HABITAT TECHNOLOGIES

CONCEPTUAL STREAM CORRIDOR RESTORATION AND ENHNACEMENT PROGRAM

EAST TOWN CROSSING

CITY OF PUYALLUP #P-21-0034
2902 East Pioneer
City of Puyallup, Pierce County, Washington

This document has been revised to incorporate
City of Puyallup review comments and recommendations

prepared for

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A VETERAN OWNED SMALL BUSINESS COOPERATIVE

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INTRODUCTION

This document details the *CONCEPTUAL STREAM CORRIDOR RESTORATION AND ENHNACEMENT PROGRAM* to be implemented as a part of the overall development of the proposed **East Town Crossing Multi-Family Residential Community** (City of Puyallup #P-21-0034) located at the southeastern corner of the intersection of Pioneer Way East and Shaw Road East within the City of Puyallup, Pierce County, Washington (Figure 1). The goal of this program is to ensure that proposed land use actions do not result in a net loss of environmentally critical areas and associated floodplain issues while also restoring and enhancing the aquatic and riparian physical and biological functions associated with a City of Puyallup Type IV Stream located directly to the east of the project site and a City of Puyallup Type III Stream located within the Pioneer Way East right-of-way along the northern boundary of the project site.

As defined by the City of Puyallup within Chapter 21.06 – *Critical Areas* the overall compensatory mitigation program document shall identify and demonstrate sufficient restoration, creation, enhancement, and/or preservation measures to maintain the functions and values of the critical area (21.06.620). In addition to the specific criteria outlined for inclusion within a compensatory mitigation program the program is required to also ensure consistency with applicable state and federal permitting requirements. As such, in addition to City of Puyallup permitting provisions the actions proposed within the compensatory mitigation program shall also submit appropriate permits (generally in the form of a *Joint Aquatic Resource Permit Application* (JARPA) package for review and approval through the Regulatory Branch, U.S. Army Corps of Engineers for Section 404 of the Clean Water Act for placement of fill within a Water of the US; through the Washington Department of Ecology for Section 401 of the Clean Water Act for Water Quality Certification, and through the Washington Department of Fish and Wildlife for a Hydrologic Project Approval (HPA) for work within the ordinary high water marks of a Water of the State.

PROJECT SITE DESCRIPTION

The project site is approximately 11-acres in size and irregular in shape. The project site had undergone prior permitted land use actions generally associated with future proposed site development actions. These prior permitted land use actions included the development of a stormwater detention pond, the removal of existing old homesites and outbuildings, clearing and grading, and the placement of imported fill materials to facilitate future proposed site development actions.

The project site is located within a quickly, more intensely developing area along the Shaw Road and Pioneer Way Corridors which is generally changing from prior single-family homesites on moderately sized parcels into commercial developments to meet the growing needs of the City of Puyallup and other local communities.

Directions to Project Site: From the City of Puyallup City Hall turn north onto 2nd Street SE and continue to East Pioneer. Turn east onto East Pioneer and continue generally easterly to Shaw Road East. The project site is located at the southeastern corner of the intersection of Pioneer Way East and Shaw Road East.

CRITICAL AREAS DETERMINATION

WETLANDS

A series of assessments and evaluations of potential wetlands within or immediately adjacent to the project site was completed by John Comis Associates (JCA 2020, 2021). The wetland findings documented within these assessments failed to identify any onsite wetlands and these assessments have been submitted to the City of Puyallup for review and verification.

A series of additional assessments of potential wetlands within the project site were completed during the summer of 2021 by Habitat Technologies. These assessments were completed following the methods and procedures defined in the *Corps of Engineers Wetland Delineation Manual* (United States Army Corps of Engineers, 1987) with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (United States Army Corps of Engineers, 2010); the Washington State *Wetland Rating System for Western Washington: 2014 Update* Publication #14-06-029 (Hruby, 2014), the State of Washington Department of Natural Resources (WDNR) Forest Practice Rules (WAC 222-16-030), and the City of Puyallup Chapter 21.06 - *Critical Areas* (see *Wetland Delineation Report – East Town Crossing* dated October 14, 2021). These assessments documented that **no areas** within the project site were identified to exhibit all three established criteria for designation as “wetland.” The created stormwater detention facilities present within the southeastern portion of the project site are best defined as intentionally created features from a non-wetland sites. These facilities were also created consistent with City of Puyallup permitting approvals.

STREAMS

As defined by onsite observations completed between March 2021 and mid-July 2021, along with prior assessments within the general vicinity of the project site dating back to 1983 of adjacent properties, seasonal surface water from the hillside area to the southeast of the project site forms within a shallow depression near the toe of slope. As defined within historical aerial photos, prior land use actions primarily associated with agricultural activities and the development of a pipeline corridor had created an excavated ditches to convey seasonal surface water generally to the northeast and then to the north to enter the ditch system associated with the Pioneer Way East Corridor. A pattern of excavated ditches continued generally westerly along the Pioneer Way East

Corridor to enter the ditched Deer Creek System and then to continue generally northwesterly to eventually enter the Lower Puyallup River. The Deer Creek System has been documented by Habitat Technologies and by the Puyallup Tribe to provide habitats for a number of fish species to include coho salmon, steelhead/rainbow trout, cutthroat trout, threespine stickleback, bullhead, sculpin, and Western brook lamprey. However, these same assessments (particularly the 1983 assessment completed by the Puyallup Tribe) did not document fish utilization within the ditch system associated with the Pioneer Way East Corridor east of the confluence with Deer Creek.

Even though the drainage corridors offsite to the east and southeast of the project site have been modified by prior and ongoing land use actions generally associated with the management of agricultural ditches, these drainage corridors convey naturally occurring surface water from an offsite wetland area and eventually enter the Deer Creek System. As such, these offsite drainage corridors appear best defined as a City of Puyallup "streams" consistent with the provisions of the City of Puyallup *Chapter 21.06.* Both of these offsite ditches do not exceed a width of 24-inches and appear to exhibit seasonal surface flow patterns. These two drainage ditches also appear best defined as City of Puyallup Type IV Streams. The standard City of Puyallup buffer for a Type IV Stream is 35 feet in width as measured perpendicular from the ordinary high water mark.

- Type IV Streams are those intermittent or ephemeral streams with channel width less than two feet taken at the ordinary high water mark, that are not used by anadromous fish or resident fish.

These offsite agricultural ditches eventually lead to the north and enter the ditch system associated with the Pioneer Way East Corridor. As such, the ditch system associated with the Pioneer Way East Corridor would also appear best defined as a City of Puyallup "streams" consistent with the provisions of the City of Puyallup *Chapter 21.06.* The ditch associated with the Pioneer Way East Corridor exhibits a width greater than 24-inches and seasonal surface flow patterns. This roadside drainage ditch also appeared best defined as City of Puyallup Type III Streams. The standard City of Puyallup buffer for a Type III Stream is 50 feet in width as measured perpendicular from the ordinary high water mark.

- Type III Streams are those streams with perennial or intermittent flow and are not used by anadromous fish.

FISH AND WILDLIFE HABITAT CONSERVATION AREAS

The assessments completed by Habitat Technologies during 2021 identified that the project site and adjacent properties had been manipulated and modified by a variety of prior and ongoing land uses. The project site was not identified to exhibit specific City of Puyallup "fish and wildlife habitat conservation areas." The project site did not provide habitats of rare or vulnerable ecological systems, communities, and habitat or habitat elements including seasonal ranges, breeding habitat, winter range, and movement corridors; areas with high relative population density or species richness; or

City of Puyallup habitats of local importance. However, two adjacent City of Puyallup stream corridors were identified – one directly to the east and one within the Pioneer Way East right-of-way directly to the north. These two streams were identified to provide limited habitat for local species and to support downstream habitats used by salmonid fish species (see *Wetland Delineation Report – East Town Crossing* dated October 14, 2021, and *CRITICAL AREAS ASSESSMENT - Surface Water Drainages and Fish and Wildlife Habitat Conservation Areas - EAST TOWN CROSSING* dated July 13, 2021 both prepared by Habitat Technologies).

SELECTED DEVELOPMENT ACTION

The *Selected Development Action* for the **East Town Crossing Multi-Family Residential Community** focuses on the development of a new multi-family residential community within the western portion of the project site. The development of this new multi-family residential community would be consistent with the City of Puyallup Comprehensive Plan, local zoning, the character of the neighborhood, and the provisions of the City of Puyallup Chapter 21.06. The proposed development would also provide consistency with both the FEMA and the City of Puyallup *Floodplain Requirements* and the City of Puyallup Chapter 21.06 through the restoration and enhancement of adjacent environmentally critical areas.

Project site planning has focused on the mandated hierarchy of environmentally critical areas impact reduction: 1) avoidance, 2) minimization, and 3) compensation. These avoidance and minimization strategies included a site design to avoid potential project related impacts to identified environmentally critical areas for their associated protective buffers. As presently identified all onsite development actions would not directly impact environmentally critical areas identified adjacent to the project site. However, onsite development actions would require the modification of identified onsite Zone A0 floodplain areas and a separated final site development plan of actions has been prepared to address potential impacts to flood storage, water quality, detention, treatment, and floodplain storage volume.

To ensure that unavoidable encroachments associated with an identified Type IV Stream directly to the east of the project site and an identified Type III Stream within the Pioneer Way East right-of-way directly to the north of the project site and proposed project would undertake a *Stream Corridor Restoration and Enhancement Program* along these two streams to avoid and minimize potential impacts to the extent practicable, to reestablish prior environmental functions and associated habitats, to provide greater protective functions and values to the identified stream corridors, and to provided increased buffer functions (i.e. screening, noise attenuation, dust attenuation, sound attenuation, detrital inputs, and habitats for local species).

The City of Puyallup has identified mitigation standard for fish and wildlife habitat conservation areas as follows (21.06.1080):

(1) **Adverse impacts to riparian and nonriparian habitats shall be fully mitigated in accordance with the approved standards and shall be specified within a mitigation plan.**

Discussion: The stream corridor directly offsite to the north would be restored through reformation to better facilitate access between the project site and Pioneer Way East, to better facilitate public utilities associated with Pioneer Way East, and to restore a protective plant community along the established corridor. The stream corridor directly offsite to the east would be restored through reformation which would create a more meandering channel pattern through a larger area, would place habitat features within the restored area, and would establish a protective plant community along the stream corridor. These actions are outlined within the mitigation program below.

(2) Mitigation for alterations to habitat areas shall achieve equivalent or greater biologic functions and shall provide similar functions as those lost.

Discussion: Both of the identified adjacent stream corridors and their adjacent riparian areas have been greatly impacted by prior and ongoing land use actions. The proposed *Stream Corridor Restoration and Enhancement Program* would restore and enhance native plant communities, would restore and enhance physical and biological riparian corridor habitat functions, would increase water quality protection, and would provide greater biological functions for local wildlife and downstream aquatic resources.

Existing Conditions: As defined by the recent environmental assessments completed for the project site, no wetlands, no streams/creeks, and no habitat conservation areas were identified within the project site. These assessments did identify a City of Puyallup Type IV Stream (non-fish bearing) offsite to the east that led into a City of Puyallup Type III Stream (non-fish bearing) within the Pioneer Way East right-of-way along the northern boundary of the project site.

The Type IV Stream offsite to the east originated within a wetland area well to the south of the project site and was conveyed via buried culvert associated with a regional pipeline corridor immediately to the southeast of the project site. Upon existing the pipeline corridor the stream was confined within an agricultural ditch generally along the southeastern boundary of the project site. Near the northeastern boundary of the project site the stream re-enters a buried culvert and is conveyed into the ditch along the southern edge of Pioneer Way East. This agricultural ditch had been created and managed by prior land use actions and was dominated by a dense mono-typic stand of reed canarygrass.

However, for this Type IV Stream more recently the eastern boundary of the onsite stormwater pond failed during a large storm event and the surface water within this offsite agricultural ditch now enters the onsite stormwater pond. From

the stormwater pond the stream enters of buried pipe and is conveyed northward to enter the ditch along the southern edge of Pioneer Way East approximately 180 feet east of the previous entry point.

The Type III Stream within the Pioneer Way East right-of-way along the northern boundary of the project site originates at the entry point of the Type IV Stream and continues westerly to enter a culvert that conveys seasonal surface flow northwesterly into a ditch along the northern side of Pioneer Way East – west of Shaw Road. This Type III Stream conveys stormwater runoff directly from Pioneer Way East and provides only very limited biofiltration of the roadway runoff as a result of a channel dominated by reed canarygrass, a variety of other grasses and herbs, and a scattering of Himalayan blackberry. The vegetation along this roadside ditch is also regularly mowed by the City of Puyallup roadway crews.

Functional Lift: Implementation of the *Stream Corridor Restoration and Enhancement Program* outlined below would ensure that there would be no net loss of habitat area, combined with the restoration and enhancement of previously impacted aquatic and riparian habitats. The Type IV Stream along the eastern side of the project site would be relocated out of the onsite stormwater pond and placement within a new meandering channel within the previously managed agricultural area immediately to the east of the project site. The restored Type IV Stream channel would begin at the outlet of the culvert associated with the offsite pipeline corridor and be relocated out of the existing agricultural ditch into a new meandering channel with an approximately 1% to 2% grade. The new channel would be located within a defined buffer area that would be planted with a variety of desirable native trees, shrubs, emergent, and herbs. In addition, a variety of habitat features (standing snags and downed logs) would be placed within the channel and buffer to provide increased habitat opportunities for feeding, cover, nesting, and perching. The restored channel and buffer area would also provide increase opportunity for detrital transport downstream into associated aquatic habitats resulting in an overall functional lift.

The Type III Stream presently within a roadside ditch associated with the Pioneer Way East Corridor would be re-configured within a restored channel directly to the south of the Pioneer Way East right-of-way. The restored channel would be wider that the present ditch and the side sloped would be gentler. As with the restored Type IV Stream the restored Type III Stream would be channel would be located within a defined buffer area that would be planted with a variety of desirable native trees, shrubs, emergent, and herbs. In addition, a variety of habitat features (standing snags and downed logs) would be placed within the channel and buffer to provide increased habitat opportunities for feeding, cover, nesting, and perching. The restored channel and buffer area would also provide increase opportunity for detrital transport downstream into associated aquatic and terrestrial habitats resulting in an overall functional lift.

Innovative Design: While the implementation of the *Stream Corridor Restoration and Enhancement Program* appears best defined to provide an overall functional lift for the identified Type IV Stream, the Type III Stream, and their associated buffers the final width of the buffer areas would not comply with the stream buffer width provisions of 21.06.1050. Where compliance with the buffer width provisions is not possible the City of Puyallup may approve "innovative mitigation programs" that allow linkages between natural systems and have the potential to restore ecological processes or provide unique ecological functions (21.06.640).

The City of Puyallup may approve innovative mitigation projects when all of the following can be clearly demonstrated:

a) The mitigation occurs in WRIA 10, in the middle Puyallup River basin, and preferably in the same subbasin as the impacts

   Discussion: The proposed *Stream Corridor Restoration and Enhancement Program* would occur immediately adjacent to and within the existing project site. This criterion is met.

b) The proposed mitigation site will provide greater improvement of critical area functions and values compared to on-site, in-kind mitigation or other sites within city boundaries

   Discussion: The proposed *Stream Corridor Restoration and Enhancement Program* would restore presently degraded habitats associated with a Type IV Stream and a Type III Stream along with their established buffers. The new channels would be located within a defined buffer area that would be planted with a variety of desirable native trees, shrubs, emergent, and herbs. In addition, a variety of habitat features (standing snags and downed logs) would be placed within the channel and buffer of the Type IV Stream to provide increased habitat opportunities for feeding, cover, nesting, and perching. The restored channel and buffer areas would also provide increase opportunity for detrital transport downstream into associated aquatic habitats resulting in an overall functional lift. This criterion is met.

c) The proposed mitigation plan is approved by the local jurisdiction wherein the site is located, by state resource agencies, and other agencies and tribes that may have jurisdiction over the proposed activity or the affected resources

   Discussion: The proposed *Stream Corridor Restoration and Enhancement Program* is subject to the City of Puyallup regulatory jurisdiction, along with the Seattle District U.S. Army Corps of Engineers,

the Washington Department of Ecology, and the Washington Department of Fish and Wildlife. Upon permit approvals this criterion would be met.

d) The proposed mitigation is consistent with the general purposes of this chapter, is in the best interest of Puyallup's citizens, and accomplishes regionally recognized goals for critical area restoration, such as conservation of threatened salmonids; and

Discussion: The proposed *Stream Corridor Restoration and Enhancement Program* is consistent with the purpose of Chapter 21.06 in that this program would protect identified stream corridor and associated buffer areas while also providing a functional lift to the aquatic and terrestrial functions and values of these stream corridors and established protective buffers. The implementation of this program also allows for the economically beneficial and productive use of the project site.

This program would comply with the Federal Clean Water Act and Washington State water pollution control laws; would prevent adverse and cumulative environmental impacts to critical areas; would protect ground and surface waters, downstream anadromous fish species, and other fish and wildlife and their habitats; and would be consistent with the Federal Endangered Species Act of 1973. Upon permit approvals this criterion would be met.

e) For innovative mitigation projects occurring outside city boundaries, the proponent of the mitigation plan shall provide sufficient documentation to show that there are no more appropriate sites within the city or urban growth area boundaries that provide suitable compensation for the impacts.

Discussion: The proposed *Stream Corridor Restoration and Enhancement Program* is located within the City of Puyallup. Upon permit approvals this criterion would be met.

Public Benefit: In addition to the restoration of the presently degraded Type IV Stream, the Type III Stream, and their associated buffers the final site development action would also provide essential and were needed workforce housing within a portion of the City of Puyallup that is well served by public roadways and utilities; that is well situated to public transportation and existing major transportation routes; that is well served by public fire, police, and medical response; and that is well situated to supportive shopping areas. The overall project would also provide increased support for the City of Puyallup tax base while also ensuring the fundamental utilization of private property.

(3) Compensation in the form of habitat restoration or enhancement is required when a habitat is altered as a result of an approved project. Alterations shall not result in net loss of habitat area except when, upon the satisfaction of the director, it is determined that the lost habitat area provides minimal functions, as determined by a critical area report, and other replacement habitats provide greater benefits to the functioning of the affected species.

Discussion: Implementation of the *Stream Corridor Restoration and Enhancement Program* would ensure that there would be no net loss of habitat area, combined with the functional life associated with the restoration and enhancement of previously impacted aquatic and riparian habitats. In addition, the amount of area to be established within the restored and enhanced corridor associated with the Type IV Stream to the east of the project site would add significantly more area than would be established following the standard stream buffer areas identified by the City of Puyallup.

The *Stream Corridor Restoration and Enhancement Program* would remove existing invasive species and plant a variety of desirable native trees, shrubs, emergent, and herbs within the established stream corridors and buffers to provide greater physical and biological support for the stream corridors onsite and within downstream aquatic and terrestrial habitats. In addition, the proposed onsite development would implement a variety of measures to minimize potential impacts to the adjacent streams which include the use of directional lighting, the treatment and detention of onsite stormwater, the placement of noise generating actions away from the stream corridors, where appropriate the fencing of the outer boundary of the established buffers, and the use of best management practices for dust and local water quality protections.

IMPACT ANALYSIS

The City of Puyallup has identified that all feasible and reasonable measures shall be taken to avoid and minimize site development related impacts to onsite and offsite environmentally critical areas. The applicant shall demonstrate that all of the following actions have been considered and implemented in terms of avoidance and mitigation sequencing (21.06.1020):

a) **Avoiding the impact altogether by not taking a certain action or parts of an action;**

Discussion: The proposed site development action would avoid all adverse impacts to the adjacent Type IV Stream and would not require an adverse impact to the identified Type III Stream. Onsite development actions would also avoid to the greatest extent practicable adverse modifications to the standard buffers associated with these streams.

b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

Discussion: The proposed site development action would minimize potential project related adverse impacts to the adjacent streams to the greatest extent practicable through site design and the development of only a single access connection to Pioneer Way East consistent with City of Puyallup public roadway safety designs and criteria. Internal site design would also allow for the minimization of the potential project related impacts to the adjacent offsite eastern stream corridor through the establishment of property boundary set-backs and the arrangement of future buildings with their backs (areas of least noise and light) facing toward the offsite restored stream corridor.

The potential impacts of stormwater runoff into the adjacent streams would also be avoided and minimized through the establishment and utilization of best management practices during site development and the creation of stormwater facilities as a part of the overall site development actions consistent with City of Puyallup stormwater regulations.

Buffer Area Modifications: The standard buffer for the Type IV Stream is 35 feet in width as measured perpendicular from the ordinary high water mark and for the Type III Stream is 50 feet in width as measured perpendicular from the ordinary high water mark. The present buffer along both sides of the Type IV Stream is dominated by a monotypic stand of reed canarygrass and the very outer portion of the western buffer includes a dense stand of Himalayan blackberry with a scattering of sapling red alder. The present buffer along the northern portion of the Type III Stream is dominated by reed canarygrass, a few herbs, and a scattering of blackberries that are routinely managed through mowing by the City of Puyallup roadway maintenance crews. The southern portion of the buffer along the Type III Stream is also dominated by a managed primarily blackberry plant community.

The *Stream Corridor Restoration and Enhancement Program* would recreate a more viable channel structure through meandering the Type IV Stream and by re-sloping the presently steep channel along the Type III Stream. Both channels would then be planted with a variety of desirable native plants to create a viable plant community that provided enhanced habitats, enhanced erosion protections, enhanced water quality protections, and enhance thermal protections.

The over length of the Type IV Stream would be increased and there would be not decrease in length of the Type III Stream. The Type III Stream would enter the existing culvert associated with Pioneer Way East to cross to the north and continue westerly along Pioneer Way East.

ACTIVE CHANNEL	TYPE III STREAM	TYPE IV STREAM
PRESENT LENGTH	221 square feet	748 square feet
PROPOSED LENGTH	221 square feet	1,300 square feet
LENGTH CHANGE	0 square feet	+ 552 square feet

c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

Discussion: The proposed site development action would implement a *Stream Corridor Restoration and Enhancement Program* to repair, rehabilitate, and restore the presently degraded character of the two stream corridors adjacent to the project site. The Type IV Stream offsite to the east is within a constructed agricultural ditch and dominated by a monotypic dense stand of reed canarygrass. In addition, the majority of the surface flow within this channel presently enters a constructed onsite stormwater pond and mixes with stormwater from adjacent developed areas prior to be conveyed to the north to enter the Type III Stream along Pioneer Way East. The Type III Stream along Pioneer Way East is within a managed roadside ditch and receives untreated stormwater runoff from Pioneer Way East.

Upon implementation the *Stream Corridor Restoration and Enhancement Program* would restore a desirable native plant community along each stream corridor (both onsite and offsite); would include a variety of habitat features for increased habitat opportunities for wildlife feeding, cover, nesting, and perching; would increase stream corridor thermal cover; and would provide increase opportunities for detrital transport downstream into associated aquatic and terrestrial habitats resulting in an overall functional lift.

d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

Discussion: Potential project related impacts to the adjacent aquatic environments would be reduced or eliminated through the onsite development and continued maintenance of appropriate stormwater treatment and detention facilities consistent with the City of Puyallup stormwater provisions. In addition, the restored stream corridors would be identified with a protective covenant or easement to ensure the long-term protections of these areas.

e) Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or;

Discussion: To ensure the short-term and long-term protection of the aquatic and terrestrial habitats associated with the identified stream corridors the overall site development action would implement a *Stream Corridor Restoration and Enhancement Program* restore a desirable native plant

community along each stream corridor, would include a variety of habitat features for increased habitat opportunities for wildlife feeding, cover, nesting, and perching, and would provide increase opportunity for detrital transport downstream into associated aquatic habitats resulting in an overall functional lift. This restoration program would also provide a visual amenity to the proposed residential community.

Stream Corridor Restoration and Enhancement Program outlined below has been prepared in accordance with the provisions of 21.06.610.

f) Monitoring the impact and taking appropriate corrective measures.

Discussion: The implementation of the proposed *Stream Corridor Restoration and Enhancement Program* would also incorporate a five-year monitoring and maintenance program to ensure the overall success of the program as measured by a set of established performance criteria. This project would also include provisions for project contingencies as needed, temporary irrigation, invasive species management, and a financial guarantee.

STREAM CORRIDOR RESTORATION AND ENHANCEMENT PROGRAM

The development of the proposed multi-family residential community avoids direct and indirect adverse impacts to identified Waters of the U.S., Waters of the State, or City of Puyallup critical habitats to the greatest extent practicable. In addition, the development of the new multi-family residential community would include an onsite stormwater collection, detention, and treatment system to avoid potential project related impacts to floodplain area or both local water quality and local water quantity within the receiving waters consistent.

Assess to the new multi-family residential community would be provided via a new driveway connection to Pioneer Way East along the northern boundary of the project site and via a new driveway connection to Shaw Road along the western boundary of the project site. The northern connection to Pioneer Way East would require a crossing of the Type III Stream presently confined within a maintained ditch associated with the Pioneer Way East right-of-way. While the final crossing structure has not yet been fully designed the project team has been coordinating with the City of Puyallup to meet critical areas and public health/safety requirements and with the Washington Department of Fish and Wildlife to meet fish passage requirements to ensure that the final design would not adversely impact fish habitats or the movement of surface water.

The development of the proposed multi-family residential community would also establish and restore a protective stream and buffer corridor composed of native plant species associated with the Type III Stream along the southern side of the Pioneer Way

East right-of-way and within a protective stream and buffer corridor associated with the Type IV Stream to the east of the eastern boundary of the project site (Appendix A).

1. The overall development of the **East Town Crossing Multi-Family Residential Community** would establish a protective stream corridor associated with the Type III Stream along the northern boundary of the project site and the Type IV Stream along the eastern boundary of the project site. The Type III Stream is presently within a managed City of Puyallup stormwater ditch along the Pioneer Way East right-of-way and is dominated by reed canarygrass and blackberry thickets. The Type IV Stream is presently within a managed agricultural field ditch and dominated by a monotypic stand of reed canarygrass. In addition, a portion of the Type IV Stream has eroded the channel and is presently entering a constructed stormwater pond within the southeastern portion of the project site.

2. Assess to the new multi-family residential community would be provided via a new driveway connection to Pioneer Way East along the northern boundary of the project site and via a new driveway connection to Shaw Road along the western boundary of the project site. The northern connection to Pioneer Way East would require a crossing of the Type III Stream presently confined within a maintained ditch associated with the Pioneer Way East right-of-way. The required crossing structure has been designed to meet critical areas protection requirements, public health/safety requirements, and the Washington Department of Fish and Wildlife to meet fish passage requirements to ensure that the new full spanning structure would not adversely impact fish habitats, the movement of aquatic organisms and detritus, or the movement of surface water.

3. The Type IV Stream located directly to the east of the project site would be relocated a short distance to the east into a restored protective corridor. The area of the restored corridor was managed for agricultural production for several decades and is presently densely overgrown with reed canarygrass and blackberry thickets. The restored corridor would be cleared of invasive vegetation and tilled. Following the clearing and tilling a new channel would be created to meander through this restored corridor starting at the location of the ditch repair associated with the adjacent stormwater pond and continuing northward to connect with the Type III Stream along Pioneer Way East. The meandering new channel would incorporate instream woody debris (a minimum of 10 standing snags and 10 downed logs) to increase aquatic and terrestrial habitats and provide channel structure/complexity.

   Area of the stream corridor and buffer restoration associated with the Type IV Stream immediately to the east of the project site is generally flat and has been managed and manipulated for the production and harvest of annual commodity crops for several decades. More recently this area has gone somewhat fallow and has become dominated by a dense monotypic stand of reed canarygrass with a scattering of dense blackberry thickets. The creation of an enhance stream channel and associated buffer within this area would be undertaken

initially by the mowing of the existing reed canarygrass and blackberries and then tilling to minimize the re-establishment of the blackberries. A small excavator would then be used to create the new meandering stream corridor with a bottom width of 12 inches to 18 inches and no greater than a 2 to 1 side slope. All side cast materials from the stream creation would be retained within the adjacent buffer and manipulated to form a scattering of hummock suitable to variations in plant community establishment.

4. The established stream corridor associated with the Type III Stream along the Pioneer Way East right-of-way adjacent to the northern portion of the project site and the restored stream corridor associated with the Type IV Stream along the eastern boundary of the project site would then be planted with a variety of desirable native plant species. The Type IV Stream Corridor would also be enhanced through the placement of standing snags and downed logs. These actions would be designed to provide enhanced habitats onsite and offsite; to provide enhanced habitat support downstream; to provide enhanced protections for local water quality; and to provide light, dust, and noise protections for adjacent habitats.

5. Temporary and long-term erosion control measures would be implemented during site preparation and channel/buffer creation. These measures include silt fencing during site preparation and seeding/mulching of exposed soil areas.

6. The onsite portion of the outer boundary of the established stream buffer areas would be posted with standard City of Puyallup buffer signs and fenced with a split-rail or other fence approved by the City of Puyallup to limit intrusion into the final established protective areas.

7. **ALL ONSITE RESTORATION AND ENHANCEMENT ACTIONS WOULD BE COMPLETED AT THE DIRECTION OF THE PROJECT BIOLOGIST.**

8. The established stream and buffer corridor areas would be protected through the establishment of a wetland tract, a “protective easement, or other City of Puyallup approved method.

9. Following the completion of the initial establishment, restoration, and enhancement activities the project biologist shall prepare an *Implementation Report* for submittal to the City of Puyallup.

10. Following City of Puyallup’s acceptance of the *Implementation Report* a minimum **five-year** *Performance Monitoring and Maintenance Program* would be undertaken to ensure the success of the *Stream Corridor Restoration and Enhancement Program*. **IF** required by the City of Puyallup or by the various involved resource agencies this *Performance Monitoring and Maintenance Program* would be extended to potentially ten-years should such additional

monitoring or maintenance be required to ensure the success of the *Stream Corridor Restoration and Enhancement Program.*

PROGRAM GOAL

The **GOAL** of the *Stream Corridor Restoration and Enhancement Program* is to ensure that proposed site development actions do not adversely impact identified aquatic resources and that the existing physical and biological functions of these aquatic resources are restored and enhanced. Upon the completion of this program there would be a functional lift in the potential for the established restoration and enhancement stream corridors to create a functional lift to onsite and offsite aquatic and terrestrial habitats. To achieve the defined **GOAL**, the following **PERFORMANCE CRITERIA** have been established:

Performance Criterion #1: 100% of the trees and shrubs initially planted within the restored and enhanced stream corridors would exhibit survival through the end of the first growing season following initial planting.

Performance Criterion #2: 80% of the trees and shrubs initially planted within the restored and enhanced stream corridors would exhibit survival through the end of the second growing season following initial planting.

Performance Criterion #3: The emergent plant community within the restored and enhanced stream corridors would exhibit the following minimum aerial coverage during the fall monitoring periods for a minimum of five-years following initial planting. For purposes of the aerial coverage determination the emergent plant community would include both planted and desirable volunteer species.

MONITORING YEAR	MINIMUM AERIAL COVERAGE
End of monitoring year one	15%
End of monitoring year two	20%
End of monitoring year three	40%
End of monitoring year five	80%
End of monitoring year seven	80% (if required)
End of monitoring year ten	80% (if required)

Performance Criterion #4: The scrub/shrub and sapling vegetation class within the restored and enhanced stream corridors would exhibit the following minimum aerial coverage during the fall monitoring periods for a minimum of five-years following initial planting. For purposes of the aerial coverage determination the scrub/shrub and sapling vegetation class would include both planted and desirable volunteer species.

MONITORING YEAR	MINIMUM AERIAL COVERAGE
End of monitoring year one	5%
End of monitoring year two	10%
End of monitoring year three	20%
End of monitoring year five	30%
End of monitoring year seven	60% (if required)
End of monitoring year ten	80% (if required)

Performance Criterion #5: The restored and enhanced stream corridors would contain a minimum of five (5) species of native shrubs and trees (combined count) at the end of monitoring years five, along with years seven and ten if required. Volunteer native species may be included in this count.

Performance Criterion #6: The restored and enhanced stream corridors associated with the Type IV Stream to the east of the project site would be enhanced through the placement of a minimum of 10 standing snags (minimum 20 feet tall and a 10-foot minimum width base root diameter) and a minimum of 10 downed logs (minimum 20 feet in length with or without rootball and a diameter at the mid-length point of 20 inches). These habitat features may exhibit retained limbs or use of the entire tree. These habitat features would be coniferous species.

Performance Criterion #7: Within the restored and enhanced stream corridors invasive species would not exceed 10% aerial coverage at the end of the first, second, third, and fifth seasons, along with years seven and ten if required, following initial planting. Invasive species include reed canarygrass, Canadian thistle, Himalayan blackberry, Scots broom, and other species listed as invasive by the Washington Department of Agriculture.

Performance Criterion #8: Throughout the restored and enhanced stream corridors, knotweed (*Polygonum* spp.) would not be present at any time during the monitoring period.

SELECTED PLANT COMMUNITIES

The plants selected for placement within the restored and enhanced stream corridors would be obtained as nursery stock. These selected species are native and commonly occur in the local area. The plant species prescribed are also selected to increase plant diversity, match present offsite communities, increase wildlife habitats, and enhance the aquatic environment. Many of the selected species can be somewhat sensitive to direct sunlight upon initial removal from the nursery and installation within the planting area. Special care would be undertaken by the planting contractor during installation to utilize existing shading and to ensure that plants are handled and installed with some care. Adequate irrigation would also be provided at the time of installation.

COMMON NAME (ID) - SCIENTIFIC NAME	NUMBER	SIZE
Big leaf maple (ACM) - *Acer macrophyllum*	28	2 gallon
Paper birch (BEP) - *Betula papyrifera*	30	2 gallon
Western dogwood (CON) - *Cornus nuttalli*	60	2 gallon
Western hawthorne (CRD) - *Crataegus douglasii*	58	2 gallon
Aspen (POT) - *Populus tremuloides*	30	2 gallon
Sitka spruce (PIS) – *Picea sitchensis*	57	2 gallon
Bitter cherry (PRE) - *Prunus emarginata*	59	2 gallon
Douglas fir (PSM) - *Pseudotsuga menziesii*	92	2 gallon
Cascara (RHP) - *Rhamnus purshiana*	58	2 gallon
Western red cedar (THP) - *Thuja plicata*	99	2 gallon
Western crabapple (PYF) - *Pyrus fusca*	Alt.	2 gallon
Pacific willow (SAL) - *Salix lasiandra*	Alt.	2 gallon
Vine maple (ACC) - *Acer circinatum*	22	1 gallon
Kinnikinnick (ACC) - *Arctostaphylos uva-ursi*	170	1 gallon
Tall Oregon grape (BEA) - *Berberis aquifolium*	41	1 gallon
Oregon grape (BEN) - *Berberis nervosa*	49	1 gallon
Hazelnut (COC) - *Cornus stolonifera*	43	1 gallon
Red osier dogwood (COS) - *Cornus stolonifera*	210	1 gallon
Ninebark (PHC) - *Physocarpus capitatus*	75	1 gallon
Twinberry (LOI) - *Lonicera involucrata*	96	1 gallon
Salal (GAS) - *Gaultheria shallon*	42	1 gallon
Oceanspray (HOD) - *Holodiscus discolor*	24	1 gallon
Red flowering currant (RIS) - *Ribes sanguineum*	45	1 gallon
Indian plum (OEM) - *Oemleria cerasiformis*	8	1 gallon
Wild rose (ROG) - *Rosa gymnocarpa*	66	1 gallon
Nootka rose (RON) - *Rosa nutkana*	100	1 gallon
Snowberry (SYA) - *Symphoricarpus albus*	71	1 gallon
Evergreen huckleberry (VAO) - *Vaccinium ovatum*	72	1 gallon
Tufted hairgrass (DEC) - *Deschacypsia cespitosa*	47	1 gallon
Snowberry (SYA) - Symphoricarpus albus	Alt.	1 gallon
Slough sedge (CAO) - *Carex obnupta*	400	plug
Small fruiting bulrush (SCM) - *Scirpus microcarpus*	400	plug
Hardstem bulrush (SCA) - *Scirpus acutus*	400	plug
Snowberry (SYA) - *Symphoricarpus albus*	66	plug

IMPLEMENTATION INSPECTION

Essential to the success of the *Stream Corridor Restoration and Enhancement Program* is the accurate inspection of onsite activities immediately prior to and during the initial invasive control actions, corridor and channel creation actions, habitat feature placements, and planting phase. These activities include pre-implementation site inspection, onsite inspection and technical direction during implementation activities, and post-planting site inspection and evaluation. The project biologist would complete onsite inspections, verify, and approve the following project tasks (at a minimum):

1. Marking of work areas and access corridors.
2. Marking of desirable plants to be retained.
3. Removal of invasive species and existing garbage.
4. Channel pattern identification.
5. Nursery stock acceptance.
6. Habitat feature acceptance.
7. Modification of plant species and sizes if required.
8. The character and placement of habitat and instream features.
9. Installation of the temporary irrigation system.
10. Installation of buffer boundary signs and buffer fencing.

The pre-implementation site inspection allows the project team and the project biologist to evaluate and, if necessary, adjust the onsite implementation steps. These steps include analysis of project site elevation, project sequencing and timing, final grade analysis, unforeseen required minor modifications to the original establishment plan, and the establishment of environmental protections (silt fences, etc.) required during planting. Onsite technical inspection during implementation and planting activities shall be conducted by the project biologist. The project biologist would perform implementation oversight and address minor unforeseen implementation difficulties to assure that the goal of the mitigation program is met.

The project biologist would be responsible for ensuring that the species and sizes of native plants selected and noted within the final planting plan are utilized during implementation. If selected native species become unavailable, the project biologist would approve, based on City standards, substitute plant species to assure that the goal of the mitigation program is met.

Following the completion of onsite planting activities an *Implementation Report* plan would be prepared and submitted to the City and potentially other involved resource agencies. The *Implementation Report* would include a description of who completed the onsite compensatory actions, a description of the scope of work completed, a description of work specifications, photo documentation of the actions taken, initial plant documentation at each established monitoring plot, and a detailed timeline of completed actions. The *Implementation Report* would also include a project evaluation prepared by the project biologist.

IMPLEMENTATION SCHEDULE

PROJECT TASK	TASK SCHEDULE
Onsite pre-implementation meeting	Completed by August 2, 202x
Placement of protective fencing. Final marking and identification of work area and access corridors.	Completed by August 6, 202x
Removal of invasive plants within the restoration areas	Completed by August 20, 202x
Placement of access connection to Pioneer Way East.	Completed by August 25, 202x
Creation of meandering channel for the Type IV Stream and re-sloped channel for the Type III Stream.	Completed by August 28, 202x
Placement of habitat features and channel woody debris.	Completed by Sept. 10, 202x
City environmental staff review of the planting areas.	Completed by Sept. 15, 202x
Planting of stream corridors and associated buffers.	Completed by Nov. 15, 202x
Implementation Report to City and potentially other involved resource agencies.	Completed by Nov. 29, 202x

based on permit approves on or before August 1, 202x

PROJECT MONITORING

Following the successful implementation of the *Stream Corridor Restoration and Enhancement Program* and the acceptance of the *Implementation Report* by the City a minimum **five-year** *Performance Monitoring and Maintenance Program* would be undertaken. **IF** required by the City of Puyallup or by the various involved resource agencies this *Performance Monitoring and Maintenance Program* would be extended to potentially ten-years should such additional monitoring or maintenance be required to ensure the success of the *Stream Corridor Restoration and Enhancement Program.*

STANDARDS OF SUCCESS

VEGETATION: A minimum of ten (10) 15-foot radius sample plots would be established – three (3) within the Type III Stream Corridor and seven (7) within the Type IV Stream Corridor. The evaluation of the success of the *Stream Corridor Restoration and Enhancement Program* would be based on the defined performance criteria. The defined performance criteria would be applied at the times of yearly monitoring. Sample locations would be shown on the *Implementation Report* graphic and shall correspond to identified photopoints.

1. As a part of monitoring years one and two the project biologist would count the number of live plants which were planted within the identified monitoring plots. Plants would be identified to species and observations of general plant condition (plant health, amount of new growth) are to be recorded.

2. During each monitoring period and at each identified sample plot the project biologist would determine percent coverage of vegetation for emergent species and for the scrub/shrub and sapling tree species. The project biologist would also document species richness within each sample plot.

3. At identified sample plots the project biologist would count the number - and tag for removal - undesirable invasive species and estimate the aerial coverage (as if the observer were looking straight down from above) of these invasive species.

4. As a part of monitoring years one and two the project biologist would count the number of desirable "volunteer" plants and estimate the aerial coverage of these plants.

5. The project biologist would take photographs that show the *Stream Corridor Restoration and Enhancement Program* area. During the monitoring period photos would be taken in the same direction and at the same location to provide a series of photos. These photos would show plant growth, plant species, and plant coverage.

6. Upon the completion of each monitoring period as noted below the project biologist would prepare a report defining methods, observations, and results along with the date the observations were completed. Each report would be provided to the City of Puyallup and potentially other involved resource agencies.

MONITORING YEAR	PLANT COMMUNITY MONITORING	MONITORING REPORT
YEAR-1	On or about April 15, 202x+1	
	On or about Sept. 15, 202x+1	Report due Oct. 7, 202x+1
YEAR-2	On or about April 15, 202x+2	
	On or about Sept. 15, 202x+2	Report due Oct. 7, 202x+2
YEAR-3	On or about Sept. 15, 202x+3	Report due Oct. 7, 202x+3
YEAR-5	On or about Sept. 15, 202x+5	report due Oct. 7, 202x+5
YEAR-7 If required	On or about Sept. 15, 202x+7	report due Oct. 7, 202x+7
YEAR-10 If required	On or about Sept. 15, 202x+10	report due Oct. 7, 202x+10

* based on a fall 202x implementation

HABITAT FEATURES: A minimum of 10 standing snags (minimum 20 feet tall and a 10-foot minimum width base root diameter) and 10 downed logs (minimum 20 feet in length with or without rootball and a diameter at the mid-length point of 20 inches) would be placed within the Type IV Stream Corridor during initial implementation actions. These habitat features may exhibit retained limbs or use of the entire tree. These habitat features would be coniferous species and the presence and location of these features would be identified within the *Implementation Report.*

STREAM LENGTH: As presently defined the Type IV Stream would be re-configured into a meandering channel with an approximate length of 1,300 linear feet.

Corridor during initial implementation actions. The presence and location of these features would be identified within the *Implementation Report.*

FORMAL SURVEY: As presently defined the Type IV Stream would be re-configured into a meandering channel to be approximately 508 linear feet in length from the outlet of the culvert associated with the pipeline corridor at the southeastern corner of the project site to its confluence with the Type III Stream along Pioneer Way East. In addition, the length of the enhanced channel that conveys the Type III Stream along Pioneer Way East from is confluence with the Type IV Stream at the east to the existing culvert crossing to the north under Pioneer Way East at the western end of the channel would continue to be approximately 252 linear feet in length.

Initial Survey: Upon the completion of the implementation of the *Stream Corridor Restoration and Enhancement Program* a formal professional survey of the program area would be accomplished. This survey would define the project boundaries, the re-configured Type IV Stream, the reshaped Type III Stream, the location of the 10 monitoring sample plots, and the location and character of the habitat features. The initial professional survey would be included within the *Implementation Report* and be utilized to ensure consistency with the performance criteria.

Year Five Survey: As a part of the preparation of the *Year-Five Monitoring Report* the program area would be re-surveyed. This survey would define the project boundaries, the Type IV Stream channel, the Type III Stream channel, the location of the 10 monitoring sample plots, and the location and character of the habitat features. This professional survey would be included within the *Year-Five Monitoring Report* and be utilized to ensure consistency with the performance criteria.

VEGETATION MAINTENANCE PLAN

Maintenance of the *Stream Corridor Restoration and Enhancement Program* plant community may be required. Such maintenance would be identified during the monitoring period and would be undertaken at the direction of the project biologist. The

overall objective is to establish undisturbed plant communities that do not require maintenance. Activities may include, but are not limited to, the removal of invasive non-native vegetation and the irrigation of selected areas. Established maintenance activities include the removal of any trash within the restoration areas.

REMOVAL OF INVASIVE NON-NATIVE VEGETATION

As a contingency, should the removal of invasive non-native species become necessary, the project proponent would contact the City of Puyallup to establish and define specific actions to be taken. Resultant contingency plan activities shall be implemented when the ongoing vegetation monitoring program indicates that invasive species are becoming dominant in the onsite plant community (invasive species greater than 10% aerial coverage or any presence of knotweed).

The following invasive vegetation maintenance removal program would be implemented to ensure the establishment of desirable plant communities. At the direction of the project biologist additional removal actions (if required) would also be undertaken to ensure the establishment of desirable plant communities. The project proponent removal not be responsible for replacement of plants that may be removed or damaged by others.

MONITORING YEAR	FIRST REMOVAL ACTION	SECOND REMOVAL ACTION	THIRD REMOVAL ACTION
YEAR-1	On or about April 15, 202x+1	on or about June 1, 202x+1	on or about August 30, 202x+1
YEAR-2	On or about April 15, 202x+2	on or about June 1, 202x+2	on or about August 30, 202x+2
YEAR-3	On or about April 15, 202x+3	on or about June 1, 202x+3	on or about August 30, 202x+3
YEAR-5	On or about April 15, 202x+5	on or about June 1, 202x+5	on or about August 30, 202x+5
YEAR-7 If required	On or about April 15, 202x+7	on or about June 1, 202x+7	on or about August 30, 202x+7
YEAR-9 If required	On or about April 15, 202x+9	on or about June 1, 202x+9	on or about August 30, 202x+9

* based on a fall 202x implementation

CONTINGENCY PLAN

As a contingency, should the proposed *Stream Corridor Restoration and Enhancement Program* fail to meet the performance criteria, the project proponent would undertake required remedial actions. Where plant survival is the failing component, the project proponent shall replant and ensure the success of this second planting which would be held to the same standard of success as measured by threshold criteria and monitoring

processes. Where non-native, invasive shrubs exceed 10% aerial coverage the project proponent would undertake removal actions. Such removal actions shall be completed using hand tools or pulling the plants by hand to remove the invasive vegetation without disrupting the soil profile. All cut or pulled vegetation would be removed from the restoration area and disposed in an approved location. Herbicides shall only be used following approval by the City. If used, all herbicide application shall be completed by a licensed professional.

Should additional remedial actions be required the project proponent would meet with the City to establish and define actions to be taken to meet the desired goal of this program.

TEMPORARY IRRIGATION

The project proponent would ensure that a minimum of **one (1) inch of water is supplied each week** to the restoration area between May 1 and October 15 for a least the first three years following initial planting. The calculated amount of required water would include both natural rainfall and temporary irrigation. The need for additional years of irrigation would be determined based on site conditions and overall plant survival. The amount of water supplied to the restoration area would be increased if onsite monitoring defines such a need.

Irrigation would be provided via a temporary system placed on the ground surface within the restoration areas or with optional hand watering. The system would allow for a minimum of 10% overlap of coverage between sprinklers and the sprinklers would be a minimum of four (4) feet above ground. The project team would employ a landscape contractor to install, operate, and maintain the irrigation system. All actions would also be monitored onsite by the project biologist.

When deemed appropriate and with authorization by the City the temporary irrigation system would be removed and disposed of at an approved facility.

PLANTING NOTES

All plant materials utilized within the restored areas would be native to the Puget Sound Region. The onsite biologist would inspect plant materials to assure the appropriate plant schedule and plant characteristics are met. The project proponent would warrant that all plants would remain alive and healthy for a period of one year following completion of planting activities. The project proponent would replace all dead and unhealthy plants with plants of the same specifications.

FINANCIAL GUARANTEE

IF REQUIRED, the project proponent would provide the City of Puyallup a financial guarantee defined in two parts. Part One (Implementation Guarantee) would be associated with the initial onsite elements of the *Stream Corridor Restoration and Enhancement Program*. Part Two (Performance Guarantee) would be associated with the *Performance Monitoring and Maintenance Program*. These guarantees would be held by the City and be equal to 125% of the actual estimated costs for identified activities. This increased percentage would allow for adequate funds to be available as a contingency should actions be required to meet the goals of these plans. The Implementation Guarantee shall be deemed to be released by the City upon the successful completion of the initial onsite elements and the acceptance if the Implementation Report by the City of Puyallup. The Performance Guarantee would be deemed to be released upon meeting the established performance criteria and acceptance by the City of the required reporting documents.

STANDARD OF CARE

This document has been completed by Habitat Technologies for the use by **Mr. Greg Hellie @ East Town Crossing**. Prior to extensive site planning the findings documented in this report should be reviewed, verified, and approved by City of Puyallup and potentially other resource and permitting agency(s) staff. Habitat Technologies has provided professional services that are in accordance with the degree of care and skill generally accepted in the nature of the work accomplished. No other warranties are expressed or implied. Habitat Technologies is not responsible for design costs incurred before this document is approved by the appropriate resource and permitting agencies.

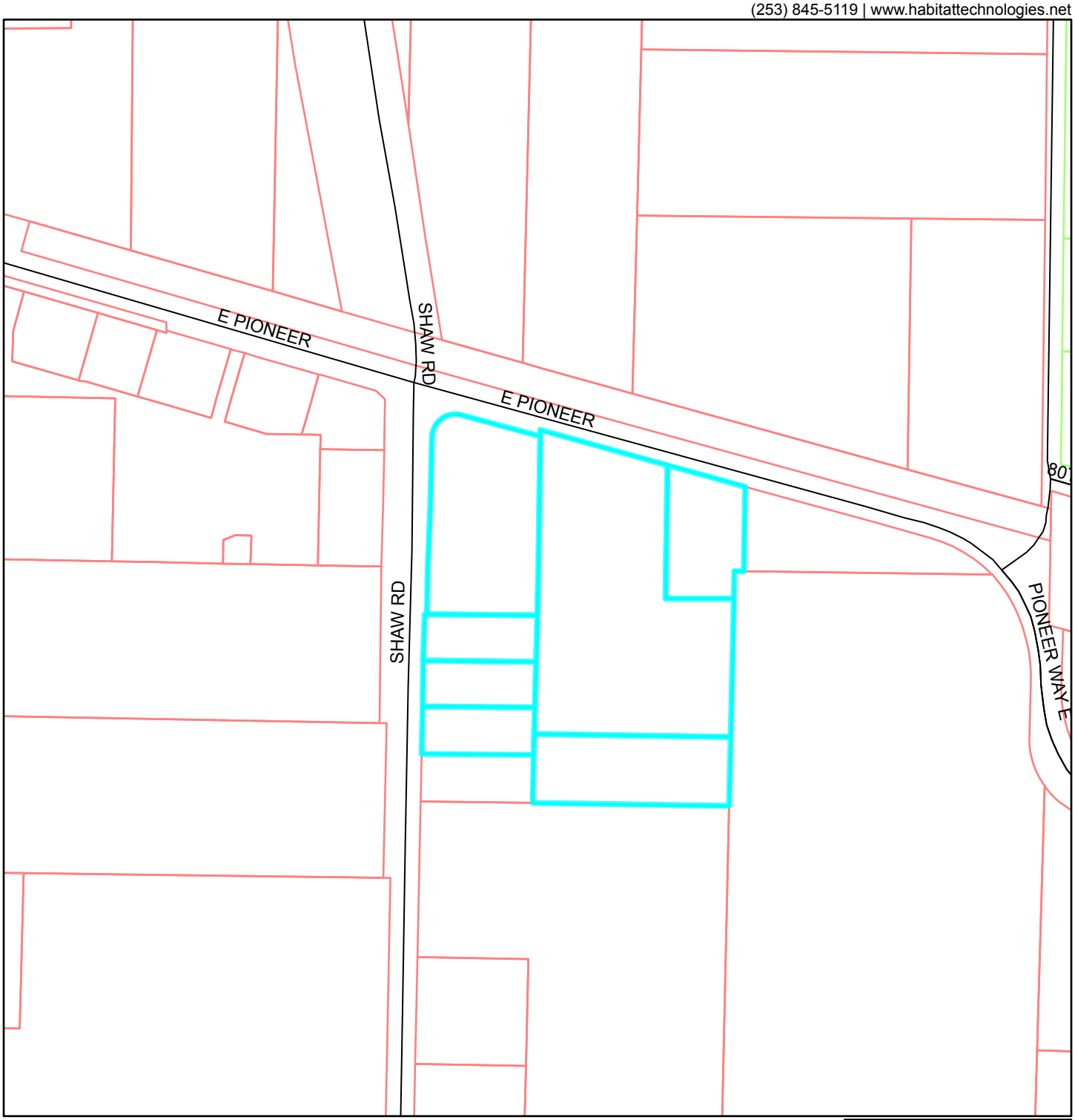
Bryan W. Peck
Senior Wetland Biologist

Thomas D. Deming, SPWS
Habitat Technologies

FIGURES

Figure 1 Site Vicinity

Habitat Technologies
P.O.Box 1088
Puyallup, WA 98371
(253) 845-5119 | www.habitattechnologies.net



Legend

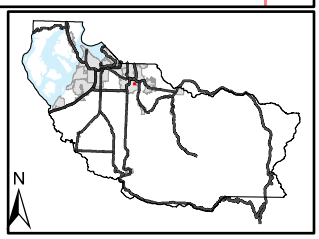
Roads

Condominium

Other

Tax Parcels

Base Parcel



1:3,600

0 80 160 320
Feet

The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos and other data may not align. The County assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. The County makes no warranty of fitness for a particular purpose.

Date: 6/7/2021 01:25 PM

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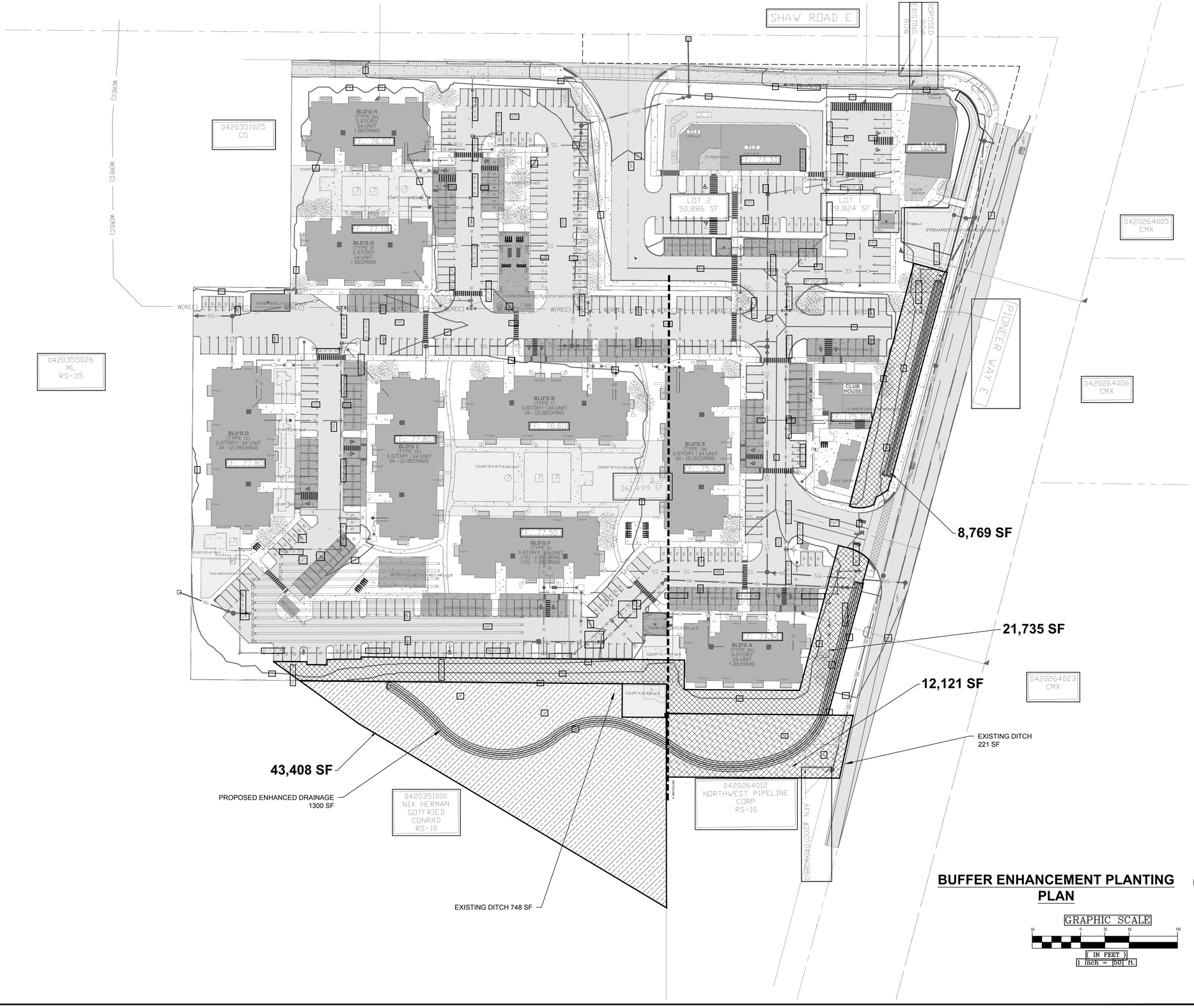
Washington State Department of Natural Resources FPARS Mapping System, 2016 (for stream typing): http://fortess.wa.gov/dnr/app1/fpars/viewer.htm

APPENDIX A – Stream Corridor Restoration Areas

Know what's **below.**
Call before you dig.



BUFFER ENHANCEMENT PLANTING PLAN

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

Nature By Design
Landscape Architecture
1320 Alameda Avenue, Suite B, Fircrest, WA 98466
www.naturebydesigninc.com
253.460.6067

PROJECT:
EAST TOWN CROSSING
PIONEER & SHAW RD
PUYALLUP WA
HABITAT TECHNOLOGIES

REVISIONS:

DRAWING ISSUED FOR:
AGENCY REVIEW
DATE: JUNE 21, 2022

STATE OF WASHINGTON
KATHERINE OWENS
NO. 692 • EXP. APRIL 2023
LICENSED LANDSCAPE ARCHITECT

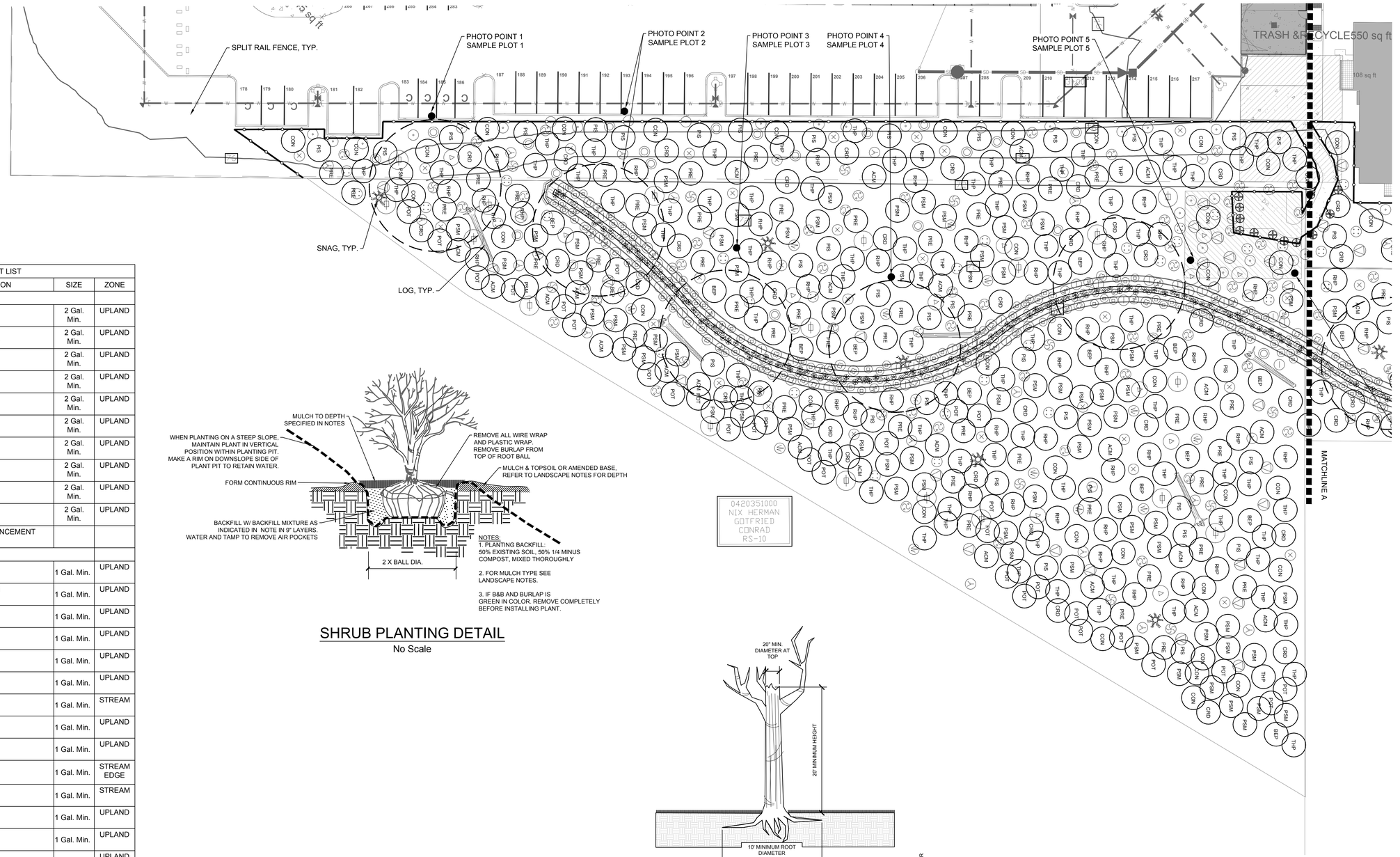
PROJECT NO:	2269
FILE NAME:	2269LSA
DRAWN BY:	KLO
CHECKED BY:	KLO
X-REFS:	CIVIL
PLOT SCALE:	1:1
DRAWING SCALES:	1:50

DRAWING CONTENTS
BUFFER ENHANCEMENT PLANTING PLAN

DRAWING NO.:
L1

ORIG. SHEET SIZE 22X34

Know what's **below.**
Call before you dig.



NATIVE PLANT LIST				
SYMBOL	QTY	DESCRIPTION	SIZE	ZONE
		TREES		
ACM	28	Acer macophyllum Big Leaf Maple	2 Gal. Min.	UPLAND
BEP	30	Betula papyifera Western Paper Birch	2 Gal. Min.	UPLAND
CON	60	Cornus nuttallii Pacific Dogwood	2 Gal. Min.	UPLAND
CRD	58	Crataegus douglasii Western Hawthrone	2 Gal. Min.	UPLAND
PIS	57	Picea sitchensis Sitka Spruce	2 Gal. Min.	UPLAND
POT	30	Popolus tremuloides Quaking Aspen	2 Gal. Min.	UPLAND
PRE	59	Prunus emargenata Bitter Cherry	2 Gal. Min.	UPLAND
PSM	92	Pseudotsuga menziesii Douglas Fir	2 Gal. Min.	UPLAND
RHP	58	Rhamnus purshiana Cascara	2 Gal. Min.	UPLAND
THP	99	Thuja plicata Western Red Cedar	2 Gal. Min.	UPLAND
	571	TOTAL BUFFER ENHANCEMENT TREES		
		SHRUBS		
△	22	Acer circinatum Vine Maple	1 Gal. Min.	UPLAND
⊕	170	Arctostophyllos uva ursi Kinnickinnick	1 Gal. Min.	UPLAND
⊙	47	Deschampsia cespitosa Tufted Hairgrass	1 Gal. Min.	UPLAND
⑄	41	Mahonia aquilfolium Tall Oregon Grape	1 Gal. Min.	UPLAND
∘	49	Mahonia nervosa Oregon Grape	1 Gal. Min.	UPLAND
⊗	43	Corylus cornuta Hazlenut	1 Gal. Min.	UPLAND
□	210	Cornus stolonifera Red Osier Dogwood	1 Gal. Min.	STREAM
◯	42	Gautheria shallon Salal	1 Gal. Min.	UPLAND
⊖	24	Holodiscus discolor Oceansoray	1 Gal. Min.	UPLAND
⌐	96	Lonicera involucrata Black Twinberry	1 Gal. Min.	STREAM EDGE
✿	75	Physocarpus capitatus Ninebark	1 Gal. Min.	STREAM
❀	8	Oelmeria cerasiformis Osoberry	1 Gal. Min.	UPLAND
⁘	45	Ribes sanguineum Flowering Currant	1 Gal. Min.	UPLAND
⋈	66	Rosa gymnocarpa Wild Rose	1 Gal. Min.	UPLAND
—	100	Rosa nutkana Nootka Rose	1 Gal. Min.	STREAM EDGE
❀	71	Symphoricarpos albus Snowberry	1 Gal. Min.	UPLAND
▽	72	Vaccinium ovatum Evergreen Huckleberry	1 Gal. Min.	UPLAND
	1181	TOTAL BUFFER ENHANCEMENT SHRUBS		
		EMERGENTS		
⫽		Carex obnupta Slough Sedge	4" Plug @ 1' O.C.	STREAM
✳		Sciprus acutus Hardstem Bulrush	4" Plug @ 1' O.C.	STREAM
☆		Sciprus microcarpus Small Fruited Bulrush	4" Plug @ 1' O.C.	STREAM

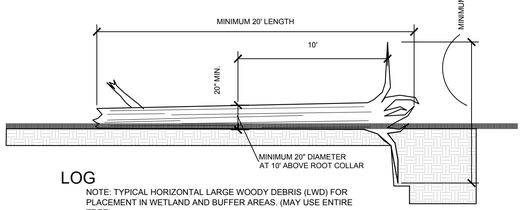
NOTES:
1. PLANTING BACKFILL: 50% EXISTING SOIL, 50% 1/4 MINUS COMPOST, MIXED THOROUGHLY
2. FOR MULCH TYPE SEE LANDSCAPE NOTES.
3. IF B&B AND BURLAP IS GREEN IN COLOR. REMOVE COMPLETELY BEFORE INSTALLING PLANT.

SHRUB PLANTING DETAIL
No Scale

UPLAND BUFFER AREA SOIL MOISTURE CONDITIONS		
COMMON NAME	SCIENTIFIC NAME	PERCENT BY WEIGHT
COLONIAL BENTGRASS	Agrostis tenuis	15%
TALL FESCUE	Festuca arundinacea	40%
PERENNIAL RYEGRASS	Lolium perenne	30%
CREEPING RED FESCUE	Festuca rubra	15%

APPLY AT THE RATE OF 120 LBS PER ACRE.
REFER TO THE KEY MAP FOR WETLAND AND UPLAND PLANTING AREAS.

SNAG (STUMP)
NOTE: TYPICAL VERTICAL LARGE WOODY DEBRIS (LWD) FOR PLACEMENT IN WETLAND AND BUFFER AREAS.



LOG
NOTE: TYPICAL HORIZONTAL LARGE WOODY DEBRIS (LWD) FOR PLACEMENT IN WETLAND AND BUFFER AREAS. (MAY USE ENTIRE TREE).

SNAG AND LOG FEATURE DETAIL

ENLARGED SOUTH BUFFER ENHANCEMENT PLANTING PLAN

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

Nature By Design
Landscape Architecture
1320 Alameda Avenue, Suite B, Fircrest, WA 98466
www.naturebydesigninc.com
253.460.6067

PROJECT:
EAST TOWN CROSSING
PIONEER & SHAW RD
PUYALLUP WA
HABITAT TECHNOLOGIES

REVISIONS:

DRAWING ISSUED FOR:
AGENCY REVIEW
DATE: JUNE 21, 2022

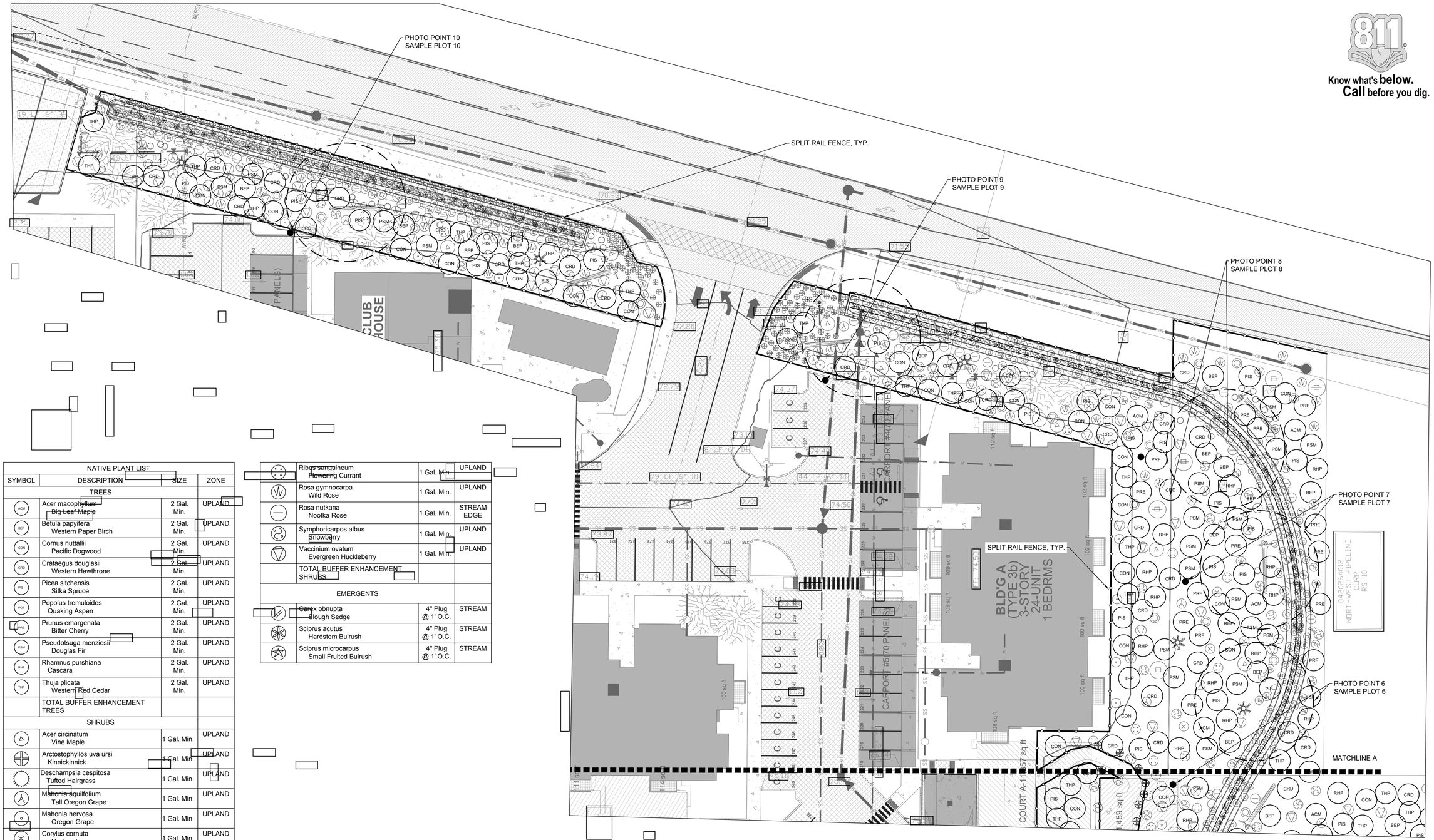
STATE OF WASHINGTON
KATHERINE OWENS
NO. 692 • EXP. APRIL 2023
LICENSED LANDSCAPE ARCHITECT

PROJECT NO:	2269
FILE NAME:	2269LSA
DRAWN BY:	KLO
CHECKED BY:	KLO
X-REFS:	CIVIL
PLOT SCALE:	1:1
DRAWING SCALES:	1:20

DRAWING CONTENTS
SOUTH ENLARGED BUFFER ENHANCEMENT PLANTING PLAN

DRAWING NO.:
L2
2 OF

ORIG. SHEET SIZE 22X34



NATIVE PLANT LIST			
SYMBOL	DESCRIPTION	SIZE	ZONE
	TREES		
ACM	Acer macrophyllum Big Leaf Maple	2 Gal. Min.	UPLAND
BEP	Betula papyifera Western Paper Birch	2 Gal. Min.	UPLAND
CON	Cornus nuttallii Pacific Dogwood	2 Gal. Min.	UPLAND
CRD	Crataegus douglasii Western Hawthrone	2 Gal. Min.	UPLAND
PIS	Picea sitchensis Sitka Spruce	2 Gal. Min.	UPLAND
POT	Popolus tremuloides Quaking Aspen	2 Gal. Min.	UPLAND
PRE	Prunus emargenata Bitter Cherry	2 Gal. Min.	UPLAND
PSM	Pseudotsuga menziesii Douglas Fir	2 Gal. Min.	UPLAND
RHP	Rhamnus purshiana Cascara	2 Gal. Min.	UPLAND
THP	Thuja plicata Western Red Cedar	2 Gal. Min.	UPLAND
	TOTAL BUFFER ENHANCEMENT TREES		
	SHRUBS		
	Acer circinatum Vine Maple	1 Gal. Min.	UPLAND
	Arctostophyllos uva ursi Kinnickinnick	1 Gal. Min.	UPLAND
	Deschampsia cespitosa Tufted Hairgrass	1 Gal. Min.	UPLAND
	Mahonia aquilfolium Tall Oregon Grape	1 Gal. Min.	UPLAND
	Mahonia nervosa Oregon Grape	1 Gal. Min.	UPLAND
	Corylus cornuta Hazlenut	1 Gal. Min.	UPLAND
	Cornus stolonifera Red Osier Dogwood	1 Gal. Min.	STREAM
	Gautheria shallon Salal	1 Gal. Min.	UPLAND
	Holodiscus discolor Oceansoray	1 Gal. Min.	UPLAND
	Lonicera involucrata Black Twinberry	1 Gal. Min.	STREAM EDGE
	Physocarpus capitatus Ninebark	1 Gal. Min.	STREAM
	Oelmeria cerasiformis Osoberry	1 Gal. Min.	UPLAND

	Ribes sanguineum Flowering Currant	1 Gal. Min.	UPLAND
	Rosa gymnocarpa Wild Rose	1 Gal. Min.	UPLAND
	Rosa nutkana Nootka Rose	1 Gal. Min.	STREAM EDGE
	Symphoricarpos albus Snowberry	1 Gal. Min.	UPLAND
	Vaccinium ovatum Evergreen Huckleberry	1 Gal. Min.	UPLAND
	TOTAL BUFFER ENHANCEMENT SHRUBS		
	EMERGENTS		
	Carex obnupta Slough Sedge	4" Plug @ 1' O.C.	STREAM
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CREEPING RED FESCUE	Festuca rubra	15%

APPLY AT THE RATE OF 120 LBS PER ACRE.
REFER TO THE KEY MAP FOR WETLAND AND UPLAND PLANTING AREAS.

NORTH BUFFER ENHANCEMENT PLANTING PLAN

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

Know what's below. Call before you dig.

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STATE OF WASHINGTON · KATHERINE OWENS · 24010 · NO. 4012 · EXP. APRIL 2023 · LICENSED LANDSCAPE ARCHITECT

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CHECKED BY:	KLO
X-REFS:	CIVIL
PLOT SCALE:	1:1
DRAWING SCALES:	1:20

DRAWING CONTENTS
NORTH ENLARGED BUFFER ENHANCEMENT PLANTING PLAN

DRAWING NO.:
L3

3 OF

ORIG. SHEET SIZE 22X34