Snohomish County

Public Works

PUBLIC NOTICE

DETERMINATION OF NONSIGNIFICANCE (DNS)

and LAND DISTURBING ACTIVITY PERMIT

PROJECT NAME and NUMBER: Little Bear Creek Advance Mitigation Site (RC 1730)

DESCRIPTION OF PROPOSAL: Snohomish County Public Works (SCPW) proposes to construct and operate a 17-acre advance wetland mitigation site in the Little Bear Creek Subbasin. SCPW intends to restore the site and improve the functions and values of the wetlands and streams so that the site generates mitigation credits that can be used to offset unavoidable impacts of future road improvement projects identified in the County's 6-year Annual Construction Plan – Transportation Improvement Program (ACP-TIP).

The currently proposed road improvement projects that would potentially use credits generated by the LBCAMS are dispersed across unincorporated Snohomish County portions of the Swamp Creek, North Creek, and Little Bear Creek subbasins. Little Bear Creek drains more than 15 square miles in southern Snohomish and northern King Counties. The subbasin is characterized by a mix of rural, residential, and commercial land uses, but retains more natural land cover (impervious surface cover of about 13 percent) than the North or Swamp Creek subbasins. Most of the subbasin (about 72%) is located outside of UGAs or incorporated areas.

The Little Bear Creek Advance Mitigation Site (LBCAMS) contains degraded wetlands, a habitat-impaired 450-foot-long reach of Little Bear Creek, and channelized spring-fed tributaries. Prior to its purchase by Snohomish County in 2017, the site had a long history of rural residential and agricultural use which involved ditching, filling, grazing, and construction of interior roads and structures. These practices altered the hydrology of the wetlands, reduced the quality and complexity of aquatic and terrestrial habitats, affected in-stream conditions, and contributed to water quality problems in this portion of the subbasin.

Creating an advance mitigation project at LBCAMS where credits can be consolidated and "banked" offers the County several advantages: Alleviates the need to find multiple suitable mitigation sites, which is increasingly difficult in developed and developing areas of Water Resource Inventory Area (WRIA) 8; Reduces uncertainty over whether the compensatory mitigation will be successful because the credits are generated in advance of the impacts; Helps mitigate concerns about temporal wetland impacts and can result in lower replacement ratios because the mitigation occurs in advance of impacts; Reduces the time and cost of future project permitting because the mitigation is pre-approved; Reduces time and cost associated with mitigation site design and construction because mitigation for multiple projects is combined in one location; Protects a site that is surrounded by residential and industrial development from future development; Enables more efficient use of limited resources in the

maintenance and monitoring of mitigation projects because of consolidation; and Increases cost efficiencies of public funds.

With implementation of this mitigation plan, LBCAMS would provide the potential for approximately 0.3 acre of wetland creation, 4.3 acres of wetland reestablishment, 0.2 acre of wetland rehabilitation, 6.0 acres of wetland enhancement, 5.6 acres of buffer and upland preservation with enhancement, and approximately 225 linear feet of floodplain enhancement. The final acreage provided by the plan's implementation would be determined at the time of final design and construction. SCPW expects to generate sufficient mitigation credits at LBCAMS to offset wetland, stream, and buffer impacts associated with up to 11 planned road improvement projects over the next 10 years.

The proposed mitigation actions include:

- Remove invasive vegetation throughout the site
- Remove structures, conduit, culverts, piping, utilities, internal fencing and decommission an existing water supply well.
- Excavate fill and regrade to appropriate elevations for wetland reestablishment or creation.
- Use fill material to selectively plug internal drainages (ditches) to enhance site hydrology and restore historical wetland conditions.
- Create complex microtopography to encourage habitat diversity and retain water on the site.
- Retain and/or install habitat features such as brush piles, habitat logs, stumps, standing snags, and root wads.
- Plant a diverse assemblage of native plants to establish forested and scrub-shrub wetland communities.
- Reconnect Little Bear Creek with its floodplain.
- Enhance instream habitat through placement of large wood, creation of a floodplain bench, and enhancement of the riparian corridor.
- Enhance wetland and stream buffers and upland areas by removing invasive vegetation and planting native species.
- Plant new buffers and riparian vegetation in areas that were previously cleared.
- Retain and enhance exterior fencing to restrict unauthorized access.
- Establish a conservation easement or similar protective covenant to ensure long-term protection of the mitigation area.
- Monitor, maintain and adaptively manage the site in perpetuity.

LOCATION OF PROPOSAL: The proposed mitigation would occur on 17 acres of land located south of 238th Street SE near its intersection with 58th Avenue SE. The site is located approximately 500 feet west of SR 522, in Section 34, Township 27 North, Range 5 East, W.M. of Snohomish County (See *Figure 1-Vicinity Map*).

APPLICANT AND LEAD AGENCY: Snohomish County Public Works

LAND DISTURBING ACTIVITY (LDA) PERMIT: This project will require an LDA permit. The preliminary estimates indicate that approximately 4,800 cubic yards of fill were placed on the site in the areas investigated, much of which will be removed or relocated as part of the mitigation project. With fill removal, site contours will be graded to restore wetlands, generally removing fill down to the naturally formed wetland hydric soils that lie beneath the fill. The project will place approximately 95 CY of fill into existing wetlands. The fill will be used to create hummocks, which will be low enough so that the wetlands retain wetland characteristics. An additional 10 CY of fill will be placed within channelized streams and ditches to create the desired hydrologic and flow path conditions. The total volume of fill in streams and wetlands is 105 CY. The fill will be derived from areas of the site that are being excavated to create, rehabilitate and reestablish wetland. The project will not add impervious surface area. The existing estimated impervious surface area totals 0.96 acres (41,817 square feet). An estimated 0.88 acres (38,332 square feet) of impervious surface area will be removed. The majority of the vegetation to be removed will be herbaceous and woody shrub invasive species. Some native species trees, including red alders, will be removed where grading is proposed to restore wetlands, but most tree clearing would remove non-native trees. Approximately 10 large-diameter trees will be removed and five large trees will be left as snags. All of the trees to be removed will be used for habitat structures or girdled to create snags that would provide habitat features for birds.

THRESHOLD DETERMINATION: The lead agency for this proposal has determined that it does not have a probably significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 4.21C.30(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

The lead agency has determined that the requirements for environmental analysis, protection, and mitigation measures have been adequately addressed in the county's development regulations and comprehensive plan adopted under chapter 36.70A RCW, and in other applicable local, state, or federal laws and rules, as provided by RCW 43.21C.240 and WAC 197-11-158. Our agency will not require any additional mitigation measures under chapter 30.61 SCC.

PUBLIC COMMEMT PERIOD: This DNS and LDA are subject to a 21-day public and agency comment period. Written comments may be submitted by mail or e-mail to the lead agency's contact person. See name and address below. Comments must be received by 5 p.m. PDT April 29, 2019.

APPEALS: This DNS may be appealed pursuant to the requirements of SCC 30.61.300 and Chapter 2.02 SCC. There is a 21-day appeal period on the DNS that commences from the date of publication of notice. Any appeal must be addressed to the County Hearing Examiner,

accompanied by a filing fee of $500.00, and be filed in writing at Snohomish County Public Works, 3000 Rockefeller Ave., Robert J. Drewel Building, 2nd Floor, Customer Service Center, Everett, Washington. The appeal must be received by 5 p.m. PDT April 29, 2019.

The appeal must contain the items set forth in SCC 30.71.050(5). In addition, SCC 30.61.305(1) also requires that any person filing an appeal of a threshold determination made pursuant to chapter 30.61 SCC shall file with the hearing examiner, within seven days of filing the appeal, a sworn affidavit or declaration demonstrating facts and evidence, that if proven, would demonstrate that the issuance of the threshold determination was clearly erroneous.

CONTACT PERSON:	Name: **Crilly Ritz, Senior Planner II** Telephone: 425 262-2476 crilly.ritz@snoco.org
RESPONSIBLE OFFICIAL:	Steven E. Thomsen, P.E., Director Snohomish County Public Works
ADDRESS:	3000 Rockefeller Ave., M/S 607 Everett, WA 98201-4046

Signature: _____ **Date:** 3/29/19

DISCLAIMER:
The determination that an environmental impact statement does not have to be filed does not mean there will be no adverse environmental impacts. Snohomish County codes governing noise control, land use performance standards, construction and improvement of county roads, drainage control, and building practices will provide substantial mitigation of the aforementioned impacts.

The issuance of this Determination of Nonsignificance (DNS) should not be interpreted as acceptance or approval of this proposal as presented. Snohomish County reserves the right to deny or approve said proposal subject to conditions if it is determined to be in the best interest of the County and/or necessary to the general health, safety, and welfare of the public to do so.

Title VI and Americans with Disabilities Act (ADA) Information: It is Snohomish County's policy to assure that no person shall on the grounds of race, color, national origin, or sex as provided by Title VI of the Civil Rights Act of 1964, as amended, be excluded from participation in, be denied the benefits of, or otherwise be discriminated against under and County sponsored program or activity. For questions regarding Snohomish County Public Works' Title VI Program, or for interpreter or translation services for non-English speakers, or otherwise making materials available in an alternate format, contact the Department Title VI Coordinator via e-mail at spw.titlevi@snoco.org or phone 425-388-6660. Hearing/speech impaired may call 711.

DISTRIBUTION LIST:

Federal Agencies:

National Marine Fisheries Service/ SEPA Review
Natural Resources Conservation Service
NOAA, National Marine Fisheries Service
NOAA, National Marine Fisheries Service - North Puget Sound Branch
US Army Corps of Engineers Seattle District (Seattle District Corps of Engineers)
US Fish & Wildlife Service/ SEPA Review

State Agencies:

Dept. of Ecology Environmental Review Section
Dept. of Ecology Water and Shorelines, Northwest Region
Dept. of Archaeology & Historic Preservation
Dept. of Fish & Wildlife Attn. SEPA Review
Dept. of Transportation/Environmental Section/NEPA/SEPA Compliance
WA Department of Natural Resources
WA Dept. of Fish & Wildlife Region 4 Office

Tribal Government:

Muckleshoot Tribe
Samish Indian Nation
Sauk-Suiattle Tribe
Skagit River System Cooperative
Snoqualmie Tribe
Stillaguamish Tribe of Indians
Suquamish Tribe
Swinomish Indian Tribal Community
Tulalip Tribes
Upper Skagit Indian Tribe

Other:

The Herald
Cities: Bothell, Woodinville
School Districts: Northshore
Libraries: King County Library System-Bothell, Sno-Isle Library-Mill Creek
Utilities: Snohomish County PUD #1
County: Parks, Recreation & Tourism, Planning and Development Services
Fire Districts: Fire District 7

Attachments: SEPA Checklist, Vicinity Map

SEPA CHECKLIST

Little Bear Creek Advance Mitigation Site (RC 1730)

Snohomish County Public Works
3000 Rockefeller Avenue
Everett, WA 98201

Prepared by:

Crilly Ritz

Snohomish County Public Works
TES-Environmental Services

Phone: (425) 262.2476

Email: crilly.ritz@snoco.org

March 2019

Purpose of Checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

SUMMARY

A. BACKGROUND

Name of proposed project:
Little Bear Creek Advance Mitigation Site (RC 1730)

Name of applicant:
Snohomish County Public Works, Engineering Services

Address and phone number of applicant or contact person:

3000 Rockefeller Avenue, M/S 607
Everett, WA 98201
Contact Person: Crilly Ritz, Senior Planner II
Transportation and Environmental Services Division
(425) 262-2476 or crilly.ritz@snoco.org

Date checklist prepared:
March 26, 2019

Agency requesting checklist:
Snohomish County Public Works

Proposed timing or schedule (including phasing, if applicable):
Site work including grading, planting and other activities to install onsite mitigation would begin in 2020 pending regulatory approval and funding availability. Onsite monitoring and maintenance, following the onsite mitigation work, would occur for a minimum ten years after the work is completed.

Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, please explain.
There are no plans for additional work related to or connected to this activity. Additional restoration work could potentially occur after the current mitigation plan is implemented.

List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Baseline Conditions Report	**Mitigation Plan**
Hazardous Materials Report	**Geotech Report**
Hydrogeological Report	**Critical Area Study**

Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, please explain.

There are no pending applications directly affecting the property.

List any government approvals or permits that will be needed for your proposal, if known.

☑	**Permit/Approval:**	**Required from:**
☑	Section 404 Authorization: Nationwide Permit	U.S. Army Corps of Engineers
☑	Section 7 Endangered Species Act Consultation	NOAA Fisheries and U.S. Fish and Wildlife Service
☑	Section 106 National Historic Preservation Act	Federal Lead Agency (Corps of Engineers)
☑	Section 401 Water Quality and CZM Certification	Washington State Department of Ecology
☑	NPDES Construction Stormwater General Permit	Washington State Department of Ecology
☑	Hydraulic Project Approval (HPA)	Washington State Department of Fish and Wildlife
☑	Drainage & Land Disturbing Activity Certification	Snohomish County – Public Works
☑	Critical Area Certification	Snohomish County – Public Works
☑	Shoreline Substantial Development Permit – *potential restoration exemption	Snohomish County - Planning and Development Services
☑	Flood Hazard Permit	Snohomish County - Planning and Development Services

1. Give a brief, complete description of your proposal, including the proposed uses and the size of the project site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal; you do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description).

   Snohomish County Public Works (SCPW) proposes to construct and operate a 17-acre advance wetland mitigation site in the Little Bear Creek Subbasin. SCPW intends to restore the site and improve the functions and values of the wetlands and streams so that the site generates mitigation credits that can be used to offset unavoidable impacts of future road improvement projects identified in the County's 6-year Annual Construction Plan – Transportation Improvement Program (ACP-TIP).

   The currently proposed road improvement projects that would potentially use credits generated by the Little Bear Creek Advance Mitigation Site (LBCAMS) are dispersed across unincorporated Snohomish County through portions of the Swamp Creek, North Creek, and Little Bear Creek subbasins. Little Bear

Creek drains more than 15 square miles in southern Snohomish County and northern King County. The subbasin is characterized by a mix of rural, residential, and commercial land uses, but retains more natural land cover (impervious surface cover of about 13%) than the North or Swamp Creek subbasins. Most of the subbasin (about 72%) is located outside of urban growth areas (UGAs) or incorporated areas.

LBCAMS contains degraded wetlands, a habitat-impaired 450-foot-long reach of Little Bear Creek, and channelized spring-fed tributaries. Prior to its purchase by Snohomish County in 2017, the site had a long history of rural residential and agricultural use which involved ditching, filling, grazing, and construction of interior roads and structures. These practices altered the hydrology of the wetlands, reduced the quality and complexity of aquatic and terrestrial habitats, affected in-stream conditions, and contributed to water quality problems in this portion of the subbasin. (See site photos in SEPA Appendix)

Creating an advance mitigation project at LBCAMS where credits can be consolidated and "banked" offers the County several advantages:

- **Alleviates the need to find multiple suitable mitigation sites for every project, which is increasingly difficult in developed and developing areas of Water Resource Inventory Area (WRIA) 8;**
- **Reduces uncertainty over whether compensatory mitigation will be successful because the credits are generated in advance of the impacts;**
- **Helps mitigate concerns about temporal wetland impacts and can result in lower replacement ratios because the mitigation occurs in advance of impacts;**
- **Reduces the time and cost of future project permitting because the mitigation is pre-approved;**
- **Reduces time and cost associated with mitigation site design and construction because mitigation for multiple projects is combined in one location;**
- **Protects a site that is surrounded by residential and industrial development from future development;**
- **Enables more efficient use of limited resources in the maintenance and monitoring of mitigation projects because of consolidation; and**
- **Increases cost efficiencies of public funds.**

With implementation of this mitigation plan, LBCAMS would provide the potential for approximately 0.3 acre of wetland creation, 4.3 acres of wetland

reestablishment, 0.2 acre of wetland rehabilitation, 6.0 acres of wetland enhancement, 5.6 acres of buffer and upland preservation with enhancement, and approximately 225 linear feet of floodplain enhancement. The final acreage provided by the plan's implementation would be determined at the time of final design and construction. SCPW expects to generate sufficient mitigation credits at LBCAMS to offset wetland, stream, and buffer impacts associated with up to 11 planned road improvement projects over the next 10 years. (See the SEPA Checklist Appendix for mitigation plan exhibits that show the proposed service area, existing areas of fill on the site, and proposed mitigation treatments. For design details, the Appendix also includes selected grading and planting plan drawings.)

The proposed mitigation actions include:

- **Remove invasive vegetation throughout the site;**
- **Remove structures, conduit, culverts, piping, utilities, internal fencing and decommission an existing water well;**
- **Excavate fill and regrade to appropriate elevations for wetland reestablishment or creation;**
- **Use fill material to selectively plug internal drainages (ditches) to enhance site hydrology and restore historical wetland conditions;**
- **Create complex microtopography to encourage habitat diversity and retain water on the site;**
- **Retain and/or install habitat features such as brush piles, habitat logs, stumps, standing snags, and root wads;**
- **Plant a diverse assemblage of native plants to establish forested and scrub-shrub wetland communities;**
- **Reconnect Little Bear Creek with its floodplain;**
- **Enhance instream habitat through placement of large wood, creation of a floodplain bench, and enhancement of the riparian corridor;**
- **Enhance wetland and stream buffers and upland areas by removing invasive vegetation and planting native species;**
- **Plant new buffers and riparian vegetation in areas that were previously cleared;**
- **Retain and enhance exterior fencing to restrict unauthorized access;**
- **Establish a conservation easement or similar protective covenant to ensure long-term protection of the mitigation area;**
- **Monitor, maintain and adaptively manage the site in perpetuity.**

2. Location of proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address if any, and section/township/range if known. If a proposal would occur over a range of areas, provide the range or boundaries of the site(s). Provide legal description, site plan, vicinity map, and topographic map if reasonably available. While you should submit any

plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The proposed mitigation would occur on 17 acres of land located south of 238th Street SE near its intersection with 58th Avenue SE. The site is located approximately 500 feet west of SR 522, in Section 34, Township 27 North, Range 5 East, W.M. of Snohomish County (See *Figure 1-Vicinity Map*).

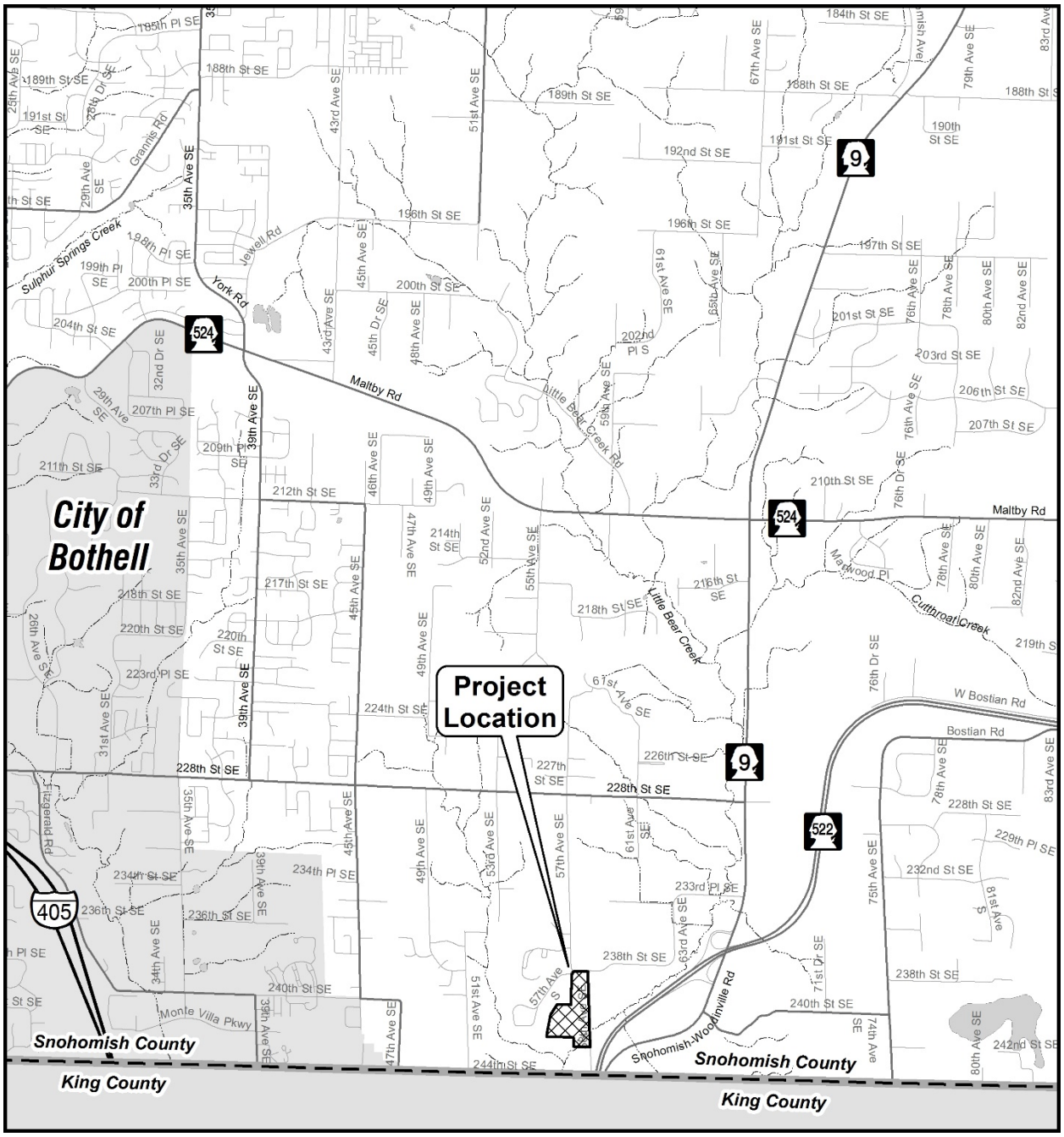


Figure 1: Vicinity Map

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (check all that apply):
   ☑ FLAT
   ☐ ROLLING
   ☐ HILLY
   ☑ STEEP SLOPES
   ☐ MOUNTAINOUS
   ☐ OTHER (please describe): Click here to enter text.

b. What is the steepest slope on the site (approximate percent slope)?

   Based on the County's Landslide Hazard Areas Map, the slopes along the western side of the site are shown as a potential landslide hazard area – or slopes that are steeper than 33%.

c. What general types of soil are found on the site (i.e., clay – sand – gravel – peat – muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

   The Natural Resources Conservation Service identifies three soil series in the project area. The soil series descriptions are provided below:

   <u>Alderwood gravelly sandy loam 8-15 percent slopes</u>
   Areas upslope and west of Little Bear Creek and its associated floodplain and wetlands are mapped with this Alderwood soil series. This soil series is mapped in areas of till plains and were formed in glacial till. These Alderwood soils are moderately well drained and moderately deep over a hardpan.
   <u>Everett gravelly sandy loam 0-8 percent slopes</u>
   Areas north of the Little Bear Creek and its associated floodplain and wetlands are mapped with this Everett soil series. This soil series is mapped on terraces and outwash plains and were formed in glacial outwash. These Everett soils are very deep and somewhat excessively drained.
   <u>Norma loam</u>
   The areas that flank the Little Bear Creek riparian corridor and its associated floodplain and wetlands are mapped with this Norma soil series. This soil series is a hydric soil. Norma soils are very deep, poorly drained, and are found in depressional areas on outwash plains and till plains.

   Soil test pits, both hand dug shovel probes in wetland areas and geotechnical excavated test pits in fill altered upland areas, showed a high percentage of muck and mucky mineral soils throughout much of the project area. Several shovel probes revealed muck or mucky silt loam ranging from 12 to 27 inches

deep. These organic soils are typically underlain by gravelly sandy loam or loamy sand of alluvial origin. Excavated test pits showed mucky soils still present beneath fill layers, including up to 7 feet of depth in select locations.

Historic site use included site modifications that included placing fill materials to build driveways, create pads for buildings, and possibly to redirect flood flows from Little Bear Creek. While the origin of the fill is unknown, some of it may have been imported, while some may have also been excavated on site and re-deposited. SCPW sampled 29 test pits (TPs) in filled areas within the site. Test pits indicate that the fill thickness ranges between 0.5 and 2.0 feet deep (average of approximately 1.7 feet) spread over approximately 3.5 acres. A Phase 1 site assessment was conducted by SCPW which indicated that the fill is clean, with no contaminated soils on site.

Fill consists primarily of the following materials:

- **Topsoil**
- **Silty sand**
- **Crushed rock**
- **Gravelly sand**
- **Sandy gravel**
- **Sand**

Mapped surficial geology of the site consists of Vashon Advanced Outwash (*Qva*) located along most of the western and northern slopes and Vashon Recessional Outwash (*Qvr*) through the central area. Recent Alluvium (*Qyal*) is found within the floodway fringe and along Little Bear Creek through the lower southeast portion of the site.

A substantial portion of the site has been disturbed and filled for past agricultural use including grazing, raising fowl, and outbuildings to support these activities. As described above, these disturbed areas were investigated to determine fill depth, fill composition and ground water seepage depths through the excavation of 29 test pits. The test pits were excavated to depths between five to seven feet below ground surface (*bgs*). Additional subsurface soil types and existing ground water elevations were investigated through the drilling of four test borings and the installation of observation wells in each test boring upon completion. The borings were all advanced to a depth of 20.5 feet *bgs*. Ground water was encountered at the exploration locations approximately two-six feet *bgs*.

Site stratigraphy was interpreted from the test pit and test boring logs and correlated with the mapped geology of the area. In general, a moderate correlation was observed between the mapped geology and the soil types found in the test pits and test borings locations on the site. There were small differences in the contact location between the Recent Alluvium (*Qyal, Qal, Qa*), Recessional Outwash (*Qvr*) and Advance Outwash (*Qva*) through the middle to southern end of the site. Shallow surficial soil types encountered at the exploration locations included uncontrolled fill, gravelly sand, silty sand, sand, silts and peat. These soils have been interpreted as uncontrolled fill (*fill*), Recent or Younger Alluvium (*Qyal, Qal, Qa*), Recessional Outwash (*Qvr*), and Advance Outwash (*Qva*).

Interpretation of the encountered natural soils on this site indicates that the site geology is typical of floodplain environments along creeks in southern Snohomish County and indicates current and past floodplain elevations of historic Little Bear Creek.

No environmental concerns such as contamination were detected in any of the test pit or test boring locations during this site investigation.

Provided below is a summary of the site's geologic features that will be taken into consideration with the design:

***Landslide Hazard Area*: Based on the Snohomish County Landslide Hazard Areas Map, the slopes along the western side of the site are shown as a potential landslide hazard area – or slopes that are steeper than 33%. Although the soils that make up this slope have not been investigated, the slopes have been mapped as Glacial Till (*Qvt*) over Advance Outwash (*Qva*).**

***Erosion Hazard Area*: The project site is located within a mapped surficial soil erosion hazard area. This designation is based upon geologic depositional processes and mapped soil types and not on any observed site conditions.**

***Fault Hazards*: It is probable that the site will experience the effects of a design level earthquake (*m >7.0*) during its design life. The Puget Lowland is located in a seismically active region where the effects of large-magnitude subduction zone earthquakes have been felt and a history of other seismicity has been recorded. In the last 20 years, several different fault systems have been identified that are the result of tectonic activity that has taken place between the late Pleistocene (< *1 million years*) and recent time (*Holocene, < 12,000 years*). The closest, the South Whidbey Island Fault Zone (*SWIFZ*) has a projected splay that crosses the project site. Additionally, the Monroe Fault**

Zone (*MFZ, 15 miles northeast*) and the Cherry Creek Fault Zone (*CCFZ, 12 miles northeast*) are identified as active by the USGS.

***<u>Seismic Hazards</u>*: Seismic hazards can be divided into primary, secondary and tertiary hazards. Primary seismic hazards originate directly from stresses in the earth's crust resulting from earthquakes and consist of strong shaking, surface-fault rupture and tectonic deformation. Secondary hazards are caused by primary hazards where strong shaking results in landslides and/or soil liquefaction. Tertiary hazards are caused by secondary hazards such as surface displacement that have impacted man-made improvements within rupture zones and landslide areas.**

A branch from the SWIFZ, called a splay, is mapped as crossing the project site. While the exact location of the splay is unknown, its approximate location has been proposed based on surficial and subsurface geologic features observed in the vicinity of the project site. The SWIFZ is an active fault zone. As such, it is possible that the project site could experience primary seismic hazards such as strong shaking and/or surface-fault rupture (*along the splay*) during its design lifespan. Based on the steep slopes along the western side of the site, the mapped geology of the site and the observed high ground water table and loose sandy soil conditions around much of the site, secondary seismic hazards such as landslides and soil liquefaction could also be experienced on or immediately adjacent to the project site during a seismic event. These types of movements could affect the proposed improvements (*tertiary impacts*), although the type of impact would most likely not be detrimental to the proposed onsite mitigation.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, please describe.

LiDAR imagery of the slopes along the western side of the site shows semi-circular shaped features with sloping hummocky topography at the base. This probably indicates historic slope failures and movements along portions of the higher over-steepened western slopes immediately adjacent to and on portions of the project site. There are also visual signs of possible on-going small movements and/or soil creep along the lower sloping hummocky topography above the barn and outbuildings. Flood, erosion, landslide, fault and seismic hazards have all been identified for this site. Geotechnical evaluation has determined that the project as proposed will either not be impacted by the above hazards in a preventable or detrimental manner - or will not increase the impact of the hazard in the immediate vicinity of the project site over its design lifespan. Additional mitigation beyond the

proposed site improvements are not recommended or required given the presence of these geologic hazards.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling excavation and grading proposed. Indicate source of fill.

Based on the test pit profiles, many of the areas that were filled were originally wetland, resulting in the potential for 4.29 acres of wetland reestablishment once fill material is removed. Preliminary estimates indicate approximately 4,800 cubic yards of fill were placed on the site in the areas investigated, much of which will be removed or relocated as part of the mitigation project. With fill removal, site contours will be graded to restore wetlands, generally removing fill down to the naturally formed wetland hydric soils that lie beneath the fill.

f. Could erosion occur as a result of clearing, construction or use? If so, please generally describe.

Altering the existing ground surface with onsite grading to provide the appropriate contours for wetland creation, rehabilitation and wetland re-establishment will remove fill that was placed and some of the existing site vegetation that has become established in these areas. Vegetation clearing and grading will temporarily expose bare soils that are more prone to erosion. These bare soil areas are expected to revegetate over a several-months-long period which would reduce the erosion potential.

g. About what percent of the site will be covered with impervious surfaces after project construction (i.e., asphalt or buildings)?

The project will not add impervious surface areas. The existing estimated impervious surface area totals 0.96 acres (41,817 square feet). An estimated 0.88 acres (38,332 square feet) of impervious surface area will be removed. All impervious surfaces within the internal portion of the site will be removed, including structures, asphalt, concrete and gravel surfaces associated with internal site access roadways, structural foundations, and other fill pads used for past site operations. Two paved site access entrances will remain to provide for future site access to allow for maintenance and monitoring.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Mitigation to minimize effects would occur through appropriate project design that takes into consideration onsite conditions. During construction, Best

Management Practices (BMPs) would be used that would prevent and minimize erosion, control surface water runoff, limit soil disturbance to specific areas, and stabilize the site through revegetation. BMPs would include construction staging, barrier berms, filter fabric fences, temporary sediment detention basins, and use of slope coverings to contain sediment on site. These measures would be used to reduce erosion resulting from grading. No significant adverse impacts are anticipated.

These BMPs would be in place around stockpiles of excavated materials, in proximity to project-area streams, wetlands and ditches, and in active construction areas, and would be designed to prevent sediments from entering surface water and storm drainage systems. Excavated soils not re-used in the project would be disposed of offsite at a permitted facility. Bare soil areas would be seeded and planted where required after establishment of final grades.

Geotechnical and hydrogeological evaluation of the site has identified site specific erosion control measures. The project site is underlain by an unconfined groundwater aquifer. This unconfined groundwater aquifer provides hydraulic conditions that support the onsite wetlands and provide base flow support to Little Bear Creek. Because of the sensitive nature of the project site's surficial wetland soils and shallow unconfined aquifer, the following erosion control BMPs are proposed:

- **A site specific *Spill Prevention, Control and Countermeasures Plan* shall be prepared by the contractor as part of the project bid package documents. This plan would be reviewed and be approved by the County as part of the contract documents. The *Spill Prevention, Control and Countermeasures Plan* would be implemented prior to site mobilization by the contractor.**
- **A site specific *Health and Safety Plan* should be prepared by the contractor and approved by the County as part of the project documents. The *Health and Safety Plan* shall be implemented prior to the start of any work on the site.**
- **Tracking of heavy equipment, construction equipment, trucks and even personnel on foot will change the hydraulic properties of the exposed surficial soil. It is recommended that access of all construction equipment, trucks and personnel be limited to only those areas to be re-worked as part of the design plan, in accordance with the project plans. Once work in an area has been completed, the area should be**

closed to all access until such a time that the area has been re-vegetated and stabilized.

- **Adequate erosion control measures shall be installed prior to the start of any earthwork to ensure minimal construction and siltation impacts to Little Bear Creek, adjacent wetlands, un-worked areas of the site, adjacent roadways or to adjacent properties. To insure proper installation and maintenance of all erosion control measures and BMP's throughout the duration of the project it is recommended that the contractor designate a responsible person that is a Certified Erosion and Sediment Control Lead (*CESCL*). Inspection and documentation of these elements shall be completed on a daily basis by the CESCL and the results of these inspections be included in the contractors' daily construction reports.**
- **Site improvements and work shall be performed in such a way so as not to impede existing surface drainage or encountered ground water flow through the area being worked. Impeding these flows could result in the destabilization of adjacent slopes. Shallow surficial soils are readily erodible. To prevent erosion and potential destabilization of slopes, run-off should not be allowed to flow uncontrolled over an exposed or unstabilized re-worked site slope at any time.**
- **Four (*4*) DOE registered observation wells (*PW-01 thru PW-04*) have been installed on this property to monitor the shallow ground water elevations. These wells are all located within the proposed work areas for the project. A minimum 15 foot non-disturbance protection radius shall be established around each of these well locations prior to the start of construction and maintained during construction.**

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, please generally describe and give approximate quantities if known.

Construction equipment, construction-related activities, and vehicles carrying workers and equipment to and from the site would result in minor, temporary increases in emissions and dust. There would be no increase in emissions once construction is complete. During grading, dust levels may increase temporarily. In addition, minor temporary increases in emissions would be released from construction equipment.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, please generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

During construction, equipment emissions would not exceed state and national air quality standards. The project would use only equipment and trucks in optimal operational condition. Dust control measures would be implemented to minimize airborne dust.

3. Water

a. Surface Water:

1. Is there any surface water body on or in the immediate vicinity of the site (including year round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, please describe type and provide names. If appropriate, state what stream or river if flows into.

Little Bear Creek, a Type S stream, and four unnamed watercourses (Numbered 1, 3, 4 and 5) are located on the proposed advance mitigation site. The unnamed watercourses include three Type Np, one Type Ns, and one Type F streams. A brief description is provided below.

Little Bear Creek flows through the south portion of the project site from east to west. Approximately 450 linear feet of channel is located on the site. Little Bear Creek is 20 to 25 feet wide within the project area, primarily contains pool and riffle habitats, and has moderate floodplain connectivity in the upstream reach where bank heights are low. Top-of-bank is approximately three feet above the stream thalweg.

Large woody debris is largely limited in the upstream portion of the stream, within the project area, but a few, larger pieces are located within the channel. Onsite observations indicated that there is minimal bank erosion, attributed to a combination of fine bank material and dense riparian vegetation established to the ordinary high water mark (OHWM). However, minor bank sloughing and limited bank undercutting was observed on the northern stream bank where the stream alignment transitions from southwest to south. In this area, flow and path relative to the bank and flow velocity have resulted in unstable bank conditions. The dominant channel substrate in this segment of Little Bear Creek is small gravel, although pockets of fine sediments are also present.

Four drainage tributaries to Little Bear Creek were observed onsite and are considerably smaller in size. These tributaries appear to have been artificially created or expanded as evidenced by side-cast material along the banks. As such, these tributaries effectively serve as conduits to facilitate drainage of the associated wetlands. Ditching was primarily done for agricultural purposes, to lower local groundwater tables, and to quickly channel runoff from the hillside

(from seeps) away from pastures and structures. These small streams also tend to be choked with reed canarygrass and other vegetation and are generally not suitable for fish. The other streams/drainages on the project site are considerably smaller in size.

These small drainages capture ground water discharging onto the property through springs and seeps located along the base of the western slope. The main drainages include:

- **The central stream, named S*tream 1,* flows downslope in a southeasterly direction year round and discharges through constructed ditches into Little Bear Creek;**
- **The southern drainage, named *Ditch 3,* captures a portion of the ground water that discharges out of the slope above the pasture/meadow area west of the farm related outbuildings. *Ditch 3* flows downslope in an easterly direction intermittently through a ditch system along the southwestern corner of the project site where it also eventually flows down into Little Bear Creek;**
- **An additional drainage ditch, named S*tream 4,* conveys wetland groundwater and run-off coming onto the property from 58th Avenue SE. This run-off is captured and drains through a ditch across the wetland pasture area along the eastern side of the site, where it is joined by the north ditch drainage discharge. The combined drainages flow in a southerly direction and discharge into Little Bear Creek. Based on site observations, it appears that this and other constructed drainage ditches on site above have not been maintained for many years.**

- ***Ditch 5* runs parallel to the north/south internal access gravel road. This drainage feature captures ground water seeping out of the western slope in the immediate vicinity of a water well/pump house. The drainage area is channeled into a ditch located along the western side of the access road, then crosses below the access road through a pipe to the adjacent wetland pasture area where it becomes *Stream 5. Stream 5* joins with *Stream 4*, eventually flowing into Little Bear Creek.**

Ten wetlands have been identified and delineated within the advance mitigation site boundaries. Four wetlands (A, C, H and J) are relatively large with multiple hydrogeomorphic (HGM) classes and Cowardin classes. The remaining six wetlands (E, F, K, L, M and N) are smaller and less complex in

both vegetation structure and hydrologic variation. The emergent wetlands (A, C, E, F, J, K, L, M and N) are dominated by species including soft rush, skunk cabbage, cattail, slough sedge, giant horsetail, bulrush, water parsley and reed canarygrass. The forested wetlands are dominated by red alder, black cottonwood, salmonberry, creeping buttercup, and bentgrass.

Wetland delineation data plot forms, rating forms, and supporting photos are provided in the project's Baseline Conditions Report. The areas identified and mapped as wetland occur in the north-central, central, and southern portions of the site in low-lying areas. These are the areas where most of the planned advance mitigation activities (e.g., wetland creation, reestablishment, rehabilitation and enhancement) will occur. On-site wetlands are fragmented by interior roads and fill which disrupts the natural hydrologic pathways and impairs hydrologic and water quality functions. Removal of the fill and reestablishment of natural hydrologic process will improve the functions and values of the on-site wetlands.

Stream and wetland buffers throughout the proposed mitigation site are generally degraded as a result of past clearing and intensive livestock grazing. The buffer area along Little Bear Creek in the project area consists primarily of young age class deciduous trees with an understory of salmonberry and invasive Himalayan blackberry. A few mature conifers are located in the riparian buffer, although overall canopy cover remains far less than historic conditions. Dead trees are common along the wetland edge where grazing occurred.

Buffers on the tributary streams range from non-existent to highly degraded. Streams are immediately adjacent to existing outbuildings or gravel driveways. Where vegetated buffers do exist, they primarily consist of short pasture grasses.

Wetland buffers are similar to tributary stream buffers. Several wetlands on-site are adjacent to or coincident with streams and share a common buffer. Wetlands within the central portion of the project area typically feature buffers impacted by buildings, paved areas, or historic grazing. Wetlands on the fringes of the project area tend to have more intact buffers. Specifically, Wetlands H and J have a relatively intact second-growth mixed forest buffer on one side for at least 100 feet

2. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

   Yes, all of the onsite work would occur within and adjacent to either streams or wetlands.

   Specific activities that will occur in and around wetlands and streams include the following (reference a figure here):

   - **The floodplain bench along the left bank of Little Bear Creek will be graded to create wetland habitat. Wetland creation will also occur along the hillslope in the southwest portion of the site and in the central portion of the site, north of the east-west driveway.**
   - **Minor grading will occur throughout the site to restore topographic features such as swales and hummocks that will allow for more diverse vegetation and a greater range of habitat type.**
   - **Former wetlands in the south-central portion of the site will be graded to appropriate elevations to facilitate reestablishment of wetland conditions.**
   - **Areas where wetland conditions exist but their characteristics or functions are substantially altered or degraded (primarily in the central portion of the site) will be rehabilitated by removing fill and recreating wetland conditions and hydrologic connections.**
   - **Two large woody structures will be installed at the upstream and downstream extents of the newly created floodplain bench along the left bank of Little Bear Creek and outside of OHWM.**
   - **A cluster of approximately six, 1 to 2 ton boulders will be set within the stream channel, on top of the existing streambed material.**
   - **Piped portions of Stream 1 and Stream 4 will be removed. Streams will flow through natural channels that will allow a hydrologic input to the wetland reestablishment area through overbank flooding.**
   - **A habitat log will be installed where stormwater currently overflows from the existing roadside ditch along 58th Avenue SE, onto the site. The log will help to direct water further onto the site, rather than spilling back into the ditch.**
   - **Habitat features such as stumps, logs, rock piles, snags and brush piles, will be installed and existing habitat features will be preserved and used onsite to the extent practical.**
   - **Invasive plant species, including Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass (*Phalaris arundincaea*) in the existing wetlands to the south and the north and along the bank of Little Bear Creek, will be removed. Areas of Himalayan blackberry on the west**

hillslope will also be removed. Removal of invasive species will occur in other areas as needed.

- **Native vegetation communities will be installed using native trees, shrubs, and emergent species tolerant of saturated soil conditions.**

3. Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

   The project will place approximately 95 CY of fill into existing wetlands. The fill will be used to create hummocks, which will be low enough so that the wetland retains wetland characteristics. An additional 10 CY of fill will be placed within channelized streams and ditches to create the desired hydrologic and flow path conditions. The total volume of fill in streams and wetlands is 105 CY. The fill will be derived from areas of the site that are being excavated to create, rehabilitate and reestablish wetland. The project does not propose to dredge material from onsite streams.

4. Will the proposal require surface water withdrawals or diversions? Please give a general description, purpose, and approximate quantities if known.

   Work within the ordinary high water mark (OHWM) of Little Bear Creek may require a short-term temporary diversion of flows around the construction zone to allow the instream work to occur in the dry. This work would occur during the appropriate in-water work windows and in accordance to other applicable terms of a Hydraulic Project Approval.

5. Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
   The southeast portion of the site lies within the FEMA mapped Little Bear Creek floodplain.

6. Does the proposal involve any discharges of waste materials to surface waters? If so, please describe the type of waste and anticipated volume of discharge.
   The project does not propose to discharge waste materials to surface waters.

b. Groundwater:

1. Will groundwater be withdrawn from a well for drinking water of other purposes? If so, please give a general description of the well, proposed uses and approximate quantities withdrawn from the well.

   No groundwater would be withdrawn from a well for drinking water or other purposes. A private well is located on the project site. Although the well has been tagged with a DOE unique well number (*ALJ-148*), it has not been registered on the DOE well log data base or on the DOH Group B water system data base. The well is considered as an unregistered water well with unknown

construction details. The well will need to be decommissioned by a licensed well driller following WAC 173-160-381, *Standards for Decommissioning a Well*, and appropriate sections of Chapter 18.104 RCW.

The project site is located within a critical aquifer recharge area of moderate sensitivity according to the Snohomish County "Critical Aquifer Recharge Area Map" dated February 2016. The project site is not located within a Wellhead Protection Area or Sole Source Aquifer Area.

Ground water was encountered at all but a couple of the exploration locations on the project site between approximately two to six feet below the ground surface. Ground water is found in an unconfined condition and is topographically controlled, discharging to manmade drainage ditches, into wetlands or directly into Little Bear Creek across the site. The overall ground water gradient in the vicinity of the project site is controlled by the gradient of Little Bear Creek which is flowing in a southwesterly direction.

Year-round seeps feed tributaries on the west side of the site and appear to be a significant source of hydrology to the slope and depressional wetlands. Springs and seeps are common in the Little Bear Creek subbasin and occur where the advance outwash surfaces. Much of the baseflow observed in Little Bear Creek during the summer emerges at these and similar spring locations.

The County excavated 29 test pits on the site in areas with fill and upland areas outside of the existing wetland boundaries. Four test borings were conducted, which included the installation of observation wells in each test boring upon completion. The test pits provided a snapshot of early spring groundwater levels on the site, while the monitoring wells were used to track the fluctuations in groundwater levels into the dry season. Monitoring indicates that the ground water table is generally at or near the surface or within about two feet of the surface during the winter and into the dry season. Monitoring is on-going and will be updated as the mitigation design progresses. The groundwater information is being used to inform the grading plan, specifically the location and depth of fill removal.

2. Will water be discharged to groundwater? Please give a general description, purpose, and approximate quantities if known.
   No water will be discharged to groundwater.

3. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (i.e., domestic sewage, industrial, containing the following chemicals..., agricultural, etc.).
   No waste material will be discharged into the ground from septic tank or other sources. A septic tank associated with a residential structure located in the upslope area north of the wetland and stream areas will be decommissioned as part of the mitigation pre-construction demolition and site preparation.
4. Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.
   No septic systems or other systems affecting groundwater will be located on the site.

c. Water Runoff (including storm water):
   1. Describe the source of runoff (including stormwater) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, please describe.

      The mitigation site contains little to no impervious surface. Most of the surface water that runs off the site is from spring fed seeps that emerge from the western hillslope and flow through small channels to Little Bear Creek. The proposed mitigation actions (e.g., fill removal, swales, hummocks, etc.) are generally designed to capture and retain surface waters on site to increase residence times and enhance hydrologic conditions of the onsite wetlands.

      The site is located at the very downstream end of the Little Bear Creek basin. As such it has the potential to receive overland flow inputs from offsite areas. The neighborhood to the north and west of the site is served by a stormwater system which discharges into an open ditch at the southwest corner of the intersection of 58th Ave SE and 238th St SE. Under high flow conditions, flow from this ditch enters Wetland A while the remaining flow continues south along 58th Ave SE and enters a catch basin located near the east entrance to the project site. A habitat log will be installed where stormwater currently overflows from the existing ditch onto the site. The log will help to direct water further onto the site, rather than spilling back into the ditch. This will allow water to sheet flow over the wetland, slowing the flow of water, and providing a lift in the hydrological and water quality functions of the onsite wetlands.
   2. Could waste materials enter ground or surface waters? If so, please generally describe.

Waste materials in the form of sediment generated during construction could enter surface water through stormwater runoff. The BMPs described in Section B above will minimize the potential for sediment to enter surface water during construction.

3. Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, please describe.

   The proposed project will affect drainage patterns in several ways:

   - **Minor grading will occur to create swales and other depressions to slow and retain groundwater that currently discharges to manmade ditches and onsite wetlands before reaching Little Bear Creek. The increased residence time will improve water quality and provide base flow support to Little Bear Creek.**
   - **Piped portions of Stream 1 and Stream 4 will be removed. Streams will flow through natural channels that will allow a hydrologic input to the wetland reestablishment area through overbank flooding.**
   - **A habitat log will be installed where stormwater currently overflows from the existing roadside ditch along 58th Ave SE, onto the site. The log will help to direct water further onto the site, rather than spilling back into the ditch.**
   - **A floodplain bench will be graded along the left bank of Little Bear Creek to increase the area of frequently inundated floodplain habitat. Inset floodplain benches also vary local hydraulic conditions (depth, velocity, stream power, etc.) which results in increased stream sediment sorting and the deposition of gravels valuable for salmonid spawning habitat. An increase in floodplain inundation would also eventually result in the expansion of riverine wetlands.**
   - **A cluster of approximately six 1 to 2 ton boulders will be set within Little Bear Creek to restore hydraulic diversity where currently homogenous conditions exist.**

   These actions are intended to improve the hydrologic functions of the aquatic habitats on site and in areas immediately downstream. By holding more water on site and increasing the hydrologic complexity of the wetland and stream habitats, the mitigation would benefit Little Bear Creek by moderating peak flows in winter and augmenting base flows in summer.

d. Proposed measures to reduce or control surface water, groundwater, runoff water, and drainage impacts, if any:

The effects of the project on surface water, groundwater and drainage are expected to be positive and beneficial. The goal of the project is to protect, restore, and enhance these resources in perpetuity.

4. Plants

a. Check all types of vegetation below found on or in close proximity to the site:
☑ deciduous tree: alder, maple, aspen, other
☑ evergreen tree: Douglas-fir, western redcedar, Sitka spruce
☑ shrubs
☑ grass: reed canarygrass
☑ pasture (former pasture)
☐ crop or grain
☐ orchards, vineyards, or other permanent crops
☑ wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
☑ water plants: water lily, eelgrass, milfoil, other
☑ other types of vegetation present: **various cultivated plant species have been planted at the site near the southeast portion including bamboo**

The site supports several vegetation communities: upland pasture, upland deciduous forest, forested wetland, scrub-shrub wetland, emergent wetland, and riparian forest. The upland pasture areas are located mainly in the southern half of the site in the area near the cluster of outbuildings. These areas are dominated by introduced grass species and weedy plants, such as tansy ragwort (*Senecio vulgaris*), dandelion (various species), and burdock (*Arctium sp*).

The upland forest occurs mostly along the west slope (west of the north-south gravel driveway) and is dominated by big leaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*). Himalayan blackberry and sword fern is common in the understory.

Forested wetland communities of young deciduous species (red alder and black cottonwood, with scattered western red cedar) primarily occur in the southwest corner and in the north-central portion of the site. The latter area is also composed of scrub-shrub wetland. The red alder trees in the north-central portion of the site are stressed, likely from a combination of long-term inundation and grazing damage and many trees have died. Several large diameter trees are scattered throughout this area, including western red cedar (*Thuja plicata*), black cottonwood (*Populus trichocarpa*), and Sitka spruce (*Picea sitchensis*).

In addition to scrub-shrub wetland located within the north-central portion of the site, this wetland type is also located west of the north-south driveway, west of Wetland A. Salmonberry (*Rubus spectabilis*) and red-osier dogwood (*Cornus sericea*) dominate this wetland type.

Emergent wetland communities occur along the northeastern portion and in the southeastern corner of the site and are dominated by mostly non-native grasses and

forbs. The riparian corridor along Little Bear Creek has relatively dense deciduous cover composed of red alder and cottonwood, along with a few mature conifers (namely western red cedar) with an understory of salmonberry, red-osier dogwood, hardhack (*Spiraea douglasii*), vine maple (*Acer circinatum*), and Himalayan blackberry (*Rubus armeniacus*).

Several ornamental cherry trees are also located in the north portion of the project area, specifically along the existing gravel driveway.

b. What kind and amount of vegetation will be removed or altered?

The majority of the vegetation to be removed will be herbaceous and woody shrub invasive species identified above. Some native species trees, including red alders, will be removed where grading is proposed to restore wetlands, but most tree clearing would remove non-native trees. Approximately 10 large-diameter trees will be removed and five large trees will be left as snags. All of the trees to be removed will be used for habitat structures or girdled to create snags that would provide habitat features for birds.

c. List threatened and endangered plant species known to be on or near the site.

No threatened or endangered plants are known at or near the site.

d. List all noxious weeds and invasive species known to be on or near the site.

Tansy ragwort (*Senecio jacobaea*) is an invasive noxious weed located onsite. Other invasive species include reed canarygrass, blackberry, and thistle.

e. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation of the site, if any:

Invasive plant species removal would be included in the mitigation site design which would include extensive onsite planting of native tree, shrub and emergent plant species.

5. Animals

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. (i.e. **birds:** hawks, heron, eagle, songbirds, owls, ducks, woodpeckers; **mammals:** deer, bear, elk, beaver, opossum, raccoon, coyote, small rodents; **fish:** bass, salmon, trout, herring, shellfish, other):

Biologists visiting the proposed mitigation site have observed wildlife adapted to suburban Snohomish County including mammals such as black-tailed deer, raccoon, coyote, and black bear; various songbirds including house sparrow, black-capped chickadee, Stellar jay, red breasted sapsucker and American robin; waterfowl including mallard; and raptors including red-tailed hawk and bald eagle.

Other wildlife signs observed on-site include beaver signs near Little Bear Creek in the form of freshly downed trees and recently chewed woody stems. Numerous other species of birds

and small mammals likely use the project area. These include species that can tolerate or benefit from human disturbance using landscape vegetation, structures, garbage cans, and other human features for foraging, movement, shelter, and potentially even breeding sites.

Terrestrial wildlife habitat in the project vicinity is somewhat limited by surrounding residential land areas north, south and west of the site and industrial development east of the site, including State Route 522 and additional commercial and industrial development further east from the site. This development limits the habitat connectivity within the project area for terrestrial species. The project area is connected to other undisturbed uplands by a relatively undisturbed riparian corridor (Little Bear Creek). However, the riparian corridor immediately upstream from the project area is relatively narrow and is bordered by industrial uses, likely limiting terrestrial wildlife use. No designated terrestrial or avian Priority Habitats and Species are located within the project vicinity.

b. List any threatened and endangered wildlife species known to be on or near the site.

Two species listed as Threatened under the Federal Endangered Species Act are known or expected to use Little Bear Creek including the reach within the project site: Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*) and Steelhead trout (*O. mykiss*). Chinook use the project area for spawning from RM 0 to 6.8. Steelhead presence has not been documented in the project area, but the species is presumed to use the segment of stream that flows through the site, although steelhead in the Sammamish River and Lake Sammamish are considered functionally extinct.

Bull trout (*Salvelinus confluentus)*, which are also listed as Threatened, are mapped within the Sammamish River, approximately 2 river miles downstream from the project site. Site conditions likely do not support bull trout habitat within the project area. However, bull trout are extremely rare in Lake Washington and Sammamish, as no spawning occurs in the system with the exception of the Cedar River. Furthermore, site conditions within the project area, including water temperature, water quality, and substrate conditions, do not represent suitable habitat for bull trout.

Coho salmon (*O. kisutch*), a species of concern, are documented to occur in Little Bear Creek from RM 0 to 7.2. Wild, indigenous, naturally spawned kokanee salmon (*Oncorhynchus nerka)*, which are also a species of concern are mapped in the project area to RM 5.1 of Little Bear Creek, however the middle-run kokanee that previously spawned in Sammamish River tributaries has been extinct since the 2000s.

Little Bear Creek and lands within 150 feet of the ordinary high water mark (OHWM) have been designated by Snohomish County as Fish and Wildlife Habitat Conservation Areas (FWHCAs).

No threatened or endangered terrestrial species are located in the project vicinity.

As of **January 11, 2019,** the following threatened, endangered, sensitive, or priority species that may be found within the county that may potentially be at the site include (check all that apply):

☑	Common Name	Latin Name	Federal Listing	State Listing
☑	Puget Sound ESU Chinook	Onchohynchus tshawytscha	Threatened	Candidate
☑	Puget Sound DPS Steelhead	O. mykiss	Threatened	N/A
☑	Bull trout	Salvelinus confluentus	Threatened	Candidate
☐	Pygmy whitefish	Prosopium coulteri	N/A	Sensitive
☐	Margined sculpin	Cottus marginatus	N/A	Sensitive
☐	Olympic mudminnow	Novumbra hubbsi	N/A	Sensitive
☐	Oregon spotted frog	Rana pretiosa	Threatened	Sensitive
☐	Larch mountain salamander	Plethodon marselli	N/A	Sensitive
☐	Common loon	Gavia immer	N/A	Sensitive
☐	Peregrine falcon	Falco peregrinus	Species of Concern	Sensitive
☐	Marbled murrelet	Brachyramphus marmoratus	Threatened	Endangered
☐	Northern spotted owl	Strix occidentalis caurina	Threatened	Endangered
☐	Yellow-billed cuckoo	Coccyzus americanus	Threatened	Candidate
☐	Fisher	Martes pennanti	Endangered	Endangered
☐	Gray wolf	Canis lupus	Endangered	Endangered
☐	Grizzly bear	Ursus arctos horribilis	Threatened	Endangered
☐	Southern resident killer whale	Orcinus orca	Endangered	Endangered

Where federal threatened and endangered species are found, all work will conform to the requirements of the Endangered Species Act administered by the US Fish and Wildlife Service and the National Marine Fisheries Service. Where state listed species or Priority Habitats and Species (PHS) are found, the Washington Department of Fish and Wildlife Priority Habitats and Species recommendations will be followed, when appropriate. The most current PHS list can be found at: http://wdfw.wa.gov/conservation/phs/list/.

c. Is the site part of a migration route? If so, please explain.

Yes. The site is within the Pacific Flyway for migratory birds of all types. The flyway stretches between Alaska and South America. Migratory waterfowl can be observed on the proposed mitigation site and in the greater project vicinity. The project site is located within 50 miles of salt water and could potentially have marbled murrelets in proximity to the site during construction as part of their daily migration back and forth from nesting areas to saltwater. All migratory birds are protected by the Migratory Bird Treaty Act administered by

the US Fish and Wildlife Service (USFWS). Bald eagles are protected by the Bald and Golden Eagle Protection Act also administered by the USFWS.

d. List any invasive animal species known to be on or near the site.

No invasive animal species are known to be on or near the site.

e. Proposed measures to preserve or enhance wildlife, if any:

Project construction would occur during the summer months when rainfall is minimal. This would help to minimize erosion and prevent sedimentation of surface waters. Bare soil areas would be revegetated after large woody debris placement and final site grades have been established. Additional timing restrictions would also be applied if it is determined that the project could adversely affect bald eagles, marbled murrelets, and other bird species in the project area.

The mitigation design would include several measures to enhance site conditions for wildlife:

- **Retain and/or install habitat features such as brush piles, nurse logs, stumps and standing snags;**
- **Plant a diverse assemblage of native plants to establish forested and scrub-shrub wetland communities;**
- **Enhance instream habitat through placement of large wood, creation of a flood bench, and enhancement of the riparian corridor;**
- **Enhance buffers and upland areas by removing invasive vegetation and planting native species.**

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Please describe whether it will be used for heating, manufacturing, etc.

No changes in energy use would result from the completed proposal. No energy is needed to meet the completed project's needs. However, during construction, minor amounts of fuel would be used by construction equipment during mitigation site grading and other construction activities.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, please generally describe.

The project would not affect potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

The site at installation completion will be a restored wetland/stream/buffer complex that will not require energy usage.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? If so, please describe.

There are no known environmental health hazards that could result from the proposed mitigation site work.

1. Describe any known or possible contamination at the site from present or past uses.

   A hazardous materials investigation was conducted to determine the presence of potentially hazardous materials within several onsite structures. The survey included one residence and multiple outbuildings. The survey report identified building materials that contain asbestos, estimated the quantity of asbestos-containing material present, and documented building materials that would potentially contain lead-based paint and polychlorinated biphenyls (PCBs), and other hazardous materials that require removal or management as part of demolition activities. These buildings were demolished in February - March 2019 as part of pre-construction site preparation to remove nuisances associated with the vacant buildings that also included removal of onsite debris.

2. Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.
   There are no known hazardous chemicals or conditions that might affect mitigation site design and construction. There are no underground hazardous liquid or gas transmission lines located within the property boundaries.

3. Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or any time during the operating life of the project.
   No toxic or hazardous chemicals would be stored, used, or produced during mitigation construction other than construction equipment fuel and lubricants required for equipment operation. Invasive plant species control would likely require application of herbicides at periodic intervals depending on the extent of their cover on the site.

4. Describe special emergency services that might be required.
   Emergency response vehicles may be required in the event of a construction accident. The completed project would not require any additional emergency services.

5. Proposed measures to reduce or control environmental health hazards, if any:
   Spill control and clean-up material would be staged onsite. The crew leader or other designated person would have a spill control plan and be trained in spill prevention and clean up. All equipment would be well maintained and in good repair to prevent the loss of any petroleum products. Refueling and vehicle maintenance would generally occur in areas outside of wetlands and away from streams. Application of herbicides, if needed, would be done by licensed applicators.

b. Noise:
   1. What types of noise exist in the area which may affect your project (i.e., traffic, equipment, operation, aircraft, other)?
      No noise in the area would affect the project.
   2. What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (i.e., traffic, construction, operation, other)? Indicate what hours noise would come from the site.
      During (short-term) construction, there would be increased noise levels generated by heavy equipment. These noise levels would exceed existing background noise levels associated with the residential community located west of the project site. Areas east of the site are industrial land uses that generate relatively loud daytime ambient noise levels. Typical noise associated with roadway traffic is expected adjacent to the site once the mitigation site has been constructed. There will be no change in the types and levels of noise as a result of constructing the mitigation site.
   3. Proposed measures to reduce or control noise impacts, if any:
      Other than limiting construction to daytime hours and primarily on weekdays, no additional measures to reduce or control noise impacts are proposed.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land use on nearby or adjacent properties? If so, please describe.
   Prior to acquisition, the site was most recently used to graze cattle and other livestock and for raising exotic birds. The site lies downslope from rural and semi-rural residential areas and lies immediately west of industrial areas located along the SR 522 corridor in the Maltby Urban Growth Area. The proposed mitigation site would provide permanent open space in an area that is surrounded by more intensive land uses.

b. Has the site been used as working farmlands or working forestlands? If so, please describe. How much agriculture or forestland of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not

been designated, how many acres in farmland or forestland tax status will be converted to non-farm or non-forest use?

The site has not been used for crop farming due to the saturated soil conditions at the site or for use as working forestlands. Prior to acquisition, portions of the site were used for grazing cattle livestock and raising exotic birds. The land is not designated for agricultural use.

1. Will the proposal affect or be affected by surrounding working farmland or forestland's normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
   The proposed mitigation site would not be affected by surrounding working farmland or forestland's normal business operations.

c. Describe any structures on the site.

The 17-acre site until recently had one manufactured home residence located at the northern portion of the site on 238th St SE. Several outbuildings such as sheds, mobile/manufactured buildings, and metal utility buildings were located in the low lying areas downslope from the residence. These structures were used for raising exotic birds and grain storage for cattle.

d. Will any structures be demolished? If so, what?

The structures identified above have been demolished. No structures remain on the property.

e. What is the current zoning classification of the site?

The site is zoned R-5 (Rural -5 Acre).

f. What is the current comprehensive plan designation of the site?

The Snohomish County Future Land Use Map designates the property as Rural Residential 1 DU/5 Acre Basic.

g. If applicable, what is the current shoreline master program designation of the site?

The Snohomish County Shoreline Management Program designates the lower portion of the site adjacent to Little Bear Creek and its floodplain as Rural Conservancy.

h. Has any part of the site been classified critical area by the city or county? If so, please specify.

Snohomish County designates streams, wetlands, and geologically hazardous areas (erosion, landslide areas) as critical areas. Little Bear Creek and the onsite wetlands are regulated by Snohomish County Critical Area Regulations (CAR) as critical areas. CAR also regulates land use activities in critical area buffers that extend landward from the stream as fish and wildlife habitat conservation areas (FWHCA).

i. Approximately how many people would reside or work in the completed project?

People will not reside or work in the completed project.

j. Approximately how many people would the completed project displace?
None.

k. Proposed measures to reduce or control impacts to nearby agricultural and forestlands of long-term commercial significance, if any:
There are no nearby agricultural or forestlands of long-term commercial significance.

l. Proposed measures to ensure the proposal is compatible with existing projected land uses and plans, if any:
The proposed mitigation project would comply with all applicable development regulations.

m. Proposed measures to avoid or reduce displacement, if any:
No measures are proposed.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
Not Applicable.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
One manufactured home located at the highest point on the site has been removed/demolished.

c. Proposed measures to reduce or control housing impacts, if any:
Property acquisition was required to purchase the site for mitigation. Chapter 8.25 and 8.26 RCW governed the acquisition proceedings. These laws insure fair and equitable treatment of those displaced. In addition, right-of-way purchases were made in accordance with the Civil Rights Act Title VI legislation and the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 42 U.S.C. These laws provide payment for reasonable and necessary costs to relocate persons displaced and ensure prompt and fair relocation payments and requires agency review of aggrieved parties. Acquisition proceedings include appraisal, determination of just compensation, presentation of an offer and compensating the individual.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
The mitigation project proposes no structures.

b. What view in the immediate vicinity would be altered or obstructed?
No views in the immediate vicinity would be altered or obstructed.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Site plantings to restore more natural conditions are expected to enhance the aesthetic appeal of the property site.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The proposed mitigation project will not produce light or glare.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

The proposed mitigation project would not produce light or glare that would pose as a safety hazard or interfere with views.

c. What existing off-site sources of light or glare may affect your proposal?

There are no off-site light sources that would affect the proposed mitigation.

d. Proposed measures to reduce or control light and glare impacts, if any?

No measures are proposed.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

There are no designated or informal recreational opportunities in the immediate vicinity of the proposed mitigation site.

b. Would the proposed project displace any existing recreation uses? If so, please describe.

The proposed mitigation site would not displace any recreation users.

c. Proposed measures to reduce or control impacts on recreating, including recreation opportunities to be provided by the project or applicant, if any:

No measures are proposed.

13. Historic and Cultural Preservation

a. Are there any buildings, structures, or sites located on or near the site that are over 45 years old listed in or eligible for listing in national, site, or local preservation registers located on or near the site? If so, please general describe.

There are no structures remaining on the site. Previous structures that were on the site were constructed in 1978 or more recently.

b. Are there any landmarks, features or other evidence of Tribal or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

A cultural resources survey was conducted to assess potential impacts to historic sites. Based on the results of the survey, no historic properties were identified and the project is not expected to affect any National Register of Historic Places-eligible resources.

Describe methods used to assess the potential impacts to cultural and historic

resources on or near the project site. Examples include consultation with Tribes and the Department of Archeology and Historic Preservation, archaeological surveys, historic maps, GIS data, etc.

Archaeologists performed a pedestrian survey of the mitigation site, defined as the Area of Potential Effects (APE), to identify archaeological deposits and exposed features on the ground surface. This effort involved walking across the proposed APE and visually inspecting the ground surface and local topography to identify areas that have been subject to modern landscape alterations. A reconnaissance-level examination and documentation of buildings and structures in the APE was also performed during the Pedestrian Survey. Properties suspected of being 45 years of age or older were documented and recorded.

Shovel probes (SPs) were excavated at 20-meter (65-foot) or smaller intervals across the horizontal extent of where project-related ground disturbance is anticipated to occur. If a SP was unable to be excavated due to heavy vegetation or surface water inundation, the SP was relocated nearby if possible. All SPs were 40 to 50 centimeters (16 to 19.5 inches) in diameter and were excavated to a depth of 75 centimeters (29.5 inches) in areas where minor grading for asphalt and fill removal is anticipated to occur, and to a depth of approximately 1 meter (3.3 feet) below ground surface in all other areas. If Pleistocene-age deposits, impassable materials, or inundated surface conditions were encountered, excavation of that probe terminated. All sediments removed from the SPs were screened through 6-millimeter (0.25-inch) mesh hardware cloth and inspected for cultural materials. Once each SP was completed, the archaeologist visually inspected profile walls and noted contents, stratigraphy, presence or absence of fill, level of disturbance, and any other important observations on a standard shovel probe form. If the SP was terminated prior to reaching the standardized terminal depths above, the reason for early termination was noted. Each SP was photographed using a digital camera and their locations were recorded using ESRI GIS Collector Application. All SPs were backfilled upon completion. All artifacts recovered in SPs were analyzed, photographed, and then reburied. No artifacts were collected.

c. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required:

The cultural resources survey recommends that an unanticipated discovery plan (UDP) be developed prior to the implementation of project-related ground disturbance and implemented during the project. The UDP should describe the steps to be taken in the event that human skeletal remains or archaeological materials are discovered. A proposed UDP is provided in the survey report.

Compliance with Section 106 National Historic Preservation Act is required as part of the pending application for an Army Corps of Engineers Section 404 permit.

The following management recommendations would likely be developed as part of the Section 106 consultation:

- **The proposed project would proceed as planned if no sites are affected by the project. A project specific Unanticipated Discoveries Protocol (UDP) would be developed as part of the Section 106 process, including keeping a UDP on site during the entire mitigation site construction project.**
- **If any ground-disturbing activities or other project activities related to this development or in any future development uncover protected cultural material (e.g., bones, shell, stone or antler tools), all work in the immediate vicinity should stop, the area should be secured, and any equipment moved to a safe distance away from the location. The on-site superintendent should then follow the steps specified in the UDP developed for the project.**
- **If any ground-disturbing activities or other project activities related to this development or in any future development uncover human remains, all work in the immediate vicinity would stop, the area secured, and any equipment be moved to a safe distance away from the location. The on-site superintendent would then follow the steps specified in the UDP developed for the project**

14. Transportation

a. Identify public streets and highways serving the site, or affected geographic area, and describe proposed access to the existing street system. Show on site plans, if any.

Primary access to the majority of the site is provided by an existing driveway located on 58th Ave SE. The upper, more northerly, portion of the site is currently accessed by an existing driveway on 238th St SE. No new site access is proposed. The existing driveway access points would be retained by the project.

b. Is the site or affected geographic area currently served by public transit? If so, please generally describe. If not, what is the approximate distance to the nearest transit stop?

There is no public transit service at the project site.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project proposal eliminate?

There will be no parking spaces provided as part of the mitigation project.

d. Will the proposal require any new – or improvements to existing – roads, streets, pedestrian, bicycle, or state transportation facilities, not including driveways? If so, please generally describe (indicate private or public).

The proposed mitigation project would not require new roadway improvements or improvements to existing roads.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, please generally describe.

The mitigation project site is not located in the immediate vicinity of water, rail or air transportation.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial or non-passenger vehicles). What data or transportation models were used to make these estimates?

The mitigation site would not generate vehicular trips.

g. Will the proposal interfere with, affect, or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, please generally describe.

The project would not interfere with, affect, or be affected by movement of agricultural and forest products on roads or streets in the area.

h. Proposed measures to reduce or control transportation impacts, if any:

No measures are proposed.

15. Public Services

a. Would the project result in an increased need for public services (i.e., fire protection, police protection, public transit, health care, schools, other)? If so, please generally describe.

No additional or increased need for public services would result from this project.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Traffic control during construction would be planned, sequenced, and administered to allow continuation of basic services during construction activities in proximity to the roadway right-of-way.

16. Utilities

a. Check all utilities currently available at the site:

☐ Electricity
☐ Natural Gas
☐ Water
☐ Refuse Service
☐ Telephone
☐ Sanitary Sewer
☐ Septic System
☑ Other (please describe) **All utilities have been removed from the proposed mitigation site.**

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site of in the immediate vicinity which might be needed.

The mitigation project proposes no utilities for the site. Existing utilities will be removed from the site.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Printed name: Crilly R. Ritz
Position and Agency/Organization: Senior Planner II, Snohomish County Public Works
Date Submitted: March 26, 2019

Appendix- Site Photos, Figures, Design Plan Drawings

Site Photos

↑The northern portion of the proposed mitigation site was heavily grazed. This area would be planted with native shrubs and trees. The utility pole and associated infrastructure would be removed as part of site restoration.

↑ The southern portion of the proposed mitigation site was an area where fill was placed to accommodate construction of buildings and access roads. Buildings and fill would be removed from this area followed by restoration with native shrubs and tree planting.

↑ The primary access road to the southern portion of the proposed mitigation site would be an area where fill and other site development such as buildings and fencing would be removed followed by restoration with native shrubs and tree planting.

↑ This area was heavily grazed. Invasive weeds such as tansy ragwort have started to spread once grazing was eliminated. The presence of western red cedar stumps and skunk cabbage indicate that this was previously a forested wetland. The project proposes to re-establish a forested wetland in this portion of the site.

↑ Looking north, with 58th Ave SE to the right, is a heavily-grazed area in the foreground where the project proposes to re-establish a forested wetland. Upland areas on the slope in the background would be planted to enhance the wetland buffer area.

↑ Little Bear Creek flows through the southern portion of the site. Invasive vegetation would be removed and native trees and shrubs planted to enhance the riparian area. In-stream habitat would be enhanced with placement of large woody debris.

Conceptual Mitigation Plan – Text Excerpts

Wetland Mitigation Actions

Wetland Enhancement

The wetland enhancement areas are those areas currently delineated as wetland, all of which will receive treatment to enhance their ecological functioning. Wetland enhancement is proposed primarily in existing wetland areas west of 58th Ave SE, riparian and wetland areas northwest of Little Bear Creek, and existing wetland areas along the hillside in the southwest portion of the site. Generally, actions in the wetland enhancement areas have been designed to provide a lift in the ecological habitat function of these areas, while maintaining or improving hydrologic functions. Treatments will vary based on the needs of the individual wetland, but will generally involve the following key design elements:

Hummocks and swales through the wetland – Minor grading will occur to create topographic features such as swales and hummocks that will allow for more diverse vegetation and a greater range of habitat type. Hummocks will be composed of suitable fill materials excavated from elsewhere on site to create the swales, or from elsewhere on site. Hummocks will be planted with facultative species. Swales are included to create drainage pathways through the wetlands and improve the hydrological regime of the existing wetlands and streams. Swales will be revegetated with facultative wetland and obligate wetland species.

Installation of a "training log" – A log will be installed where stormwater currently overflows, during high flow events, from the existing roadside ditch along 58th Ave SE, onto the site. The log will direct water further onto the site, rather than spilling back into the ditch. This will allow water to sheet flow over the wetland, slowing the flow of water, and provide a lift in the hydrological and water quality functions of the onsite wetland area.

Retain or install habitat features – Existing habitat features such as stumps, rock piles, snags and brush piles, will be preserved and used onsite to the extent practical. If sufficient materials are not available at the site, they will be imported (from an approved offsite location) and used to construct habitat features. Habitat features will provide an increase in habitat structure and function.

Remove invasive plants – Removal of invasive plant species will be focused on the monocultures of Himalayan blackberry and reed canarygrass in the existing emergent wetland areas to the south and the north and along the bank of Little Bear Creek, as well as the removal of Himalayan blackberry from the wet seeps along the hillslope to the west. Blackberry will be removed by hand, grubbed, and an approved aquatic herbicide will be applied as needed. Reed canarygrass would be mowed and subsequently sprayed with an approved aquatic herbicide. Removal of invasive species will occur in other areas as needed.

Planting – Replacement of appropriate native vegetation communities using native trees, shrubs, and emergent species tolerant of saturated soil conditions.

Wetland enhancement areas are identified on Sheet G09 and design details for these areas can be found on Sheets C02, C03, C04,C05 and CO6 of the 90% Plan Set. Planting detail for this area can be found on Sheets L02, L03, LO4, LO5 and L06.

Wetland Reestablishment

The wetland reestablishment areas are those areas which were formerly wetland and contain hydric soils, but have been filled or drained. Wetland reestablishment is proposed primarily in areas where fill has been placed for development. Mitigation actions in these areas have been designed to return natural and historic functions to the former wetland. Wetland reestablishment will include:

Removal of fill – Grading to appropriate elevations to facilitate wetland conditions. Because the topography of the site is highly varied and depths to groundwater also vary, there is no single target elevation for wetland reestablishment

Grading of wetland depressions – Minor grading will occur to create depressions that will engage groundwater during the wet season and form ephemeral shallow open water habitat intended for use by amphibians.

Hillslope depressions – Minor grading will occur to create shallow depressions along the hillslope along the western portion of the site. These depressions will capture and retain water from local hillside seeps to restore wetland conditions, as well as increase habitat diversity.

Daylighting of streams – Piped portions of Stream 1 and Stream 4 will be removed. Streams will flow through natural channels that will allow a hydrologic input to the wetland reestablishment area through overbank flooding.

Removal of invasive plant species – Invasive will be removed using hand-held equipment or mowed, and will be focused on the monocultures of Canada thistle and reed canarygrass near the existing outbuildings to the west, as well as the small patches of bamboo and Himalayan blackberry in the current upland pasture. Removal of invasive species will occur in other areas as needed.

Planting – Replacement of appropriate native vegetation communities using native trees, shrubs, and emergent species tolerant of saturated soil conditions.

Wetland reestablishment areas are identified on Sheet G09 and design details for this area can be found on Sheets C03-C06 of the 90% Plan Set. Planting detail for this area can be found on Sheets L03-L06.

Wetland Rehabilitation

The wetland rehabilitation areas are areas where wetland conditions exist but their characteristics or functions are substantially altered or degraded, primarily in the central portion of the site, where wetlands are largely surrounded by fill. By removing fill and recreating wetland conditions, hydrologic connections to the reestablished wetlands will occur. Though rehabilitation will not produce an increase in wetland acreage, it will create a gain in hydrologic function. Subsequently planting these areas with structurally diverse, native vegetation, similar to vegetation in the wetland reestablishment area, will also make these currently isolated areas part of a larger vegetated corridor, also resulting in a gain in habitat function.

Wetland rehabilitation areas are identified on Sheet G08 and design details for these areas can be found on Sheets C04 and CO5 of the 90% Plan Set. Planting detail for this area can be found on Sheets L04 and C05.

Wetland Creation

Wetland creation will occur in areas that are currently upland with upland soils. These areas will be converted to wetland through the removal of soil material and grading of target elevations to establish a hydrologic connection. Wetland will be created along the left bank of Little Bear Creek through the grading of the floodplain bench. Wetland creation will also occur along the hillslope in the southwest portion of the site and in the central portion of the site, north of the driveway. These areas will also be planted with a mixture of native woody and herbaceous vegetation to facilitate development of high value wetland communities.

Wetland creation areas are identified on Sheet G09 and design details for these areas can be found on Sheets C02-C05 of the 90% Plan Set. Planting detail for this area can be found on Sheets L02-L05.

Installation of Native Vegetation Communities in the Wetland Mitigation Action Areas

Six general plant communities will be established throughout the four wetland mitigation action areas described above. These plant communities will be adaptively managed over the proposed 10-year monitoring program. A description of each plant community is provided below.

Wetland Hummock Communities will be installed on the wetland hummocks within the Wetland Enhancement Area in the northern portion of the site, west of 58th Ave SE. Plants within this community primarily include tree species and taller shrub species to support a more diverse assemblage. Installed plants will be container plantings that are primarily facultative and facultative wetland species.

Wetland Enhancement Communities include trees, shrub, and emergent species adapted for wet conditions. This plant community will be planted in areas that are currently wetland but lack structural diversity. These areas are located west of the existing driveway, northwest of Little Bear Creek, and the large area north of 58th Ave SE. These planting will occur outside of the graded hummocks and swales. Installed plants will be container plantings and include primarily facultative and facultative wetland tree, shrub, and emergent species.

Wetland Understory Enhancement Communities will be installed in existing forested wetland areas that lack a structurally diverse understory, primarily in the southern portion of the site and along the hillslope to the southwest. Installed plants will be container plantings and include shrub and emergent species adapted for wet conditions, primarily facultative and facultative wet species.

Wetland Creation/Reestablishment/Rehabilitation Communities will be installed in areas that are currently considered upland. These areas will be cleared and grubbed, then graded to an appropriate elevation to create wetland hydrology. The vegetation palette is similar to the Wetland Enhancement Communities areas but will have greater species and structural diversity. The majority of this plant community will be installed in the large Wetland Reestablishment Area in the center of the site

(including the interspersed Wetland Rehabilitation Areas) as well as the three Wetland Creation Areas located in the northern portion of the site, west of the existing driveway, and along the hillslope to the southwest. All plants will be container plantings.

Wetland Creation/Reestablishment/Rehabilitation (8" depth max.) Communities (Mix H) will be installed within the larger graded wetland depressions within the Wetland Enhancement Area and Wetland Reestablishment Areas, throughout the majority of the site. This community includes primarily emergent species that will be able to tolerate a maximum of six to nine inches of standing water during the wet season. Species will be similar to the 6" maximum depth community, but will have more species diversity. All species will be installed as tube, or plug plantings.

Floodplain and Riparian Mitigation Actions along Little Bear Creek

Enhancement of the Little Bear Creek floodplain and riparian corridor will occur in the southern portion of Wetland C. A floodplain bench will be graded along the left bank of Little Bear Creek. The design intent of the bench is twofold; first, to increase the area of frequently inundated floodplain and second, to vary local hydraulic conditions resulting in increased stream habitat heterogeneity. Field reconnaissance indicated that Little Bear Creek is slightly incised within the valley bottom (2 to 4 feet). During a site visit, ESA noted presence of coarse woody debris embedded in the creek bank which may indicate the wood was covered by sediment deposition. This historic movement of sediment may have been a result of previous clearing and subsequent hill slope erosion. Excavation of a small flood bench, 1 to 2 feet above the channel thalweg, will create frequently inundated areas which are valuable rearing habitat for juvenile salmonids. Inset flood benches also vary local hydraulic conditions (depth, velocity, stream power, etc.) which results in increased stream sediment sorting.

The County recognizes that additional restoration opportunities may exist along Little Bear Creek up- and downstream of the LBCAMS. The project is designed to create wetland mitigation credits while not precluding or impeding additional future salmon or stream restoration projects. Although, though the project will improve stream, floodplain and riparian habitat, the County is not seeking stream or fish credits. If any of the 11 proposed road improvement projects results in impacts to fish or fish habitat, compensatory mitigation for those impacts would not occur at the LBCAMS.

In addition to the grading of the floodplain bench, key design elements include the placement of large wood structures along the bank of the stream, the addition of streambed material, and revegetation with riverine wetland appropriate species. Other stream and floodplain mitigation actions include:

Creation of floodplain bench. A floodplain bench will be graded along the left bank of Little Bear Creek to enhance off channel habitat and increase the area of frequently inundated floodplain that are valuable rearing habitat for juvenile salmonids. Inset floodplain benches also vary local hydraulic conditions (depth, velocity, stream power, etc.) which results in increased stream sediment sorting and the deposition of gravels valuable for salmonid spawning habitat. An increase in floodplain inundation would also eventually result in the expansion of riverine wetlands.

Install large wood structures – Two large woody structures (LWS) will be installed at the upstream and downstream extents of the newly created floodplain bench along the left bank of

Little Bear Creek and outside of OHWM. In addition to impeding bank erosion, these structures will also increase cover for fish, provide substrate for benthic macroinvertebrates, and promote habitat heterogeneity.

Addition of streambed material – A cluster of approximately six, 1 to 2 ton boulders will be set within the stream channel, on top of the existing streambed material. The addition of this boulder cluster will restore structural complexity and a hydraulic diversity where currently homogenous conditions exist.

Removal of invasive species – Preconstruction, invasive vegetation will be removed, by hand, grubbed, and mowed when necessary and will focus on the knotweed and Himalayan blackberry populations along the banks of Little Bear Creek. Removal of invasive species will occur in other areas of the riparian area as needed. Approved aquatic herbicides will be applied as needed.

Installation of Native Vegetation Communities in the Floodplain and Mitigation Action Areas
Two plant communities will be established within the areas of riparian enhancement and wetland creation as described above. These plant communities will be adaptively managed over the proposed 10- year monitoring program. A description of each plant community is below and proposed planting schedules for each are included in Appendix A.

Riparian Enhancement Communities (Mix I) will occur along the streambank, upstream and downstream of the created floodplain, to provide bank stability and overhanging vegetative cover to Little Bear Creek. This community will also be installed directly behind the floodplain and act as a transition zone between wetland and upland conditions. Plantings will be container plantings and primarily include facultative wetland tree, shrub, and emergent species that can tolerate wet conditions during times of high flow.

Floodplain Wetland Creation Communities (Mix J) will occur within the portion of the graded floodplain that will be engaged most frequently. Plantings will include the installation of live stakes of shrub species that are adapted to tolerate frequent inundation, primarily facultative wetland species. Live stakes will be installed within the floodplain to stable banks and provide overhanging cover to Little Bear Creek.

Design details for the creation of the floodplain bench and enhancement of the riparian corridor of Little Bear Creek can be found on Sheets CO1 C05 and C04 of the 90% Plan Set. Planting detail for this area can be found on Sheets L05.

Upland Mitigation Actions

Upland Preservation with Enhancements
Upland areas adjacent to the wetlands are classified as upland preservation with enhancement areas. Generally, in these areas, invasive vegetation will be removed and native, structurally diverse plantings will be installed, to provide a lift in habitat function. Upland preservation with enhancement areas include the forested hillslope to the west of the site, the area to the southwest of Little Bear Creek, the house site on the north west corner of the property, and the bare slope on the north end of the property. On the forested hillslope and upland areas to the north of the site, invasive vegetation removal will focus on large Himalayan blackberry thickets (Figure 7). Removal of invasive species in the remainder of the Upland Enhancement Areas will occur as needed. The removal will be done by hand

when possible. Blackberry will be removed by hand, grubbed, and an approved herbicide will be applied as necessary. Reed canarygrass would be mowed and subsequently sprayed with an approved herbicide. These areas will then be underplanted with native trees and shrubs in forested areas or interplanted with native shrubs and trees in sparsely vegetated areas. In upland areas that are not currently forested, structures and unsuitable fill soils will be removed, topsoil will be added, and the areas will be planted with native trees and shrubs.

After enhancements, and as a part of LBCAMS, these upland areas will be preserved, along with the remainder of the site. The enhancement of these upland areas will result in a functional lift in ecological buffer function and provide a higher degree of protection to the adjacent wetlands. The preservation of these upland areas will keep ensure that these buffer functions are provided in perpetuity.

Installation of Native Vegetation Communities in the Upland Mitigation Action Areas
Two plant communities will be installed in the upland preservation with enhancement areas. These plant communities will be adaptively managed over the proposed 10-year monitoring program. A description of each plant community is below and proposed planting schedules for each are included in Appendix A.

Upland Planting Communities (Mix A) will occur at the site of the house and adjacent slope at the north end of the property; these areas are currently sparsely vegetated. Installed plantings will be container plants and include a mix of coniferous and deciduous trees and upland shrub species.

Upland Understory Enhancement Communities (Mix B) will occur in currently forested areas that lack a diverse understory. This community will be established in the forested upland hillslope in the western portion of the site, as well as in the forested area to the southeast of Little Bear Creek, in the southern portion of the site. This community includes a mix of native shrub species that will add a multi-structural understory to these forested areas and improve species diversity.

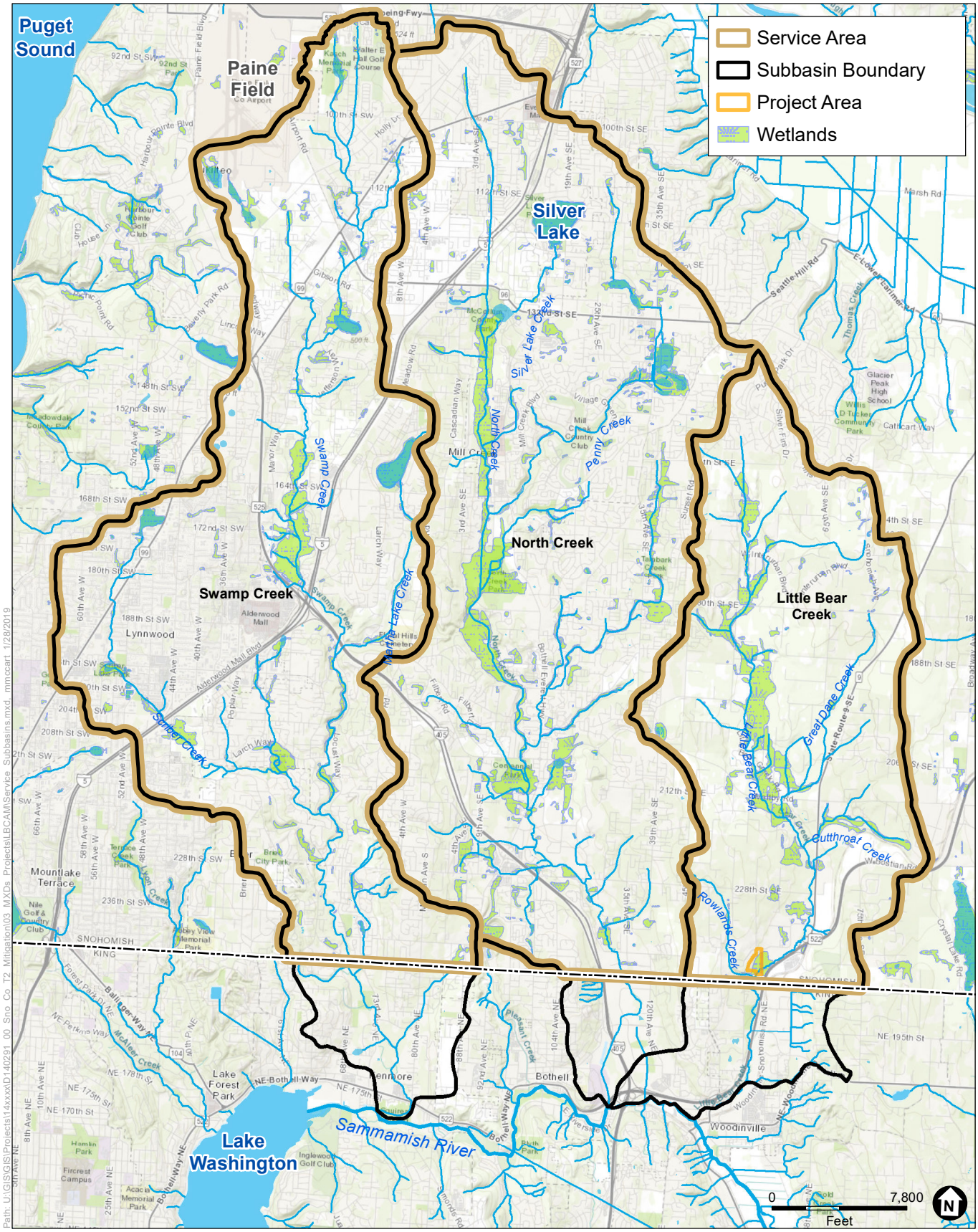
Upland preservation and enhancement areas are identified on Sheet G09 and design details for these areas can be found on Sheets C02, CO5, and C06 of the 90% Plan Set. Planting detail for this area can be found on Sheets L02, LO5, and L06.

Fill Placement

As discussed above, large areas of fill material were imported to the site to support previous land use activities. Imported materials range from gravels to soils. Re-use of fill material on site serves several functions: to reduce off-haul costs, to develop visual screens for the site, and to develop topographic/habitat variability. Three locations have been identified for fill placement: the house pad off of 238th Ave SE, the toe-of-slope located north of Wetland A, and an area immediately north of the gate off of 58th Avenue SE (AKA the future vehicle entrance). At the house pad location, excavated gravels will be placed to an average thickness of approximately 1.5 feet, capped with 1.0 to 1.5 feet of excavated fill soil, and planted with native upland tree and shrub species (Mix A). An estimated 2,000 cubic yards of fill will be placed, occupying a footprint of approximately 250 feet by 100 feet (See Sheets C02 and L02). Approximately 175 cubic yards of material will be placed at the toe-of-slope of the northern hill. Fill berm dimensions will measure approximately 75 feet by 45 feet and 1.5 feet in depth. The berm will receive a similar planting treatment as the house pad berm. Fill placement will also occur

north of the vehicle entrance and will take the form of a long broad berm measuring approximately 0.5 feet tall, 45 feet wide at the base, and approximately 160 feet long. This berm, too, will be capped with clean soil excavated from on site and planted with native upland vegetation (Mix A). We estimate the berm will be approximately 150 cubic yards of gravels and soils combined (See Sheets C04 and L04).

Mitigation Plan Exhibits and Design Drawings

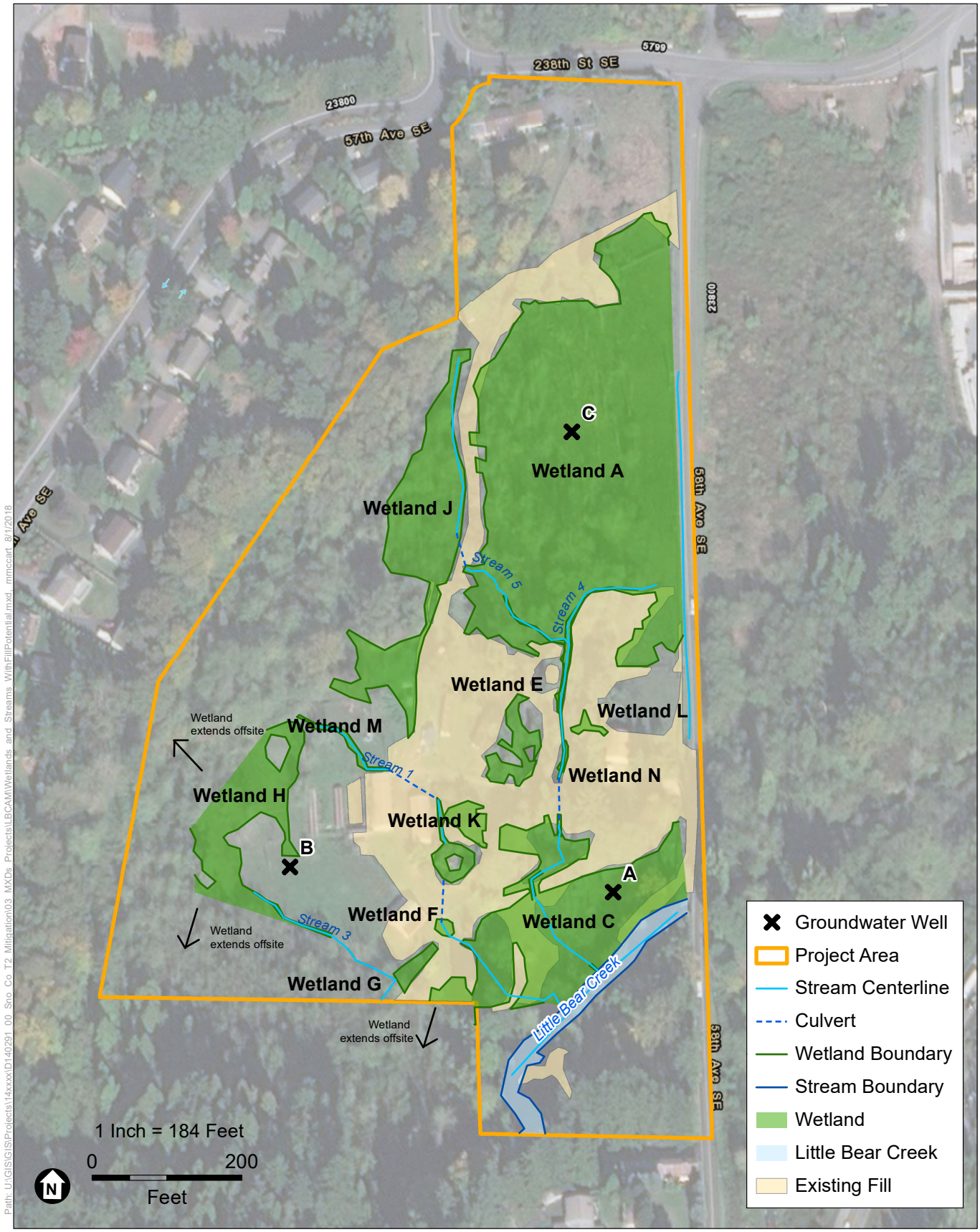


SOURCE: ESRI, 2018; ESA, 2017; Snohomish County, 2018

Little Bear Creek Advance Mitigation Site

Figure 3
Service Areas and Subbasins

ESA



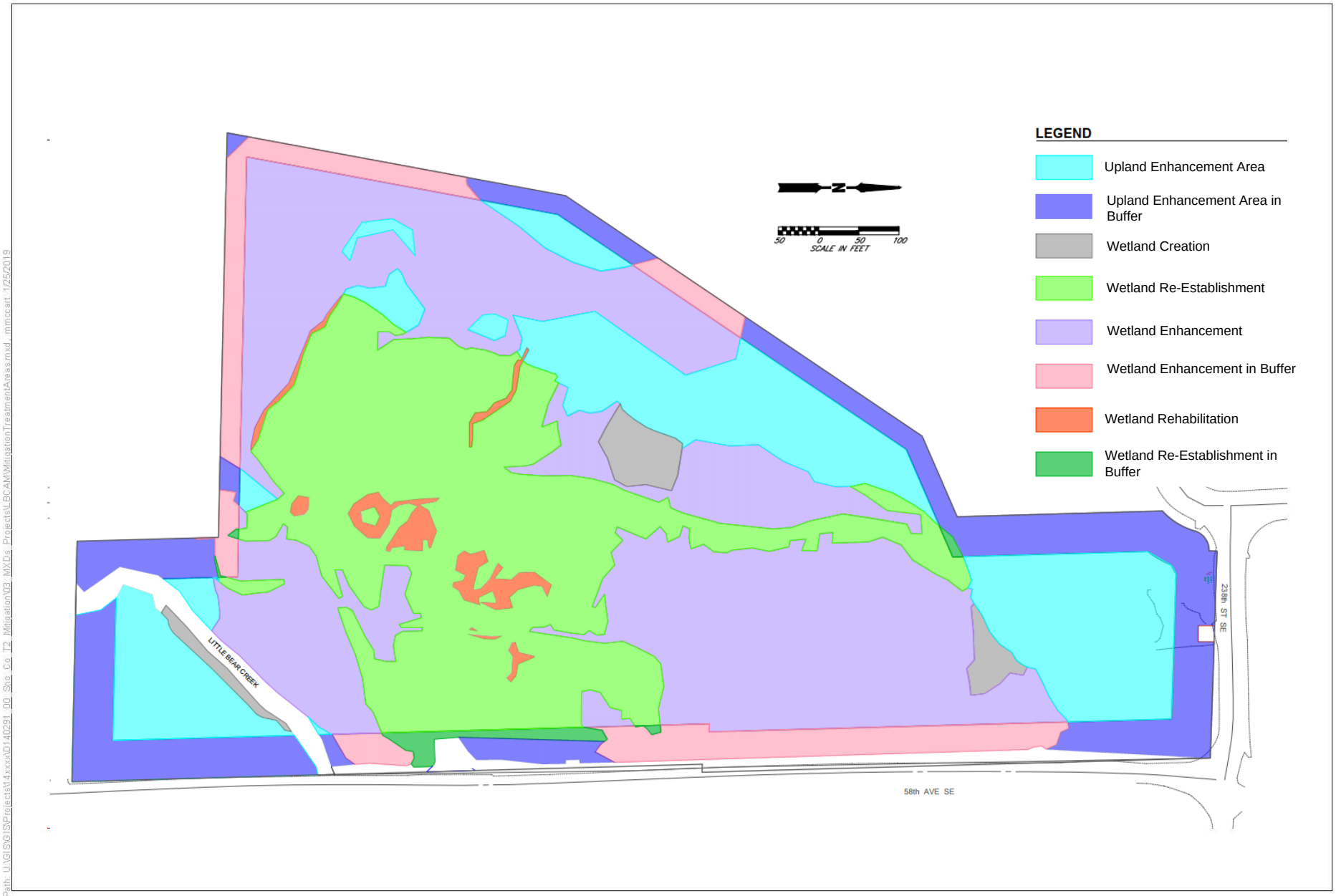
SOURCE: DigitalGlobe, 2016; ESA, 2018

Little Bear Creek Advance Mitigation Site

Figure 9

Wetlands and Streams with Identified Fill Areas

ESA



SOURCE: ESRI, 2018; ESA, 2017; Snohomish County, 2018

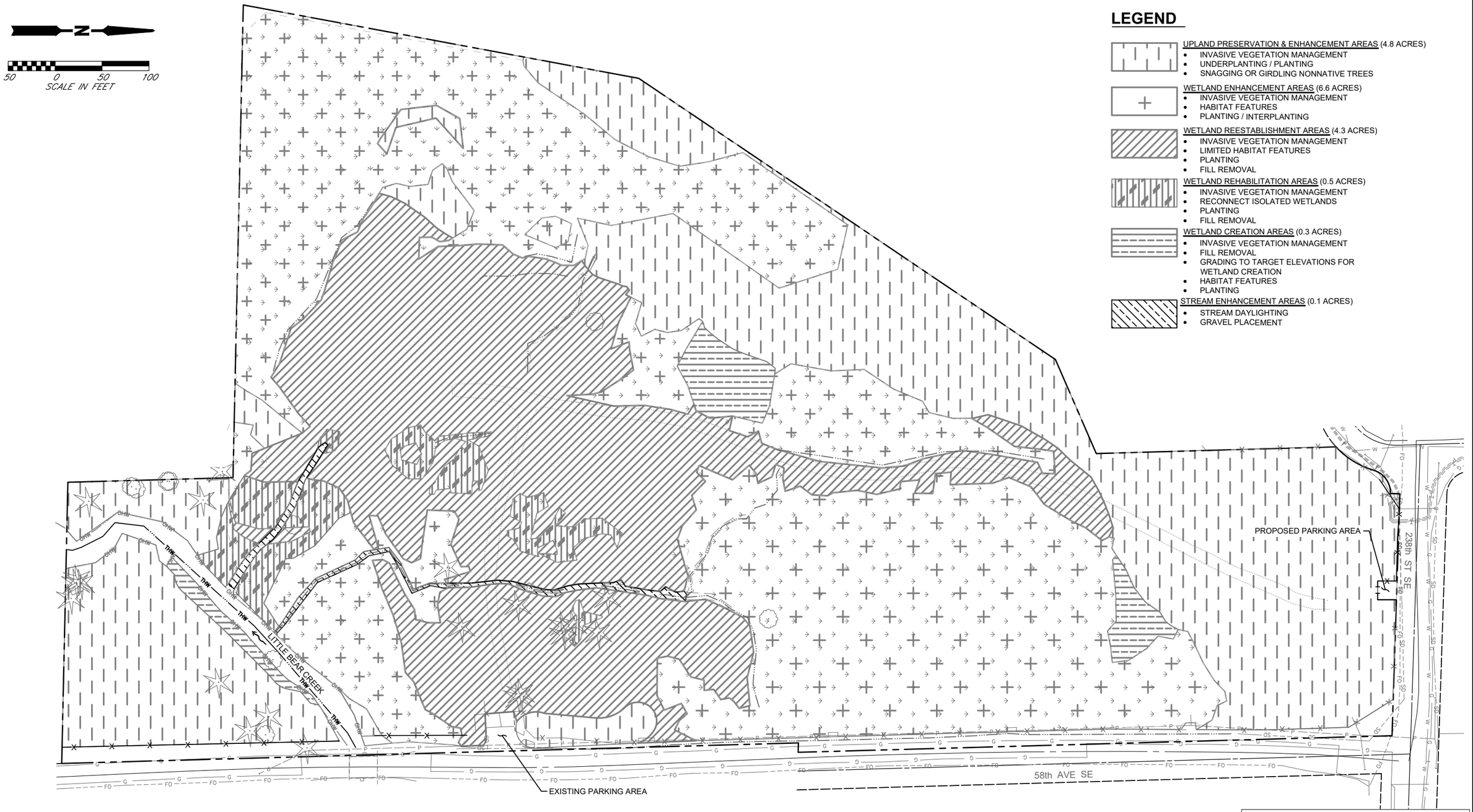
Little Bear Creek Advance Mitigation Site

Figure 10
Mitigation Treatment Areas

ESA

Path: U:\GIS\GIS\Projects\14xxxx\D140291_00_Sno_Co_T2_Mitigation\03_MXDs_Projects\LBCAM\MitigationTreatmentAreas.mxd mmccart 1/25/2019

SECTION 34, T27N, R5E, W.M.



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DATE	NO.	REVISION	BY
10/12/18			

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HORZ. DATUM: LOCAL	VERT. DATUM: NAVD 88
DESIGNED BY: ESB, BDT	DRAWN BY: AMF, RK

PRELIMINARY

90% DESIGN

REVIEWED AND APPROVED FOR CONSTRUCTION

SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

LITTLE BEAR CREEK ADVANCED MITIGATION SITE

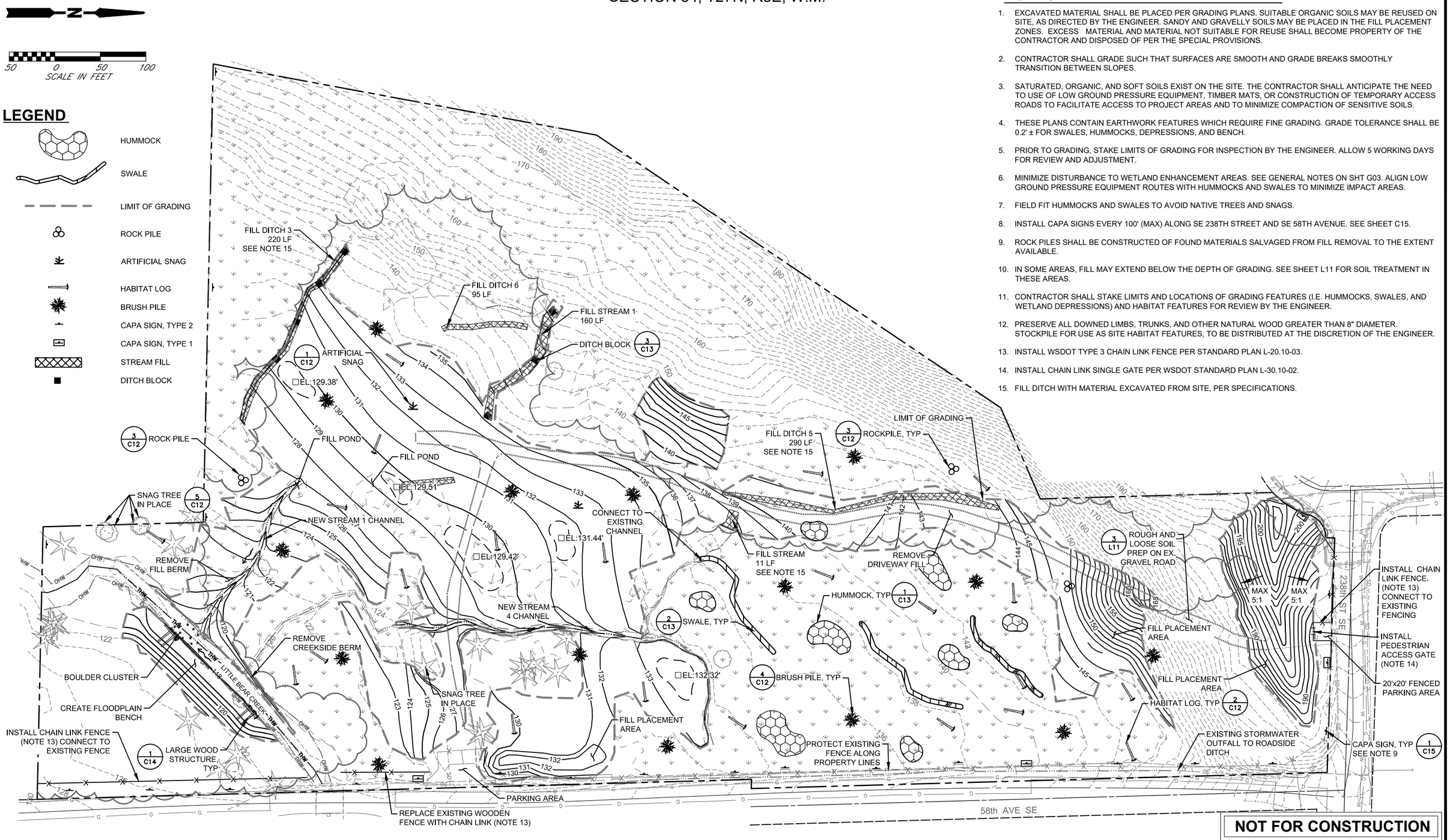
MITIGATION GOALS

REFERENCE SHEET NO. G09

SHEET 9 OF 37 SHEETS

2/27/2019 5:01:31 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\G09 SITE OVERVIEW.DWG

SECTION 34, T27N, R5E, W.M.



NOTES

1. EXCAVATED MATERIAL SHALL BE PLACED PER GRADING PLANS. SUITABLE ORGANIC SOILS MAY BE REUSED ON SITE, AS DIRECTED BY THE ENGINEER. SANDY AND GRAVELLY SOILS MAY BE PLACED IN THE FILL PLACEMENT ZONES. EXCESS MATERIAL AND MATERIAL NOT SUITABLE FOR REUSE SHALL BECOME PROPERTY OF THE CONTRACTOR AND DISPOSED OF PER THE SPECIAL PROVISIONS.
2. CONTRACTOR SHALL GRADE SUCH THAT SURFACES ARE SMOOTH AND GRADE BREAKS SMOOTHLY TRANSITION BETWEEN SLOPES.
3. SATURATED, ORGANIC, AND SOFT SOILS EXIST ON THE SITE. THE CONTRACTOR SHALL ANTICIPATE THE NEED TO USE OF LOW GROUND PRESSURE EQUIPMENT, TIMBER MATS, OR CONSTRUCTION OF TEMPORARY ACCESS ROADS TO FACILITATE ACCESS TO PROJECT AREAS AND TO MINIMIZE COMPACTION OF SENSITIVE SOILS.
4. THESE PLANS CONTAIN EARTHWORK FEATURES WHICH REQUIRE FINE GRADING. GRADE TOLERANCE SHALL BE 0.2' ± FOR SWALES, HUMMOCKS, DEPRESSIONS, AND BENCH.
5. PRIOR TO GRADING, STAKE LIMITS OF GRADING FOR INSPECTION BY THE ENGINEER. ALLOW 5 WORKING DAYS FOR REVIEW AND ADJUSTMENT.
6. MINIMIZE DISTURBANCE TO WETLAND ENHANCEMENT AREAS. SEE GENERAL NOTES ON SHT G03. ALIGN LOW GROUND PRESSURE EQUIPMENT ROUTES WITH HUMMOCKS AND SWALES TO MINIMIZE IMPACT AREAS.
7. FIELD FIT HUMMOCKS AND SWALES TO AVOID NATIVE TREES AND SNAGS.
8. INSTALL CAPA SIGNS EVERY 100' (MAX) ALONG SE 238TH STREET AND SE 58TH AVENUE. SEE SHEET C15.
9. ROCK PILES SHALL BE CONSTRUCTED OF FOUND MATERIALS SALVAGED FROM FILL REMOVAL TO THE EXTENT AVAILABLE.
10. IN SOME AREAS, FILL MAY EXTEND BELOW THE DEPTH OF GRADING. SEE SHEET L11 FOR SOIL TREATMENT IN THESE AREAS.
11. CONTRACTOR SHALL STAKE LIMITS AND LOCATIONS OF GRADING FEATURES (I.E. HUMMOCKS, SWALES, AND WETLAND DEPRESSIONS) AND HABITAT FEATURES FOR REVIEW BY THE ENGINEER.
12. PRESERVE ALL DOWNED LIMBS, TRUNKS, AND OTHER NATURAL WOOD GREATER THAN 8" DIAMETER. STOCKPILE FOR USE AS SITE HABITAT FEATURES, TO BE DISTRIBUTED AT THE DISCRETION OF THE ENGINEER.
13. INSTALL WSDOT TYPE 3 CHAIN LINK FENCE PER STANDARD PLAN L-20.10-03.
14. INSTALL CHAIN LINK SINGLE GATE PER WSDOT STANDARD PLAN L-30.10-02.
15. FILL DITCH WITH MATERIAL EXCAVATED FROM SITE, PER SPECIFICATIONS.

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SNOHOMISH COUNTY ENGINEER

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SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

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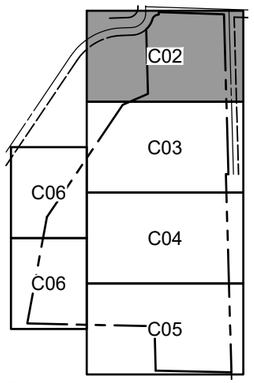
LITTLE BEAR CREEK ADVANCED MITIGATION SITE

GRADING PLAN OVERVIEW

REFERENCE SHEET NO. C01

SHEET 12 OF 37 SHEETS

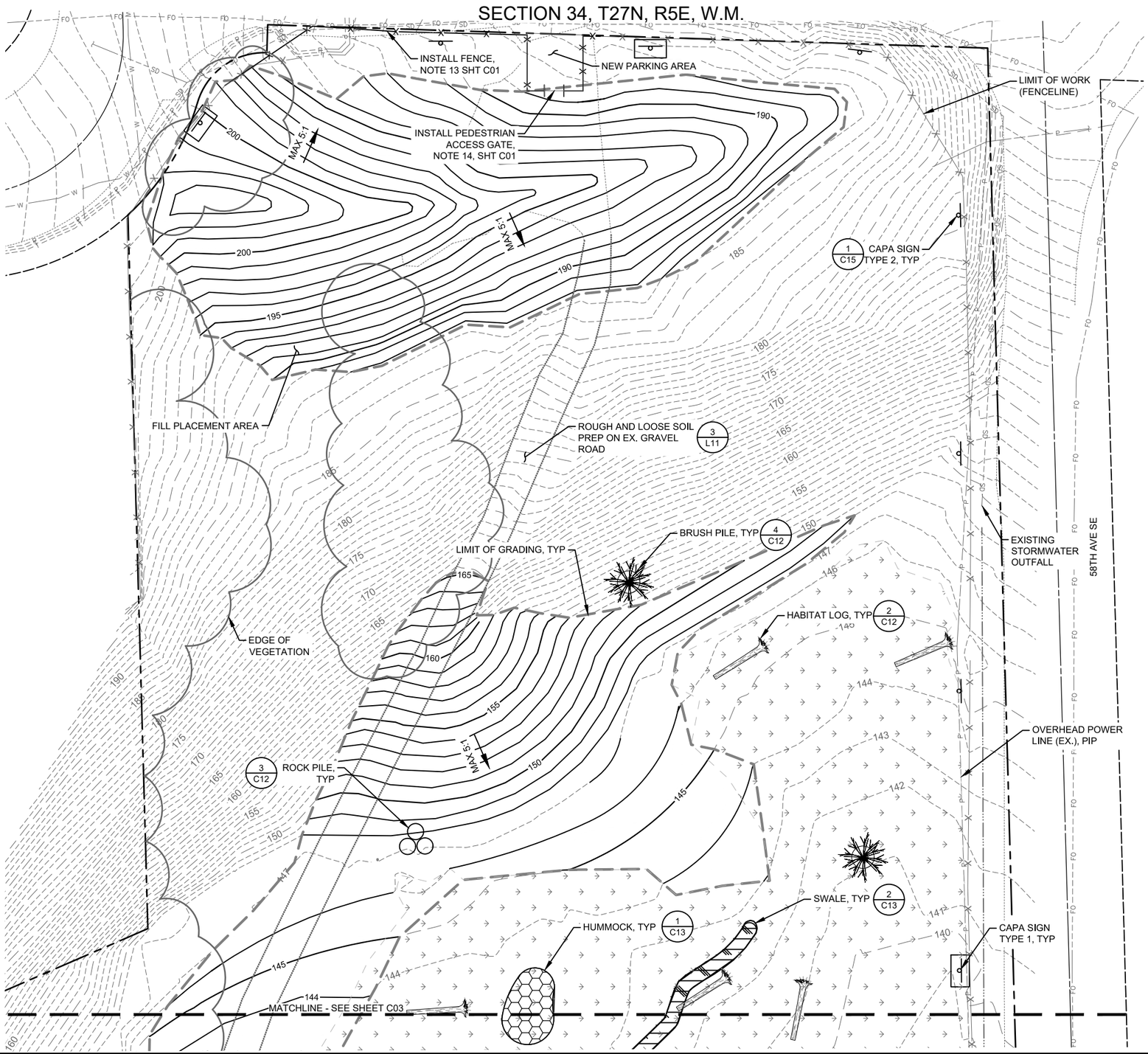
2/27/2019 4:38:58 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\C01 GRADING OVERVIEW.DWG



SITE KEY

NOTES

1. SEE SHEETS G02 AND C01 FOR LEGEND.



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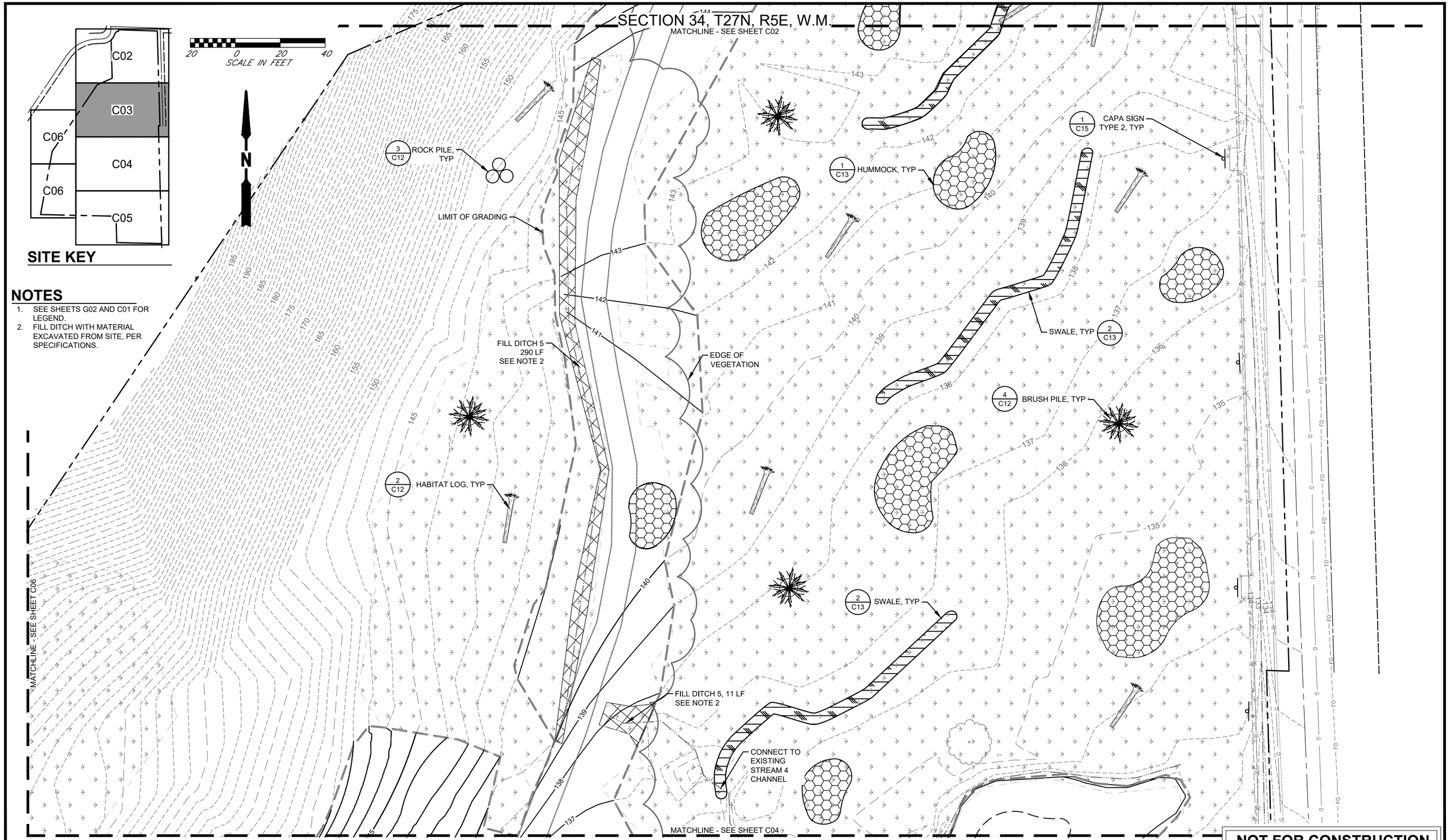
LITTLE BEAR CREEK ADVANCED MITIGATION SITE

GRADING PLAN, 1 OF 5

REFERENCE SHEET NO. C02

SHEET 13 OF 37 SHEETS

2/27/2019 4:39:29 PM - HANNAH SNOW - \\ES\AIES\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\C02 GRADING PLAN, 1 OF 5.DWG



SITE KEY

NOTES

1. SEE SHEETS G02 AND C01 FOR LEGEND.
2. FILL DITCH WITH MATERIAL EXCAVATED FROM SITE, PER SPECIFICATIONS.

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SURVEY NO.:	FIELD BOOK(S):
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DESIGNED BY: ESB, BDT	DRAWN BY: AMF, RK

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SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

LITTLE BEAR CREEK ADVANCED MITIGATION SITE

GRADING PLAN, 2 OF 5

REFERENCE SHEET NO. C03

SHEET 14 OF 37 SHEETS

2/27/2019 4:39:59 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\C03 GRADING PLAN, 2 OF 5.DWG

SECTION 34, T27N, R5E, W.M.

MATCHLINE - SEE SHEET C03

MATCHLINE - SEE SHEET C06

MATCHLINE - SEE SHEET C05

EDGE OF VEGETATION

BRUSH PILE, TYP (4/C12)

HABITAT LOG, TYP (2/C12)

CAPA SIGN TYPE 2, TYP (1/C15)

DITCH BLOCK, TYP (3/C13)

FILL DITCH 6, 95 LF

FILL EX STREAM 1 CHANNEL, 150 LF

LIMITS OF GRADING

FILL EX STREAM 1 CHANNEL, 60 LF

FILL ARTIFICIAL POND

NEW STREAM 4 CHANNEL (2/C14, 3/C14)

PROTECT STREAM 4 THROUGH WETLAND C

TREE ISLANDS

RETAIN EXISTING PARKING AREA

CONNECT TO EXISTING FENCE

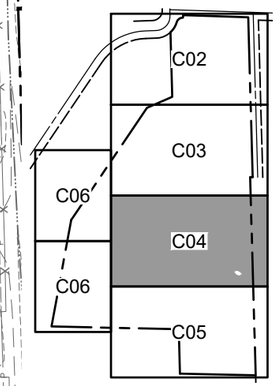
CAPA SIGN TYPE 1, TYP (1/C15)

EL:132.32'

EL:131.44'

EL:129.42'

EL:129.51'



SITE KEY

20 0 20 40
SCALE IN FEET

N

NOTES

1. SEE SHEETS G02 AND C01 FOR NOTES AND LEGEND.

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DATE	NO.	REVISION	BY
10/12/18			

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DESIGNED BY: ESB, BDT	DRAWN BY: AMF, RK

PRELIMINARY

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SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

LITTLE BEAR CREEK ADVANCED MITIGATION SITE

GRADING PLAN, 3 OF 5

REFERENCE SHEET NO. C04

SHEET 15 OF 37 SHEETS

2/27/2019 4:40:32 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\C04 GRADING PLAN, 3 OF 5.DWG

SECTION 34, T27N, R5E, W.M.

MATCHLINE - SEE SHEET C04

MATCHLINE - SEE SHEET C06

DITCH BLOCK, TYP (3/C13)

EL:129.38'

EDGE OF VEGETATION

FILL DITCH 3
290 LF
SEE NOTE 3

ROCK PILE, TYP (3/C12)

FILL POND

NEW STREAM 1 CHANNEL (1/C14, 3/C14)

LIMITS OF GRADING

REMOVE FILL

STREAM 1 OUTLET

STREAM 4

REMOVE CREEKSIDE BERM

BRUSH PILE, TYP (4/C12)

EDGE OF VEGETATION

HABITAT LOG, TYP (2/C12)

LITTLE BEAR CREEK

LARGE WOOD STRUCTURE, TYP (1/C14)

BOULDER CLUSTER, TYP (2/C14)

FLOODPLAIN BENCH

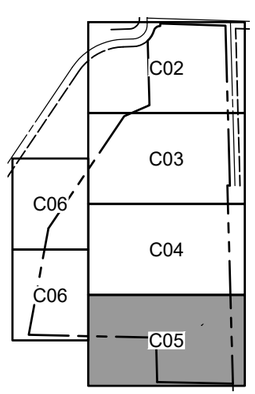
STREAM CHANNEL NOT SURVEYED AT DOWNSTREAM END

ORDINARY HIGH WATER

CAPA SIGN TYPE 2, TYP (1/C15)

NOTES

1. LIMIT DISTURBANCE TO WETLAND AREAS.
2. SEE SHEETS G02 AND C01 FOR LEGEND.
3. FILL DITCH WITH MATERIAL EXCAVATED FROM SITE, PER SPECIFICATIONS.



SITE KEY

20 0 20 40
SCALE IN FEET

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DESIGNED BY: ESB, BDT	DRAWN BY: AMF, RK

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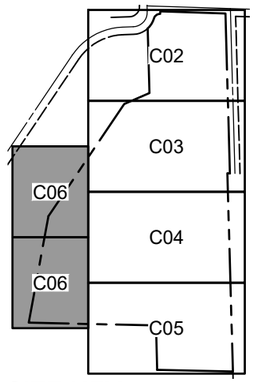
LITTLE BEAR CREEK ADVANCED MITIGATION SITE

GRADING PLAN, 4 OF 5

REFERENCE SHEET NO. C05

SHEET 16 OF 37 SHEETS

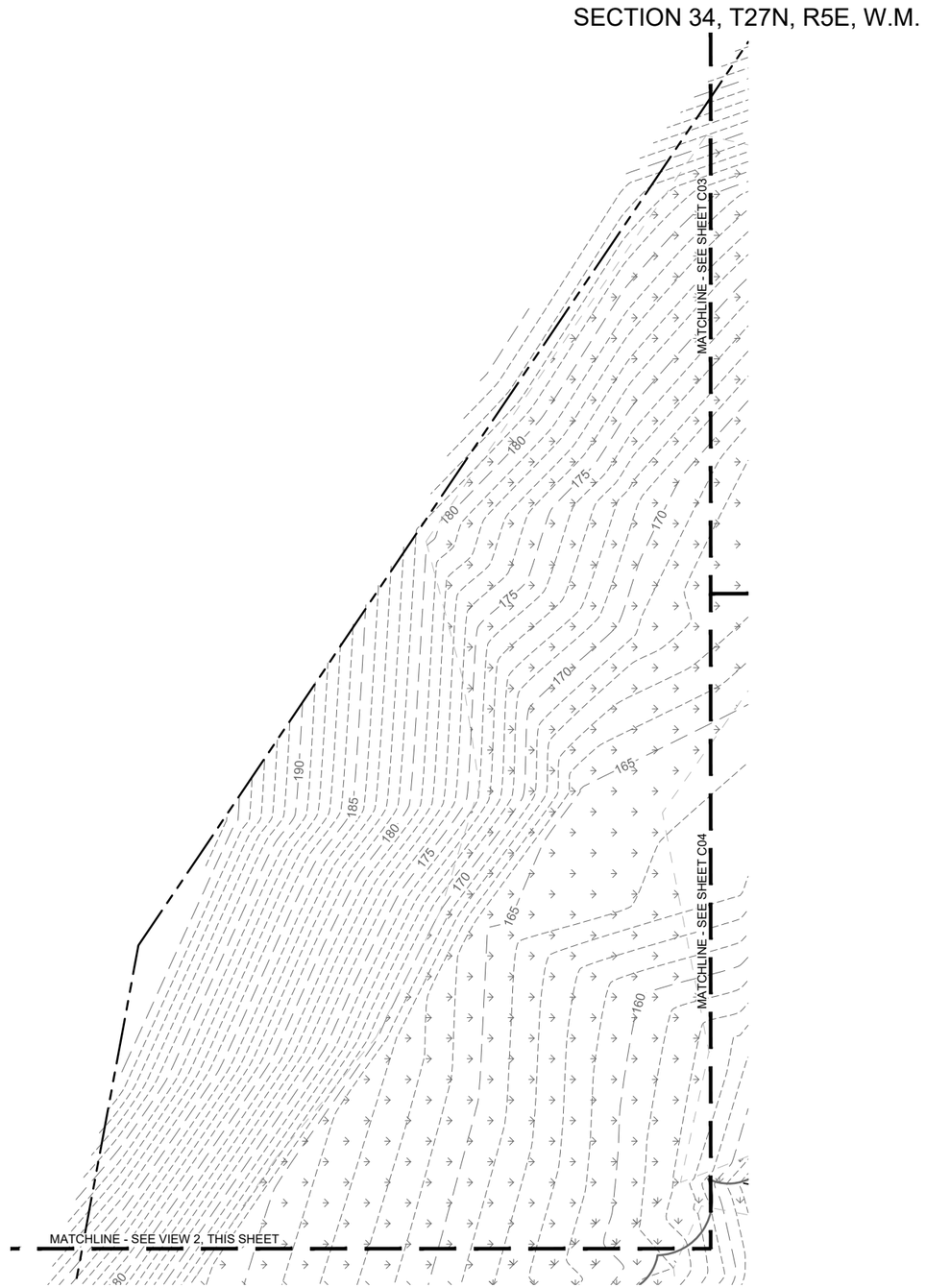
2/27/2019 4:41:06 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\C05 GRADING PLAN, 4 OF 5.DWG



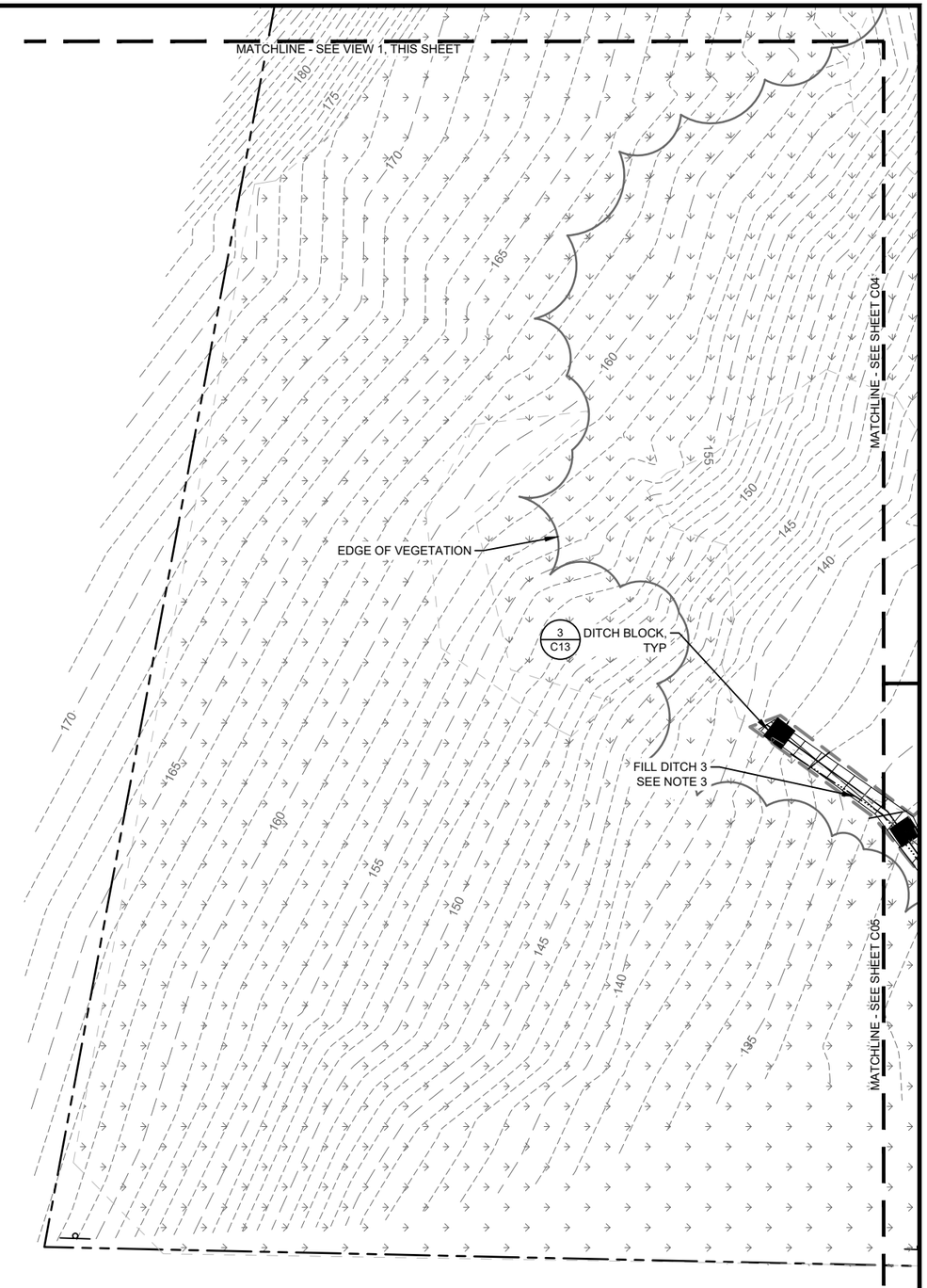
SITE KEY

NOTES

1. SEE SHEETS G02 AND C01 FOR LEGEND.
2. UNDELINEATED WETLANDS MAY EXIST IN THESE AREAS. MINIMIZE DISTURBANCE TO WETLANDS.
3. FILL DITCH WITH MATERIAL EXCAVATED FROM SITE, PER SPECIFICATIONS.



VIEW 1



VIEW 2

NOT FOR CONSTRUCTION

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DESIGNED BY: ESB, BDT	DRAWN BY: AMF, RK

PRELIMINARY

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SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

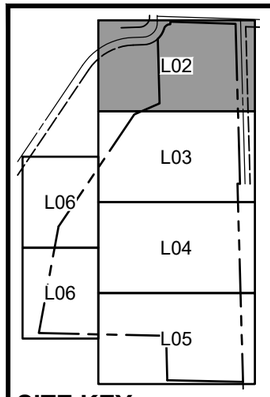
LITTLE BEAR CREEK ADVANCED MITIGATION SITE

GRADING PLAN, 5 OF 5

REFERENCE SHEET NO. **C06**

SHEET **17** OF **37** SHEETS

2/27/2019 4:41:40 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\C06 GRADING PLAN, 5 OF 5.DWG



SITE KEY

SECTION 34, T27N, R5E, W.M.

NOTES

1. FOR PLANTING AND SEEDING SCHEDULES SEE SHEETS L07, L08, & L09.
2. FOR PLANTING & SOIL PREPARATION DETAILS SEE SHEETS L10 & L11.

PLANTING LEGEND

- MIX A - UPLAND ENHANCEMENT
- MIX B - UPLAND UNDERSTORY ENHANCEMENT
- MIX C - WOODLAND HUMMOCK WETLAND ENHANCEMENT
- MIX D - WETLAND ENHANCEMENT
- MIX E - WETLAND UNDERSTORY ENHANCEMENT
- MIX F - WETLAND CREATION/ RE-EST./REHAB.
- MIX G - WETLAND CREATION/ RE-EST./ENH. 8" DEPTH MAX.
- MIX H - RIPARIAN ENHANCEMENT
- MIX I - FLOODPLAIN WETLAND CREATION

N

20 0 20 40
SCALE IN FEET

MATCHLINE - SEE SHEET L03

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DESIGNED BY: ABG, ESB	DRAWN BY: ABG

PRELIMINARY

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STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT

REVIEWED AND APPROVED FOR CONSTRUCTION

SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

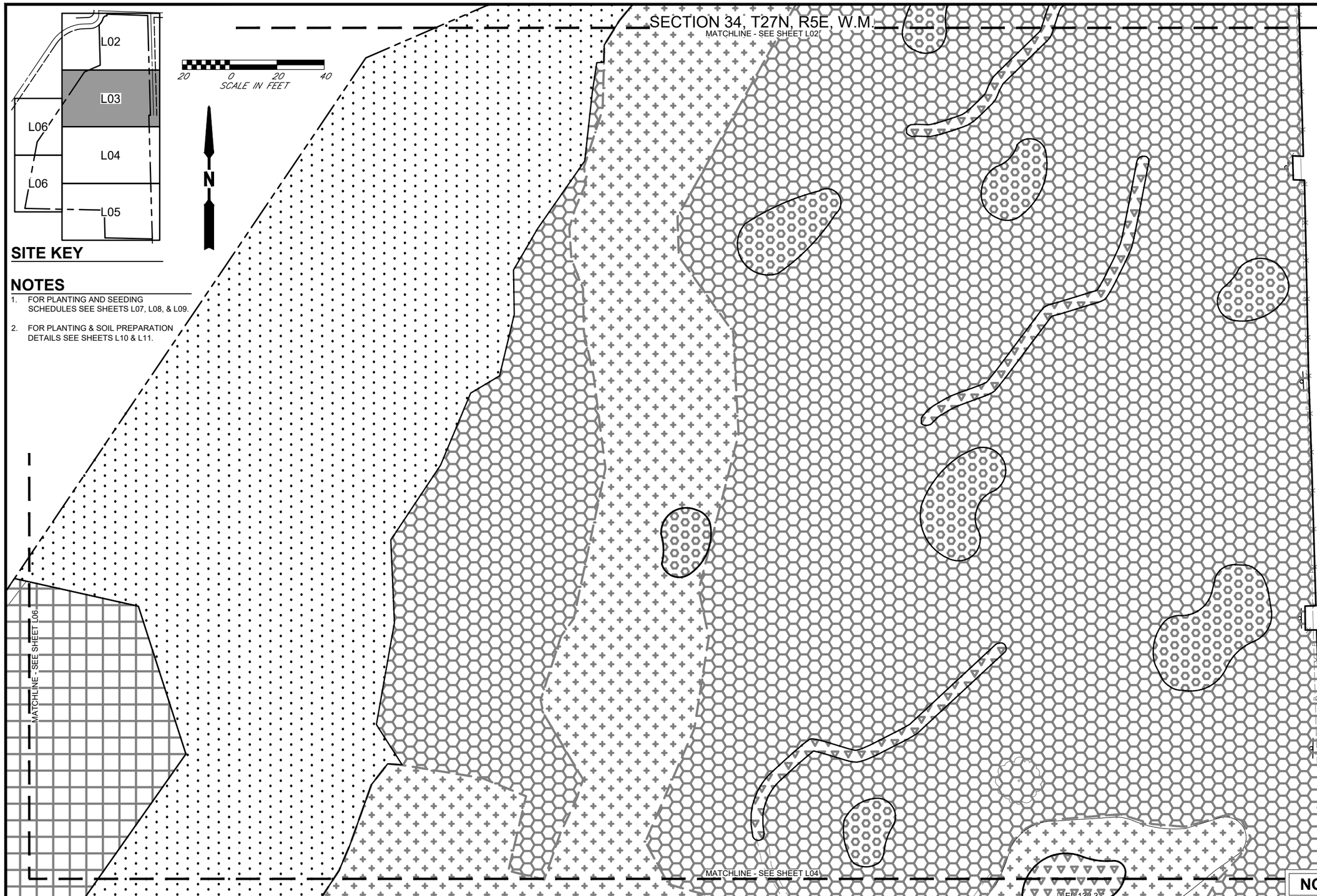
LITTLE BEAR CREEK ADVANCED MITIGATION SITE

PLANTING PLAN, 1 OF 5

REFERENCE SHEET NO. **L02**

SHEET **28** OF 37 SHEETS

2/27/2019 4:44:30 PM - HANNAH SNOW - \\ESAES\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\L02 PLANTING PLAN, 1 OF 5.DWG



SITE KEY

NOTES

1. FOR PLANTING AND SEEDING SCHEDULES SEE SHEETS L07, L08, & L09.
2. FOR PLANTING & SOIL PREPARATION DETAILS SEE SHEETS L10 & L11.

PLANTING LEGEND

- MIX A - UPLAND ENHANCEMENT
- MIX B - UPLAND UNDERSTORY ENHANCEMENT
- MIX C - WOODLAND HUMMOCK WETLAND ENHANCEMENT
- MIX D - WETLAND ENHANCEMENT
- MIX E - WETLAND UNDERSTORY ENHANCEMENT
- MIX F - WETLAND CREATION/ RE-EST./REHAB.
- MIX G - WETLAND CREATION/ RE-EST./ENH. 8" DEPTH MAX.
- MIX H - RIPARIAN ENHANCEMENT
- MIX I - FLOODPLAIN WETLAND CREATION

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DESIGNED BY: ABG, ESB	DRAWN BY: ABG

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DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

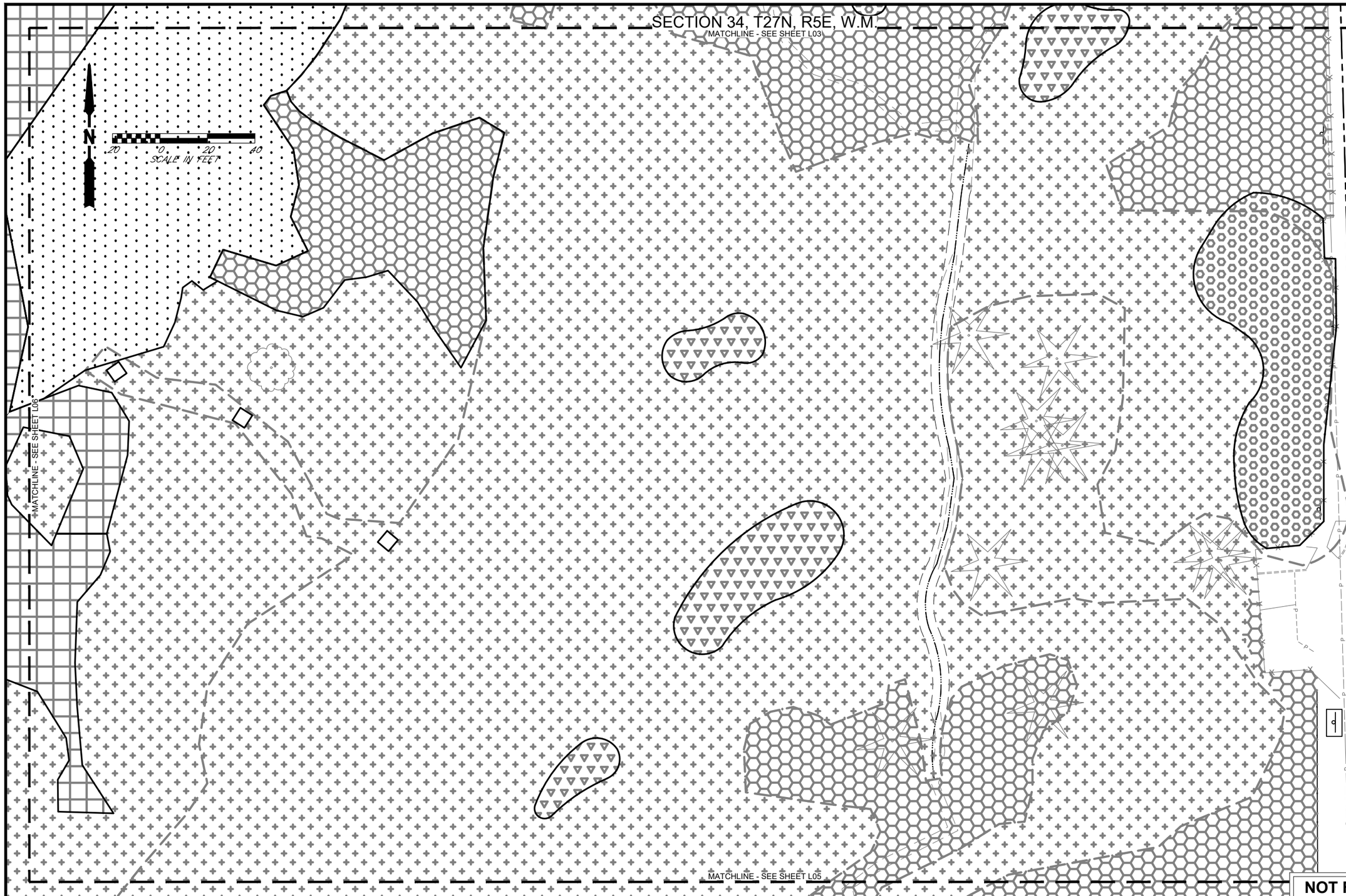
FUNDING NO. _____

LITTLE BEAR CREEK ADVANCED MITIGATION SITE

PLANTING PLAN, 2 OF 5

REFERENCE SHEET NO. L03

SHEET 29 OF 37 SHEETS

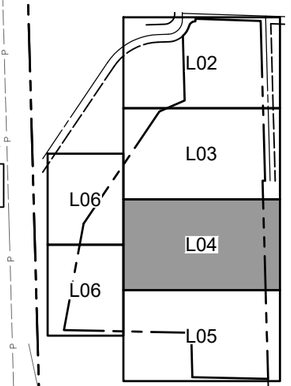


PLANTING LEGEND

- MIX A - UPLAND ENHANCEMENT
- MIX B - UPLAND UNDERSTORY ENHANCEMENT
- MIX C - WOODLAND HUMMOCK WETLAND ENHANCEMENT
- MIX D - WETLAND ENHANCEMENT
- MIX E - WETLAND UNDERSTORY ENHANCEMENT
- MIX F - WETLAND CREATION/ RE-EST./REHAB.
- MIX G - WETLAND CREATION/ RE-EST./ENH. 8" DEPTH MAX.
- MIX H - RIPARIAN ENHANCEMENT
- MIX I - FLOODPLAIN WETLAND CREATION

NOTES

1. FOR PLANTING AND SEEDING SCHEDULES SEE SHEETS L07, L08, & L09.
2. FOR PLANTING & SOIL PREPARATION DETAILS SEE SHEETS L10 & L11.



SITE KEY

NOT FOR CONSTRUCTION

DATE	NO.	REVISION	BY
10/12/18			

Know what's below. Call 811 before you dig.

UPI NO.:	FED. AID PROJ. NO.:
SURVEY NO.:	FIELD BOOK(S):
HORZ. DATUM: LOCAL	VERT. DATUM: NAVD 88
DESIGNED BY: ABG, ESB	DRAWN BY: ABG

PRELIMINARY

90% DESIGN

STATE OF WASHINGTON — EXP. 2

REVIEWED AND APPROVED FOR CONSTRUCTION

SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

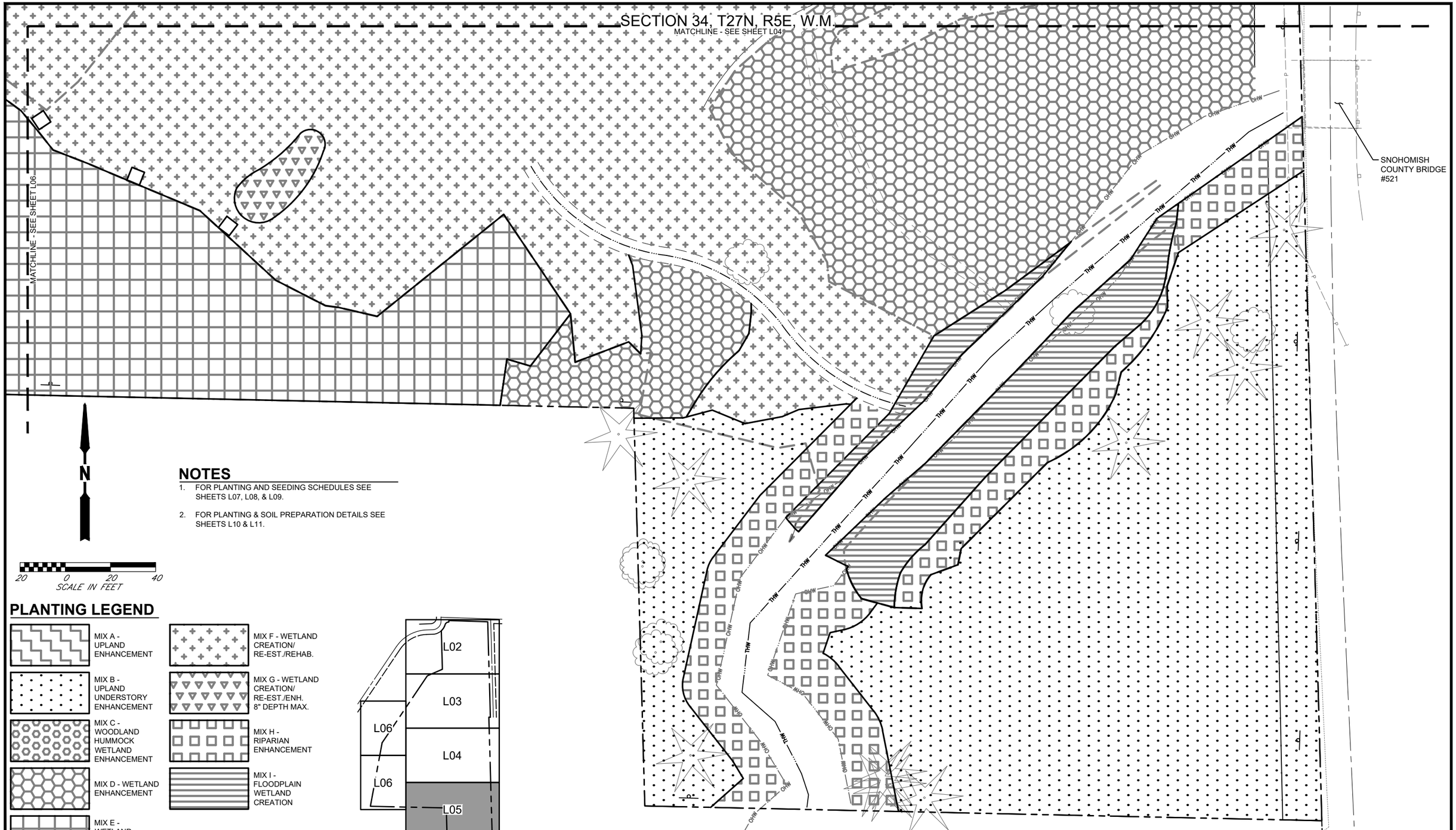
LITTLE BEAR CREEK ADVANCED MITIGATION SITE

PLANTING PLAN, 3 OF 5

REFERENCE SHEET NO. L04

SHEET 30 OF 37 SHEETS

2/27/2019 4:45:30 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\L04 PLANTING PLAN, 3 OF 5.DWG



N

20 0 20 40
SCALE IN FEET

NOTES

1. FOR PLANTING AND SEEDING SCHEDULES SEE SHEETS L07, L08, & L09.
2. FOR PLANTING & SOIL PREPARATION DETAILS SEE SHEETS L10 & L11.

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SITE KEY

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DATE	NO.	REVISION	BY
10/12/18			

Know what's below. Call 811 before you dig.

UPI NO.:	FED. AID PROJ. NO.:
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HORZ. DATUM: LOCAL	VERT. DATUM: NAVD 88
DESIGNED BY: ABG, ESB	DRAWN BY: ABG

PRELIMINARY

90% DESIGN

STATE OF WASHINGTON LANDSCAPE ARCHITECT EXP. 2/27/2019

REVIEWED AND APPROVED FOR CONSTRUCTION

SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

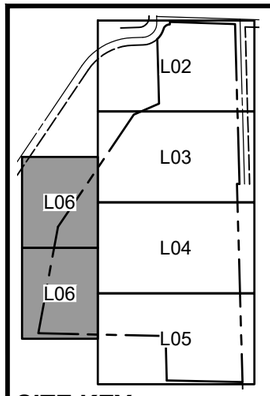
LITTLE BEAR CREEK ADVANCED MITIGATION SITE

PLANTING PLAN, 4 OF 5

REFERENCE SHEET NO. L05

SHEET 31 OF 37 SHEETS

2/27/2019 4:46:03 PM - HANNAH SNOW - \\ESA\ESA\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\L05 PLANTING PLAN, 4 OF 5.DWG



SITE KEY

NOTES

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2. FOR PLANTING & SOIL PREPARATION DETAILS SEE SHEETS L10 & L11.

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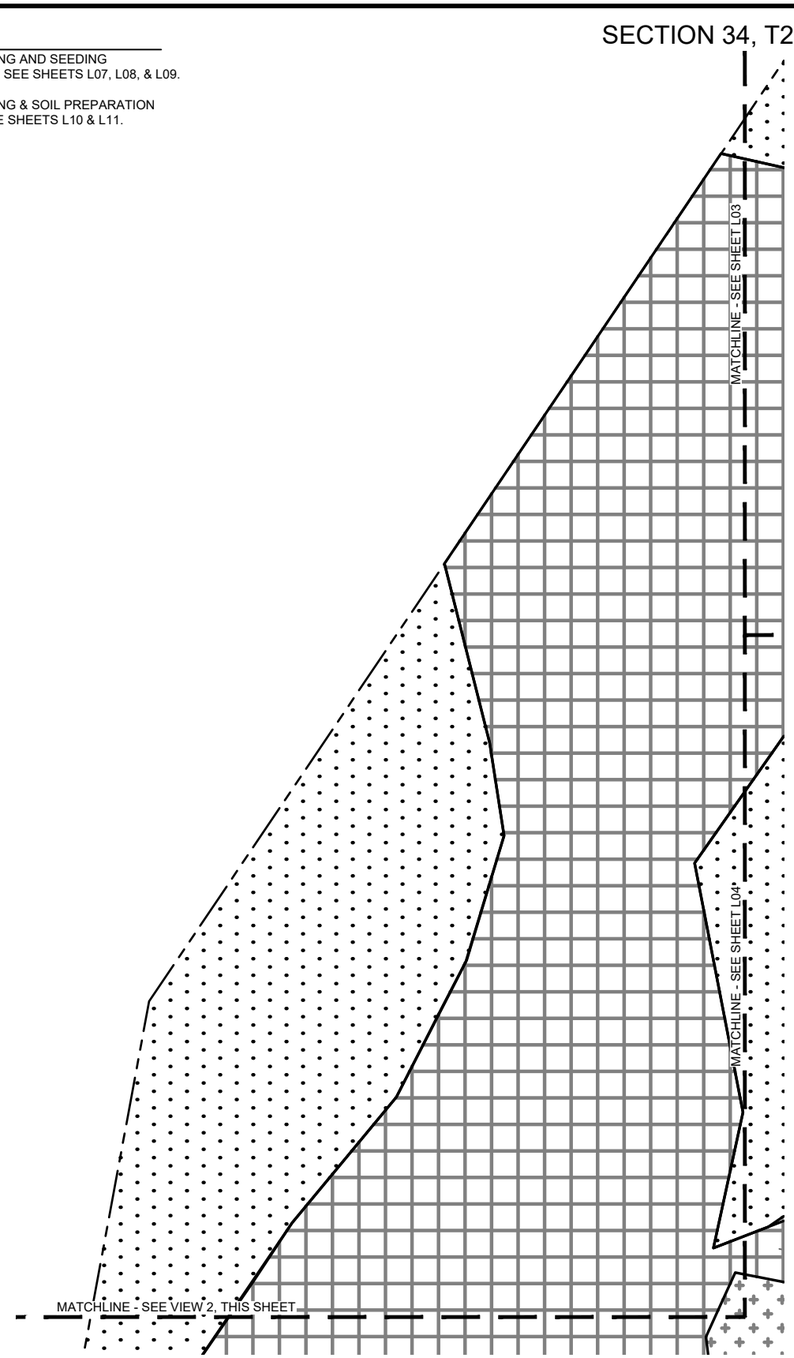
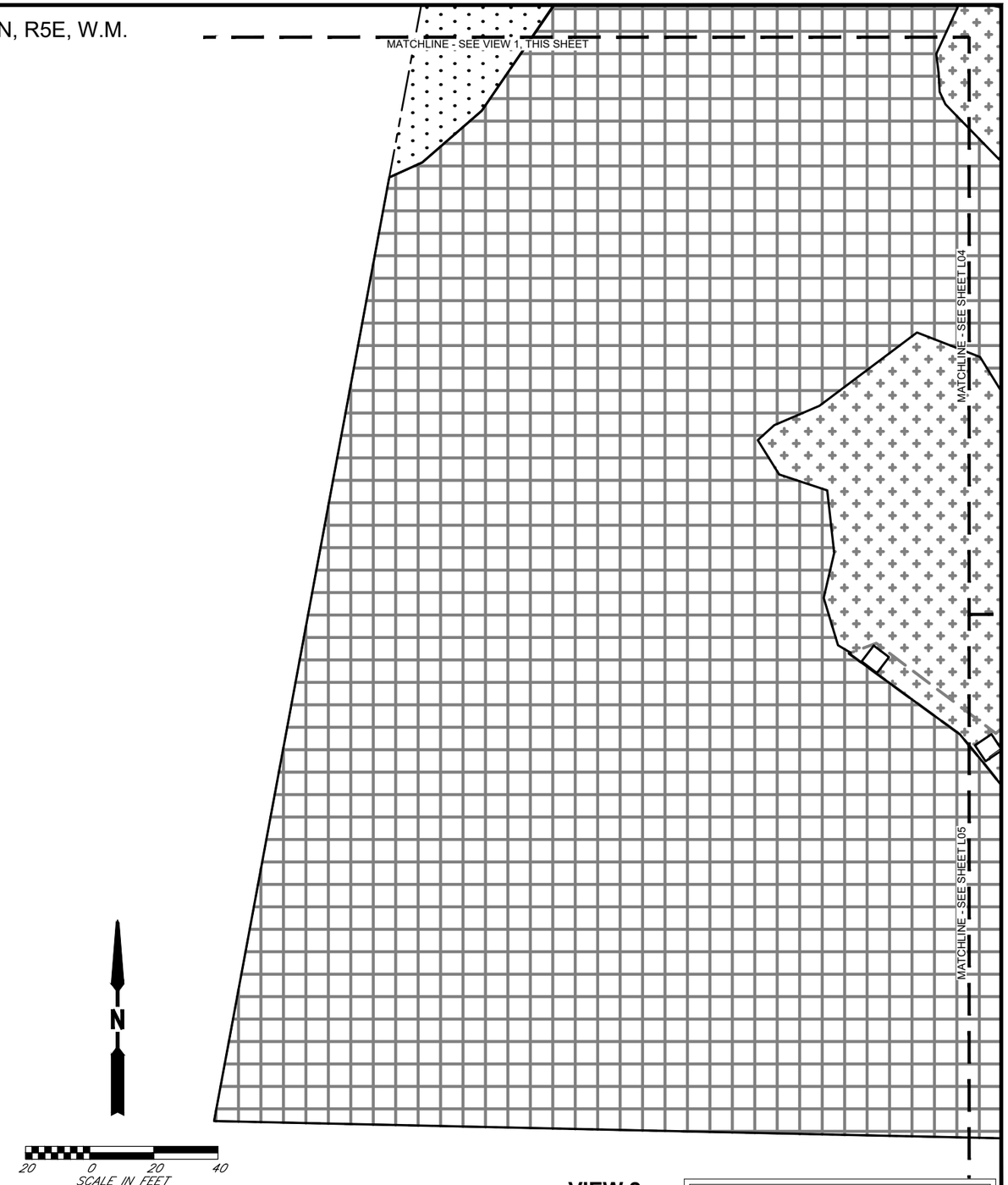


VIEW 1



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20 0 20 40
SCALE IN FEET

VIEW 2

NOT FOR CONSTRUCTION

DATE	NO.	REVISION	BY
10/12/18			

Know what's below. Call 811 before you dig.

UPI NO.:	FED. AID PROJ. NO.:
SURVEY NO.:	FIELD BOOK(S):
HORZ. DATUM: LOCAL	VERT. DATUM: NAVD 88
DESIGNED BY: ABG, ESB	DRAWN BY: ABG

PRELIMINARY

90% DESIGN

STATE OF WASHINGTON LANDSCAPE ARCHITECT EXP. 2/1/19

REVIEWED AND APPROVED FOR CONSTRUCTION

SNOHOMISH COUNTY ENGINEER

DATE APPROVED:

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

FUNDING NO. _____

LITTLE BEAR CREEK ADVANCED MITIGATION SITE

PLANTING PLAN, 5 OF 5

REFERENCE SHEET NO. **L06**

SHEET **32** OF **37** SHEETS

2/27/2019 4:46:38 PM - HANNAH SNOW - \\ESA\ES\PROJECTS\SEA\14XXXX\D140291.00 SNOHOMISH COUNTY ON-CALL\TASK ORDER 2 - ADVANCE MITIGATION\08_CAD\DWGS\90% DESIGN\L06 PLANTING PLAN, 5 OF 5.DWG