparian Forest	
	F	B	F	B	F	B
Little brown bat	0.7	0	1	0.7	1	0.7
Bobcat	0.3	0	1	0.1	0.3	0
Elk	0.3	0	1	0	1	0
Downy woodpecker	0.1	0	1	1	0.7	0.7
Red-legged frog	0	0	1	0	1	0
Red-tailed hawk	0.3	0	1	1	0.3	0
White-crowned sparrow	0.7	0.3	0.7	0.7	0.3	0.1
Native bumble bee	0.3	0.1	0.7	0.7	0.7	0

TABLE B-6
PRE-CONSTRUCTION WILDLIFE HABITAT UNITS FOR THE AREA WITHIN 1,000 FEET OF THE FILTRATION FACILITY SITE

	Nursery Land/Rural Residential/Pastures (~ 190 acres)		Upland Forest (~ 85 acres)		Riparian Forest (~ 25 acres)		WHUs (300 acres)
	F	B	F	B	F	B	
Little brown bat	133.00	0.00	85.00	59.50	25.00	17.50	
Bobcat	57.00	0.00	85.00	8.50	7.50	0.00	
Elk	57.00	0.00	85.00	0.00	25.00	0.00	
Downy woodpecker	19.00	0.00	85.00	85.00	17.50	17.50	
Red-legged frog	0.00	0.00	85.00	0.00	25.00	0.00	
Red-tailed hawk	57.00	0.00	85.00	85.00	7.50	0.00	
Song sparrow	133.00	57.00	59.50	59.50	7.50	2.50	
Native bumble bee	57.00	19.00	59.50	59.50	17.50	0.00	
WHUs	**513.00**	**76.00**	**629.00**	**357.00**	**132.50**	**37.50**	**1,745.00**

TABLE B-7
POST-CONSTRUCTION HSIS FOR THE AREA WITHIN 1,000 FEET OF THE FILTRATION FACILITY SITE

	Nursery Land		Upland Forest		Rip Forest	
	F	B	F	B	F	B
Little brown bat	0.7	0	1	0.7	1	0.7
Bobcat	0.3	0	1	0.1	0.3	0
Elk	0.3	0	1	0	1	0
Downy woodpecker	0.1	0	1	1	0.7	0.7
Red-legged frog	0	0	1	0	1	**0.3 (+)**
Red-tailed hawk	0.3	0	1	1	0.3	0
White-crowned sparrow	0.7	0.3	0.7	0.7	0.3	0.1
Native bumble bee	0.3	0.1	0.7	0.7	0.7	0

TABLE B-8
POST-CONSTRUCTION WILDLIFE HABITAT UNITS FOR THE AREA WITHIN 1,000 FEET OF THE FILTRATION FACILITY SITE

	Nursery Land/Rural Residential/Pastures (~ 190 acres)		Upland Forest (~ 85 acres)		Riparian Forest (~ 25 acres)		WHUs
	F	B	F	B	F	B	
Little brown bat	133.00	0.00	85.00	59.50	25.00	17.50	
Bobcat	57.00	0.00	85.00	8.50	7.50	0.00	
Elk	57.00	0.00	85.00	0.00	25.00	0.00	
Downy woodpecker	19.00	0.00	85.00	85.00	17.50	17.50	
Red-legged frog	0.00	0.00	85.00	0.00	25.00	7.50	
Red-tailed hawk	57.00	0.00	85.00	85.00	7.50	0.00	
Song sparrow	133.00	57.00	59.50	59.50	7.50	2.50	
Native bumble bee	57.00	19.00	59.50	59.50	17.50	0.00	
WHUs	**513.00**	**76.00**	**629.00**	**357.00**	**132.50**	**45.00**	**1,752.50**

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Appendix C
HEP Assumptions

HEP Assumptions

In general, foraging habitat scores higher on the HSI scale (0 to 1) for most species compared to breeding habitat because feeding is not restricted to a specific site and many of the species are generalist foragers that can adapt to various environments.

Assumptions of pre-construction conditions in the nursery land located within the project footprint consider the fact that the landscape is or has been a highly managed commercial operation with frequent human presence during the day and occasionally at dawn and dusk. The sparse growth patterns of the nursery stock and periodic harvesting limit foraging and breeding opportunities. Consequently, the nursery land at the planned Filtration Facility and a section of pipeline as well as the Intertie rated low to moderately low for most foraging and breeding opportunities for the selected wildlife species (**Table B-1, Appendix B**). Exceptions include HSIs for foraging habitat for the little brown bat and white-crowned sparrow, which are expected to be relatively high (0.7) given the likelihood of insect outbreaks on nursery land despite control of insects using pesticides/herbicides/miticides (Table B-1, Appendix B). As a conservative measure, the analysis assumes a higher suitability of foraging habitat for the bat and sparrow than likely existed in the nursery fields.

The soils of nursery land would provide only low or limited breeding sites for the western bumble bee, which requires deep burrows underground. Soils are expected to be frequently disturbed, compacted, and occasionally lined with plastic for easier removal of nursery stock. Consequently, few to no opportunities for wildlife that require burrows are available at the nursery land. This includes the red-legged frog, which can use burrows as thermal cover during summer months. Prey species (mice, voles, moles, etc.) for the red-tailed hawk also require burrows for necessary life functions.

In contrast to nursery land, the upland forest on the planned Filtration Facility Site was assumed to provide higher quality foraging and breeding opportunities for the selected wildlife species, with some exceptions. A higher rating for many of the focal species is based on the complexity of the habitat structure (which has multiple canopy layers), a preponderance of native shrub and tree species, and downed wood and snags that provide nesting and denning sites. Limitations of the upland forest include the presence of English ivy and English holly in the understory of the upland forest on-site is assumed to lower the value foraging habitat for the red-legged frog and the western bumblebee. For the red-legged frog, ivy smothers native groundcover species and tree trunks and reduces the abundance of insects and other invertebrates due to the inedibility of the waxy leaves. Extensive mats of ivy exclude native groundcover species which reduces the nectar sources for pollinators including the bumble bee. Although deer and elk are known to browse on English ivy, it is not a preferred food source and is typically eaten when other food sources are not available.

Additional assumptions include limited habitat opportunities in the ROWs due to the narrow width of vegetation, expected high predation rate (for white-crowned sparrows) due to high habitat fragmentation, frequent disturbance by traffic, and occasional maintenance activities conducted along the roadways such as vegetation trimming and spraying.

Pre-construction conditions within 1,000 feet of planned Filtration Facility Site are also evaluated using HEP to determine if noise, light, and an overall change in land use at the facility would affect adjacent

wildlife. The 1,000 feet width was conservatively selected because it accounts for relatively large habitat patches suitable for some of the medium to large wildlife species that require extensive habitat (such as the bobcat and Roosevelt elk). The 1,000-foot width also captures the dispersal distance exhibited by smaller species like the red-legged frog which can cover distances of a mile or more post-breeding. Continuous natural cover such as along vegetated stream corridors are generally preferred by the red-legged frog for dispersal. Refer to Tables B-3 and B-4 (Appendix B) for HSIs and associated wildlife habitat units. By increasing red-legged frog foraging and dispersal habitat on-site, the off-site red-legged frog breeding habitat located approximately 1,000 feet to the west of the southwest corner of the Filtration Facility Site is expected to be improved. The approximate habitat areas are shown in **Figure C-1**. Nursery land also includes rural residential yards and associated pastures.

Figure C-1
Habitat/Land Cover within 1,000 feet of the Planned Filtration Facility

Post-construction HEP Analysis—Results and Assumptions for the Filtration Facility Project

Post-construction habitat conditions for the planned Filtration Facility and post-construction pipeline include the categories listed below (as shown in Figure C-1). Several new habitat types are proposed for creation as part of the project because the approximate 94 acres of nursery land have been / are being converted to a planned Filtration Facility with landscaping and restored natural areas. A summary of pre-

and post-construction habitat / land cover types, acreages and management regimes is also included in Appendix A.

- **Upland Forest – Mixed Hardwood Forest** (a portion is SEC-h forest) (6.8 acres on the Filtration Facility Site, expanded with additional plantings from 5.8 acres and approximately 80 acres off-site to the north, east, and south within 1,000 feet of the facility) – This habitat on-site and along SE Dodge Park Boulevard provides habitat for small to medium mammals, birds, and ungulates. Forest canopy is critical to providing clean air and filtering surface water. Forests also provide habitats for pollinators, which are essential in the reproduction of many flowering plants. Mature canopy is retained during the course of the project. This off-site forested area will remain undisturbed.
- Savanna / Oak Woodland (roughly 29 acres) – This area is entirely contained within the former nursery land. The restoration design of this area was focused on providing oak woodland and savanna, which includes a mix of Oregon white oak (Quercus garryana) and native shrub clusters, intermixed with native prairie herbaceous plants (Appendix B). Oak woodlands and savannas are one of the most imperiled habitats in Oregon, with the greatest loss occurring in valley bottoms and foothills due to impacts such as conversion to agriculture, development, and invasive plant species. Oak savannah/meadow habitats are important to migratory songbirds, particularly neotropical migrants. They provide important stop-over habitat for birds migrating through the region. There are other important habitat benefits of this rare plant community. Oregon white oaks provide nest cavities for birds such as kestrels that hunt the grasslands, as well as produce abundant acorns used by both birds and mammals such nuthatches, acorn woodpeckers, and western gray squirrel. Many invertebrates, including various moths, butterflies, gall wasps, and spiders, are found exclusively in association with this oak species. Native meadow habitats within the savanna include abundant wildflower composition and provide essential habitat for numerous pollinators, birds, and mammals. The space between the grasses also provides crucial nesting areas and cover for wildlife species such as the western meadowlark.
- **Grassland** (about 5 acres on the Filtration Facility Site) – Two relatively small areas of grassland are proposed as firebreaks – one strip will be adjacent to the riparian forest in the southwest corner and one between the upland forest and the Filtration Facility in the northwest corner of the site. The groundcover will consist of native grassland species and will support limited foraging and breeding habitat for songbirds, including the white-crowned sparrow, spotted towhee, dark-eyed junco, etc. Small mammals are anticipated to take cover in these narrow strips of grassland.
- **Riparian Forest** (1.9 acres on the Filtration Facility Site, expanded with proposed plantings from 0.2 acre and about 25 acres of adjacent Riparian Forest within 1,000 feet to the west and south of the Filtration Facility Site). The on-site area contains wooded riparian forest and agricultural land that is in the process of being restored to native riparian buffer. The land falls within the 200-foot setback of the headwaters of Johnson Creek (located off-site). Restoration and management activities in the area include dense native plantings, installation of willow wattles and live stakes, and care of those areas including watering during summer months and manual/mechanical control of invasive species. Riparian areas are important in stabilizing stream temperatures, reducing runoff, and maintaining valuable habitat for a variety of wildlife. This area will also provide connectivity with native plantings through the property outside of the planned Filtration Facility fence.

- **Wooded/Shrubby Buffer and Hedgerows** (about 6 to 7 acres on the Filtration Facility Site) – These areas are entirely contained within the former nursery land. Throughout the edges of the parcel and around the Filtration Facility fence, dense plantings have been designed to minimize sound and light impacts on adjacent natural areas and provide functional habitat for wildlife. Some of these areas are shrub-dominated hedgerows, while others are dense tree stands with native shrubs mixed in. Hedgerows provide wildlife corridors for birds, mammals, and insects to move freely to adjacent natural areas. They are also important nesting habitats for birds and provide food and shelter for pollinators.
- **Interior Hard Surfaces** (about 14 acres) – Includes buildings, paved walkways, and asphalt paving for parking lots – non-vegetated hard surfaces with no habitat value. For the purposes of habitat assessment, interior hard surfaces were excluded from the HEP analysis.
- **Interior Landscaping** (~ 16 acres) – A mix of ornamental and some native shrubs will be planted in a few pockets near buildings and along walkways. Lawn will be established adjacent to parking areas and facility buildings to minimize fire danger.
- **Interior Stormwater Ponds** (~ 5 acres) – Stormwater ponds are designed to capture surface water on-site and infiltrate or slowly treat stormwater. These are designed with native shrub, sedge, and grass plantings. Stormwater ponds will improve water quality by removing pollutants and increasing groundwater recharge, and are also valuable habitats for birds and aquatic wildlife and insects.

Post-construction habitat conditions were rated based on the following assumptions and are based on the planting plans presented in **Appendix E**:

- The largest habitat category proposed for the Filtration Facility Site is a savanna /oak woodland to be planted with native herbaceous species and periodically mowed. At least 20 native forb and grass species endemic to Willamette Valley prairies and meadows will be seeded and are anticipated to achieve substantial cover by Year 3 post-seeding. The cover in the native meadow will provide numerous foraging and breeding opportunities for the white-crowned sparrow and other songbirds like the Lazuli bunting and savannah sparrow.
- Vegetation cover within the fenced facility was considered to have little to no habitat quality, except for the little brown bat, white-crowned sparrow and western bumblebee that are expected to fly over the 8-foot high fencing and access plants for foraging opportunities. No breeding opportunities for wildlife species are assumed within the facility fence for the purpose of providing a conservative analysis.
- Changes to the on-site upland forest would include enhancement of the understory due to replacement of English ivy and English holly with native shrub and tree species where existing native vegetation is lacking. Other changes include the establishment of a dense band of evergreens to provide cover in the future for wildlife species like bobcat, deer and elk. Habitat conditions were considered 3 years after planting; therefore, cover benefits for deer and elk would likely occur more than 3 years post-construction.
- The installation of 5 bat boxes will improve breeding habitat for the little brown bat at the Filtration Facility Site and contribute to the overall increase in wildlife habitat value. Two bat boxes are proposed in the savanna / oak woodland, 1 bat box is proposed in the area where enhanced riparian forest plantings are planned, 1 bat box is proposed in the wooded/shrubby buffer, and one bat boxes

proposed in the existing upland forest. Breeding sites are a limiting factor for bats as standing dead trees are often removed as hazard trees and maternal colonies in attics/buildings are not often tolerated.

- Log/brush piles proposed for the wooded/shrubby buffer along the western facility perimeter will provide foraging sites and cover that will benefit a multitude of wildlife species, including the red-legged frog, bobcat, downy woodpecker, western bumblebee, white-crowned sparrow, and red-tailed hawk.
- A section of remnant fencing at the filtration facility site will be removed to improve wildlife movement corridors that will be established around the perimeter of the facility.
- Because of the linear, highly fragmented, and small sizes of the habitat types along the finished water pipelines (road ROWs) and Intertie, limited foraging and breeding opportunities are expected pre- and post-construction. Slightly fewer opportunities would be available at the Intertie post-construction because a portion of the site would consist of hard surfaces; however, the Intertie represents a very small portion of the larger nursery land cover type in the vicinity. The pipeline easement on private nursery land will be returned to pre-construction conditions and no loss of existing wildlife value would occur.
- A grass seed mix will be used to restore/rehabilitate areas where vegetation has been / will be removed within road ROW and is expected to provide limited to moderately low or foraging opportunities for the little brown bat, bobcat, white-crowned sparrow, downy woodpecker, and the western bumble bee. Overall, habitat quality will be slightly to somewhat reduced in the road ROW; however, these reductions in habitat quality will be off-set by the extensive native plantings proposed at the planned Filtration Facility Site.

Appendix D

Pre- and Post-Construction Habitat Summary and Management

TABLE D-1
COMPARISON OF PRE- AND POST-CONSTRUCTION HABITAT STRUCTURE AND MANAGEMENT STRATEGIES PER LAND COVER TYPE

	Pre-Construction Conditions			Post-Construction Conditions		
Habitat Types	**Acres**	**Habitat Description**	**Nursery Management Strategies**	**Acres**	**Habitat Description – 3 years after initial planting**	**Proposed Management Strategies**
Filtration Facility Site (Nursery Land)*	89.2	Commercial field-grown ornamental shrubs and trees; areas of bare soil, high-density cloned plantings – spindly shrubs with limited cover.	Daily/weekly plant care including pesticide/herbicide/rodenticide application, staking; periodic harvesting (early spring/fall every 3 to 4 years), and tilling.	0	Inside facility fence will be high-density ornamental perennial shrubs that will be permanent. Outside the fence, there will be developing native hedgerows and clusters, oak savanna, and native prairie referred to below as savannah/oak woodland, riparian habitat, and wooded/shrubby buffer.	Same as pre-construction without harvesting or tilling. no use of herbicides or pesticides.
Finished Water Pipelines (Vegetated portions of the Road Rights-of-Way)	16.87	• Altman Road – 45' ROW, mix of shrubs/trees. • Lusted Road – 60' ROW, mix of shrubs/trees. • SE Dodge Park Blvd – 60', mix of shrubs/trees. • SE Cottrell Road – 60' ROW, mix of shrubs/trees.	Maintained by the County – including annual or periodic spraying for weeds; periodic trimming to maintain road visibility.	16.87	Disturbed areas within the ROWs are temporarily seeded with poco barley and a native grass mix. The purpose of reseeding in the ROW is to prevent erosion and add vegetative cover to prevent establishment of weeds.	Same as pre-construction.
Upland Forest (includes some off-site SEC Forest**)	5.8 on-site; ~ 85 off-site	Multi-layered mature forest, primarily native tree, shrub and groundcover species. Mixed hardwood and conifer with extensive invasion of English ivy and holly.	Little to no management.	6.8 on-site	An additional 173 trees along the eastern edge of the Filtration Facility and the western edge f the SEC-h boundary and reduced invasive ivy within the established forest on the Filtration Facility Site.	Same as pre-construction, with the exception of additional maintenance and monitoring of the expanded shrub/tree plantings along the SEC forest interface and removal of invasive English ivy from trunks of trees.
Mixed Woodland (Raw Water Pipeline)	4	Mix of open deciduous woodland and shrub land – mostly native species such as Oregon ash. Includes a perennial pond (~2 to 6 feet deep) with native and non-native emergent vegetation.	Period mowing of groundcover and trimming of woody vegetation that blocks vehicles conducted by the landowner.	4	Similar to pre-construction condition.	Same as pre-construction.
Riparian Habitat (Includes SEC Water Resource)	--	Multi-layered mature forest, primarily native tree, shrub and groundcover species; and agricultural field.	Daily/weekly plant care including pesticide/herbicide/rodenticide application, staking; periodic harvesting (early spring/fall every 3 to 4years), and tilling.	1.9	Diversity of native shrubs and trees tolerant of a variety of moisture regimes and sun exposure to establish a dense canopy of woody plant material adjacent to Johnson Creek headwaters.	Minimal management, with the exception of spot-spray of non-native invasive plants; watering as needed during establishment.
Intertie (Nursery Land)	0.5	Areas of bare soil, high-density ornamental shrub plantings – spindly shrubs with limited cover.	Same as above (First Row)	0.5	Developed utility with ornamental landscaping.	Less daily/weekly landscaping care with the proposed plantings.
Savanna / Oak Woodland (Outside facility fence)	--	NA	NA	29.3	Diverse mix of native forbs (9 species), grasses (7 species), shrubs, and trees. Groundcover species will include pollinator-friendly native prairie species. Additional benefits: • Using local ecotypes of native seeds for adaptability. • Wide diversity of forbs to capture range of blooming periods. • Variety of flower colors and shapes to increase habitat value.	• Fall mow to minimize impact on pollinators. • Mow rotationally during fall months to minimize impact on pollinator larvae. • Fall mow will allow maximum native forb seed set and will minimize impact on nesting birds.
Grassland (Outside facility fence)	--	NA	NA	3.5	Mixed native grass species; plant heights up to 2 feet to provide cover; periodic mowing.	Fall mowing.
Wooded / Shrubby Buffer* (Outside facility fence)	--	NA	NA	6.3	Dense woodland with diverse shrubs and trees.	Plantings will be dense so that mowing will not be conducted in these areas or will be limited.
Hard Surfaces (Inside facility fence primarily)	--	NA	NA	~ 14	No vegetation – no habitat features.	NA
Interior Landscaping	--	NA	NA	15.7	Mix of ornamental shrubs (mostly evergreen) and small trees with perennial groundcover – mostly non-native species.	Weekly to monthly maintenance of plantings including occasional invasive removal, line trimming, and maintenance of irrigation system.
Stormwater/Overflow Basins (Inside facility fence primarily)	--	NA	NA	~ 6	Intermittent ponding; some plant materials.	Periodic replanting; removal of sediment.
Totals	**116.97**	NA	NA	**~ 92**		

* Includes ~ 1 acre of landscaping along the exterior of the planned Filtration Facility lumped with the Wooded/Shrubby Buffer because of proximity and similar structure.

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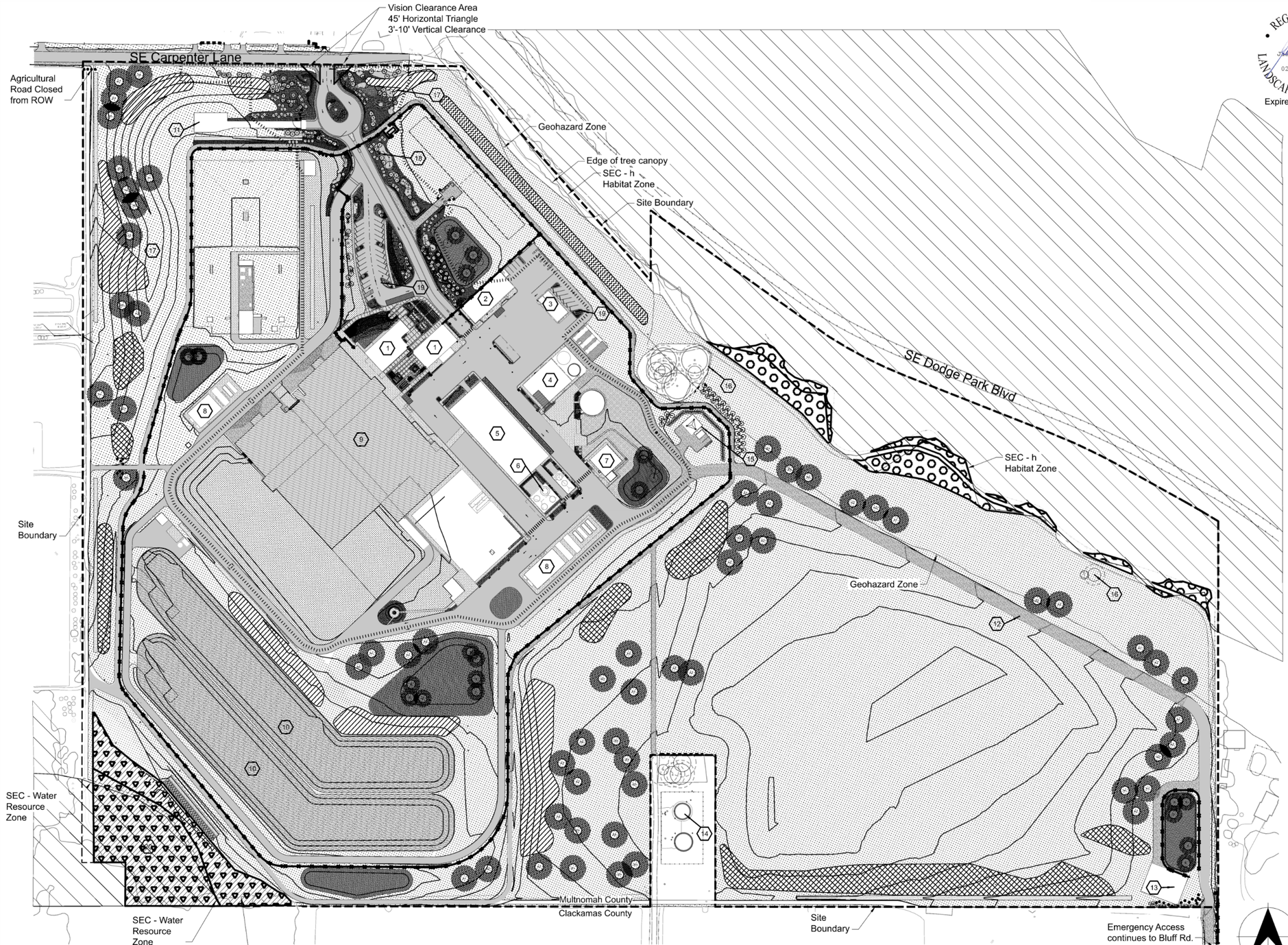
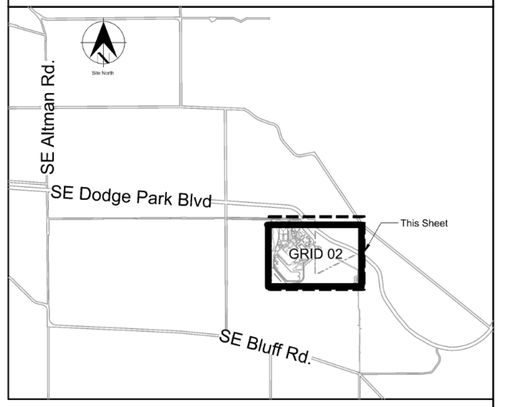
Appendix E
Planting Plans



PLAN
SCALE: 1" = 120'-0"

REGISTERED LANDSCAPE ARCHITECT
0821
JASON HIATT
OREGON
02/20/2014
Expires: 02/28/26

KEY PLAN



Sheet Keynotes

1. Administration Building
2. Maintenance Building
3. General Storage Building
4. Mechanical Dewatering Bldg.
5. Chemical Building
6. Chemical Storage Tanks
7. Washwater Clarification
8. Electric Building
9. Filtration Basins
10. Overflow Basins
11. Pleasant Home Pumpstation
12. Emergency Access Route
13. Raw Water Pipeline Cover (At-Grade)
14. Pleasant Home Water Towers (Off-Site)
15. Communication Tower Area (See Planting Note 1)
16. Existing Trees to Remain
17. Planted Berm for Screening
18. Plantings at Facility Entry (See Planting Note 2)
19. Parking Area plantings (See Planting Note 3)
20. SEC Water Resource Area (See Planting Note 4)

Planting Notes

1. Communication Tower Area planting is designed to meet screening and parking requirements. See sheet LU-403 for enlargment and more detail on specific requirements.
2. Plantings around facility buildings are of a more ornamental nature and are proposed as containerized plants which will have supplemental irrigation. See sheet LU-400,401 and 402 for enlargements to see plant sizes and locations in this area. Additional seeded areas shown within facility also may recieve supplemental irrigation as a fire risk mitigation measure. See outlined area.
3. Parking Area plantings - See sheets LU-400 and LU-402 for enlargments to see locations of parking islands with plant sizes to meet parking lot planting requirements and listed by Multnomah County.
4. SEC Water Resource Area - This area is currently under agricultrual use and has bare soil. Proposed plans have no additional disturbance within this zone. Proposed plantings to be all native species installed with hand tools only.

General Sheet Notes

1. No development or construction activity proposed within SEC zones on Filtration Site. Native plantings only within these zones.

Legend

- Asphalt Paving
- Concrete Paving
- Gravel Paving
- Basins
- Facility Fenceline
- Areas to recieve supplemental irrigation
- Native Grass / Forb Mixes
- Upland Forest Planting Area
- Riparian Forest Planting Area
- Hedgerow Planting Area
- Swale Planting
- Stormwater Planting
- Screen Mix: Forested Planting
- Screen Mix: Shrubby Planting
- Tree / Shrub Planting Clusters
- Proposed Trees - Deciduous and Evergreen
- Landscape Bed - Shrubs, Groundcover, Mulch
- Existing tree to remain
- Significant Environmental Concern (SEC) Zone

THIS DRAWING IS AN UPDATE TO 00-LU-306. SEE DRAWINGS 00-LU-409, 00-LU-410, AND 00-LU-411 FOR PLANTING INFORMATION.

No	Date	Description	Appd
CF	05/10/24	For Conformed Documents	MRG
Survey			

Revision

Stantec

Designed By	Design Mgr	LSH
Drawn By	Const Mgr	TG
Checked By	CM/I Engr Mgr	JB
Project Mgr	Date 05/10/24	MRG

Warning
0 1/2 1
If this bar does not measure 1" then the drawing is not to scale

PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

David W. Peters, Engineering Manager, PE No 16683 — Date

CITY OF PORTLAND, OREGON 1851

Bull Run Filtration Facility
Land Use Plans
Landscape Plan

SAP Project No W02229
1/4 Section -
Sheet No 00-LU-306
of

Plot Date: 11-APR-2025 11:55 User: jason File: W02229-FF-00-LU-306.dgn Model: Layout1 ColorTable: user attached from dialog DesignScript: PWB_PenTable.pen PlotScale: 1:0.0833333

Individual Plants

Managed Landscape Areas		
Botanical Name	**Common Name**	**Plant Size**
Trees		
Alnus rhombifolia	White Alder	1.5" Cal.
Calocedrus decurrens	Incense-Cedar	5' Height
Nyssa sylvatica	Tupelo	1.5" Cal.
Pinus contorta var. contorta	Shore Pine	5' Height
Pinus ponderosa var. benthamiana	Pacific Ponderosa	5' Height
Pseudotsuga menziesii	Douglas-fir	1.5" Cal.
Quercus garryana	Oregon White Oak	1.5" Cal.
Quercus garryana	Oregon White Oak	2" Cal.
Rhamnus purshinana	Cascara	1.5" Cal.
Thuja 'Hogan'	Hogan Western Red Cedar	8' Height
Thuja plicata	Western Red Cedar	5' Height
Thuja plicata	Western Red Cedar	8' Height
Sub-Trees (10-15')		
Acer circinatum	Vine Maple	15 Gal.
Amelanchier alnifolia	Wester Service Berry	15 Gal.
Large Shrubs (5-10')		
Garrya elliptica	Silk Tassle Tree	5 Gal.
Myrica californica	Pacific Wax Myrtle	5 Gal.
Rubus parviflora	Thimbleberry	1 Gal.
Viburnum trilobum	American Cranberry	1 Gal.
Small Shrubs (2' - 5')		
Cornus 'Kelseyi'	Kelsey's Dogwood	1 Gal.
Mahonia aquifolium 'Compacta'	Compact Oregon Grape	1 Gal.
Mahonia nervosa	Cascade Oregon Grape	1 Gal.
Mahonia 'Soft Caress'	Soft Caress Mahonia	5 Gal.
Philadelphus lewisii 'Snow Dwarf'	Dwarf Mockorange	1 Gal.
Polysticum munitum	Western Sword Fern	5 Gal.
Spiraea betulifolia var. 'Tor'	Birchleaf Spirea	1 Gal.
Vaccinium ovatum	Evergreen Huckleberry	5 Gal.
Herbaceous (perennials, ferns, grasses)		
Achillea 'Moonshine'	Moonshine Yarrow	1 Gal.
Aesclepias speciosus	Milkweed	1 Gal.
Aquilegia columbiana	Columbine	1 Gal.
Calamgrostis nutkatensis	Pacific Reedgrass	1 Gal.
Deschampsia 'Goldtau'	Gold Dew Tufted Hairgrass	1 Gal.
Helleborus argutifolia	Corsican Hellebore	1 Gal.
Iris douglasii	Douglas Iris	1 Gal.
Lupinus polyphullus	Big-Leaf Lupine	1 Gal.
Sidalcea campestris	Checker Mallow	1 Gal.
Tellima grandiflora	Fringecup	1 Gal.
Groundcover (12" or less)		
Arctostaphylos 'Vancouver Jade'	Vancouver Jade Bearberry	1 Gal.
Carex flacca	Grey Sedge	1 Gal.
Fragaria chiloensis	Beach Strawberry	1 Gal.
Mahonia repens	Cascade Oregon Grape	1 Gal.
Sedum spathifolium	broadleaf sedum	1 Gal.
Sedum oreganum	oregon sedum	1 Gal.

Unmanaged Landscape Areas		
Botanical Name	**Common Name**	**Plant Size**
Pinus contorta var. contorta	Shore Pine	5' Height
Pinus ponderosa var. willamettenesis	Willamette Valley Ponderosa Pine	5' Height
Pseudotsuga menziesii	Douglas Fir	5' Height
Quercus garryana	Oregon Oak	2" Cal.

Groundcover Mix - See sheet 00-LU-410 for layout details

Extended Area Groundcover				
Legend	**Botanical Name**	**Common Name**	**Plant Size**	**% Composition**
	Arctostaphylos 'Vancouver Jade'	Vancouver Jade Bearberry	1 Gal.	33%
	Carex flacca	Grey Sedge	1 Gal.	33%
	Fragaria chiloensis	Beach Strawberry	1 Gal.	34%

Screening Planting Mixes - See sheet 00-LU-410 for layout details

Screening Mix - Forested				
Legend	**Botanical Name**	**Common Name**	**Plant Size**	**% Composition**
	Trees			
	Abies grandis	Grand Fir	3' Ht. Bareroot	15%
	Acer macrophyllum	Bigleaf Maple	1.5" Cal. Bareroot	5%
	Calocedrus decurrens	Incense Cedar	2' Ht. Bareroot	15%
	Larix occidentalis	Western Larch	3' Ht. Bareroot	5%
	Pinus ponderosa	Ponderosa Pine	3' Ht. Bareroot	10%
	Pseudotsuga menziesii	Douglas Fir	3' Ht. Bareroot	5%
	Rhamnus purshiana	Cascara	3' Ht. Bareroot	5%
	Salix scouleriana	Scouler's Willow	3' Ht. Bareroot	5%
	Shrubs			
	Mahonia aquifolium	Tall Oregon Grape	Bareroot	15%
	Oemleria ceracisformis	Osoberry	Bareroot	5%
	Polystichum munitum	Swordfern	Bareroot	5%
	Rubus parviflorus	Thimbleberry	Bareroot	5%
	Symphoricarpos albus	Snowberry	Bareroot	5%

Screening Mix - Shrubby Unirrigated				
Legend	**Botanical Name**	**Common Name**	**Plant Size**	**% Composition**
	Trees			
	Cornus nuttallii	Pacific Dogwood	1/2" Bareroot	5%
	Pinus contorta var. contorta	Shore Pine	1/2" Bareroot	10%
	Shrubs			
	Amelanchier alnifolia	Serviceberry	1 Gal.	5%
	Corylus cornuta var californica	Western Hazelnut	1Gal.	5%
	Holodiscus discolor	Oceanspray	1 Gal.	5%
	Garrya elliptica	Silk Tassel	1 Gal.	10%
	Mahonia aquifolium	Tall Oregon Grape	1Gal.	5%
	Myrica californica	Pacific Wax Myrtle	1 Gal.	10%
	Philadelphus lewisii	Mockorange	1 Gal.	5%
	Physocarpus capitatus	Pacific Ninebark	1 Gal.	5%
	Ribes malvaceum	Chapparal Currant	1 Gal.	5%
	Rosa gymnocarpa	Baldhip Rose	1 Gal.	5%
	Sambucus racemosa	Red Elderberry	1 Gal.	5%
	Spiraea douglasii	Douglas Spiraea	1 Gal.	5%
	Symphoricarpos albus	Snowberry	1 Gal.	5%
	Vaccinium ovatum	Evergreen Huckleberry	1 Gal.	5%
	Viburnum edule	Highbush cranberry	1 Gal.	5%

Planting Clusters - See sheet 00-LU-410 for layout details

Planting Clusters				
Legend	**Botanical Name**	**Common Name**	**Plant Size**	**% Composition**
A1	*Quercus garryana*	Oregon White Oak	1/2" Bareroot	100%
A2	*Pinus ponderosa var. benthamiana*	Pacific Ponderosa Pine	1/2" Bareroot	20%
	Quercus garryana	Oregon White Oak	1/2" Bareroot	80%
A3	*Amelanchier alnifolia*	Western Service Berry	1 Gal. Bareroot	5%
	Holodiscus discolor	Oceanspray	1 Gal. Bareroot	5%
	Mahonia aquifolium	Oregon Grape	1 Gal. Bareroot	10%
	Philadelphus lewisii	Mockorange	1 Gal. Bareroot	5%
	Physocarpus capitatus	Ninebark	1 Gal. Bareroot	5%
	Quercus garryana	Oregon Oak	1/2" Bareroot	30%
	Rosa gymnocarpa	Baldhip Rose	1 Gal. Bareroot	15%
	Symphoricarpos albus	Snowberry	1 Gal. Bareroot	15%
B1	*Mahonia aquifolium*	Oregon Grape	1 Gal. Bareroot	20%
	Rhamnus purshiana	Cascara	1/2" Bareroot	10%
	Salix scouleriana	Scouler's Willow	1/2" Bareroot	5%
	Sambucus cerulea	Blue elderberry	1 Gal. Bareroot	10%
	Symphoricarpos albus	Snowberry	1 Gal. Bareroot	50%
	Symphoricarpos mollis	Creeping Snowberry	1 Gal. Bareroot	5%
C1	*Mahonia aquifolium*	Tall Oregon Grape	1 Gal. Bareroot	20%
	Rosa gymnocarpa	Baldhip Rose	1 Gal. Bareroot	20%
	Rubus parviflorus	Thimbleberry	1 Gal. Bareroot	50%
	Symphoricarpos albus	Snowberry	1 Gal. Bareroot	10%

Type1 Seeding

Seeded Mowing Area			
Legend	**Botanical Name**	**Common Name**	**Percentage/PLS**
	Fleur de Lawn Blanche		PLS
	Lolium perenne	Perennial Ryegrass	40%
	Festuca trachyphylla	Hard Fescue	22%
	Festuca 'Quatro'	Quatro Tetraploid Sheep Fescue	20%
	Trifolium repens	White Clover	5%
	Achillea millefolium	White Yarrow	5%
	Lobularia maritima	Sweet Alyssum	5%
	Bellis perennis	Single White English Daisy	3%

Type 2 Seeding

Grassland Seeding - Bunchgrass Focused			
Legend	**Botanical Name**	**Common Name**	**Lbs/Acre**
	Grasses		
	Danthonia californica	California Oatgrass	6
	Deschampsia elongata	Slender Hairgrass	5
	Festuca occidentalis	Western Fescue	1
	Festuca roemeri	Roemer's Fescue	2
	Hordeum brachyantherum	Meadow Barley	1
	Koeleria macrantha	Prairie Junegrass	1
	Poa scabrella	Pine Junegrass	1
	Forbs		
	Achillea millefolium	Yarrow	0.5
	Anaphalis marginatacea	Pearly Everlasting	0.5
	Epilobium angustifolium	Fireweed	0.5
	Eriophyllum lanatum	Oregon Sunshine	1
	Geranium oreganum	Western Geranium	1
	Lupinus polyphyllus	Bigleaf Lupine	0.1
	Prunella vulgaris ssp lanceolata	Common Selfheal	1
	Sidalcea campestris	Meadow checkermallow	1
	Lomatium utriculatum	Common biscuitroot	1
	Lomatium macrocarpum	Bigseed Biscuitroot	1
	Solidago canadensis	Canada Goldenrod	0.25

Type 3 Seeding

Grassland Seeding - Color and Fire Resistance Focused			
Legend	**Botanical Name**	**Common Name**	**lbs/Acre**
	Danthonia californica	California Oatgrass	6
	Deschampsia elongata	Slender Hairgrass	5
	Festuca occidentalis	Western Fescue	1
	Festuca roemeri	Roemer's Fescue	2
	Hordeum brachyantherum	Meadow Barley	2
	Koeleria macrantha	Prairie Junegrass	1
	Poa scabrella	Pine Junegrass	2
	Forbs		
	Achillea millefolium	Yarrow	0.5
	Asclepias speciosa	Milkweed	0.5
	Anaphalis marginatacea	Pearly Everlasting	0.5
	Brodiaea coronaria	Brodiaea	0.5
	Epilobium angustifolium	Fireweed	0.25
	Eriophyllum lanatum	Oregon Sunshine	0.5
	Gaillardia aristata	blanket flower	0.5
	Geranium oreganum	Western Geranium	0.5
	Lomatium macrocarpum	*Bigseed Biscuitroot*	1
	Lupinus polyphyllus	*Bigleaf Lupine*	0.1
	Penstemon cardwellii	Cardwell's penstemon	0.25
	Prunella vulgaris ssp lanceolata	Common Selfheal	0.5
	Sidalcea campestris	Meadow checkermallow	0.5
	Solidago canadensis	Canada Goldenrod	0.5

See Sheet 00-LU-404 for stormwater plants

REGISTERED
0821
Jason Hirst
OREGON
02/20/2014
LANDSCAPE ARCHITECT
Expires: 02/27/2023

No	Date	Description	Appd
1	12/30/22	Building Permit	MRG
Revision			
Survey			

Stantec

Designed By XXX | Design Mgr XXX
Drawn By XXX | Const Mgr XXX
Checked By XXX | Const Supvr XXX
Project Mgr XXX | Date 12/30/22

Warning
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If this bar does not measure 1" then the drawing is not to scale

PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

David W. Peters, Engineering Manager, PE No 16683 — Date

CITY OF PORTLAND OREGON 1851

Bull Run Filtration Facility

Land Use Plans

Plant Species and Sizes

SAP Project No: W02229
1/4 Section: -
Sheet No: 00-LU-409
19

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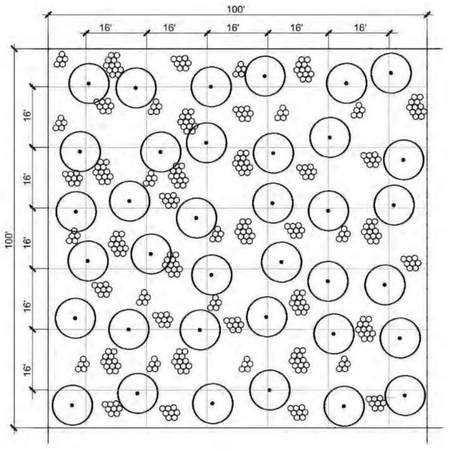


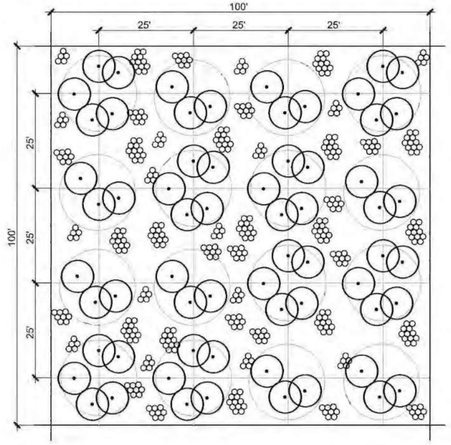
NOTES

1) Prior to installing plants, apply Grassland Seeding mix and establish for 45-days minimum.
2) Install trees at an overall density of 39 trees/10,000 s.f. (170/acre)
3) Install trees 10'-22' on-center; average 16' on-center.
4) Install shrubs at an overall density of 400 shrubs/10,000 s.f. (11742/acre)
5) Install shrubs in groups of 3-12 plants per species. Space shrubs 1' min to 3' max on-center.
6) provide 5' minimum spacing between shrub groups and between a tree and shrubs group.
7) Spread species throughout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.
8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.
9) See Planting Mixes on 00-GEN-L101 for planting types and densities.

TREE

SHRUB

Screening Mix: Forested Planting
NTS



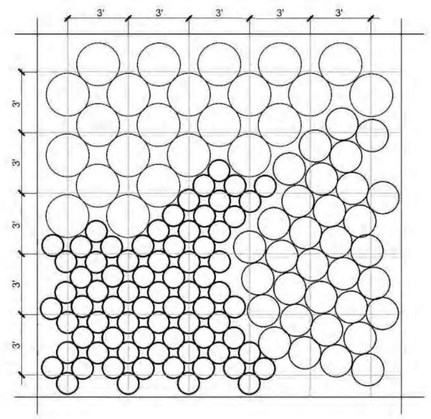
NOTES

1) Prior to installing plants, apply Grassland Seeding mix and establish for 45-days minimum.
2) Install trees in clumps within a 20' diameter circle spaced 25' on-center. Space trees at least 5' apart minimum.
3) 50% of tree clumps to be 5 trees: 3 conifers and 2 deciduous; 50% of tree clumps to be 3 conifers.
4) Install shrubs at an overall density of 400 shrubs/10,000 s.f. (11742/acre)
5) Install shrubs in groups of 3-12 plants per species. Space shrubs 1' min to 3' max on-center.
6) provide 5' minimum spacing between shrub groups and between a tree and shrubs group.
7) Spread species throughout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.
8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.
9) See Planting Mixes on 00-GEN-L101 for planting types and densities.

TREE CLUMP
(20' DIAMETER)

SHRUB

Screening Mix: Shrubby Planting
NTS



NOTES

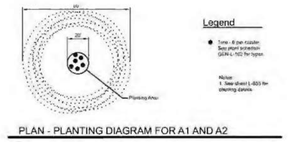
1) Install *Arctostaphylos* 'Vancouver Jade' average 3' on-center, square spacing.
2) Install *Carex flacca* average 1.5' on-center, square spacing.
3) Install *Fragaria chiloensis* average 2' on-center, square spacing.
4) Install groundcover plants in groups of a minimum of 270 and a maximum of 810 of plants per species.
5) Final placement will be approved by Owner's representative prior to planting. Plant groupings should respond to the immediate area's topography and feature shrubs and trees.
6) A single bed area sample should contain all species.
7) Planting groups shall not abut species of the same group.
8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.
9) See Planting Mixes on 00-GEN-L101 for planting types and densities.

Arctostaphylos 'Vancouver Jade'

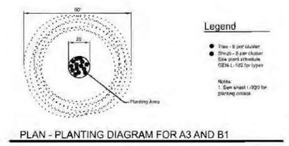
Fragaria chiloensis

Calamagrostis nutkatensis

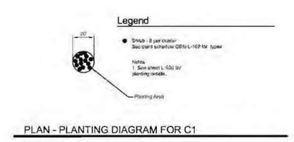
Groundcover Planting
NTS



PLAN - PLANTING DIAGRAM FOR A1 AND A2



PLAN - PLANTING DIAGRAM FOR A3 AND B1



PLAN - PLANTING DIAGRAM FOR C1

Cluster Planting
NTS

REGISTERED
0821
Jason Hirst
OREGON
02/20/2014
LANDSCAPE ARCHITECT
Expires: 02/27/2023

No	Date	Description	Appd
1	12/30/22	Building Permit	MRG
		Revision	
Survey			

Stantec

Designed By	XXX	Design Mgr	XXX
Drawn By	XXX	Const Mgr	XXX
Checked By	XXX	Const Supvr	XXX
Project Mgr	XXX	Date	12/30/22

Warning
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If this bar does not measure 1" then the drawing is not to scale

PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

David W. Peters, Engineering Manager, PE No 16683 — Date

CITY OF PORTLAND, OREGON 1851

Bull Run Filtration Facility

Land Use Plans

Planting Details

SAP Project No
W02229
1/4 Section
-
Sheet No
00-LU-410
20

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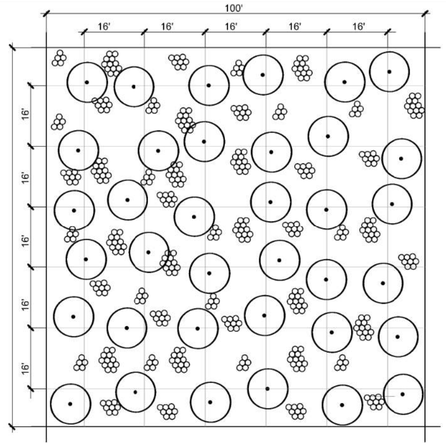


NOTES

1) Prior to installing plants, apply Grassland Seeding mix and establish for 45-days minimum.

2) Install trees at an overall density of 39 trees/10,000 s.f. (170/acre)

3) Install trees 10'-22' on-center; average 16' on-center.

4) Install shrubs at an overall density of 399 shrubs/10,000 s.f.

5) Install shrubs in groups of 3-12 plants per species. Space shrubs 1' min to 3' max on-center.

6) provide 5' minimum spacing between shrub groups and between a tree and shrubs group.

7) Spread species throughout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

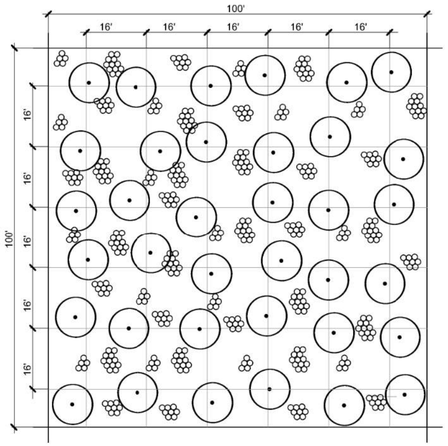
8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

	Mitigation Planting			
Legend	Botanical Name	Common Name	Plant Size	Composition
	Trees			
	Abies grandis	Grand Fir	2' Ht. Bareroot	10/10,000 sf
	Acer macrophyllum	Bigleaf Maple	1/2" Bareroot	3/10,000 sf
	Calocedrus decurrens	Incense Cedar	2' Ht. Bareroot	3/10,000 sf
	Larix occidentalis	Western Larch	2' Ht. Bareroot	1/10,000 sf
	Pinus ponderosa	Ponderosa Pine	2' Ht. Bareroot	10/10,000 sf
	Pseudotsuga menziesii	Douglas Fir	2' Ht. Bareroot	3/10,000 sf
	Rhamnus purshiana	Cascara	1/2" Bareroot	6/10,000 sf
	Salix scouleriana	Scouler's Willow	1/2" Bareroot	3/10,000 sf
	Shrubs			
	Mahonia aquifolium	Tall Oregon Grape	Bareroot	57/10,000 sf
	Oemleria cerasiformis	Osoberry	Bareroot	28/10,000 sf
	Physocarpus capitatus	Pacific ninebark	Bareroot	57/10,000 sf
	Polystichum munitum	Swordfern	Bareroot	28/10,000 sf
	Rubus parviflorus	Thimbleberry	Bareroot	57/10,000 sf
	Rosa pisocarpa	Swamp Rose	Bareroot	57/10,000 sf
	Spiraea douglasii	Douglas Spiraea	Bareroot	57/10,000 sf
	Symphoricarpos albus	Snowberry	Bareroot	57/10,000 sf

TREE

SHRUB

Upland Forest Planting
NTS



NOTES

1) Prior to installing plants, survey planting area an remove invasives if located.

2) Install trees at an overall density of 39 trees/10,000 s.f. (170/acre)

3) Install trees 10'-22' on-center; average 16' on-center.

4) Install shrubs at an overall density of 399 shrubs/10,000 s.f.

5) Install shrubs in groups of 3-12 plants per species. Space shrubs 1' min to 3' max on-center.

6) provide 5' minimum spacing between shrub groups and between a tree and shrubs group.

7) Spread species throughout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

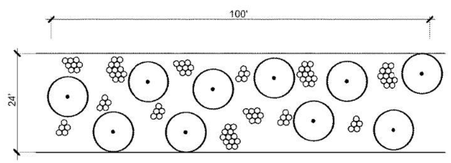
8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds. Overseed any bare soil patches with Grassland Seeding Mix.

Botanical Name	Common Name	Planting Size	Composition
Trees			
Malus fusca	Western Crabapple	1/2" Bareroot	6/10,000 s.f.
Pseudotsuga menziesii	Douglas Fir	2' Ht. Bareroot	3/10,000 s.f.
Rhamnus purshiana	Cascara	1/2" Bareroot	20/10,000 s.f.
Salix scouleriana	Scouler's Willow	1/2" Bareroot	7/10,000 s.f.
Thuja plicata	Western Red Cedar	2' Ht. Bareroot	3/10,000 s.f.
Shrubs			
Cornus sericea	Redosier Dogwood	Bareroot	80/10,000 s.f.
Lonicera involucrata	Twinberry	Bareroot	80/10,000 s.f.
Physocapus capitatus	Ninebark	Bareroot	80/10,000 s.f.
Rosa pisocarpa	Swamp Rose	Bareroot	80/10,000 s.f.
Spiraea douglasii	Douglas Spirea	Bareroot	80/10,000 s.f.

TREE

SHRUB

Riparian Forest Planting
NTS



NOTES

1) Prior to installing plants, apply Grassland Seeding mix and establish for 45-days minimum.

2) Install trees at an overall density of 39 trees/10,000 s.f. (170/acre)

3) Install trees in a naturalistic manner, dispersed throughout the hedgerow. Min. 12', Max. 18' on-center.

4) Install shrubs at an overall density of 399 shrubs/10,000 s.f.

5) Install shrubs in groups of 3-12 plants per species. Space shrubs 1' min to 3' max on-center.

6) provide 5' minimum spacing between shrub groups and between a tree and shrubs group.

7) Spread species throughout the given planting area to avoid monocultures, a random 10,000 s.f. sample should contain all species.

8) Maintain a 1' diameter plant-free area around all stems and mulch with wood chip mulch to prevent weeds.

Hedgerow Planting			
Botanical Name	Common Name	Plant Size	Composition
Trees			
Rhamnus purshiana	Cascara	1/2" Bareroot	39/10,000 sf
Shrubs			
Mahonia aquifolium	Tall Oregon Grape	Bareroot	57/10,000 sf
Ribes malvaceum	Chapparal Currant	Bareroot	57/10,000 sf
Rosa gymnocarpa	Baldhip Rose	Bareroot	57/10,000 sf
Rosa nutkana	Nootka Rose	Bareroot	57/10,000 sf
Rubus parviflorus	Thimbleberry	Bareroot	57/10,000 sf
Spiraea douglasii	Douglas Spiraea	Bareroot	57/10,000 sf
Symphoricarpos albus	Snowberry	Bareroot	57/10,000 sf

Hedgerow Planting
NTS

REGISTERED LANDSCAPE ARCHITECT
2221
Jason Hirst
OREGON
02/20/2014
Expires: 02/28/26

No	Date	Description	Appd
CF	05/10/24	For Conformed Documents	MRG
Revision			
Survey			

Stantec

Designed By	XXX	Design Mgr	XXX
Drawn By	XXX	Const Mgr	XXX
Checked By	XXX	CM/I Engr Mgr	XXX
Project Mgr	XXX	Date 05/10/24	

Warning
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PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

David W. Peters, Engineering Manager, PE No 16683 — Date

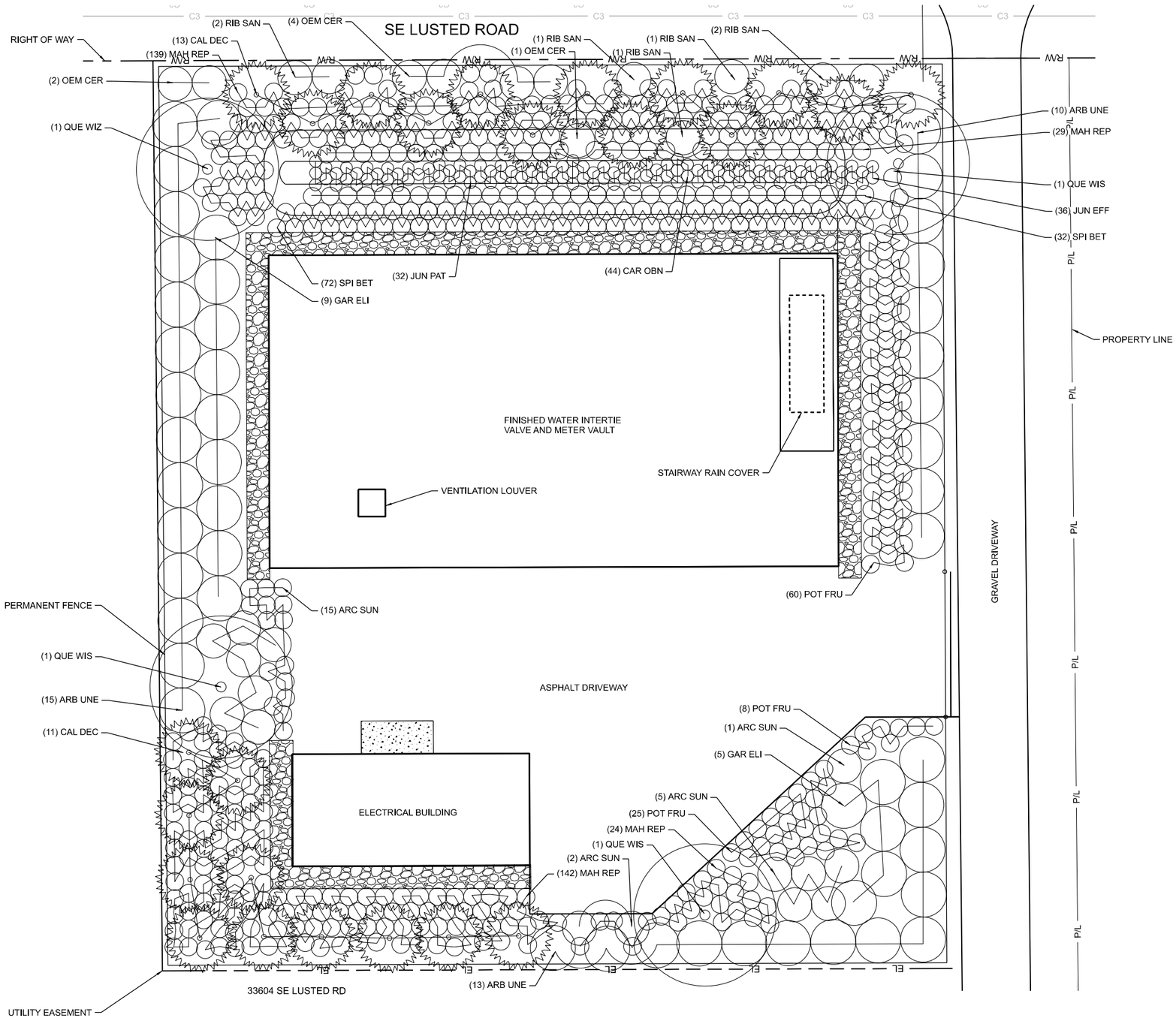
CITY OF PORTLAND OREGON 1851

Bull Run Filtration Facility

Land Use Plans

Planting Details

SAP Project No W02229
1/4 Section -
Sheet No 00-LU-411



GENERAL SHEET NOTES

SHEET KEYNOTES

LEGEND

- (17) SPI BET — SHRUB PLANTING WITH COUNT AND SYMBOL
- (17) CAL DEC — TREE PLANTING WITH COUNT AND SYMBOL
- GRAVEL MAINTENACE STRIP
- PIPELINE
- EL — EASEMENT
- P/L — PROPERTY LINE
- R/W — RIGHT OF WAY

PLANT SCHEDULE

	Finish Water Intertie		
	Botanical Name	Common Name	Planting Size
	Screening Plants		
CAL DEC	*Calocedrus decurrens*	Incense Cedar	6'-8' height
QUE WIS	*Quercus wislizeni*	Interior Live oak	2" caliper
ARB UNE	*Arbutus unedo 'Compacta'*	Compact Strawberry Tree	15 gal. container
ARC SUN	*Arctostaphylus 'Sunset'*	Sunset Manzanita	5 gal. container
GAR ELL	*Garrya elliptica*	Silktassle Bush	5 gal. container
POT FRU	*Potentilla fruticosa 'Lundy'*	Happy Face Potentilla	1 gal. container
MAH REP	*Mahonia repens*	Creeping Mahonia	1 gal. container
OEM CER	*Oemlaria cerasiflora*	Oso Berry	5 gal. container
RIB SAN	*Ribes sanguineum*	Red Flowering Currant	5 gal. container
SPI BET	*Spiraea betulifolia var. Lucida*	Birchleaf Spirea	1 gal. container
	Stormwater Planting		
CAR OBN	*Carex obnupta*	Slough Sedge	1 gal. container
JUN EFF	*Juncus effusus*	Soft Rush	1 gal. container
JUN PAT	*juncus patens 'Elks Blue'*	Grey Rush	1 gal. container
SPI BET	*Spirea betulifolia var. Lucinda*	Birchleaf Spirea	1 gal. container
MAH AQU	*Mahonia aquifolia*	Oregon Grape	1 gal. container

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Scale In Feet

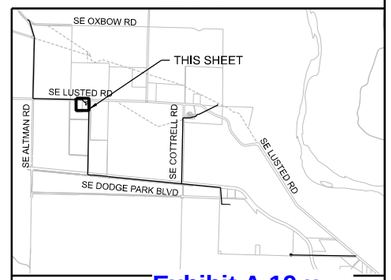

Exhibit A.19.u

No	Date	Description	Appd
		Revision	
Survey			

PRELIMINARY
NOT FOR
CONSTRUCTION

Designed By	DG	Program Mgr	XXX
Drawn By	DG	Const Mgr	XXX
Checked By	BN	Const Supvr	XXX
Project Mgr	XXX	Date	6/30/22

WARNING

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PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

XXX XXX — Date

XXX XXX — Date

CITY OF PORTLAND, OREGON 1851

Bull Run Filtration Pipelines

FINISH WATER INTERTIE LANDSCAPE PLAN

SAP Project No
W02563
1/4 Section
Sheet No
LU-501

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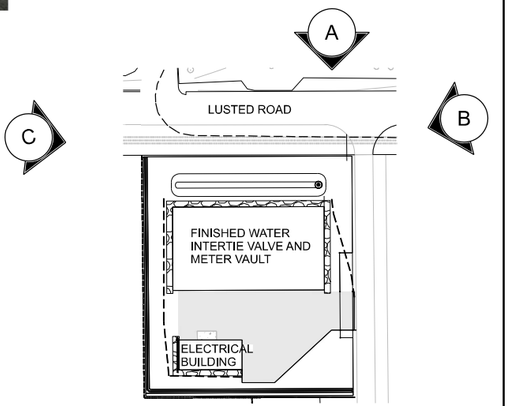
VISUALIZATION A

VISUALIZATION B

VISUALIZATION C



VISUALIZATION ORIENTATION MAP

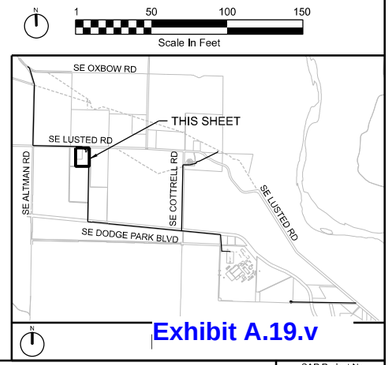


Exhibit A.19.v

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No	Date	Description	Appd
		Revision	
Survey			

PRELIMINARY NOT FOR CONSTRUCTION

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Drawn By	DG	Const Mgr	XXX
Checked By	BN	Const Supvr	XXX
Project Mgr	XXX	Date	6/30/22

WARNING

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PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

XXX XXX — Date

XXX XXX — Date

CITY OF PORTLAND OREGON 1851

Bull Run Filtration Pipelines

FINISHED WATER INTERTIE VISUALIZATIONS

SAP Project No
W02563
1/4 Section

Sheet No
LU-502

Appendix F
Existing Conditions Approval

Existing Natural Resource Conditions of Approval Imposed in the 2023 Land Use Decision

12.e. All external lighting shall comply with the County's Dark Sky Lighting Standards of MCC 39.6850 [MCC 39.6850 & 39.7515(A)]. Placement of lighting shall avoid shining it directly into an undeveloped Significant Environmental Concern for water resource or wildlife habitat area. [MCC 39.5560(B)]

12.g. All planted areas must be continuously maintained, including provisions for watering planting areas where such care is required. The small grove of Douglas-fir, bigleaf maple, and walnut trees near the Pleasant Home Water District easement and SE Carpenter Lane (Exhibit A.212, Sheet LU-301) shall be protected and maintained on- going basis. Any required landscaping that becomes diseased, dies or is removed, shall be replanted within the next planting season with a similar species and a suitable size after discussion with and determination by the Planning Director [MCC 39.8040(A)(4) and MCC 39.8045(C)(4) & (5)].

12.i. No nuisance plants listed in MCC 39.5580 Table 1 shall be planted on any of the subject properties with SEC-h or SEC-wr overlays within the control of the Portland Water Bureau. The Portland Water Bureau owners shall remove the nuisance plants listed in Table 1 from the cleared areas of the properties and replant with native grasses, ground covers or other approved plantings. The property owners shall maintain the cleared area free of these nuisance plants [MCC 39.5750 (F), MCC 39.5580, MCC 39.5860(B)(7)]

Following all pipeline construction and road improvement activities, the Water Bureau or their representative shall provide a survey to the County confirming the size, location and species of all trees removed during pipeline construction and road improvement work. If the total number of trees removed outside of an SEC zone exceeds 363, the additional tree removal is only approved if each additional tree is replaced at a ratio of 1.5 to 1 on the filtration facility site. Additional tree removal outside of the right-of-way or project easement areas is prohibited.

Prior to issuance of the Certificate of Occupancy, Property owner shall implement the plantings identified in the Mitigation Plan at Exhibit I.96, Attachment A and plant any additional replacement trees identified in Condition 18.

Appendix G

Tree Planting at Filtration/ Facility Site

TREE PLANTING AT FILTRATION/FACILITY SITE

Trees to be Planted	Units	Total	Trees per Unit	Totals
Landscaping Inside Facility Fence				**458**
Forested Planting Area	S.F.	27,084	0.0039	106
Stormwater Planting Area	S.F.	25,000	0.0064	160
Individual Trees	Each	84	1	84
A-1	Clusters	2	6	12
A-3	Clusters	2	6	12
B	Clusters	14	6	84
Landscaping Outside Facility Fence				**2027**
Upland Forest				**173**
Riparian Forest				**312**
Hedge Row				**67**
Forested Planting Area	S.F.	62,967	0.0039	246
Shrubby Planting Area	S.F.	103,128	0.0063	650
Stormwater Planting Area	S.F.	19,351	0.0064	125
Individual Trees	Each	88	1	88
A-1	Clusters	16	6	96
A-2	Clusters	22	6	132
A-3	Clusters	18	6	108
B	Clusters	5	6	30
Total				**2485**