Cherry Hills Estate, White Salmon (WA)

Contents

AMENDED: NOVEMBER 28, 2023, BY HRK ENGINEERING & FIELD SERVICES

A. BACKGROUND

1. Name of the proposed project, if applicable:

Cherry Hill Estates Subdivision

2. Name of applicant:

Legacy Development Group

3. Address and phone number of applicant and contact person:
Include e-mail, phone numbers and addresses of everyone listed under question #2.

Email: cameron@curtishomesllc.com

Phone Numbers: (541)490-6339

Address:
PO Box 1935
Hood River, OR 97031

4. Date checklist prepared:

September 2023

Amended November 28th, 2023

5. Agency requesting checklist:

City of White Salmon

6. Proposed timing or schedule (including phasing, if applicable):

December 1, 2023, to December 31, 2025

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No

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

There are no major concerns regarding this project. Since the project will not disturb sensitive areas such as wetlands, waterbodies, sensitive ecological area, or areas within known historical/archaeological features.

A Stormwater Pollution and Prevention Plan (SWPPP) will be required to determine stormwater management.

Also, on November 7th, 2023, an Arborist Report was written by Braun Arboricultural Consulting LLC, to evaluate the presence of heritage trees on the site. From the report, 8 oak trees were identified and were determined to be in fair or good health and low risk. Also, the diameter of

the Heritage Tree Protection Area and the Building Set Back Line were provided in the Report and recommendations for mitigation were provided and will be followed (See Appendix 7 for Arborist Report).

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

There are no applications pending at the time of this submittal.

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

The permits that will be required by the City of White Salmon pertain to fill/grading, construction, plat, utility, and the site plan.

11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and 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.)

The project consists of converting a vacant orchard into a residential subdivision on 7.93 acres of parcel 0310247500400. The lot will require activities such as minor grading, the removal of vegetative debris (e.g., Himalayan blackberry, burnt trees, etc.), the removal of miscellaneous debris (e.g., irrigation pipes, wood, metal, etc.), the addition of utilities, roads and the building of the units.

12. Location of the 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 area, provide the range or boundaries of the site(s). Provide a 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 Cherry Hill Estates Subdivision project site is located on parcel 0310247500400 (Lot 4 SP 91-17 IN NEME: 24-3-10) at 45°44'13.0"N 121°29'17.4"W. This parcel is within the city limits of White Salmon, WA (Klickitat County), Section 24, Township 3N, Range 10E, WM.

B: ENVIRONMENTAL ELEMENTS

1. EARTH

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other...

The site sits on the top of Cherry Hill in the City of White Salmon, where the site is **hilly**.

A portion of the westerly edge of the southerly leg of the property experiences steep slopes of 40% or greater (See Appendix 8 for Statement from Terra Surveying). However, based on the Geotechnical Report by Earths Engineers, Inc, dated November 15, 2021, it's stated that the subject property is not considered to be over steepened and at risk of sliding. It also states that

slopes steeper than 2H:1V along the proposed access road should be regraded to be 2H:1V to void the risk of shallow soil movement (See Appendix 9 for Geotechnical Report).

There are no water bodies in the immediate vicinity of the project site.

The Columbia River is located 1 mile to the south, the White Salmon River is located 1.7 miles to the West and Jewett Creek is located 0.55 miles to the East.

The Site is not susceptible to landslides due to the high basaltic compositions of the bedrock and soil parent material (see Appendix 3).

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

The steepest slope on the project site is approximately 40% on the westerly edge of the southerly leg of the property (See Appendix 8 for Statement from Terra Surveying).

c. What general types of soils are found on the site (for example, 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 soils are classified as 86B Chemawa ashy loam (8 to 15 percent slopes) and 86C Chemawa ashy loam (15-30 percent slope). They are both in hydraulic group B (see Appendix 1 and 2). The proposal does not have the aim of removing soil from the site as any grading activities will relocate soil within the site boundaries.

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

There is no history or evidence of unstable soils on the project site, according to the USDA Natural Resources Conservation Service and the Department of Ecology landslide information.

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.

The project will include 7.93 acres of disturbance. The work will consist of clearing, grading, and building the units. If additional fill is required, it will be sourced from WSDOT approved sources.

f. Could erosion occur because of clearing, construction, or use? If so, generally describe.

General erosion considerations are to be considered with site development of converting a decommissioned orchard into a residential neighborhood. A Stormwater Pollution Prevention Report and Plan will need to be done in order to minimize the impacts of erosion on the project site and the local area.

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

Approximately 75% of the land will be covered by impervious material and the site plan will include mitigation measures to reduce surface runoff.

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

Best management Practices (BMPs), and a SWPPP will aid in reducing erosion impacts from construction activities, such as mass grading or trenching for utilities.

---

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, generally describe and give approximate quantities if known.

Construction: Standard emissions associated with construction equipment (e.g., excavators, backhoe, etc.), and construction materials (asphalt, concrete, aggregate, painting, grading, etc.).

Post-Construction: Standard household emission associated with a residential area (e.g., houses, cars, etc.).

b. Are there any off-site sources of emissions or odor that may affect your proposal?

No, there are no off-site sources of emissions or odor that will affect this site.

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

There are currently no proposed management practices. The site, applicant and contractor will comply with all local air quality rules.

---

3. WATER

a. Surface

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

There are no water bodies in the immediate vicinity of the project site (~300 ft or 0.05 mi). The Columbia River is located 1 mile to the south, the White Salmon River is located 1.7 miles to the West and Jewett Creek is located 0.55 miles to the East.

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.

No work will be required in or adjacent to any of the described water bodies for this project.

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

No fill will be placed in or removed from surface water or wetlands.

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

There are no existing surface or ground water sources that would require withdrawals or diversions.

5. Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No. The proposal does not lie within a 100-year floodplain.

6. Does the proposal involve any discharge of waste materials into surface waters? If so, describe the type of waste and anticipated volume of discharge.

No. The proposal does not involve any discharge of waste material into surface waters.

b. Ground:

1. Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well? Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No water well is proposed. Water will be provided via the City of White Salmon municipal system.

2. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals…; agricultural; etc.). 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 waste material will be discharged into the ground from septic tanks or other sources. Waste material will be removed via sewer lines which will hook up to the municipal sewer system.

c. Water runoff (including storm water):

1. Describe the sources of runoff 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, describe.

The only major potential source for runoff will be during the construction phase. However, a SWPPP will been made which will include a detention system and consider construction and post-construction run off. BMPs will also be put into action to reduce sources of runoff.

2. Could waste materials enter ground or surface waters?

No. All domestic waste materials will be captured, contained, and transported off the site in sewer system network connected to the municipal system.

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

No. The proposal will not alter or affect drainage patterns in the vicinity of the site.

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

Surface runoff from impervious surfaces will be collected into a drainage control system consisting of pipes, catch basins and manholes. The runoff will be collected and directed to discharge into the planned storm water management system. Storm water detention will be provided as needed at the downhill area of the site.

---

4. PLANTS

a. Check the types of vegetation found on the site:

— Deciduous tree: Alder, maple, aspen, other

— Evergreen tree: Fir, cedar, pine, other

— Shrubs

— Grass

— Pasture

— Crop or grain

— Orchards, vineyards or other permanent crops.

— Wet soil plants: Cattail, buttercup, bullrush, skunk cabbage, other

— Water plants: Water lily, eelgrass, milfoil, other

— Other types of vegetation

The vegetative landscape consists of an old cherry orchard. There are grasses, weeds, burnt trees, blackberry bushes, shrubs, and a few live trees such as cedar, oak, and maple.

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

The entire area of the site will have to be cleared of most of the vegetation prior to construction activities. There is a minimal number of alive trees, due to the majority being burnt, on site which will be removal. Any volunteer cherry trees will be removed if necessary. The trees that do not need to get removed are located near fence lines, such as the oak, or the vegetation located on the natural gas embankment which does have native species such as snowberries.

The 8 oak Candidate Heritage Trees on the site will not be removed or altered.

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

There are no threatened or endangered plant species known to be near or on the site. Most of the plants are cherry trees, grasses and shrubs that are nonnative.

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

Landscaping will adhere to White Salmon requirements for residential development. The project will prioritize the planting of native plants. This will have a beneficial effect on the local fauna, insects and reduce irrigation needs on the sites.

From Arborist Report, the 8 total oak Candidate Heritage Trees will be protected following the reports recommendations (See Appendix 7).

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

Blackberry (Himalayan), wild carrot (See Appendix 5)

---

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. Examples include:
Birds: Hawk, heron, eagle, songbirds, other: Mammals: Deer, bear, elk, beaver, other: Fish: Bass, salmon, trout, herring, shellfish, other:

There are a few birds and mammals present in the vicinity of the site.
Examples include quail, deer, hawks, and songbirds.

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

There are no threatened species known to be in the vicinity of the site (see Appendix 4).

c. Is the site part of a migration route?

The site is not part of a migration route.

d. Proposed measures to preserve or enhance wildlife if any:

There are no planned impacts on wildlife for this proposed project. Some measures to preserve or enhance wildlife is through the encouragement of planting native plants such as shrubs, trees, grasses, and flowers. This will help the local populations of insects, birds, mammals, and amphibians.

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

No known invasive species on site

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? Describe whether it will be used for heating, manufacturing, etc.

Construction: Energy will be used for the construction of the project. Diesel and gasoline will be used by construction equipment and vehicles.

Post Construction: Electric and natural gas utilities will be installed, to provide services for residential purposes.

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

No. The project will not affect the potential use of solar energy by adjacent property needs.

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:

Currently, no energy conservation features are included in the plans of this proposal. However, the contractor may choose materials with lower transportation and other energy costs, using renewable energy sources, or designing the subdivision with maintenance measures that help reduce energy consumption and promote energy generation.

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 because of this proposal? If so, describe.

There are no known health hazards, toxic chemicals, risk of explosion or fire, spill, or hazardous waste concerns associated with the project area and scope of work.

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

There are no known contaminants located in the project boundary. The project site sits on a decommissioned orchard. The orchard may have used pesticides and fertilizers, but further testing will have to be done to determine the level of contamination.

2. Describe existing hazardous chemicals and 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.

The site has gas and utility lines running through out, which will need to be rerouted before the construction of the site. The gas line sits on the western side going in the north-south direction. Before construction the lines will be located.

3. Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

A limited amount of diesel fuel and machine lubricants will be used and stored on the project site for the use of excavation and construction equipment during the site development activities.

4. Describe special emergency services that might be required.

No special emergency services will be required.

5. Proposed measures to reduce or control environmental health hazards, if any:

Best Management Practices will be utilized during the site development process. The hazards will be minimized by mapping out the different utilities prior to construction to have a negligible impact on human and environmental health. Spill kits will be stored on site to ensure that all potential pollutants, if spilled, are absorbed/removed and the area cleaned to original condition.

b. Noise

1. What types of noise exist in the area that may affect your project?

There are no noises in the area which will affect the project.

2. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis?

The level of noise during the construction phase will be limited to standard workday hours. Post construction noise levels will be standard residential noises, which are to be expected.

3. Proposed measures to reduce or control noise impacts, if any:

To control noise levels, all construction will adhere to currently existing noise regulations or noise ordinance requirements (Klickitat County and/or City of White Salmon as applicable).

---

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The current usage of the project area is a vacant decommissioned orchard. The proposal will have no effect on the land usage of nearby/adjacent properties. site is in a residential neighborhood in the White Salmon UGB, zoned R-1 residential low density. There are no adverse effects that are anticipated.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land 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 forest land tax status will be converted to non-farm or non-forest use?

This site was used an orchard (farmland). There will be no significant long-term commercial impacts because the lot has been vacant for a long time. The project will convert 100% of the lot into residential lands.

1. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
Know Your Farming Neighbors.

This project will not influence the surrounding working farm or forested lands.

c. Describe any structures on the site.

There are currently no structures on site.

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

There are currently no structures on site that need to be demolished.

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

The current zoning is R1 (Single Family Residential). The parcel will be split up into 35 lots with dwelling units adhering to the City of White Salmon Municipal Code (Chapter 17.24 - R1 SINGLE-FAMILY RESIDENTIAL DISTRICT)

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

2012 Comprehensive Plan Designation (Residential Low Density)

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

The area is not included within the Shoreline Master Program and is not within 200 feet of any of the listed water bodies within the Klickitat County SMP.

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

The site has not been classified as a critical area by the city or county.

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

Approximately 72 to 100 people will be residing on the site once the project is complete.
2 persons per residence * 35 = 70
2.8 persons per residence * 35 = 98

j. Approximately how many people would the completed project displace?

This project would not be displacing any residents as the site is vacant.

k. Proposed measures to avoid or reduce displacement impacts, if any:

The site is vacant and will create housing.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Project proposal complies with current zoning and projected residential land use.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forestlands of long-term commercial significance, if any:

Not Applicable.

---

9. HOUSING

a. Approximately how many units would be provided, if any?

Approximately there will be 35 single family, fair market value units will be developed

b. Approximately how many units, if any, would be eliminated?

None. The lot is currently vacant.

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

There is no proposed measure to reduce or control housing impacts.

---

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principle exterior building material(s) proposed?

White Salmon Municipal Code regulates residential building height to twenty-eight feet or less; exterior cladding will be residential siding.

b. What views in the immediate vicinity would be altered or obstructed?

Undeveloped site will become a residential neighborhood. Views will not be obstructed.

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

There is no proposed measure to reduce or control aesthetic impacts as the aim is to construct high quality residential homes in conformance with local building code standards.

---

11. LIGHT AND GLARE

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

Minimal glare from residential windows may be present during extremely sunny days. Streetlights will be installed along new circulatory routes conforming to local regulations on placement and brightness.

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

No.

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

None.

---

12. RECREATION

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

There are no recreation facilities within the project boundary.
Within a mile of the project there are two city parks and a school.

b. Would the proposed project displace any existing recreational uses?

No.

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

There are currently no proposed measures to mitigate impacts on recreation.

---

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, state, or local preservation registers located on or near the site? If so, specifically describe.

There are no structures present on the site.

b. Are there any landmarks, features, or other evidence of Indian 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.

There are no landmarks on the site.

c. Describe the 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.

The current method used to reduce impacts to cultural and historical resources will be to halt construction if an object is found. Then consult the Inadvertent Discovery Plan (IDP) prepared by the Department of Ecology (Appendix 6). The IDP outlines the protocols and procedures involved is a discovery is made and will also include the appropriate list of contacts to notify such as the local archaeological department, historic preservation societies and local tribes.

d. 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.

There are no anticipated impacts to archaeological resources for this project, and as such avoidance/ minimization/ compensation measures are not proposed at this time.

---

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.

The parcel has direct connection to Spring Street which is connected to Main Avenue.
A second means of egress is proposed to the East that will connect to Main Avenue through a neighboring parcel that is being developed in tandem.

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

There are currently no public transit operations near the site. The Mount Adams Transportation Service (MATS) offers transportation in this region and is located approximately 3000 feet away from the project site.
A traffic control plan will be prepared.

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

The proposal will require installation of a new road network, to include pedestrian sidewalks within the parcel to facilitate adequate circulation. The streets and sidewalks will be a dedicated Right of Way for the City of White Salmon.

Also, the proposal will require extended frontage improvements along NW Spring Street following the Typical Cross-Section for Connector Street on the Bicycle Network per the City`s recently adopted Transportation System Plan (TSP) "Lite", (August 30, 2023).

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

No. There will be no water, rail, or air transportation in the immediate vicinity of the project site.

e. 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 and non-passenger vehicles). What data or transportation models were used to make these estimates?

A maximum of 80 trips per day would be generated with peak ours being from 6-9 am and 3-6 pm. Please note that with the increase of work from home offices there is more variation in trips.

f. 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, generally describe.

No.

g. Proposed measures to reduce or control transportation impacts, if any: Identify public streets and highways serving the site and describe proposed access to the existing street system.

A Traffic Control Plan (TCP) might be needed in order to determine traffic impacts prior to construction.

---

15. PUBLIC SERVICES

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

The impacts of additional home sites on public services have not been quantified.

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

There are no proposed measures to reduce or control direct impacts on public services at the moment.

---

16. UTILITIES

a. Circle utilities currently available at the site: Electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

All are available but need to be connected to the site, except there will be not septic system.

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

A water and a sanitary sewer system will be added to the project site, these services are available and will be integrated into the city's infrastructure.
Electric, natural gas and other utilities are also present in the site vicinity and will be added accordingly.

SECTION 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:

Carlos Garrido

Digitally signed by Carlos Garrido
DN: C=US, E=cgarrido@hrkus.com, O="HRK Engineering and Field Services ", OU="Principal ", CN="Carlos Garrido "
Date: 2023.11.29 08:35:12-08'00'

Name of Signee: Carlos Garrido

Position and Agency/Organization: Project Manager, HRK Engineering & Field Services

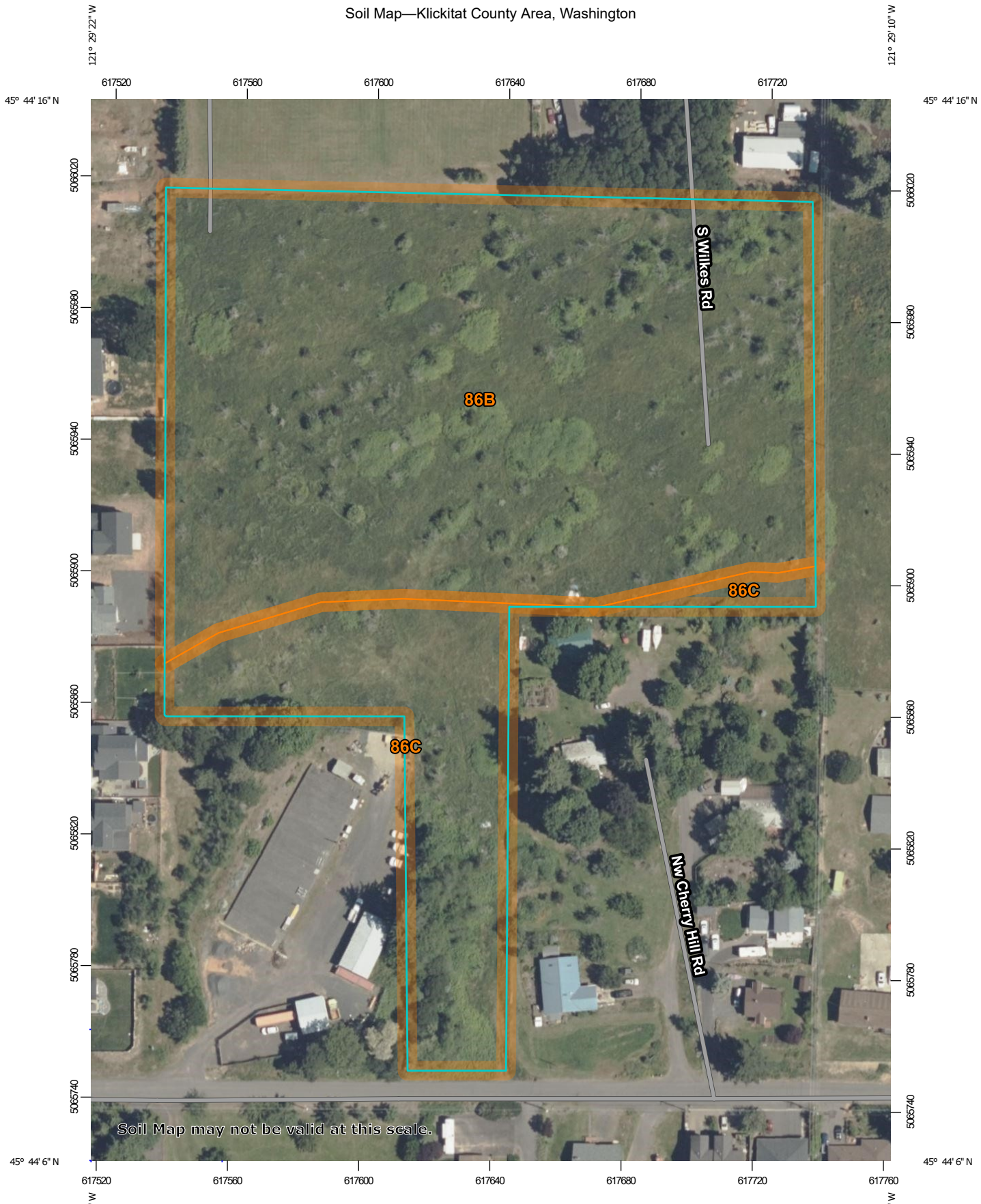
Date Submitted: September 8, 2023

Amended: November 28, 2023

APPENDIX

1. **Soil Map**
2. **Soil Types**
    a. **86C**
    b. **86B**
3. **Liquefaction Susceptibility Map of Klickitat County, Washington**
4. **State Listed Species AND Priority Habitats and Species on the Site**
5. **Invasive and Noxious Weed List**
6. **Inadvertent Discovery Plan (IDP)**
7. **Arborist Report**
8. **Statement of Critical Slopes by Terra Surveying**
9. **Geotechnical Report**

APPENDIX 1



Map Scale: 1:1,570 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Klickitat County Area, Washington
Survey Area Data: Version 16, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 28, 2020—May 29, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
86B	Chemawa ashy loam, 8 to 15 percent slopes	6.1	77.5%
86C	Chemawa ashy loam, 15 to 30 percent slopes	1.8	22.5%
Totals for Area of Interest		**7.8**	**100.0%**

APPENDIX 2

Klickitat County Area, Washington

86B—Chemawa ashy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2kmy
Elevation: 600 to 2,100 feet
Mean annual precipitation: 45 to 65 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chemawa and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chemawa

Setting

Landform: Terraces
Parent material: Volcanic ash

Typical profile

H1 - 0 to 26 inches: ashy loam
H2 - 26 to 60 inches: ashy silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F006XC003WA - Cool Frigid Moist Xeric Mountain Slopes (Grand fir Cool, Moist Shrub /Herb)
Other vegetative classification: grand fir/vanillaleaf (CWS524)
Hydric soil rating: No

Minor Components

Timberhead

Percent of map unit: 5 percent

Klickitat County Area, Washington

86C—Chemawa ashy loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2kmz
Elevation: 500 to 2,200 feet
Mean annual precipitation: 45 to 65 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chemawa and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chemawa

Setting

Landform: Terraces
Parent material: Volcanic ash

Typical profile

H1 - 0 to 26 inches: ashy loam
H2 - 26 to 60 inches: ashy silt loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F006XC003WA - Cool Frigid Moist Xeric Mountain Slopes (Grand fir Cool, Moist Shrub /Herb)
Other vegetative classification: grand fir/vanillaleaf (CWS524)
Hydric soil rating: No

Minor Components

Timberhead

Percent of map unit: 5 percent
Hydric soil rating: No

APPENDIX 3

WASHINGTON STATE DEPARTMENT OF
Natural Resources
Doug Sutherland - Commissioner of Public Lands

Division of Geology and Earth Resources
Ron Teissere - State Geologist

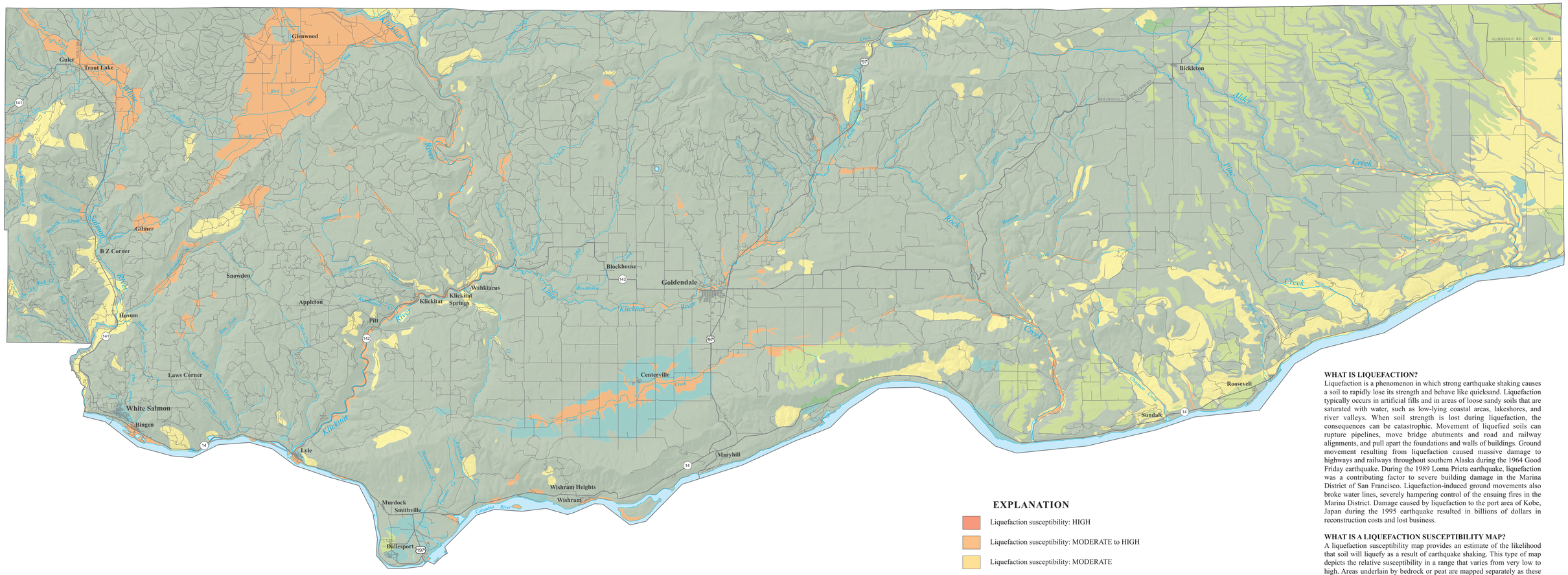
Department of Homeland Security
Federal Emergency Management Agency
Region 10

Washington Military Department
Emergency Management Division

WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES
OPEN FILE REPORT 2004-20

Liquefaction Susceptibility and Site Class Maps of Washington State, By County
Map 20A—Klickitat County Liquefaction Susceptibility
Sheet 39 of 78

Pamphlet accompanies maps



Liquefaction Susceptibility Map of Klickitat County, Washington

by Stephen P. Palmer, Sammantha L. Magsino, Eric L. Bilderback, James L. Poelstra, Derek S. Folger, and Rebecca A. Niggemann

September 2004

Lambert conformal conic projection
North American Datum of 1983 HARN
Shaded relief generated from U.S. Geological Survey 30-meter Digital Elevation Model, 2x vertical exaggeration
Production by Anne C. Heinitz, Rebecca A. Niggemann, and Jaretta M. Roloff
Editing by Karen D. Meyers

scale 1:150,000

2 1 0 2 4 6 8 Miles

2 1 0 2 4 6 8 Kilometers

Stephen P. Palmer
9/1/04

EXPLANATION

- Liquefaction susceptibility: HIGH
- Liquefaction susceptibility: MODERATE to HIGH
- Liquefaction susceptibility: MODERATE
- Liquefaction susceptibility: LOW to MODERATE
- Liquefaction susceptibility: LOW
- Liquefaction susceptibility: VERY LOW to LOW
- Liquefaction susceptibility: VERY LOW
- Bedrock
- Peat deposit — Peat is not susceptible to liquefaction but may undergo permanent displacement or loss of strength as a result of earthquake shaking.
- Water
- Ice

This explanation is standardized for this series of county-based liquefaction maps; some categories may not appear on this map.

WHAT IS LIQUEFACTION?

Liquefaction is a phenomenon in which strong earthquake shaking causes a soil to rapidly lose its strength and behave like quicksand. Liquefaction typically occurs in artificial fills and in areas of loose sandy soils that are saturated with water, such as low-lying coastal areas, lakeshores, and river valleys. When soil strength is lost during liquefaction, the consequences can be catastrophic. Movement of liquefied soils can rupture pipelines, move bridge abutments and road and railway alignments, and pull apart the foundations and walls of buildings. Ground movement resulting from liquefaction caused massive damage to highways and railways throughout southern Alaska during the 1964 Good Friday earthquake. During the 1989 Loma Prieta earthquake, liquefaction was a contributing factor to severe building damage in the Marina District of San Francisco. Liquefaction-induced ground movements also broke water lines, severely hampering control of the ensuing fires in the Marina District. Damage caused by liquefaction to the port area of Kobe, Japan during the 1995 earthquake resulted in billions of dollars in reconstruction costs and lost business.

WHAT IS A LIQUEFACTION SUSCEPTIBILITY MAP?

A liquefaction susceptibility map provides an estimate of the likelihood that soil will liquefy as a result of earthquake shaking. This type of map depicts the relative susceptibility in a range that varies from very low to high. Areas underlain by bedrock or peat are mapped separately as these earth materials are not liquefiable, although peat deposits may be subject to permanent ground deformation caused by earthquake shaking.

This map is based solely on surficial geology published at a scale of 1:100,000 by the Washington State Department of Natural Resources, Division of Geology and Earth Resources (Washington Division of Geology and Earth Resources staff, 2001). We have assigned liquefaction susceptibility based on published geologic correlations (Youd and Perkins, 1978) and similarity of the geologic units in the map area to units that have been subjected to a quantitative susceptibility analysis (Grant and others, 1998; Palmer, 1995; Palmer and others, 1994, 1995, 1999, 2002, 2003, *in press*). The assignment of liquefaction susceptibility represents our best professional judgment.

HOW CAN THIS MAP BE USED?

Liquefaction susceptibility maps such as this can be used for many different purposes by a variety of users. For example:

- Emergency managers can determine which critical facilities and lifelines are located in hazardous areas.
- Building officials and engineers can select areas where detailed geotechnical studies should be performed before new construction or retrofitting of older structures.
- Facilities managers can assess the vulnerability of corporate and public facilities, including schools, and recommend actions required to maximize public safety and minimize earthquake damage and loss.
- Insurance providers can determine relative seismic risk to aid in the calculation of insurance ratings and premiums.
- Land-use planners can reduce vulnerability by recommending appropriate zoning and land use in high hazard areas to promote long-term mitigation of earthquake losses.
- Private property owners can guide their decisions on purchasing, retrofitting, and upgrading their properties.

This map is meant only as a general guide to delineate areas prone to liquefaction. It is not a substitute for site-specific investigation to assess the potential for liquefaction for any development project. Because the data used in the liquefaction susceptibility assessment have been subdivided on the basis of regional geologic mapping, this map cannot be used to determine the presence or absence of liquefiable soils beneath any specific locality. This determination requires a site-specific geotechnical investigation performed by a qualified practitioner.

This map is intended to be printed at a scale of 1:150,000 in order to present the entire study area on a single standard-size plate. However, the map was generated using 1:100,000-scale digital coverages of the geologic mapping; therefore, the digital data reflect the original 1:100,000-scale of the hazard mapping. As with all maps, it is recommended that the user does not apply this map, either digitally or on paper, at scales greater than the source data.

Liquefaction during the 1965 SeaTac earthquake caused both lateral and vertical movement of the ground in the Port of Seattle. Cargo cranes such as the one in the background are vulnerable to liquefaction-induced ground displacement. Lateral spreading such as this can cause severe damage to both above-ground structures and underground utilities. Photo courtesy of the Karl V. Steinbrugge Collection, Earthquake Engineering Research Center [http://nisee.berkeley.edu/visual_resources/steinbrugge_collection.html].

During the 2001 Nisqually earthquake, liquefied sand was extruded onto the ground surface beneath the railroad tracks near Capitol Lake in Olympia. The vented sand is called a sand blow, and is clear evidence of liquefaction of the underlying soil. Photo by Stephen P. Palmer.

REFERENCES CITED

Grant, W. P.; Perkins, W. J.; Youd, T. L., 1998, Evaluation of liquefaction potential in Seattle, Washington. In Rogers, A. M.; Walsh, T. J.; Kockelman, W. J.; Priest, G. R., editors, Assessing earthquake hazards and reducing risk in the Pacific Northwest: U.S. Geological Survey Professional Paper 1560, v. 2, p. 441-473, 1 plate. [accessed Sep. 9, 2004 at http://greenwood.cr.usgs.gov/pub/ppapers/p1560/p1560po.pdf]

Palmer, S. P., 1995, Liquefaction analysis of soil deposits found in the Sumner quadrangle. In Dragovich, J. D.; Pringle, P. T., Liquefaction susceptibility for the Sumner 7.5-minute quadrangle, Washington: Washington Division of Geology and Earth Resources Geologic Map GM-44, p. 13-26.

Palmer, S. P.; Evans, B. D.; Schasse, H. W., 2002, Liquefaction susceptibility of the Greater Eastside area, King County, Washington: Washington Division of Geology and Earth Resources Geologic Map GM-48, 1 sheet, scale 1:36,000, with 14 p. text.

Palmer, S. P.; Magsino, S. L.; Poelstra, J. L.; Niggemann, R. A., *in press*, Liquefaction susceptibility map of Clark County, Washington: Washington Division of Geology and Earth Resources, 1 sheet, scale 1:100,000.

Palmer, S. P.; Perkins, W. J.; Grant, W. P., 2003, Liquefaction susceptibility of the greater Tacoma urban area, Pierce and King Counties, Washington: Washington Division of Geology and Earth Resources Geologic Map GM-51, 1 sheet, scale 1:30,000 with 11 p. text. [accessed Sep. 9, 2004 at http://www.dnr.wa.gov/geology/pdf/gm51.zip]

Palmer, S. P.; Schasse, H. W.; Norman, D. K., 1994, Liquefaction susceptibility for the Des Moines and Renton 7.5-minute quadrangles, Washington: Washington Division of Geology and Earth Resources Geologic Map GM-41, 2 sheets, scale 1:24,000, with 15 p. text.

Palmer, S. P.; Walsh, T. J.; Gerstel, W. J., 1999, Geologic folio of the Olympia-Lacey-Tumwater urban area, Washington-Liquefaction susceptibility map: Washington Division of Geology and Earth Resources Geologic Map GM-47, 1 sheet, scale 1:48,000, with 16 p. text.

Palmer, S. P.; Walsh, T. J.; Logan, R. L.; Gerstel, W. J., 1995, Liquefaction susceptibility for the Auburn and Poverty Bay 7.5-minute quadrangles, Washington: Washington Division of Geology and Earth Resources Geologic Map GM-43, 2 sheets, scale 1:24,000, with 15 p. text.

Washington Division of Geology and Earth Resources staff, 2001, Digital geologic maps of the 1:100,000 quadrangles of Washington: Washington Division of Geology and Earth Resources Digital Report 2, June 2003 version, 1 CD-ROM disk.

Youd, T. L.; Perkins, D. M., 1978, Mapping liquefaction-induced ground failure potential: American Society of Civil Engineers, Journal of the Geotechnical Engineering Division, v. 104, no. GT4, p. 433-446.

APPENDIX 4

Washington Department of FISH and WILDLIFE

STATE LISTED SPECIES

Revised October 2021

The Washington Fish and Wildlife Commission has classified the following 46 species as Endangered, Threatened, or Sensitive. The federal status of species under the Endangered Species Act differs in some cases from state status; federal status is indicated by: Federal Endangered (FE), Threatened (FT), Candidate (FC), USFWS has made a 90-day finding that listing may be warranted (90d), or a NOAA Species of Concern (FSC).

STATE ENDANGERED

A species native to the State of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state.

The 35 State Endangered species listed below are designated in Washington Administrative Code 220-610-010

MAMMALS (14)

Fin Whale	FE
Sei Whale	FE
Blue Whale	FE
Humpback Whale	FT/FE[#]
[#]*Mexico DPS=T; Central America DPS=E*	
North Pacific Right Whale	FE
Sperm Whale	FE
Killer Whale	FE[#]
[#]*Southern Residents only*	
Gray Wolf	90d
Grizzly Bear	FT
Lynx	FT
Fisher	-
Columbian White-tailed Deer	FT
Woodland Caribou[x]	FE
Pygmy Rabbit	FE

BIRDS (12)

Sandhill Crane	-
Snowy Plover	FT
Upland Sandpiper[x]	-
Marbled Murrelet	FT
Tufted Puffin	-
Columbian Sharp-tailed Grouse	-
Greater Sage-Grouse	-
Ferruginous Hawk	-
Northern Spotted Owl	FT
Yellow-billed Cuckoo[x]	FT
Streaked Horned Lark	FT
Oregon Vesper Sparrow	90d

REPTILES (3)

Western Pond Turtle	90d
Leatherback Sea Turtle	FE
Loggerhead Sea Turtle	FE

AMPHIBIANS (2)

Oregon Spotted Frog	FT
Northern Leopard Frog	-

INVERTEBRATES (4)

Oregon Silverspot Butterfly[x]	FT
Taylor's Checkerspot	FE
Mardon Skipper	-
Pinto Abalone	-

STATE THREATENED

A species native to the state of Washington that is likely to become endangered within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats.

The 5 State Threatened species are designated in Washington Administrative Code 220-200-100

MAMMALS (3)

Sea Otter	-
Western Gray Squirrel	-
Mazama Pocket Gopher	
subsp. *glacialis, pugetensis, tumuli, yelmensis*	FT
...subsp. *couchi, louiei*[x]*, melanops*	-

BIRDS (1)

American White Pelican	-

REPTILES (1)

Green Sea Turtle	FT

[x]*These species are, or may be, extirpated from all of their historical range in Washington*

For more information, check our website:
https://wdfw.wa.gov/species-habitats/species

Or contact us at:
wildthing@dfw.wa.gov
or
Wildlife Program (360) 902-2515
Fish Program (360) 902-2700

For more information on federal status, check the US Fish and Wildlife Service or the NOAA National Marine Fisheries Service

STATE SENSITIVE

A species native to the state …that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats.

The 6 State Sensitive species are designated in Washington Administrative Code 220-200-100

MAMMALS (1)

Gray Whale	FE[#]
[#]*Western North Pacific Stock*	

BIRDS (1)

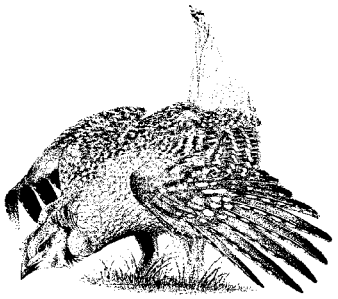
Common Loon	-

FISH (3)

Pygmy Whitefish	-
Margined Sculpin	-
Olympic Mudminnow	-

AMPHIBIAN (1)

Larch Mountain Salamander	-



STATE CANDIDATE SPECIES

Revised October 2021

Washington Department of FISH and WILDLIFE

The Washington Department of Fish and Wildlife has designated the following 71 species as Candidates for listing in Washington as State Endangered, Threatened, or Sensitive. The Department reviews species for listing following procedures in Washington Administrative Code 220-610-110. The federal status of species under the Endangered Species Act differs in some cases from state status; federal status is indicated by: Federal Endangered (FE), Threatened (FT), Candidate (FC), USFWS has made a 90-day finding that listing may be warranted (90d), or a NOAA Fisheries Species of Concern (FSC).

MAMMALS (10)

Townsend's Big-eared Bat	-
Keen's Myotis Bat	-
White-tailed Jackrabbit	-
Black-tailed Jackrabbit	-
Washington Ground Squirrel	-
Townsend's Ground Squirrel	
South of the Yakima River	-
Olympic Marmot	-
Cascade Red Fox	-
Wolverine	FC
Pacific Harbor Porpoise	-

BIRDS (14)

Western Grebe	-
Clark's Grebe	-
Short-tailed Albatross	FE
Northern Goshawk	-
Golden Eagle	-
Cassin's Auklet	-
Flammulated Owl	-
Burrowing Owl	-
White-headed Woodpecker	-
Black-backed Woodpecker	-
Loggerhead Shrike	-
Slender-billed White-breasted Nuthatch	-
Sage Thrasher	-
Sagebrush Sparrow	-

REPTILES and AMPHIBIANS (10)

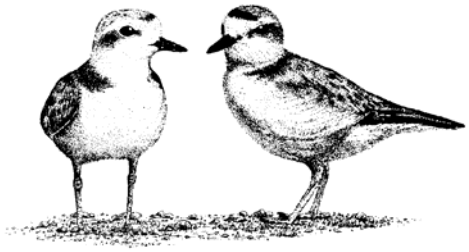
Sagebrush Lizard	-
Common Sharp-tailed Snake	-
California Mountain Kingsnake	-
Striped Whipsnake	-
Dunn's Salamander	-
Van Dyke's Salamander	-
Cascade Torrent Salamander	90d
Western Toad	-
Columbia Spotted Frog	-
Rocky Mountain Tailed Frog	-

FISH (10)

Mountain Sucker	-
Lake Chub	-
Leopard Dace	-
Umatilla Dace	-
River Lamprey	-
Steelhead	
Snake River	FT
Upper Columbia	FT
Middle Columbia	FT
Lower Columbia	FT
Bull Trout	FT

MOLLUSKS (7)

Shortface Lanx	-
Ashy (Columbia) Pebblesnail	-
California Floater	-
Columbia Oregonian (snail)	90d
Poplar Oregonian (snail)	-
Dalles Sideband (snail)	90d
Blue-gray Taildropper (slug)	-



Many species of uncertain conservation need are listed in our State Wildlife Action Plan:
https://wdfw.wa.gov/species-habitats/at-risk/swap

INSECTS (18)

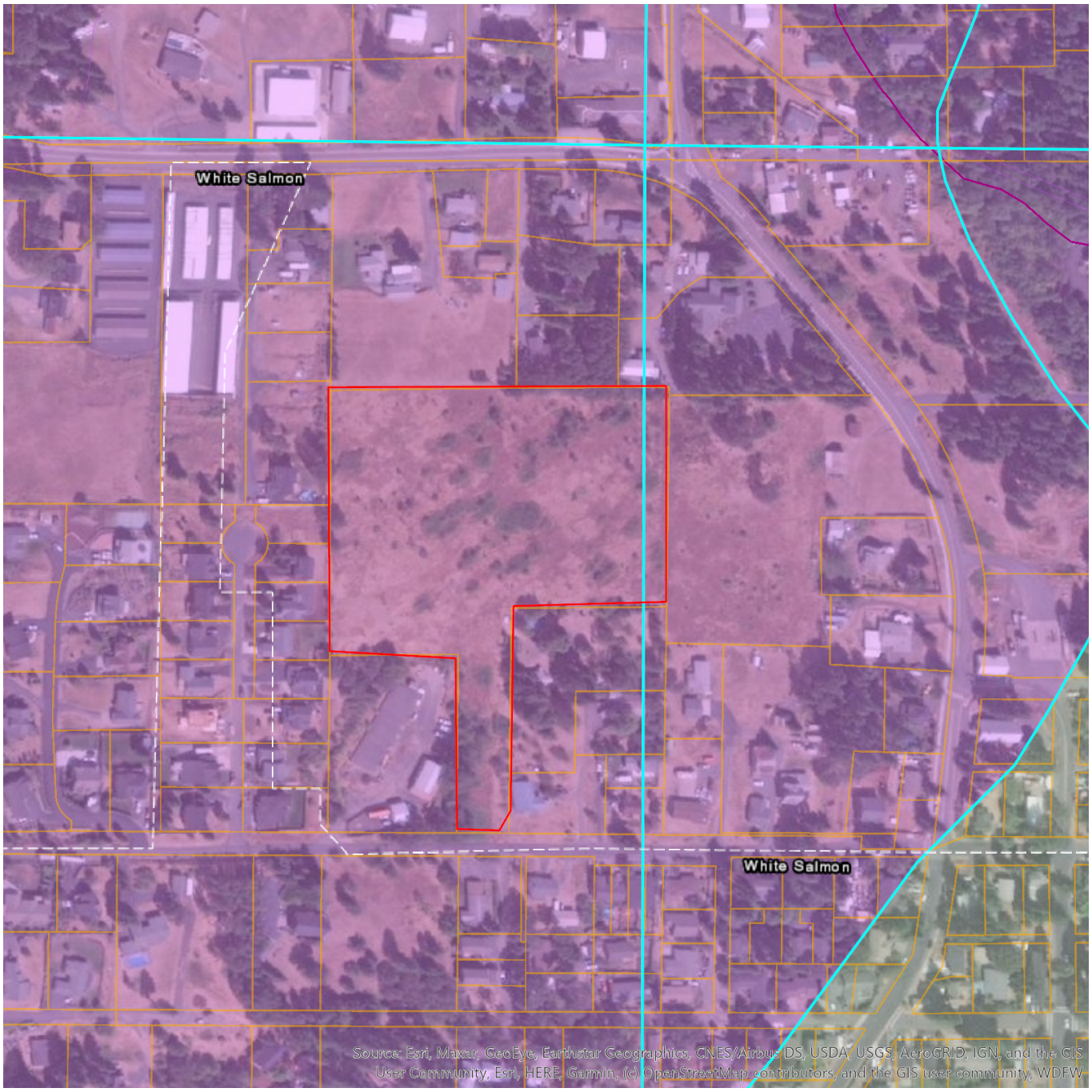
Beller's Ground Beetle	-
Mann's Mollusk-eating Ground Beetle	
Columbia River Tiger Beetle	-
Hatch's Click Beetle	-
Columbia Clubtail (dragonfly)	-
Pacific Clubtail	-
Sand-verbena Moth	-
Yuma Skipper	-
Makah Copper	-
Chinquapin Hairstreak	-
Johnson's Hairstreak	-
Juniper Hairstreak	-
Puget Blue	-
Valley Silverspot	-
Silver-bordered Fritillary	-
Great Arctic	-
Island Marble	FE
Western Bumble Bee	90d

OTHER INVERTEBRATES (2)

Giant Palouse Earthworm	-
Leschi's Millipede	-

For more information, check our website:
https://wdfw.wa.gov/species-habitats/species
Or contact us:
Wildlife Program (360) 902-2515
Fish Program (360) 902-2700

Priority Habitats and Species on the Web



Report Date: 10/29/2021

PHS Species/Habitats Overview:

Occurence Name	Federal Status	State Status	Sensitive Location
Mule and black-tailed deer	N/A	N/A	No
California mountain kingsnake	N/A	Candidate	Yes
Northern Spotted Owl	Threatened	Endangered	Yes
Little Brown Bat	N/A	N/A	Yes
Yuma myotis	N/A	N/A	Yes

PHS Species/Habitats Details:

Mule and black-tailed deer	
Scientific Name	*Odocoileus hemionus*
Priority Area	Regular Concentration
Site Name	LOWER WHITE SALMON WINTER RANGE DAMAGE AREAS
Accuracy	1/4 mile (Quarter Section)
Notes	BLACK-TAIL DEER WINTER RANGE AGRICULTURAL LAND AND RURAL HOUSING ALONG THE LOWER WHITE SALMON RIVER USED CONSISTANTLY BY WINTERING DEER RESULTING IN DAMAGE COMPLAINTS
Source Record	905012
Source Dataset	PHSREGION
Source Name	BICKNELL, BOB WDW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00612
Geometry Type	Polygons

California mountain kingsnake	
Scientific Name	*Lampropeltis zonata*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	Candidate
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	QTR-TWP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00025

California mountain kingsnake	
Scientific Name	*Lampropeltis zonata*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	Candidate
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	QTR-TWP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00025

Northern Spotted Owl	
Scientific Name	*Strix occidentalis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	Threatened
State Status	Endangered
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Northern Spotted Owl	
Scientific Name	*Strix occidentalis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	Threatened
State Status	Endangered
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026

Yuma myotis	
Scientific Name	*Myotis yumanensis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

APPENDIX 5

Class C Weeds

Class C weeds are non-native weeds found in Washington. Many of these species are widespread in the state. Long-term programs of suppression and control are a local option, depending upon local threats and the feasibility of control in local areas.

Common name	**Scientific name**
Austrian fieldcress *	*Rorippa austriaca*
black henbane	*Hyoscyamus niger*
buffalobur *	*Solanum rostratum*
common St. Johnswort *	*Hypericum perforatum*
common teasel *	*Dipsacus fullonum*
Eurasian watermilfoil * hybrid	*Myriophyllum spicatum x Myriophyllum sibiricum*
hairy whitetop *	*Lepidium appelianum*
hoary cress *	*Lepidium draba*
Italian arum *	*Arum italicum*
jointed goatgrass *	*Aegilops cylindrica*
jubata grass	*Cortaderia jubata*
longspine sandbur *	*Cenchrus longispinus*
nonnative cattail species & hybrids (reminder, does not include the native common cattail, *Typha latifolia*)	*Typha* species
oxeye daisy	*Leucanthemum vulgare*
Pampas grass *	*Cortaderia selloana*
spikeweed *	*Centromadia pungens*
spiny cocklebur *	*Xanthium spinosum*
spotted jewelweed *	*Impatiens capensis*
Swainsonpea *	*Sphaerophysa salsula*
thistle, Canada *	*Cirsium arvense*
tree-of-heaven *	*Ailanthus altissima*
wild carrot *	*Daucus carota*
yellow flag iris *	*Iris pseudacorus*

**** indicates known population in Klickitat County***

To find out more about weeds and weed control in Washington, contact:

Klickitat County
Noxious Weed Control Board
228 West Main St., MS-CH-23
Goldendale, WA 98620
509-773-5810
Email: noxiousweed@klickitatcounty.org
Web site:
https://www.klickitatcounty.org/562/Weed-Control

or

Washington State
Noxious Weed Control Board
1111 Washington Street
P.O. Box 42560
Olympia, WA 98504-2560
360-725-5764
Email: noxiousweeds@agr.wa.gov
Web site:
http://www.nwcb.wa.gov/

or

Washington State
Department of Agriculture
21 North First Avenue #103
Yakima, WA 98902
509-225-2604

WEED'EM OUT
NOXIOUS WEEDS DAMAGE OUR RESOURCES

2021

Klickitat County Noxious Weed List

Turkish thistle, *Carduus cinereus*,
is a new Class A noxious weed for 2021.
This annual thistle is found close to Washington in northeastern Oregon and the adjacent area in Idaho. Eradication is required of Turkish thistle when found in Washington

*N*oxious weeds are non-native plants introduced to Washington through human actions. Because of their aggressive growth and lack of natural enemies in the state, these species can be highly destructive, competitive or difficult to control. These exotic species can reduce crop yields, destroy native plant and animal habitat, damage recreational opportunities, clog water-ways, lower land values and poison humans and livestock.

To help protect the county's resources, the Klickitat County Noxious Weed Control Board adopts a County Noxious Weed List each year. This list categorizes weeds into three major classes - A, B and C – according to the seriousness of the threat they pose to the county.

Class A Weeds

Class A weeds are non-native species with a limited distribution in Washington. Preventing new infestations and eradicating existing infestations is the highest priority. Eradication is required by law.

Common name	Scientific name
common crupina	*Crupina vulgaris*
cordgrass, common	*Spartina anglica*
cordgrass, dense-flowered	*Spartina densiflora*
cordgrass, saltmeadow	*Spartina patens*
cordgrass, smooth	*Spartina alterniflora*
dyer's woad	*Isatis tinctoria*
eggleaf spurge *	*Euphorbia oblongata*
false brome	*Brachypodium sylvaticum*
floating primrose-willow	*Ludwigia peploides*
flowering rush	*Butomus umbellatus*
French broom	*Genista monspessulana*
garlic mustard	*Alliaria petiolata*
giant hogweed *	*Heracleum mantegazzianum*
goatsrue	*Galega officinalis*
hydrilla	*Hydrilla verticillata*
Johnsongrass *	*Sorghum halepense*
knapweed, bighead *	*Centaurea macrocephala*
knapweed, Vochin *	*Centaurea nigrescens*
kudzu	*Pueraria montana var. lobata*
meadow clary	*Salvia pratensis*
oriental clematis *	*Clematis orientalis*
purple starthistle	*Centaurea calcitrapa*
reed sweetgrass	*Glyceria maxima*
ricefield bulrush	*Schoenoplectus mucronatus*
sage, clary	*Salvia sclarea*
sage, Mediterranean *	*Salvia aethiopis*
silverleaf nightshade	*Solanum elaeagnifolium*
small-flowered jewelweed	*Impatiens parviflora*
South American spongeplant	*Limnobium laevigatum*
Spanish broom	*Spartium junceum*
Syrian beancaper	*Zygophyllum fabago*
Texas blueweed	*Helianthus ciliaris*
thistle, Italian	*Carduus pycnocephalus*
thistle, milk	*Silybum marianum*
thistle, slenderflower	*Carduus tenuiflorus*
thistle, Turkish	*Carduus cinereus*
variable-leaf milfoil	*Myriophyllum heterophyllum*
wild four o'clock	*Mirabilis nyctaginea*

Class B Weeds

Class B weeds are non-native species presently limited to portions of the state. Class B species are designated for control in regions where they are not yet widespread. Preventing infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.

Class B Designate Weeds in Klickitat County

Common name	Scientific name
blueweed	*Echium vulgare*
Brazilian elodea	*Egeria densa*
bugloss, annual	*Lycopsis arvensis*
bugloss, common	*Anchusa officinalis*
camelthorn	*Alhagi maurorum*
common fennel, (except bulbing fennel)	*Foeniculum vulgare*
common reed, nonnative	*Phragmites australis*
fanwort	*Cabomba caroliniana*
gorse	*Ulex europaeus*
grass-leaved arrowhead	*Sagittaria graminea*
hawkweed oxtongue	*Picris hieracioides*
hawkweed, orange	*Hieracium aurantiacum*
hawkweeds: All non-native species/hybrids of the WALL subgenus	*Hieracium, subgenus Hieracium*
herb-Robert *	*Geranium robertianum*
knapweed, black	*Centaurea nigra*
knapweeed, brown	*Centaurea jacea*
knotweed, Bohemian *	*Fallopia x bohemica*
knotweed, giant *	*Fallopia sachalinensis*
knotweed, Himalayan	*Persicaria wallichii*
knotweed, Japanese *	*Fallopia japonica*
loosestrife, garden	*Lysimachia vulgaris*
loosestrife, purple *	*Lythrum salicaria*
loosestrife, wand	*Lythrum virgatum*
Malta starthistle	*Centaurea melitensis*
parrotfeather	*Myriophyllum aquaticum*
policeman's helmet	*Impatiens glandulifera*
saltcedar * (unless intentionally planted prior to 2004)	*Tamarix ramosissima*
shiny geranium	*Geranium lucidum*
spurge flax	*Thymelaea passerina*
spurge laurel	*Daphne laureola*
spurge, leafy *	*Euphorbia virgata*
spurge, myrtle *	*Euphorbia myrsinites*
thistle, musk *	*Carduus nutans*
thistle, plumeless *	*Carduus acanthoides*
thistle, Scotch *	*Onopordum acanthium*
velvetleaf	*Abutilon theophrasti*
water primrose	*Ludwigia hexapetala*
white bryony	*Bryonia alba*
wild chervil	*Anthriscus sylvestris*
yellow archangel *	*Lamiastrum galeobdolon*
yellow floatingheart	*Nymphoides peltata*

Class B Non-Designate Weeds in Klickitat County

Common name	Scientific name
butterfly bush *	*Buddleja davidii*
Dalmatian toadflax *	*Linaria dalmatica* ssp. *dalmatica*
Eurasian watermilfoil *	*Myriophyllum spicatum*
European coltsfoot	*Tussilago farfara*
hairy willowherb *	*Epilobium hirsutum*
hawkweeds: All non-native species/hybrids of the MEADOW subgenus	*Hieracium, subgenus Pilosella*
hoary alyssum *	*Berteroa incana*
houndstongue *	*Cynoglossum officinale*
indigobush *	*Amorpha fruticosa*
knapweed, diffuse *	*Centaurea diffusa*
knapweed, meadow *	*Centaurea x gerstlaueri*
knapweed, Russian *	*Rhaponticum repens*
knapweed, spotted *	*Centaurea stoebe*
kochia *	*Bassia scoparia*
lesser celandine *	*Ficaria verna*
perennial pepperweed *	*Lepidium latifolium*
poison hemlock *	*Conium maculatum*
puncturevine *	*Tribulus terrestris*
Ravenna grass	*Tripidium ravennae*
rush skeletonweed *	*Chondrilla juncea*
Scotch broom *	*Cytisus scoparius*
sulfur cinquefoil *	*Potentilla recta*
tansy ragwort *	*Jacobaea vulgaris*
yellow nutsedge *	*Cyperus esculentus*
yellow starthistle *	*Centaurea solstitialis*

Class C Weeds

absinth wormwood	*Artemisia absinthium*
Austrian fieldcress	*Rorippa austriaca*
babysbreath	*Gypsophila paniculata*
black henbane	*Hyoscyamus niger*
blackgrass	*Alopecurus myosuroides*
buffalobur	*Solanum rostratum*
cereal rye	*Secale cereale*
common barberry	*Berberis vulgaris*
common catsear	*Hypochaeris radicata*
common groundsel	*Senecio vulgaris*
common St. Johnswort	*Hypericum perforatum*
common tansy	*Tanacetum vulgare*
common teasel	*Dipsacus fullonum*
curlyleaf pondweed	*Potamogeton crispus*
English hawthorn	*Crataegus monogyna*
English ivy - four cultivars only	*Hedera helix* 'Baltica', 'Pittsburgh', and 'Star', and *H. hibernica 'Hibernica'*
Eurasian watermilfoil hybrid	*Myriophyllum spicatum* x *Myriophyllum sibiricum*
evergreen blackberry	*Rubus laciniatus*
field bindweed	*Convolvulus arvensis*
fragrant waterlily	*Nymphaea odorata*
hairy whitetop	*Lepidium appelianum*
Himalayan blackberry	*Rubus bifrons* (*Rubus armeniacus*)
hoary cress	*Lepidium draba*
Italian arum	*Arum italicum*
Japanese eelgrass	*Nanozostera japonica*
jubata grass	*Cortaderia jubata*
jointed goatgrass	*Aegilops cylindrica*
lawnweed	*Soliva sessilis*
longspine sandbur	*Cenchrus longispinus*
medusahead	*Taeniatherum caput-medusae*
nonnative cattail species and hybrids (reminder, does not include the native common cattail, *Typha latifolia*)	*Typha* species
old man's beard	*Clematis vitalba*
oxeye daisy	*Leucanthemum vulgare*
Pampas grass	*Cortaderia selloana*
perennial sowthistle	*Sonchus arvensis*
reed canarygrass	*Phalaris arundinacea*

Class C Weeds continued

Russian olive	*Elaeagnus angustifolia*
scentless mayweed	*Tripleurospermum inodorum*
smoothseed alfalfa dodder	*Cuscuta approximata*
spikeweed	*Centromadia pungens*
spiny cocklebur	*Xanthium spinosum*
spotted jewelweed	*Impatiens capensis*
Swainsonpea	*Sphaerophysa salsula*
thistle, bull	*Cirsium vulgare*
thistle, Canada	*Cirsium arvense*
tree-of-heaven	*Ailanthus altissima*
ventenata	*Ventenata dubia*
white cockle	*Silene latifolia*
wild carrot (except where commercially grown)	*Daucus carota*
yellow flag iris	*Iris pseudacorus*
yellow toadflax	*Linaria vulgaris*

To learn more about noxious weeds and noxious weed control in Washington State, please contact:

WA State Noxious Weed Control Board
P.O. Box 42560
Olympia, WA 98504-2560
(360) 725-5764

Email: noxiousweeds@agr.wa.gov
Website: http://www.nwcb.wa.gov

Or

WA State Department of Agriculture
(509) 249-6973

Or

Your County Noxious Weed Control Board

Please help protect Washington's economy and environment from noxious weeds!

Cover photo of Turkish thistle by Mark Porter, Oregon Department of Agriculture

2021

Washington State Noxious Weed List

Turkish thistle, *Carduus cinereus*, is a new Class A noxious weed for 2021. This annual thistle is found close to Washington in northeastern Oregon and the adjacent area in Idaho. Eradication is required of Turkish thistle when found in Washington.

List arranged alphabetically by:

COMMON NAME

Washington State Noxious Weed Control Board

Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. **Eradication of all Class A plants is required by law.**

Class B Weeds: Non-native species presently limited to portions of the State. Species are **designated** for required control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal. Please contact your County Noxious Weed Control Board to learn which species are designated for control in your area.

Class C Weeds: Noxious weeds that are typically widespread in WA or are of special interest to the state's agricultural industry. The Class C status allows county weed boards to require control if locally desired, or they may choose to provide education or technical consultation.

Class A Weeds
Eradication is required

common crupina	*Crupina vulgaris*
cordgrass, common	*Spartina anglica*
cordgrass, dense-flowered	*Spartina densiflora*
cordgrass, saltmeadow	*Spartina patens*
cordgrass, smooth	*Spartina alterniflora*
dyer's woad	*Isatis tinctoria*
eggleaf spurge	*Euphorbia oblongata*
false brome	*Brachypodium sylvaticum*
floating primrose-willow	*Ludwigia peploides*
flowering rush	*Butomus umbellatus*
French broom	*Genista monspessulana*
garlic mustard	*Alliaria petiolata*
giant hogweed	*Heracleum mantegazzianum*
goatsrue	*Galega officinalis*
hydrilla	*Hydrilla verticillata*
Johnsongrass	*Sorghum halepense*
knapweed, bighead	*Centaurea macrocephala*
knapweed, Vochin	*Centaurea nigrescens*
kudzu	*Pueraria montana* var. *lobata*
meadow clary	*Salvia pratensis*
oriental clematis	*Clematis orientalis*
purple starthistle	*Centaurea calcitrapa*
reed sweetgrass	*Glyceria maxima*
ricefield bulrush	*Schoenoplectus mucronatus*
sage, clary	*Salvia sclarea*
sage, Mediterranean	*Salvia aethiopis*
silverleaf nightshade	*Solanum elaeagnifolium*
small-flowered jewelweed	*Impatiens parviflora*
South American spongeplant	*Limnobium laevigatum*
Spanish broom	*Spartium junceum*
Syrian beancaper	*Zygophyllum fabago*
Texas blueweed	*Helianthus ciliaris*
thistle, Italian	*Carduus pycnocephalus*
thistle, milk	*Silybum marianum*
thistle, slenderflower	*Carduus tenuiflorus*
thistle, Turkish	*Carduus cinereus*
variable-leaf milfoil	*Myriophyllum heterophyllum*
wild four-o'clock	*Mirabilis nyctaginea*

Class B Weeds

blueweed	*Echium vulgare*
Brazilian elodea	*Egeria densa*
bugloss, annual	*Lycopsis arvensis*
bugloss, common	*Anchusa officinalis*
butterfly bush	*Buddleja davidii*
camelthorn	*Alhagi maurorum*
common fennel, (except bulbing fennel)	*Foeniculum vulgare* except *F. vulgare* var. *azoricum)*
common reed (nonnative genotypes only)	*Phragmites australis*
Dalmatian toadflax	*Linaria dalmatica* ssp. *dalmatica*
Eurasian watermilfoil	*Myriophyllum spicatum*
European coltsfoot	*Tussilago farfara*
fanwort	*Cabomba caroliniana*
gorse	*Ulex europaeus*
grass-leaved arrowhead	*Sagittaria graminea*
hairy willowherb	*Epilobium hirsutum*
hawkweed oxtongue	*Picris hieracioides*
hawkweed, orange	*Hieracium aurantiacum*
hawkweeds: All nonnative species and hybrids of the meadow subgenus	*Hieracium,* subgenus *Pilosella*
hawkweeds: All nonnative species and hybrids of the wall subgenus	*Hieracium,* subgenus *Hieracium*
herb-Robert	*Geranium robertianum*
hoary alyssum	*Berteroa incana*
houndstongue	*Cynoglossum officinale*
indigobush	*Amorpha fruticosa*
knapweed, black	*Centaurea nigra*
knapweed, brown	*Centaurea jacea*
knapweed, diffuse	*Centaurea diffusa*
knapweed, meadow	*Centaurea × gerstlaueri*
knapweed, Russian	*Rhaponticum repens*
knapweed, spotted	*Centaurea stoebe*
knotweed, Bohemian	*Fallopia × bohemica*
knotweed, giant	*Fallopia sachalinensis*
knotweed, Himalayan	*Persicaria wallichii*
knotweed, Japanese	*Fallopia japonica*
kochia	*Bassia scoparia*
lesser celandine	*Ficaria verna*
loosestrife, garden	*Lysimachia vulgaris*
loosestrife, purple	*Lythrum salicaria*
loosestrife, wand	*Lythrum virgatum*
Malta starthistle	*Centaurea melitensis*
parrotfeather	*Myriophyllum aquaticum*
perennial pepperweed	*Lepidium latifolium*
poison hemlock	*Conium maculatum*
policeman's helmet	*Impatiens glandulifera*
puncturevine	*Tribulus terrestris*
Ravenna grass	*Tripidium ravennae*
rush skeletonweed	*Chondrilla juncea*
saltcedar	*Tamarix ramosissima*
Scotch broom	*Cytisus scoparius*
shiny geranium	*Geranium lucidum*
spurge flax	*Thymelaea passerina*
spurge laurel	*Daphne laureola*
spurge, leafy	*Euphorbia virgata*
spurge, myrtle	*Euphorbia myrsinites*
sulfur cinquefoil	*Potentilla recta*
tansy ragwort	*Jacobaea vulgaris*
thistle, musk	*Carduus nutans*
thistle, plumeless	*Carduus acanthoides*
thistle, Scotch	*Onopordum acanthium*
velvetleaf	*Abutilon theophrasti*
water primrose	*Ludwigia hexapetala*
white bryony	*Bryonia alba*
wild chervil	*Anthriscus sylvestris*
yellow archangel	*Lamiastrum galeobdolon*
yellow floating heart	*Nymphoides peltata*
yellow nutsedge	*Cyperus esculentus*
yellow starthistle	*Centaurea solstitialis*

APPENDIX 6

INADVERTENT DISCOVERY PLAN

PLAN AND PROCEDURES FOR THE DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

To request ADA accommodation, including materials in a format for the visually impaired, call Ecology at 360-407-6000 or visit https://ecology.wa.gov/accessibility. People with impaired hearing may call Washington Relay Service at 711. People with a speech disability may call TTY at 877-833-6341.

Site Name(s): | Location:

Project Lead/Organization: | County:

If this Inadvertent Discovery Plan (IDP) is for multiple (batched) projects, ensure the location information covers all project areas.

1. INTRODUCTION

The IDP outlines procedures to perform in the event of a discovery of archaeological materials or human remains, in accordance with applicable state and federal laws. An IDP is required, as part of Agency Terms and Conditions for all grants and loans, for any project that creates disturbance above or below the ground. An IDP is not a substitute for a formal cultural resource review (Executive 21-02 or Section 106).

Once completed, **the IDP should always be kept at the project site** during all project activities. All staff, contractors, and volunteers should be familiar with its contents and know where to find it.

2. CULTURAL RESOURCE DISCOVERIES

A cultural resource discovery could be prehistoric or historic. Examples include (see images for further examples):

- An accumulation of shell, burned rocks, or other food related materials.
- Bones, intact or in small pieces.
- An area of charcoal or very dark stained soil with artifacts.
- Stone tools or waste flakes (for example, an arrowhead or stone chips).
- Modified or stripped trees, often cedar or aspen, or other modified natural features, such as rock drawings.
- Agricultural or logging materials that appear older than 50 years. These could include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, and many other items.
- Clusters of tin cans or bottles, or other debris that appear older than 50 years.
- Old munitions casings. ***Always assume these are live and never touch or move.***
- Buried railroad tracks, decking, foundations, or other industrial materials.
- Remnants of homesteading. These could include bricks, nails, household items, toys, food containers, and other items associated with homes or farming sites.

The above list does not cover every possible cultural resource. When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

If any employee, contractor, or subcontractor believes that they have uncovered cultural resources or human remains at any point in the project, take the following steps to ***Stop-Protect-Notify***. **If you suspect that the discovery includes human remains, also follow Sections 5 and 6.**

STEP A: Stop Work.

All work must stop immediately in the vicinity of the discovery.

STEP B: Protect the Discovery.

Leave the discovery and the surrounding area untouched and create a clear, identifiable, and wide boundary (30 feet or larger) with temporary fencing, flagging, stakes, or other clear markings. Provide protection and ensure integrity of the discovery until cleared by the Department of Archaeological and Historical Preservation (DAHP) or a licensed, professional archaeologist.

Do not permit vehicles, equipment, or unauthorized personnel to traverse the discovery site. Do not allow work to resume within the boundary until the requirements of this IDP are met.

STEP C: Notify Project Archaeologist (if applicable).

If the project has an archaeologist, notify that person. If there is a monitoring plan in place, the archaeologist will follow the outlined procedure.

STEP D: Notify Project and Washington Department of Ecology (Ecology) contacts.

Project Lead Contacts

Primary Contact		Alternate Contact	
Name:		Name:	
Organization:		Organization:	
Phone:		Phone:	
Email:		Email:	

Ecology Contacts (completed by Ecology Project Manager)

Ecology Project Manager		Alternate or Cultural Resource Contact	
Name:		Name:	
Program:		Program:	
Phone:		Phone:	
Email:		Email:	

STEP E: Ecology will notify DAHP.

Once notified, the Ecology Cultural Resource Contact or the Ecology Project Manager will contact DAHP to report and confirm the discovery. To avoid delay, the Project Lead/Organization will contact DAHP if they are not able to reach Ecology.

DAHP will provide the steps to assist with identification. DAHP, Ecology, and Tribal representatives may coordinate a site visit following any necessary safety protocols. DAHP may also inform the Project Lead/Organization and Ecology of additional steps to further protect the site.

Do not continue work until DAHP has issued an approval for work to proceed in the area of, or near, the discovery.

DAHP Contacts:

Name: Rob Whitlam, PhD
Title: State Archaeologist
Cell: 360-890-2615
Email: Rob.Whitlam@dahp.wa.gov
Main Office: 360-586-3065

Human Remains/Bones:

Name: Guy Tasa, PhD
Title: State Anthropologist
Cell: 360-790-1633 (24/7)
Email: Guy.Tasa@dahp.wa.gov

4. TRIBAL CONTACTS

In the event cultural resources are discovered, the following tribes will be contacted. See Section 10 for Additional Resources.

Tribe:		Tribe:	
Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	
Tribe:		Tribe:	
Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	

Please provide contact information for additional tribes within your project area, if needed, in Section 11.

5. FURTHER CONTACTS (if applicable)

If the discovery is confirmed by DAHP as a cultural or archaeological resource, or as human remains, and there is a partnering federal or state agency, Ecology or the Project Lead/Organization will ensure the partnering agency is immediately notified.

Federal Agency:		State Agency:	
Agency:		Agency:	
Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	

6. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Follow the steps under ***Stop-Protect-Notify.*** For specific instructions on how to handle a human remains discovery, see: *RCW 68.50.645: Skeletal human remains—Duty to notify—Ground disturbing activities—Coroner determination—Definitions*.

Suggestion: If you are unsure whether the discovery is human bone or not, contact Guy Tasa with DAHP, for identification and next steps. Do not pick up the discovery.

Guy Tasa, PhD State Physical Anthropologist
Guy.Tasa@dahp.wa.gov
(360) 790-1633 (Cell/Office)

For discoveries that are confirmed or suspected human remains, follow these steps:

1. Notify law enforcement and the Medical Examiner/Coroner using the contacts below. **Do not call 911** unless it is the only number available to you.

   Enter contact information below (required):
   - Local Medical Examiner or Coroner name and phone:
   - Local Law Enforcement main name and phone:
   - Local Non-Emergency phone number (911 if without a non-emergency number):
2. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human or if the discovery site constitutes a crime scene and will notify DAHP.
3. **DO NOT speak with the media, allow photography or disturbance of the remains, or release any information about the discovery on social media.**
4. If the remains are determined to be non-forensic, Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed by others or disturbed.

Further activities:

- Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation. Organizations may also participate in consultation.
- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
- When consultation and documentation activities are complete, work in the discovery area may resume as described in Section 8.

If the project occurs on federal lands (such as a national forest or park or a military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) apply and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, the Project Lead/Organization will comply with applicable state and federal laws, and the above protocol.

7. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological resources discovered during construction are protected by state law RCW 27.53 and assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

The Project Lead/Organization must ensure that proper documentation and field assessment are made of all discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and the archaeologist.

The archaeologist will record all prehistoric and historic cultural material discovered during project construction on a standard DAHP archaeological site or isolate inventory form. They will photograph site overviews, features, and artifacts and prepare stratigraphic profiles and soil/sediment descriptions for minimal subsurface exposures. They will document discovery locations on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require the archaeologist to conduct further evaluation using hand-dug test units. They will excavate units in a controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. They may also use a test unit or trench excavation to determine if an intact occupation surface is present. They will only use test units when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. They will conduct excavations using standard archaeological techniques to precisely document the location of cultural deposits, artifacts, and features.

The archaeologist will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each unit on a standard form. They will complete test excavation unit level forms, which will include plan maps for each excavation level and artifact counts and material types, number, and vertical provenience (depth below

surface and stratum association where applicable) for all recovered artifacts. They will draw a stratigraphic profile for at least one wall of each test excavation unit.

The archaeologist will screen sediments excavated for purposes of cultural resources investigation through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

The archaeologist will analyze, catalogue, and temporarily curate all prehistoric and historic artifacts collected from the surface and from probes and excavation units. The ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology, and the affected tribe(s).

Within 90 days of concluding fieldwork, the archaeologist will provide a technical report describing any and all monitoring and resultant archaeological excavations to the Project Lead/Organization, who will forward the report to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s) for review and comment.

If assessment activities expose human remains (burials, isolated teeth, or bones), the archaeologist and Project Lead/Organization will follow the process described in **Section 6**.

8. PROCEEDING WITH WORK

The Project Lead/Organization shall work with the archaeologist, DAHP, and affected tribe(s) to determine the appropriate discovery boundary and where work can continue.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Lead/Organization, DAHP, any affected tribe(s), Ecology, and the federal agencies (if any) determine that compliance with state and federal laws is complete.

9. ORGANIZATION RESPONSIBILITY

The Project Lead/Organization is responsible for ensuring:

- This IDP has complete and accurate information.
- This IDP is immediately available to all field staff at the sites and available by request to any party.
- This IDP is implemented to address any discovery at the site.
- That all field staff, contractors, and volunteers are instructed on how to implement this IDP.

10. ADDITIONAL RESOURCES

Informative Video

Ecology recommends that all project staff, contractors, and volunteers view this informative video explaining the value of IDP protocol and what to do in the event of a discovery. The target audience is anyone working on the project who could unexpectedly find cultural resources or human remains while excavating or digging. The video is also posted on DAHP's inadvertent discovery language website.

Ecology's IDP Video (https://www.youtube.com/watch?v=ioX-4cXfbDY)

Informational Resources

DAHP (https://dahp.wa.gov)

Washington State Archeology (DAHP 2003)
(https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

Association of Washington Archaeologists (https://www.archaeologyinwashington.com)

Potentially Interested Tribes

Interactive Map of Tribes by Area
(https://dahp.wa.gov/archaeology/tribal-consultation-information)

WSDOT Tribal Contact Website
(https://wsdot.wa.gov/tribal/TribalContacts.htm)

11. ADDITIONAL INFORMATION

Please add any additional contact information or other information needed within this IDP.

Implement the IDP if you see…

Chipped stone artifacts.

Examples are:

- Glass-like material.
- Angular material.
- “Unusual” material or shape for the area.
- Regularity of flaking.
- Variability of size.

Stone artifacts from Oregon.

Stone artifacts from Washington.

Biface-knife, scraper, or pre-form found in NE Washington. Thought to be a well knapped object of great antiquity. Courtesy of Methow Salmon Rec. Foundation.

Implement the IDP if you see…

Ground stone artifacts.

Examples are:

- Unusual or unnatural shapes or unusual stone.
- Striations or scratching.
- Etching, perforations, or pecking.
- Regularity in modifications.
- Variability of size, function, or complexity.

Above: Fishing Weight - credit CRITFC Treaty Fishing Rights website.

Artifacts from unknown locations (left and right images).

Implement the IDP if you see…

Bone or shell artifacts, tools, or beads.

Examples are:

- Smooth or carved materials.
- Unusual shape.
- Pointed as if used as a tool.
- Wedge shaped like a “shoehorn”.
- Variability of size.
- Beads from shell (dentalium) or tusk.

Upper Left:*Bone Awls from Oregon.*

Upper Center: *Bone Wedge from California.*

Upper Right: *Plateau dentalium choker and bracelet, from Nez Perce National Historical Park, 19th century, made using Antalis pretiosa shells Credit: Nez Perce - Nez Perce National Historical Park, NEPE 8762, Public Domain.*

Above: *Tooth Pendants. Right: Bone Pendants. Both from Oregon and Washington.*

Implement the IDP if you see…

Culturally modified trees, fiber, or wood artifacts.

Examples are:

- Trees with bark stripped or peeled, carvings, axe cuts, de-limbing, wood removal, and other human modifications.
- Fiber or wood artifacts in a wet environment.
- Variability of size, function, and complexity.

Left and Below: *Culturally modified tree and an old carving on an aspen (Courtesy of DAHP).*

Right, Top to Bottom: *Artifacts from Mud Bay, Olympia: Toy war club, two strand cedar rope, wet basketry*.

Implement the IDP if you see…

Strange, different, or interesting looking dirt, rocks, or shells.

Human activities leave traces in the ground that may or may not have artifacts associated with them. Examples are:

- "Unusual" accumulations of rock (especially fire-cracked rock).
- "Unusual" shaped accumulations of rock (such as a shape similar to a fire ring).
- Charcoal or charcoal-stained soils, burnt-looking soils, or soil that has a "layer cake" appearance.
- Accumulations of shell, bones, or artifacts. Shells may be crushed.
- Look for the "unusual" or out of place (for example, rock piles in areas with otherwise few rocks).

Shell Midden pocket in modern fill discovered in sewer trench.

Underground oven. Courtesy of DAHP.

Shell midden with fire cracked rock.

Hearth excavated near Hamilton, WA.

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Agricultural or logging equipment. May include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, etc.
- Domestic items including square or wire nails, amethyst colored glass, or painted stoneware.

Left: Top to Bottom: *Willow pattern serving bowl and slip joint pocket knife discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Right: *Collections of historic artifacts discovered during excavations in eastern Washington cities.*

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Railway tokens, coins, and buttons.
- Spectacles, toys, clothing, and personal items.
- Items helping to understand a culture or identity.
- Food containers and dishware.

Main Image: *Dishes, bottles, workboot found at the North Shore Japanese bath house (ofuro) site, Courtesy Bob Muckle, Archaeologist, Capilano University, B.C. This is an example of an above ground resource.*

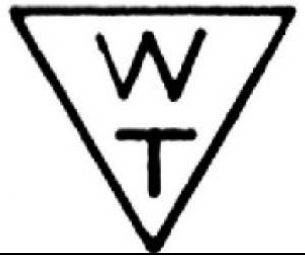
Right, from Top to Bottom: *Coins, token, spectacles and Montgomery Ward pitchfork toy discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Implement the IDP if you see…

- Old munition casings – if you see ammunition of any type – ***always assume they are live and never touch or move!***
- Tin cans or glass bottles with an older manufacturer's technique – maker's mark, distinct colors such as turquoise, or an older method of opening the container.

Far Left: .303 British cartridge found by a WCC planting crew on Skagit River. Don't ever touch something like this!
Left: Maker's mark on bottom of old bottle.

Right: *Old beer can found in Oregon. ACME was owned by Olympia Brewery. Courtesy of Heather Simmons.*



Logo employed by Whithall Tatum & Co. between 1924 to 1938 (Lockhart et al. 2016).

Can opening dates, courtesy of W.M. Schroeder.

Implement the IDP if you see…

You see historic foundations or buried structures.

Examples are:

- Foundations.
- Railroad and trolley tracks.
- Remnants of structures.

Counter Clockwise, Left to Right: *Historic structure 45KI924, in WSDOT right of way for SR99 tunnel. Remnants of Smith Cove shantytown (45-KI-1200) discovered during Ecology CSO excavation, City of Spokane historic trolley tracks uncovered during stormwater project, intact foundation of historic home that survived the Great Ellensburg Fire of July 4, 1889, uncovered beneath parking lot in Ellensburg.*

Implement the IDP if you see...

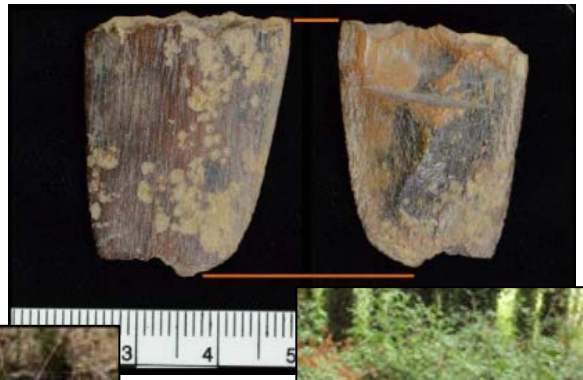
Potential human remains.

Examples are:

- Grave headstones that appear to be older than 50 years.
- Bones or bone tools--intact or in small pieces. It can be difficult to differentiate animal from human so they must be identified by an expert.
- These are all examples of animal bones and are not human.

Center: *Bone wedge tool, courtesy of Smith Cove Shantytown excavation (45KI1200).*

Other images (Top Right, Bottom Left, and Bottom) Center: Courtesy of DAHP.



Directly Above: This is a real discovery at an Ecology sewer project site.

What would you do if you found these items at a site? Who would be the first person you would call?

Hint: *Read the plan!*

APPENDIX 7

Preliminary Report:
Identification of Candidate Heritage Trees, Assessment of Condition, and Estimation of Heritage Tree Protection Areas

for

Cameron Curtis
Curtis Homes LLC
by

David M. Braun
Braun Arboricultural Consulting LLC
Hood River OR
November 7th, 2023

Background

I was contacted by Cameron Curtis in early November 2023 regarding the need for an arborist's assessment of candidate heritage trees potentially present on a lot and covered by the White Salmon Heritage Tree Ordinance. The lot is on the north side of Spring St. in White Salmon (Lot 4, Klickitat County Tax Lot #0310247500400, 7.93 ac.; Klickitat County, 2023).

Mr. Curtis requires an arborist's assessment of Candidate Heritage Trees to facilitate final development plans and obtain permit approvals. The focus of this Report is to provide location and condition information on trees likely qualifying as Heritage Trees based on the Heritage Tree portion (18.10.317- Special Provisions-Heritage Trees) of the White Salmon Critical Areas Ordinance (Chapter 18.10) of Title 18 – Environment, White Salmon Code of Ordinances.

The following is my interpretation of the meaning and application of Section 18.10.317:

HTPAs: designation of Heritage Tree Protection Areas (HTPAs) is required for qualifying trees; dimensions are 10 times tree diameter at breast height (diameter at 4.5 ft.) plus a 15 ft. wide Building Set Back Line (BSBL), e.g., a 20 in. diameter oak would require a circle 200 in. (16.7 ft.) wide plus 15 ft. on all sides, adding up to a 46.7 ft. (47 ft.) wide protection zone (alternative is average crown width plus BSBL). Trees over 14 in. dbh (Oregon White Oak) or 18 in. dbh (other species) may be designated Heritage Trees. I refer to such trees as "Candidate Heritage Trees" before a final determination is made by the City as to what trees will be retained (see Tree removal, below). Significant incursions that are likely to significantly decrease tree health or stability are not allowed, such as cuts, fills, buried utilities, or building footprints over a significant portion of a HTPA; mitigation including fencing, mulching, temporary irrigation, are recommended to reduce impacts by minor incursions inside or work outside the HTPA.

Tree removal: If a property can't be reasonably developed based on zoning due to extensive coverage of the parcel area by HTPAs, some Candidate Heritage Trees may be removed; dead, high risk, "weed" tree species such as *Ailanthus altissima* (Tree of Heaven), non-maintained fruit trees, or trees in very poor condition may also be removed even if they meet diameter requirements. Key sections of the Heritage Tree Ordinance are included at the end of this report.

Scope

Two objectives are the subject of this report:

Describe the large trees on the property: their species, location, size (diameter, height, and spread), and overall condition. Trees over 14 in. dbh (Oregon White Oak) or 18 in. dbh (other species) may be designated Heritage Trees and protected during and after construction activities under the White Salmon Critical Areas Ordinance.

Identify Candidate Heritage Trees and estimate Heritage Tree Protection Areas (HTPAs) in relation to development plans. A Heritage Tree Protection Plan (HTPP) for mitigation of impacts to specific HTPAs will be prepared as a supplement to this Preliminary Report upon request that describes likely construction impacts and proposes mitigation. The HTTP will be based on this preliminary report, updated with revised recommendations for mitigation of likely construction impacts to Heritage Trees, and include a revised schematic showing the HTPAs, BSBLs, and building and other construction footprints; this schematic would ideally be prepared by the surveyor producing plans for the site.

Methods

Candidate Heritage Trees

Identify species and measure the diameter using a diameter tape. Visually assess trees for condition and defects. This involves viewing all sides from the root crown to the top of the crown.

Establish approximate tree locations. This was done with photographs and visually estimated position relative to fence lines likely to be near property lines; candidate trees are located on a schematic (Figure I). More exact locations were not determined at this time because only one marker from the 2022 survey was observed, and because survey work to produce final plans for the site can more efficiently define tree locations.

Site

Walk the property and observe approximate property boundaries. Determine past disturbance history that may have affected the large trees. Identify Candidate Heritage Trees based on species and diameter.

Results

Number and Species of Candidate Heritage Trees

Eight Candidate Heritage Trees were identified by the assessor: all were Oregon White Oak (*Quercus garryana*) (Table I). Other tree species included Bitter Cherry (*Prunus avium*), Bigleaf Maple (*Acer macrophyllum*), Black Locust (*Robina pseudoacacia*), and Oregon Ash (*Fraxinus*

latifolia); none of these were 18 in. dbh. Some fruit trees, cherries, were present that may have approached or exceeded 18 in. dbh, but these were non-maintained and in very poor condition.

#	Sps	dbh	Ht.	Cond.	Impacts	Likely Cons. HTPA+BSBL Diameter (ft.)	Notes
1	Oak	15.8	40	Fair	None	43	High crown, lean to SE
2	Oak	22.2	40	Fair	Slight	48	High crown, lean to SE, basal opening
3	Oak	13.4	35	Fair	None	42	High crown, suppressed by maple, lean to S
4	Oak	16.9	25	Good	None	44	Full crown, old, barbed wire embedded
5	Oak	25.3	30	Good	None	51	Full crown to E, old, barbed wire embedded, adjacent to #6 to W
6	Oak	19.5	30	Good	None	47	Full crown to W, adjacent to #5 to E
7	Oak	13.5	35	Fair	None	42	One-sided crown to S, suppressed by #8
8	Oak	13.5	35	Fair	None	42	One sided high narrow crown to N (in clump NE of #7 and a third smaller stem)

Table I. Candidate Heritage Trees. All trees were measured at 4.5 ft. (dbh) from soil line on side-hill, except for trees #2 and #8, which were measured at the narrowest point at about 3 ft. Height and distance from fence lines ("boundaries") were visually estimated. Trees in fair condition (1,2,3,7,8) had one sided crowns lacking low branches or suppressed by a taller tree nearby. Trees in good condition had larger crowns and were open grown (although #5 and #6 were a pair, and therefore had one-sided crowns). All were relatively young (estimated 30 - 50 years) and fast growing; some had light crown die-back likely caused by anthracnose disease (which the species tolerates); all were likely of sprout origin from old stumps; an old stump protruded from the basal opening of #2, and was within the clump made up of #7, #8, and a third smaller stem. The oak diameters of 13.4, 13.5, and 13.5 in. were considered to be 14 in. based on rounding and allowance for measurement error.

Tree Locations and Protected Areas

All trees were within the property lines based on old fence lines observed on site, and within property lines based on inspection of the Klickitat County Tax Lot Map (Klickitat County, 2023) and the 1992 property survey (Trantow Surveying, 1992). One surveyor lath stake (marked "PROPERTY CORNER LOT 3") was observed 20 ft. north of oak #6 on the newer west fence line; this likely was from the 2022 survey referred to by Mr. Curtis. Trees depicted in Figure I.

Incursion into Protected Areas by Proposed Construction

Although the footprints of hardscapes, buried utilities, or buildings are not known at this time, construction impacts to the Candidate Heritage Trees are likely to be minimal. Mr. Curtis described the plans for the area as a multi home development, with the access road leaving Spring St. and traversing the narrow portion (101 ft. wide) to access the larger rectangular area to the north where the homes would be located (Klickitat County, 2023; Figure I). The first three oaks are 10 – 20 ft. from the west property line in the narrow area; the other trees are closer to

other boundaries (< 1 to 4 ft.). Construction impacts to trees #2 - #8 are estimated to be "none" based on current information, but this assessment could change based on final plans (Table I).

Oak #2 would be closest to the access road of the three trees in the narrow area; its HTPA would be 18.3 ft. (22 in. dbh * 10) + a BSBL of (15 ft.)*2 ft., or a circle 48 ft. in diameter. This would put the edge of the protection area about 44 ft. from the west property line and 6 ft. west of the center of the 101 ft. wide area (the tree is about 20 ft. from the west boundary).

Figure I. Candidate Heritage Trees. Eight Oregon White Oaks qualify as Heritage Trees based on species and diameter. Condition was fair or good, and all were determined to be at a hazard level of "low risk", based on improvements such as homes, common areas, sidewalks, and roads built within 1.5 tree heights of the trees. Diameter ranged from 14 to 25 in., and heights from 25 – 40 ft. Trees are near property boundaries: Oaks #1, #2, and #3 are along the west boundary in the southern, narrow neck of the property; oaks #4, #5, and #6 are along the west boundary, and oaks #7 and #8 are along the north boundary. Oak #2 was the farthest from a boundary, about 20 ft. east of the west boundary along the narrow neck of the property at bottom. The property approximated by the black lines is Tax Lot 4, 7.93 ac., # 0310247500400. Aerial photo date is July 24th, 2021.

Discussion

Heritage Tree Protection Areas (HTPAs) and Setbacks (BSBLs)

Heritage Trees receive protection in the form of Heritage Tree Protection Areas (HTPAs) and Building Set Back Lines (BSBLs), and the trees and protection areas are included on plans. Assuming the eight Candidate Heritage Trees will appear on final plans as Heritage Trees, entry into the protected zones is unlikely except for Oak #2. Retaining some of the existing trees and shrubs around the eight identified trees would also benefit the trees, although removal or pruning of some competing Bitter Cherry, Bigleaf Maple and Black Locust would improve vigor of trees #1 - #3.

Fate of Candidate Heritage Trees

All the Candidate Heritage Trees were determined to be in fair or good health and low risk (Dunster, 2017). The trees can be retained as Heritage Trees, represent a benefit to the property, and will maintain other environmental benefits: the goal of the Critical Area Ordinance. Given all the activities on a home construction site, designation of HTPAs plus BSBLs and application of the mitigation discussed, at minimum, should ensure that this occurs.

Risk Assessment

Tree risk assessment assigns a risk rating to trees based on the likelihood that a tree or tree part will fail and contact a target; overall risk is assigned based on the probability of that contact and the consequence (Dunster et al, 2017). Based on the assumption that buildings or roads or other improvements will be within 1.5 tree heights of the trees, overall risk was estimated to be minimal due to low failure risk, small tree size, and the types of targets.

Mitigation

Besides erection of fencing, mulching and supplemental irrigation will likely be recommended once the development footprints are known. Grade changes or footings near or slightly in HTPAs will affect root health, so trees will benefit from this mitigation; it is of critical importance in the dry summer months. Removal or crown reduction of nearby trees will also improve health.

Recommendations

The surveyor would ideally include tree locations, HTPAs and BSBLs for the flagged Candidate Heritage Trees on plans that depict grade changes, footings, roads, buildings, and buried utilities.

Depending on the type and location of construction related disturbance near the trees, mitigation can be recommended by a qualified arborist in a HTTP as a brief supplement to this report.

Key Sections of the Heritage Tree Ordinance Relating to this Report

18.10.317-Special Provisions—Heritage Trees

A. "…All heritage trees…shall be protected as critical areas. The tree protection area shall be equal to ten times the trunk diameter of the tree or the average diameter of the area enclosed by the outer edge of the drip line of the canopy, whichever is greater."

B. "Heritage trees include:
1. Oregon White Oaks with a trunk diameter larger than fourteen inches,
2. All tree species with a trunk diameter greater than eighteen inches, or
3. Any tree designated as a heritage tree by the city council in accordance with the nomination process detailed below."

E. Maintenance and preservation of heritage trees is required.
1. Any owner or applicant shall use reasonable efforts to maintain and preserve all heritage trees located thereon in a state of good health. …"
    a. Avoidance of grading, excavation, demolition, or construction activity within heritage tree protection area where possible.
    b. Grading, excavation, demolition, or construction within the heritage tree protection area shall require submittal of a tee protection plan…"
2. The critical area report …shall include a heritage tree protection plan and shall be prepared by a certified arborist. The plan shall address issues related to protective fencing and protective techniques to minimize impacts …"
3. Building setback lines stipulated by subsection 18.10.212 shall be measured from the outer line of the tree protection area for heritage trees (18.10.212-Building Setback Line (BSBL): "Unless otherwise specified, a minimum BSBL of fifteen feet is required from the edge…").

G. Exceptions to the provisions in this section include:
1. A heritage tree can be removed if it is dead, dangerous, or a nuisance, as attested by an arborists' report…"
2. A heritage tree in or very close to the "building area" of an approved single-family residence design can be replaced by another tree. A heritage tree can be removed if its presence reduces the building area of the lot by more than 50 percent after all potential alternatives including possible setbacks to minimum yard depth and width requirements have been considered.

References

City of White Salmon 2021. Chapter 18.10 – Critical Areas Ordinance, including 18.10.317-Special Provisions—Heritage Trees (18.10.317-Special Provisions—Heritage Trees) Accessed and downloaded November 3rd, 2023. https://library.municode.com/wa/white_salmon/codes/code_of_ordinances?nodeId=TIT18EN_CH18.10CRAROR

Dunster, J. A., T. Smiley, N. Matheny, and S. Lilly, 2017. Tree Risk Assessment Manual. International Society of Arboriculture, Champaign, Il. 194 pgs.

Google 2023. Google Earth Pro used to produce schematic based on aerial imagery, Tax Lot Map, and Trantow Survey. Schematic based on an image dated July 24th, 2021, and accessed November 4th, 2023. Google Earth Pro 7.3.3.7786(32-bit) Build Date July 21, 2020. Copywrite 2020 Google LLC.

Klickitat County 2023. Klickitat County Tax Lot Maps. Accessed and downloaded Map on November 4th, 2023. Approximate boundaries transferred to schematic with drawing tools in Google Earth Pro. https://imap.klickitatcounty.org/#10/45.8283/120.7404/c22ecdf827df6af49a

Trantow Surveying, 1992. Klickitat County WA Short Plat No. SP – 91 – 17 NW ¼ NE1/4 SEC. 24, T. 3N., R. 10 E., W.M. "Cherry Hill Estates". T. N. Trantow Surveying P. L. S., Bingen, WA. Filed in Klickitat County, July 24th, 1992. Obtained via link from Tax Lot Map (Klickitat County, 2023).

Assessors Credentials

David M. Braun Ph.D., Owner, Braun Arboricultural Consulting LLC
Cell: 541-806-0347 dave@braunarborcare.com www.braunarborcare.com
Ph.D., Forest Ecology, 1998
College of Forest Resources, University of Washington, Seattle, Washington.
M.F.S., Forest Ecology, 1986.
School of Forestry and Environmental Studies, Yale University, New Haven, Connecticut.
B. S., Biology, 1982.
Fairfield University, Fairfield, Connecticut.

Memberships, Certifications, Licenses

Certified Arborist, International Society of Arboriculture (ISA) #PN-6114A
TRAQ Tree Risk Assessment Credential, ISA (being renewed)
Member, American Society of Consulting Arborists (ASCA)
Oregon CCB #188757; Washington Registration # BRAUNAC908DQ
Oregon Commercial Pesticide Operator License AG-L1017983CPO
Oregon Commercial Pesticide Applicator License AG-L1017982CPA (being renewed)
Washington Commercial Pesticide Applicator License: 82597

Insurance and Bond

David M. Braun and Braun Arboricultural Consulting LLC, Reg. Num. 354066-93 (Nov. 2007), is insured with a standard business insurance policy through Columbia River Insurance, Hood River, OR. Phone: 541-386-2444. Coverage includes: $1,000,000 Liability and Medical Expenses, $2,000,000 Products –Completed Operations, $1,000,000 Professional Liability Insurance, Workman's Compensation Insurance, and a $20,000 surety bond.

Assumptions and Limiting Conditions

1. Any legal description provided to the assessor (David M. Braun) is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is assessed or evaluated as though free and clear, under responsible ownership and competent management.
2. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the assessor can neither guarantee nor be responsible for the information provided by others.
3. The assessor shall not be required to give testimony or attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
4. Loss or alteration of this report invalidates the entire report.
5. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the assessor.
6. Neither all or any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales, or other media, without the prior expressed written or verbal consent of the assessor particularly as to the conclusions or recommendations, identity of the assessor, or any reference to any professional society or institute or designation conferred upon the assessor as stated in his qualification.
7. This report and conclusions expressed herein, represents the opinion of the assessor, and the assessor's fee is in no way contingent upon the reporting of a specified value, stipulated results, and the occurrence of a subsequent event nor upon any finding to be reported.
8. Unless expressed otherwise: (1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring, except for those minimally invasive procedures that were preformed and described in the report. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the tree or property in question may not arise in the future.

Certification of Performance

Location of Assessed Trees: Lot 4, Tax Lot #0310247500400, Spring St., White Salmon, Washington
I, David M. Braun certify to the best of my knowledge and belief that:

1. That the statements of fact contained in this Heritage Tree report are true and correct.
2. That the assessment, analysis, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and that they are my personal, unbiased professional analysis, opinions, and conclusions.
3. That I have no present or prospective interest in the trees that are the subject of the assessment, and that I have no personal interest or bias with respect to the client. Because Braun Arboricultural Consulting LLC provides multiple services, including appraisal, risk assessment, tree pruning, diagnosis and treatment of injurious insects and diseases, and tree removal, a bid for possible future work on the subject trees may be provided to the client, or the property owners, if one or more are requested. David M. Braun states that the methods, observations, conclusions, and recommendations contained in this tree Risk Assessment report were in no way influenced by a desire for a particular outcome that could form the basis of additional work on the subject trees; he also urges the client and property owners to obtain additional bids from other contractors if one is requested from Braun Arboricultural Consulting LLC.
4. That my compensation is not contingent upon a predetermined result or the occurrence of a subsequent event.
5. That my analysis, conclusions, and opinions were developed, and this assessment has been prepared, in conformity with industry standards and guidelines.
6. That methods found in this assessment were based on a request by the client to determine risk posed by the tree and provide recommendations for reducing it.
7. That my assessment is based on information known to me at this time. If more information is disclosed, I may have further opinions.
8. That, as a result of my examination, investigations, and analysis of the trees and all of the data pertinent thereto, and in the light of my experience, the recommendations for removing trees or retaining them while mitigating health impacts may be acted on with some assurance of success.

I further certify that I am a registered member in good standing of the American Society of Consulting Arborists (ASCA) and the International Society of Arboriculture (ISA), that I have a Tree Risk Assessment Qualification (TRAQ) and that I have been active in the field of Arboriculture for a period of 15 years.

Signed **November 7th, 2023**
Date

APPENDIX 8

November 6, 2023

The City of White Salmon, Community Department
Attn: Erika Castro Guzman
100 N. Main Street
White Salmon, WA 98672

Re: Statement regarding slopes on Cherry Hill Estates

Erika,

The purpose of this statement is to verify the existence of steep slope critical areas being defined by slopes exceeding 40 percent on the Cherry Hill Estates project. The topographic detail being used for design was derived by using the State of Washington Lidar data, wasco-B, data blocks. This data was field checked in December 2020 with a grid of ground shots for quality control. The majority of the property is well under the 40 percent slope, however the portion on the westerly edge of the southerly leg of the property does have slope at or exceeding the 40 percent slope.

Please reach out if you have questions.

Erik M. Carlson, P.L.S.
President
Terra Surveying

TERRA SURVEYING
1406 12th Street, Suite 100
Hood River, Oregon
Phone: 541.386.4531 Email: terra@gorge.net Web: terralandsurveying.com

APPENDIX 9

Earth Engineers, Inc.

2411 Southeast 8th Avenue • Camas • WA 98607
Phone: 360-567-1806
www.earth-engineers.com

November 15, 2021

Legacy Development Group
PO Box 4
Hood River, Oregon 97031
Attention: Cameron Curtis, President

Phone: (541) 490-6339
E-mail: cameron@curtishomesllc.com

Subject: **Geotechnical Investigation Report**
Proposed Spring Street Subdivision
Klickitat County Tax Lot No. 0310247500400
Intersection of Northwest Spring Street and Northwest Cherry Hill Road
White Salmon, Klickitat County, Washington
EEI Report No. 20-071-1

Dear Mr. Curtis:

Earth Engineers, Inc. (EEI) is pleased to provide our attached Geotechnical Investigation Report for the above referenced project. This report includes the results of our field investigation, an evaluation of geotechnical factors that may influence the proposed construction, and geotechnical recommendations for the proposed structures and general site development.

We appreciate the opportunity to perform this geotechnical study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Sincerely,
Earth Engineers, Inc.

Troy Hull, P.E.
Principal Geotechnical Engineer

Jacqui Boyer
Geotechnical Engineering Associate

Attachment: Geotechnical Investigation Report

Distribution (electronic copy only): Addressee

GEOTECHNICAL INVESTIGATION REPORT

For the:

Proposed Spring Street Subdivision
Klickitat County Tax Lot No. 0310247500400
Intersection of Northwest Spring Street
and Northwest Chery Hill Road
White Salmon, Klickitat County, Washington

Prepared for:

Legacy Development Group
PO Box 4
Hood River, Oregon 97031
Attention: Cameron Curtis

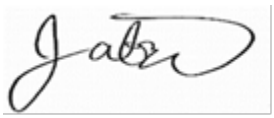
Prepared by:

Earth Engineers, Inc.
2411 Southeast 8th Avenue
Camas, Washington 98607
Phone: 360-567-1806

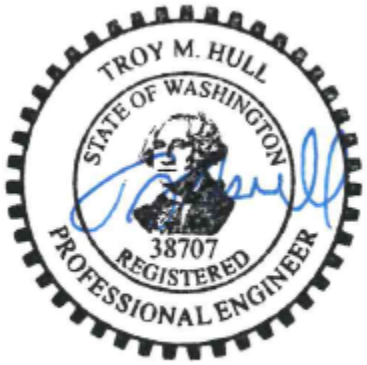
EEI Report No. 21-071-1

November 15, 2021

Earth Engineers, Inc.



Jacqui Boyer
Geotechnical Engineering Associate



Troy Hull, P.E.
Principal Geotechnical Engineer

TABLE OF CONTENTS

1.0 PROJECT INFORMATION

1.1 Project Authorization

Earth Engineers, Inc. (EEI) has completed a geotechnical investigation report for the proposed development to be located on Klickitat County Tax Lot No. 0310247500400 off of Northwest Spring Street near the intersection with Northwest Cherry Hill Road in White Salmon, Klickitat County, Washington. Our geotechnical services were authorized by Cameron Curtis with Legacy Development Group on September 24, 2021 by signing our Proposal No. 21-P066-R1 issued on February 18, 2021 and revised on May 6, 2021.

1.2 Project Description

Our current understanding of the project is based on the information Greg Hagbery (formerly with Legacy Development Group) provided to EEI Geotechnical Engineering Associate Jacqui Boyer via e-mail on February 17, 2021. We have also been provided with the following documents pertaining to the project:

- **A survey titled "Cherry Hill Estates" prepared by T.N. Trantrow Surveying, P.L.S. dated July 21, 1992.** This survey shows the boundaries of the subject property with respect to the surrounding properties. The survey indicates that the subject 7.93-acre property is Lot 4 of the Cherry Hill Estates.

- **A conceptual plan titled "Pre-App Proposal" prepared by Legacy Development Group Inc. dated January 2021.** This plan shows the preliminary neighborhood layout of the proposed subdivision, including the proposed roadway and lot divisions on the property. See Figure 1 below. The plan also shows a site location map for the subject property with respect to its vicinity. It should be noted that it is our understanding these plans are preliminary.

- **A survey titled "Property Boundary Survey for Curtis Homes, Location: Tract of Land Located in the Northeast Quarter of the Northeast Quarter of Section 24, Township 3 North, Range 10 East, Willamette Meridian, Klickitat County, Washington" prepared by Terra Surveying, dated December 2020.** This topographic property survey shows the existing property topography with 1-foot contour lines, and elevations based on the N.A.V.D. 99 vertical datum.

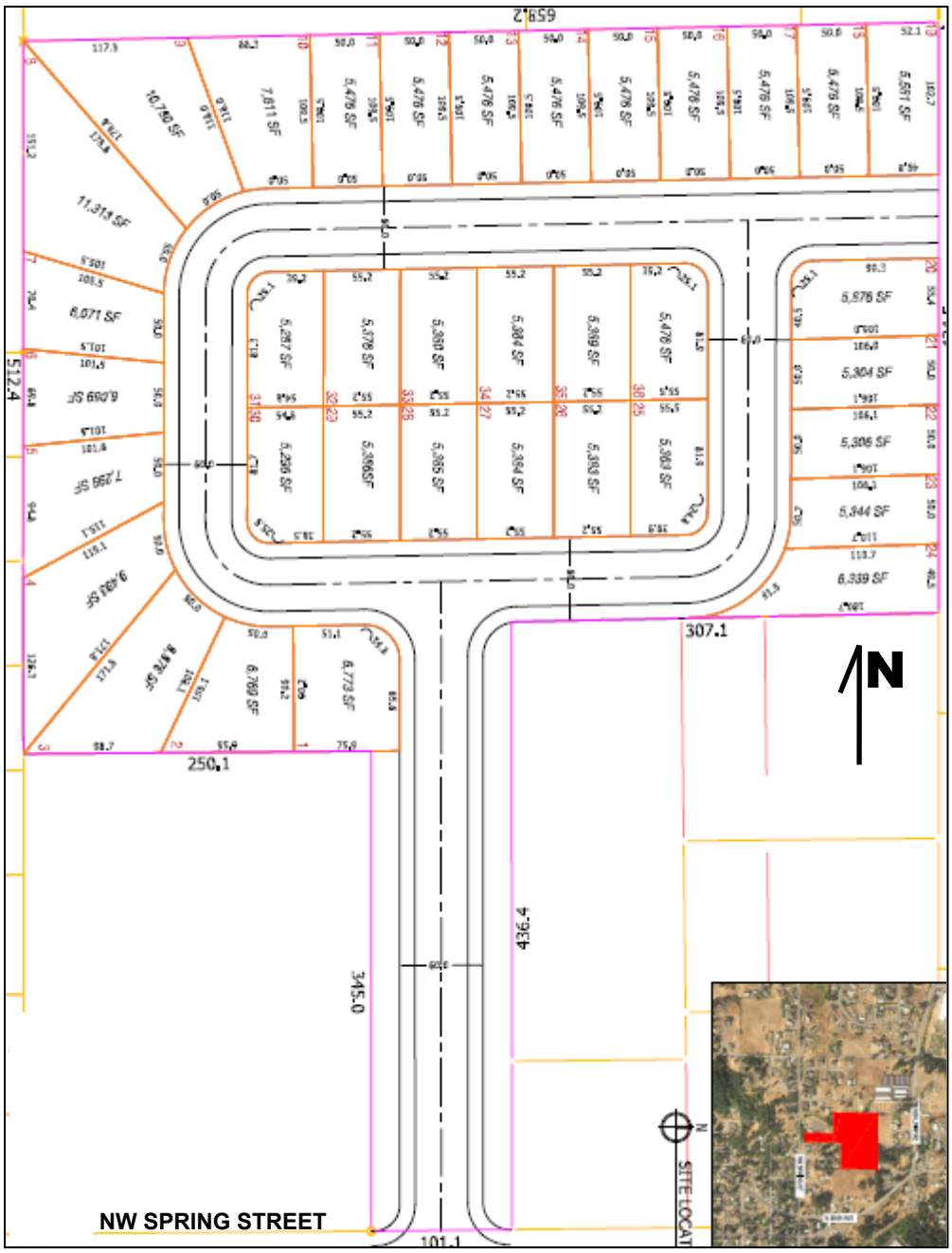


Figure 1: Preliminary site plan for the subject property. The subject property is outlined in pink and the proposed lots are outlined in orange. Base plan source: referenced above.

As shown on Figure 1 above, we understand that the plan is to divide the subject property into 36 residential lots ranging in size from 5,287 square feet to 11,313 square feet. The plan indicates that the proposed roadway is 60-feet wide, and accesses the property from Northwest Spring Street to the south.

At this time, we have not been provided detailed design drawings for the project. For the purposes of this report, we are assuming maximum house foundation loads of 3 kips per linear foot for wall footings, 40 kips for column footings, and 150 psf for floor slabs. We also assume maximum cuts

and fills will be minimal, on the order of 2 feet. Finally, we have assumed that the proposed subdivision residences will be constructed in accordance with the 2018 International Residential Code (IRC).

1.3 Purpose and Scope of Services

In order to provide geotechnical recommendations for the proposed development, we performed a subsurface investigation to better define the subsurface soil, rock, and groundwater properties. We performed 11 test pits (TP-1 through TP-11) around the subject property. The depths of the explorations ranged from 4 to 9.5 feet. In order to characterize soil strength, we supplemented some of the test pits with drive probe testing.

Select soil samples collected from the test pits were tested in the laboratory to determine the material's properties for our evaluation. Laboratory testing was accomplished in general accordance with ASTM procedures.

This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents geotechnical recommendations regarding the development of the single family residential lots as follows:

- A discussion of subsurface conditions encountered including pertinent soil and rock properties as well as the encountered groundwater conditions.
- Geotechnical related recommendations for foundation design including allowable bearing capacity and estimated settlements.
- A qualitative evaluation of slope stability.
- Seismic design parameters in accordance with the ASCE 7-16.
- Structural fill recommendations, including an evaluation of whether the in-situ soils can be used as structural fill.
- Floor slab support recommendations.
- Retaining wall design parameter recommendations, including earth pressures, backfill and drainage.
- Construction recommendations including wet/dry weather site preparation and drainage recommendations.
- Asphaltic concrete pavement section thickness design recommendations based on an assumed CBR value, as well as assumed traffic loading conditions.
- Discussions on geotechnical issues that may impact the project.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

As noted above, the project area is located on Klickitat County Tax Lot No. 0310247500400 in White Salmon, Washington. The property is accessed from Northwest Spring Street to the south, and is bounded by residential properties to the west, north and east. See Figure 2 below for the project vicinity map.

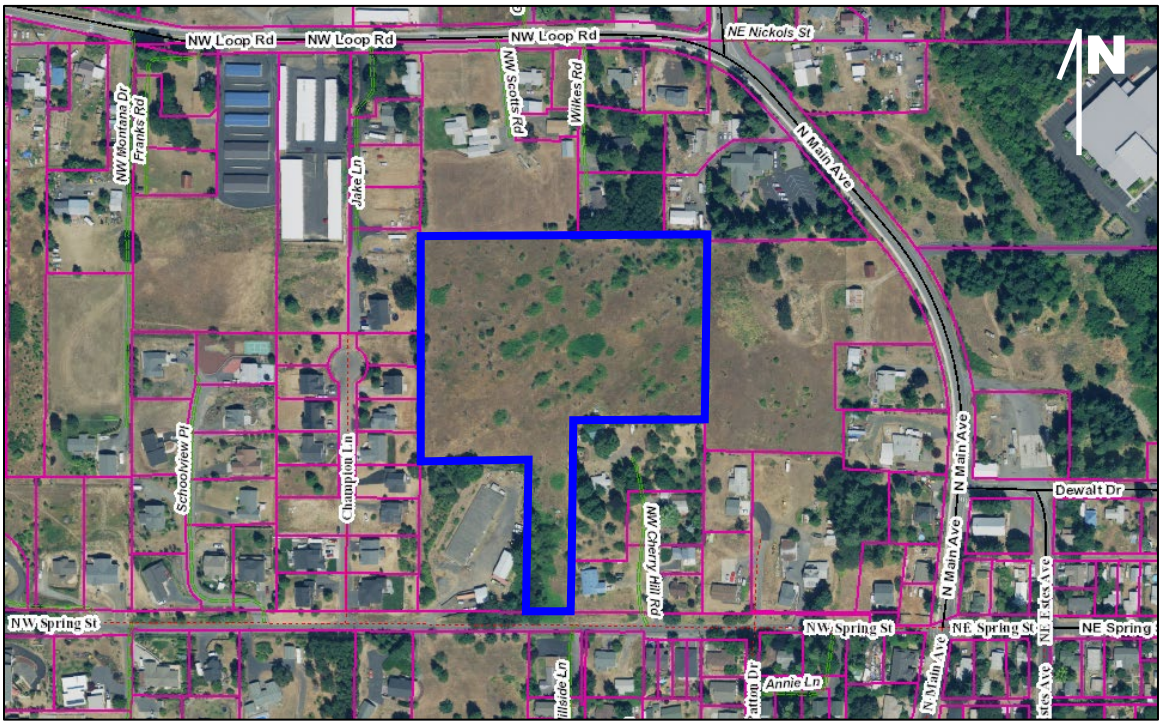


Figure 2: Vicinity map (base map source - http://imap.klickitatcounty.org/). The subject property is outlined in blue.

At the time of our investigation, the property was vacant. The site was vegetated with grass, shrubs, scattered trees, and blackberry bushes. It should be noted that some of the vegetation appeared burned. There is also an access road in the southern portion of the property off of Northwest Spring Street.

In terms of topography, the subject property is generally sloping down to the northeast at about 7H:1V (Horizontal:Vertical). Slopes in the area of the proposed lots (i.e. the northern portion of the property) are up to about 3.5H:1V. The steepest slope on the subject property is located along the access road (i.e. the southern portion of the property), up to 1.9H:1V. See Appendix B for the site topography taken from the survey referenced above.

While on site, we did not observe signs of previous or current soil movement, such as leaning tree trunks, clearly identifiable landslide head scarps, or surface cracking in the soils. See Photos 1 through 4 below for current site conditions.

Photo 1: Current site conditions (taken from TP-3, facing northeast).

Photo 2: Current site conditions (taken from TP-4, facing north).

Photo 3: Current site conditions (taken from TP-8, facing southwest).

Photo 4: Current site conditions (taken from TP-11, facing Northwest Spring Street to the south).

2.2 Mapped Geology and Soils

The underlying geologic unit mapped in the area of the subject property is Qtb – Olivine basalt and andesite from the upper Miocene to Quaternary[1].

We reviewed the United States Department of Agriculture (USDA) Soil Survey[2] to define the surface soils on the subject property. The USDA maps the soils on the subject property to be Unit 86B-Chemawa ashy loam on 8 to 15 percent slopes, and 86C-Chemawa ashy loam on 15 to 30 percent slopes. This well drained soil unit is formed on terraces from a parent material of volcanic ash. A typical profile for this soil unit is ashy loam overlying ashy silt loam with a depth to a restrictive feature of more than 80 inches.

As part of our due diligence for this report, we reviewed the Washington State Department of Natural Resources (DNR) Geologic Information Portal (https://geologyportal.dnr.wa.gov/). According to the DNR portal, portions of the property are mapped within a moderate susceptibility to shallow landslides. It should be noted that the portal does not map any historic landslide deposits or fault lines on or in proximity to the subject property. In addition, the portal does not map the subject property within a liquefaction susceptibility area due to the presence of shallow bedrock.

According to the USGS Fault and Fold Database of the United States, the Hood River fault zone is located approximately 2.9 miles south of the site and the Faults near the Dalles is approximately 5.5 miles northeast of the site. The Hood River fault zone defines the eastern margin of a half graben, and is described to contain normal right lateral faults with a slip rate of less than 0.2mm/year[3]. The Faults near the Dalles are described as northwest striking, right-lateral strike slip faults, and are categorized as having a slip rate of less than 0.2mm/year, although no slip data in Quaternary deposits are available[4].

2.3 Subsurface Materials

As stated above, we explored the site with 11 test pits (TP-1 through TP-11) located around the subject property. The test pits were advanced by Legacy Development Group of Hood River, Oregon using an excavator with a 2-foot wide toothed bucket. In addition, we performed supplemental drive probe testing at TP-5, TP-8, and TP-10. For the approximate exploration locations, see the "Exploration Location Plan" in Appendix B. Results of the test pits are reported in Appendix C. Upon completion, the test pits were loosely backfilled with the excavated soil and tamped down with the excavator bucket.

---

[1] Bela, J.L, 1982, Geologic and Neotectonic Evaluation of North-Central Oregon: The Dalles 1 degree x 2 degree Quadrangle, Oregon Department of Geology and Mineral Industries, Geological Map Series 27, scale 1:250,000.
[2] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.
[3] Personius, S.F., compiler, 2002, Fault number 866, Hood River fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults.
[4] Personius, S.F., and Lidke, D.J., compilers, 2003, Fault number 580, Faults near The Dalles, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults.

Drive probe tests extended from the ground surface at the locations referenced above to the depth of drive probe refusal. The drive probe test is based on a "relative density" exploration device used to determine the distribution and to estimate strength of the subsurface soil units. The resistance to penetration is measured in blows-per-½-foot of an 11-pound hammer which free falls roughly 39 inches driving a 3/4-inch outside diameter pipe with a 1-inch diameter endcap into the ground. This measure of resistance to penetration can be used to estimate relative density of soils. For a more detailed description of this geotechnical exploration method, please refer to the Slope Stability Reference Guide for National Forests in the United States, Volume I, USDA, EM-7170-13, August 1994, P 317-321. Results of the drive probe tests are reported in the exploration logs in Appendix C.

Select soil samples were tested in the laboratory to determine material properties for our evaluation. Laboratory testing was accomplished generally in accordance with ASTM procedures. The testing performed included moisture content tests (ASTM D2216), and fines content determinations (ASTM D1140). The test results have been included on the exploration logs located in Appendix C.

Generally, we encountered a surficial layer of topsoil overlying fill soils, overlying native soils with decomposed rock, which eventually transitioned to bedrock with depth. The thickness of the strata varied across the site. Each individual stratum encountered is discussed in further detail below.

TOPSOIL

The surficial layer encountered in all of our explorations consisted of a dry to moist, light brown sandy silt with rootlets. The thickness of this stratum in our test pits was 6 to 12 inches.

FILL/TILLED SOILS

In all of our test pits, we encountered what we interpret to be fill/tilled soils underlying the surficial topsoil layer. The soil was generally a light brown to brown sandy silt to silty sand with rootlets, wood chips and charcoal pieces. We also encountered boulders, as well as wood, plastic and metal debris within this stratum. It is possible these organic soils are the result of agricultural tilling or clearing the area in the past. Laboratory moisture content testing on samples obtained within this stratum ranged from 9 to 12 percent, indicating a dry condition. Fines content laboratory testing for samples obtained within this stratum ranged from 39 to 89 percent passing the #200 sieve. Based on the excavator digging effort and supplementary drive probe testing, we consider this stratum to be medium stiff/medium dense to very stiff/very dense. The fill/tilled soils extended to depths ranging from 2 to 4 feet bgs in our explorations. It should be noted that this stratum extended to the terminal depth of our exploration at TP-6 due to practical digging refusal on a boulder.

NATIVE SOILS

In all of our explorations (except for TP-6), we encountered native soils underlying the fill soils. The soil was generally an orange-brown to reddish brown to dark brown silt with varying amounts of sand. We also encountered decomposed rock fragments in this stratum (red to black to gray to white). Laboratory moisture content testing on samples obtained within this stratum ranged from

8 to 50 percent, indicating a dry to wet condition. It should be noted that the relatively high moisture content was likely a result of the decomposed rock encountered in this stratum (i.e. the material may hold a significant amount of moisture, but it did not visually appear wet). While in the field, the native soils generally appeared to be moist. Fines content testing on samples obtained within this stratum ranged from 60 to 98 percent passing the #200 sieve. Based on the excavator digging effort and supplementary drive probe testing, we consider this native silt stratum to be very stiff to hard. The silt stratum extended to the terminal depths of our explorations at depths ranging from 5 to 9.5 feet bgs. It should be noted that all of our test pits terminated due to practical digging refusal on hard soil/decomposed rock, except for TP-5 and TP-8 which were terminated due to practical excavator reach.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The exploration logs included in the Appendices should be reviewed for specific information at specific locations. These records include soil descriptions, stratifications, and locations of the samples. The stratifications shown on the logs represent the conditions only at the actual exploration locations. Variations may occur and should be expected between locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual. The fill extent at each exploration location was estimated based on an examination of the soil samples, the presence of foreign materials, field measurements, and the subsurface data. The explorations performed are not adequate to accurately identify the full extent of existing fill soil across the site. Consequently, the actual fill soil extent may be much greater than that shown on the exploration logs and discussed herein. The samples that were not altered by laboratory testing will be retained for at least 90 days from the date of this report and then will be discarded.

2.4 Groundwater Information

Groundwater was not observed during out subsurface investigation. According to a historical well log (available from http://apps.wrd.state. or.us/apps/gw/well_log/) drilled approximately 700 feet north of the property, static groundwater was encountered 325 feet below the ground surface.

Although a static groundwater level was not encountered at the time of our subsurface investigation, it is possible for a perched groundwater level to be present within the depths explored at some future time depending upon climatic and rainfall conditions. In general, we do not expect that groundwater will influence the proposed construction.

2.5 Seismic Design Parameters and Hazards

In accordance with ASCE 7-16, we recommend a Site Class C (very dense soil and soft rock profile) for this site when considering the average of the upper 100 feet of bearing material beneath the foundations. This recommendation is based on the results of our subsurface investigation as well as our understanding of the local geology.

Inputting our recommended Site Class as well as the site latitude and longitude into the Seismic Design Maps (SEAOC/OSHPD) website (http://seismicmaps.org), we obtained the seismic design parameters shown in Table 1 below.

Table 1: Seismic Design Parameter Recommendations (ASCE 7-16)

Parameter	Recommendation
Site Class	C
S_s	0.512g
S_1	0.235g
F_a	1.295
F_v	1.500
S_{MS} (=S_s x F_a)	0.663g
S_{M1} (=S_1 x F_v)	0.353g
S_{DS} (=2/3 x S_s x F_a)	0.442g
Design PGA (=S_{DS}/2.5)	0.177g
MCE_G PGA	0.228g
F_{PGA}	1.200
PGA_M (=MCE_G PGA x F_{PGA})	0.273g

Note: Site latitude = 45.736933, longitude = -121.488038

The return interval for these ground motions is 2 percent probability of exceedance in 50 years.

As stated above, the property is not mapped within a liquefaction hazard zone; which coincides with the findings of our subsurface investigation. Because we do not consider the soils to be liquefiable (and because there are not any significant slopes on the property), there is not a risk of seismically induced lateral spreading.

With respect to slope stability, we do not consider the subject property to be oversteepened and at risk of sliding given the subject property slopes are generally not steeper than 2H:1V (except for a portion of the proposed access road). The slopes steeper than 2H:1V along the access road should be regraded to be 2H:1V to avoid the risk of shallow soil movement.

3.0 EVALUATION AND FOUNDATION RECOMMENDATIONS

3.1 Geotechnical Discussion

The following geotechnical factors may influence the proposed construction:

1. **Presence of possible fill/tilled soils** – As stated above, we encountered rootlets in the upper soils at all of our test pits to depths ranging from 2 to 4 feet bgs. It is possible these organic soils are the result of agricultural tilling or clearing the area in the past. The presence of such materials could result in excess settlements and unsatisfactory foundation performance. As such, for structures (i.e. buildings, pavement, retaining walls, etc.) we recommend overexcavating the fill/tilled soils down to the hard native soils encountered at depths of 2 to 4 feet bgs (i.e. any new foundations for the proposed subdivision penetrate through the compressible soils to bear on the sandy silt soils).

2. **Moisture sensitive soils** – The fine-grained portion of the soils encountered at the site are expected to be moisture sensitive. The increase in moisture content during periods of wet weather can cause significant reduction in the soil strength and support capabilities and will also be slow to dry. As such, water should not be allowed to collect in foundation excavations or on prepared subgrades, and care should be taken when operating construction equipment on the exposed subgrade. While not required, we recommend consideration be given to performing construction in the dry summer months to reduce the risk of damaging the site soils with the construction equipment. See more detailed recommendations for drainage in Section 4.1.

3. **Practical digging refusal encountered** – In our subsurface investigation, all of the test pits terminated with practical excavation refusal on hard soil/decomposed rock (except for TP-5 and TP-8 which were terminated due to practical excavator reach). The depth to practical excavation refusal ranged from 4 to 9.5 feet in our explorations. Excavations through this stratum may be difficult and require specialized equipment.

4. **Lack of detailed design drawings** – We have not been provided with a detailed design drawing set for the proposed construction. Once the drawings for the project are complete, we should review those drawings to determine if the design complies with our recommendations or if our recommendations need to be modified.

In summary, provided the recommendations in this report are adhered to, we do not foresee any major issues that would preclude the proposed construction. The above-mentioned factors are listed to draw the attention of the reader to the issues to address during design and construction of the proposed development.

3.2 General Site Preparation

Prior to the start of any earthwork, the test pit locations performed for our subsurface investigation, that fall under or adjacent to structurally improved areas, should be located, excavated to their bottoms, and backfilled with well-graded granular structural fill in properly compacted lifts, under the observation of a representative of the Geotechnical Engineer.

We envision that the topsoil, vegetation, roots, soft soils, and any other deleterious soils will need to be stripped from beneath the proposed building areas and proposed roadways. Topsoil in our test pits ranged from about 6 to 12 inches thick. In addition, as stated above, beneath new structures we recommend overexcavating the fill/tilled soils encountered across the property to depths ranging from 2 feet to 4 feet. It should be expected that the depth of these materials may vary across the site. A representative of the Geotechnical Engineer should determine the depth of removal at the time of construction.

After stripping and excavating to the proposed subgrade level, as required, the building areas and roadways should be inspected by a representative of the Geotechnical Engineer and proofrolled with a fully loaded, tandem axle, rubber tire dump truck or water truck. Soils that are observed to rut or deflect excessively under the moving load, or are otherwise judged to be unsuitable, should be undercut and replaced with properly compacted fill. If the subgrade cannot be accessed with a dump truck, then the subgrade will need to be visually evaluated by a representative of the Geotechnical Engineer by soil probing.

Any utilities present beneath the proposed construction will need to be located and rerouted as necessary and any abandoned pipes or utility conduits should be removed to inhibit the potential for subsurface erosion. Utility trench excavations should be backfilled with properly compacted structural fill as discussed in Section 3.3 below.

3.3 Structural Fill

Structural fill should be free of organics or other deleterious materials, have a maximum particle size less than 3 inches, be relatively well graded, and have a liquid limit less than 45 and plasticity index less than 25. In our professional opinion the onsite native soils are likely not appropriate for use as structural fill due to their variable, fine grained, moisture sensitive nature. As such, it may be more practical to import granular, well graded, crushed rock gravel structural fill. We recommend all structural fill be moisture conditioned to within 3 percentage points below and 2 percentage points above optimum moisture as determined by ASTM D1557 (Modified Proctor). If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.

Fill should be placed in relatively uniform horizontal lifts on the prepared subgrade which has been stripped of deleterious materials and approved by the Geotechnical Engineer or their representative. If loose soils exist on the prepared subgrades, they should be re-compacted. Each loose lift should be about 1-foot thick. The type of compaction equipment used will ultimately

determine the maximum lift thickness. Structural fill should be compacted to at least 92 percent of the maximum dry density as determined by ASTM D1557. Each lift of compacted engineered fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts.

Any structural fill placed on slopes at or greater than 5H:1V should be properly benched. Level benches excavated into the existing slope should be a minimum of 4 feet wide laterally, and should be cut into the slope for no more than every five feet of vertical rise. The placement of fill should begin at the base of the fill. All benches should be inspected by a representative of the Geotechnical Engineer and approved prior to placement of structural fill lifts. If evidence of seepage is observed in the bench excavations, a supplemental drainage system may need to be designed and installed to prevent hydrostatic pressure buildup behind the fill. Final fill and/or cut slopes should be kept at or below a slope of 2H:1V. The fill should extend horizontally outward beyond the exterior perimeter of the building and pavements at least 5 feet and 3 feet respectively, prior to sloping.

To reiterate, each lift of compacted engineered fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts.

3.4 Foundation Recommendations

Once the site has been properly prepared as discussed above, the proposed residences can be supported on a conventional shallow foundation system. Spread footings for building columns and continuous footings for bearing walls can be designed for an allowable soil bearing pressure of up to 2,000 psf for foundations bearing on the very stiff to hard native soils first encountered in our test pits at depths of about 2 to 4 feet bgs, or on properly compacted, granular structural fill overlying the native soils. The above allowable soil bearing pressure can be increased by one-third when including short-term wind or seismic loads. Minimum footing dimensions should be in compliance with the 2018 IRC.

Lateral frictional resistance between the base of footings and the subgrade can be expressed as the applied vertical load multiplied by a coefficient of friction of 0.30 for concrete foundations bearing directly on the very stiff to hard native soils or structural fill. In addition, lateral loads may be resisted by passive earth pressures based on an equivalent fluid pressure of 300 pounds per cubic foot (pcf) for footings poured “neat” against the above-mentioned soil. These are ultimate values—we recommend a factor of safety of 1.5 be applied to the equivalent fluid pressure, which is appropriate due to the amount of movement required to develop full passive resistance. To be clear, no safety factor has been applied to the friction factor recommended above either.

Exterior footings and foundations in unheated areas should be located at a depth of at least 18 inches below the final exterior grade to provide adequate frost protection. If the residences are to be constructed during the winter months or if the foundation soils will likely be subjected to freezing temperatures after foundation construction, then the foundation soils should be

adequately protected from freezing. Otherwise, interior foundations can be located at nominal depths compatible with architectural and structural considerations.

The foundation excavations should be observed by a representative of the Geotechnical Engineer prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Unsuitable soil zones encountered at the bottom of the foundation excavations should be removed and replaced with properly compacted structural fill as directed by the Geotechnical Engineer.

After opening, foundation excavations should be observed and concrete placed as quickly as possible to avoid exposure of the excavation to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, the foundation concrete should be placed during the same day the excavation is made. If the soils will be exposed for more than 2 days or for any length of time during precipitation events, consideration should be given to placing a thin layer of rock atop the exposed subgrade to protect it from the elements.

Based on the known subsurface conditions we anticipate that properly designed and constructed foundations could experience maximum total and differential settlements on the order of 1-inch and 1/2-inch, respectively.

We recommend that the perimeter foundations include footing drains on the exterior of the buildings. The footing drains typically consist of a 3 or 4 inch diameter perforated drain pipe placed in a trench excavated next to the base of the footing and surrounded on the sides and above by drain rock. To increase the drain pipe life, we recommend it be sleeved with a sock (i.e. filter fabric). Footing drains do a have a useful life and eventually need to be replaced—because they can get silted up. Footing drains should be discharged to an approved outlet point and should not be connected directly to crawl space drains or storm drains, unless there is a backflow preventer installed to prevent the different drain lines from backing up into each other.

3.5 Floor Slab Recommendations

For the purposes of this report, we have assumed that maximum floor slab loads will not exceed 150 psf. Based on the existing soil conditions, the design of slabs-on-grade can be based on a subgrade modulus (k) of 150 pci. This subgrade modulus value represents an anticipated value which would be obtained in a standard in-situ plate test with a 1-foot square plate.

It is our professional opinion that the floor slabs can be grade supported on a minimum of 6 inches of properly compacted well-graded granular structural fill placed on the very stiff to hard native soils first encountered in our test pits at depths of about 2 to 4 feet bgs. The structural fill should be placed as outlined in Section 3.3 above. The floor slabs should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage.

Where feasible, the slab area native subgrade should be proof-rolled with a heavily loaded tandem axel dump truck, or similar rubber-tired vehicle, to identify as "soft" spots prior to the placement of any structural fill. Soils that are observed to rut or deflect excessively under the moving load, or are otherwise judged to be unsuitable, should be undercut and replaced with properly compacted structural fill. In the case that the subgrade area is not accessible to a large rubber-tired vehicle, the Geotechnical Engineer's representative may need to approve the slab subgrade using a steel probe rod.

The 6-inch thick well graded granular structural fill should provide a capillary break to limit migration of moisture through the slab. If additional protection against moisture vapor is desired, a vapor retarding membrane may also be incorporated into the design. Factors such as cost, special considerations for construction, and the floor covering suggest that decisions on the use of vapor retarding membranes be made by the project design team, the contractor, and the owner.

3.6 Retaining Wall Recommendations

While we are not aware of any specific retaining walls for the project, we are providing these general recommendations for preliminary planning purposes. Once more detailed plans are known about retaining walls, we should be provided the drawings so that we can update our recommendations if necessary. For the purposes of this report, we have assumed that no walls will be greater than 10 feet tall.

Retaining wall footings should be designed in accordance with the recommendations contained in Section 3.4 above. Lateral earth pressures on walls, which are not restrained at the top, may be calculated on the basis of an "active" equivalent fluid pressure of 35 pcf for level backfill, and 60 pcf for sloping backfill with a maximum 2H:1V slope. Lateral earth pressures on walls that are restrained from yielding at the top (i.e. stem walls) may be calculated on the basis of an "at-rest" equivalent fluid pressure of 55 pcf for level backfill, and 90 pcf for sloping backfill with a maximum 2H:1V slope. The stated equivalent fluid pressures do not include surcharge loads, such as foundation, vehicle, equipment, etc., adjacent to walls, hydrostatic pressure buildup, or earthquake loading. Surcharge loads on walls should be calculated based on the attached formulas shown in Appendix E.

We recommend that retaining walls be designed for an earth pressure determined using the Mononobe-Okabe method to mitigate future seismic forces. Our calculations were based on one-half of the Design Peak Ground Acceleration (PGA) value of 0.177g, which was obtained from Table 1 above. We have assumed that the retained soil/rock will have a minimum friction angle of 29 degrees and a total unit weight of about 115 pounds per cubic foot. For seismic loading on retaining walls with level backfill, new research indicates that the seismic load is to be applied at 1/3 H of the wall instead of 2/3 H, where H is the height of the wall[5]. We recommend that a Mononobe-Okabe earthquake thrust per linear foot of 4.7 psf * H^2 be applied at 1/3 H, where H is the height of the wall measured in feet. Note that the recommended earthquake thrust value is appropriate for slopes

[5] Lew, M., et al (2010). "Seismic Earth Pressures on Depp Building Basements," SEAOC 2010 Convention Proceedings, Indian Wells, CA.

behind the retaining wall of up to 10 degrees. For a maximum 2H:1V slope, we recommend 16 psf * H^2. This assumes a granular backfill retained by the walls.

All backfill for retaining walls should be select granular material, such as sand or crushed rock with a maximum particle size between ¾ and 1 ½ inches, having less than 5 percent material passing the No. 200 sieve. Because of their fines content, the native soils do not meet this requirement, and it will be necessary to import material to the project for wall backfill. Non-expansive soils can be used for the last 18 to 24 inches of backfill, thus acting as a seal to the granular backfill. All backfill behind retaining walls should be moisture conditioned to within ± 2 percent of optimum moisture content, and compacted to a minimum of 90 percent of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). This recommendation applies to all backfill located within a horizontal distance equal to 75 percent of the wall height, but should be no less than 4 feet.

An adequate subsurface drain system will need to be designed and installed behind retaining walls to prevent hydrostatic buildup. A waterproofing system should be designed for any basement walls where moisture intrusion is not desirable.

3.7 Pavement Section Thickness Recommendations

After the site has been stripped and prepared in accordance with Section 3.2 of this report (i.e. the fill is overexcavated), the pavement subgrade should be proofrolled with a fully loaded dual axle dump truck. Areas found to be soft or yielding under the weight of a dump truck should be overexcavated as recommended by the Geotechnical Engineer's representative and replaced with additional crushed rock gravel fill.

The pavement section thickness recommendations presented below in Tables 2 and 3 are considered typical and minimum for the assumed parameters. In order to achieve the assumed 20-year design life, pavement does need regular maintenance to protect the underlying subgrade from being damaged. The primary concern is subgrade water saturation which can cause it to weaken. Proper site drainage should be maintained to protect pavement areas. In addition, cracks that develop in the pavement should be sealed on a regular basis.

Using the AASHTO method of flexible pavement design, the following design parameters have been assumed:

- An assumed California Bearing Ratio (CBR) value of 20 for the very stiff to hard native soils.
- A pavement life of 20 years.
- A terminal serviceability (Pt) of 2 (i.e. poor pavement condition).
- A regional factor (R) of 3.0.
- Assumed total car trips of:
  - 10 cars per day for car parking (which equates to 2.2 daily equivalent single axle loads, ESALs)

- 60 cars per day for drive lanes (which equates to 13.4 daily equivalent single axle loads, ESALs)

The project Civil Engineer should review our assumptions to confirm they are appropriate for the anticipated traffic loading. See Tables 2 and 3 below for recommended pavement section thicknesses based on the above assumptions.

Table 2: Asphaltic Concrete - Recommended Minimum Thicknesses (inches)

Pavement Materials	Parking Areas	Drive Lanes
Asphaltic Concrete	2.5 inches	3 inches
Crushed Aggregate Base Course (less than 5% fines)	6 inches	6 inches

Table 3: Portland Cement Concrete - Recommended Minimum Thicknesses (inches)

Pavement Materials	Parking Areas	Drive Lanes
Portland Cement Concrete	6 inches	6 inches
Crushed Aggregate Base Course (less than 5% fines)	6 inches	6 inches

Asphaltic concrete materials should be compacted to at least 91 percent of the material's theoretical maximum density as determined in general accordance with ASTM D2041 (Rice Specific Gravity). The crushed aggregate base course should consist of well-graded crushed stone with a maximum particle size no greater than 2 inches. Aggregate base course materials should be free of organics or other deleterious materials, be relatively clean (i.e. less than 5 percent soil passing the U.S. #200 sieve), well graded, and have a liquid limit less than 45 and plasticity index less than 25. The base course should be moisture conditioned to within 2 percent of optimum and compacted to a minimum of 95 percent of ASTM D1557 as outlined in Section 3.3 of this report. When placed, the lift base course thickness should generally not exceed 12 inches prior to compacting. The type of compaction equipment used will ultimately determine the maximum lift thickness. In addition, we recommend that the structural fill be placed within +/- 2 percent of the optimum moisture for that material.

4.0 CONSTRUCTION CONSIDERATIONS

EEI should be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. EEI cannot accept any responsibility for any conditions that deviate from those described in this report, nor for the performance of the foundations if not engaged to also provide construction observation for this project.

4.1 Moisture Sensitive Soils/Weather Related Concerns

The soils encountered at this site are expected to be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

4.2 Drainage and Groundwater Considerations

Water should not be allowed to collect in the foundation excavations or on prepared subgrades for the floor sections during construction. Positive site drainage should be maintained throughout construction activities. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. If groundwater is encountered, a system of sumps and pumps may be required to keep footing excavations drained until the footing is placed to prevent softening of the subgrade soils.

A site grading plan should be developed to provide rapid drainage of surface water permanently away from the building areas and to inhibit infiltration of surface water around the perimeter of the building and beneath slabs. The grades should be sloped away from the building areas. Roof runoff should be piped (tightlined) away from the subdivision residences and commercial buildings. As discussed in Section 3.4, we recommend the foundations include footing drains on the exterior of the homes.

4.3 Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its “Construction Standards for Excavations, 29 CFR, part 1926, Subpart P”. This document and subsequent updates were issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavations or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our

understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. EEI does not assume responsibility for construction site safety or the contractor's compliance with local, state, and federal safety or other regulations.

5.0 REPORT LIMITATIONS

As is standard practice in the geotechnical industry, the conclusions contained in our report are considered preliminary because they are based on assumptions made about the soil, rock, and groundwater conditions exposed at the site during our subsurface investigation. A more complete extent of the actual subsurface conditions can only be identified when they are exposed during construction. Therefore, EEI should be retained as your consultant during construction to observe the actual conditions and to provide our final conclusions. If a different geotechnical consultant is retained to perform geotechnical inspection during construction, then they should be relied upon to provide final design conclusions and recommendations and should assume the role of geotechnical engineer of record, as is the typical procedure required by the governing jurisdiction.

The geotechnical recommendations presented in this report are based on the available project information, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform EEI in writing so that we may amend the recommendations presented in this report, if appropriate, and if desired by the client. EEI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

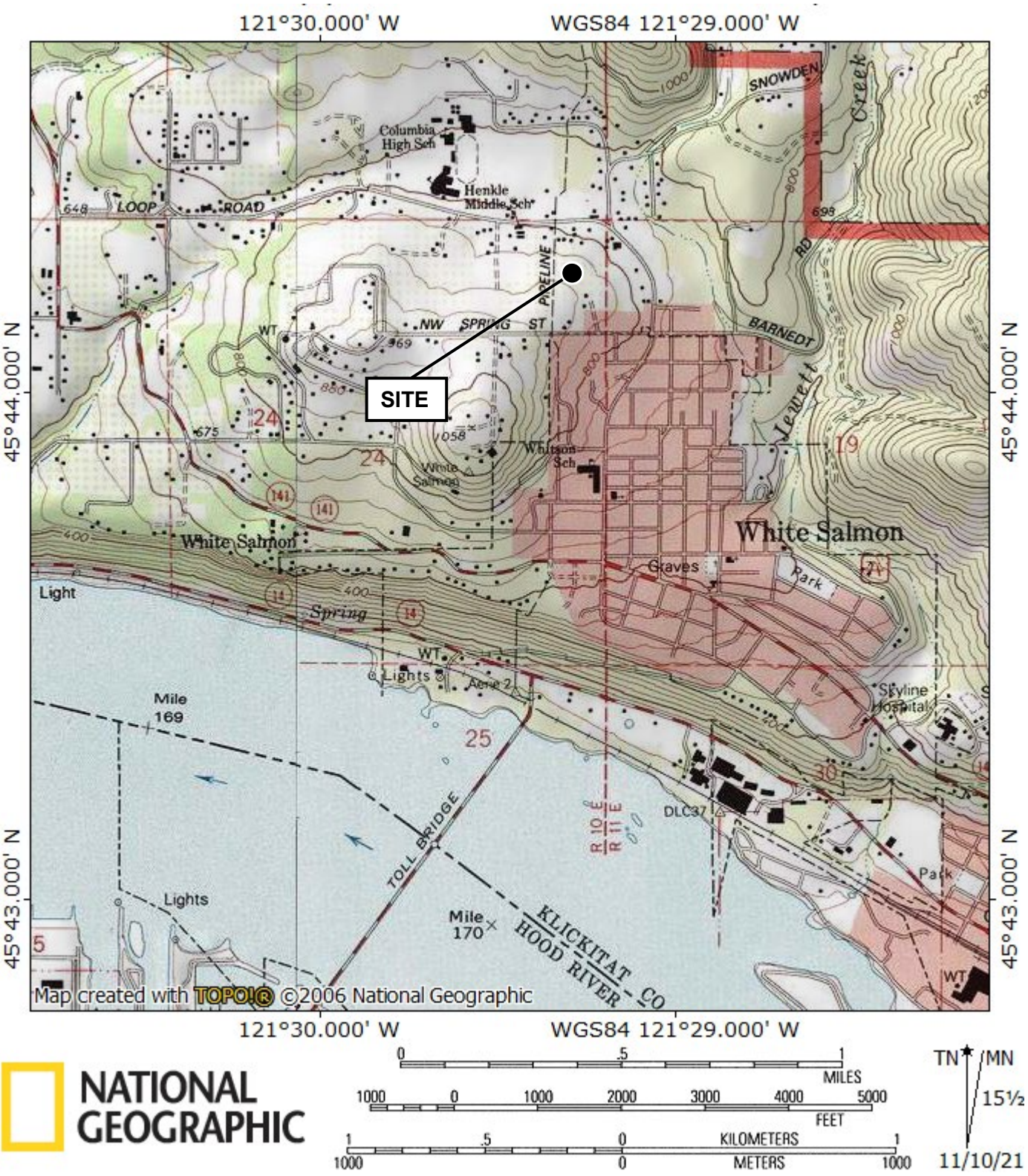
Once construction plans are finalized and a grading plan has been prepared, EEI should be retained to review those plans, and modify our existing recommendations related to the proposed construction, if determined to be necessary.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of our client, Legacy Development Group for the proposed Spring Street Subdivision located on Klickitat County Tax Lot No. 0310247500400 off of Spring Street near the intersection with Northwest Cherry Hill Road in White Salmon, Klickitat County, Washington. EEI does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by EEI.

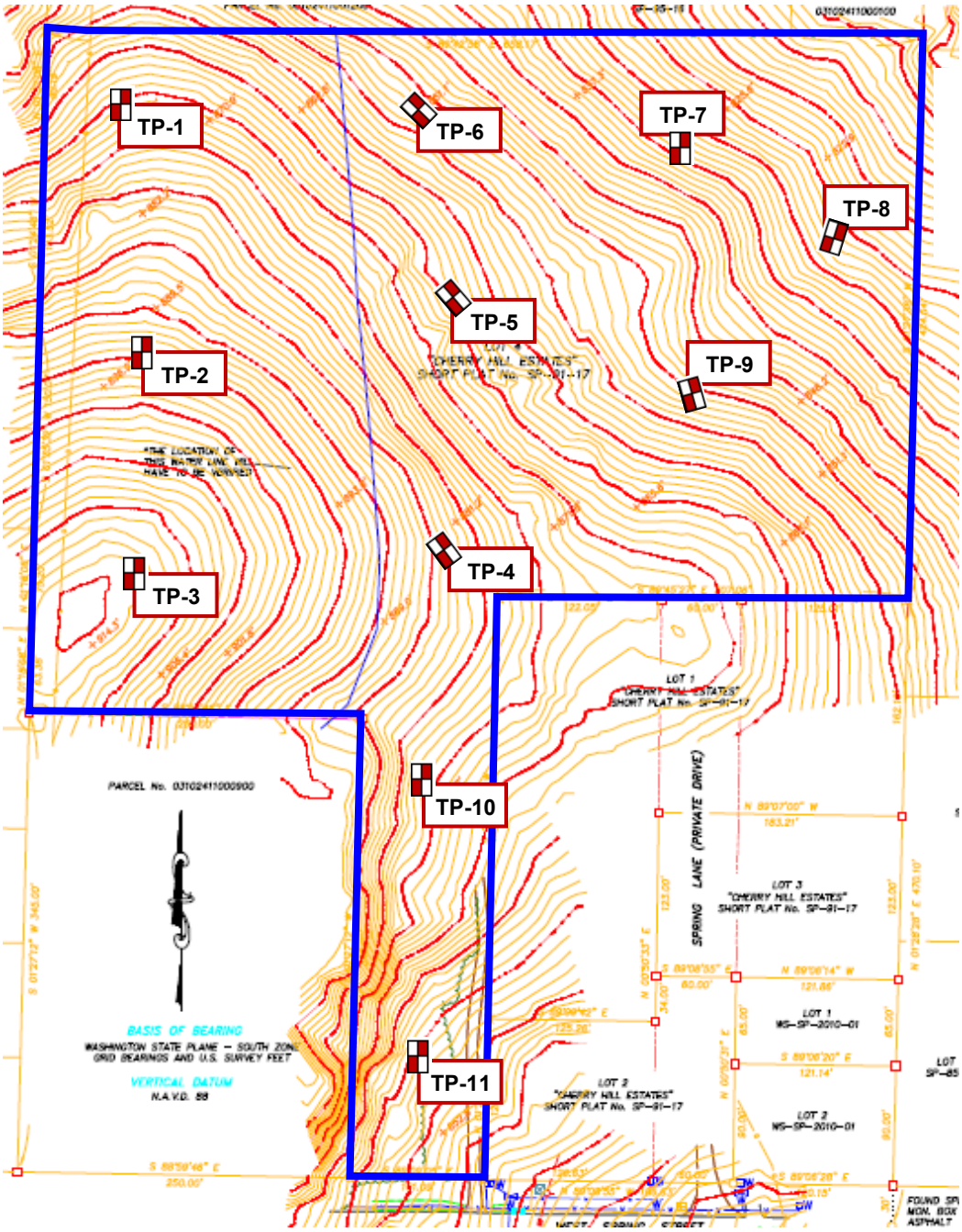
APPENDICES

APPENDIX A – SITE LOCATION PLAN



Earth Engineers, Inc.	**Proposed Spring Street Subdivision Klickitat County Tax Lot No. 0310247500400 Intersection of Northwest Spring Street and Northwest Cherry Hill Road White Salmon, Klickitat County, Washington**	**Report No. 21-071-1** **November 15, 2021**

APPENDIX B – SITE EXPLORATION PLAN



= Approximate Test Pit Location

Base plan source: "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Earth Engineers, Inc.	**Proposed Spring Street Subdivision Klickitat County Tax Lot No. 0310247500400 Intersection of Northwest Spring Street and Northwest Cherry Hill Road White Salmon, Klickitat County, Washington**	**Report No. 21-071-1** **November 15, 2021**

Appendix C: Test Pit TP-1

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 875
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (8-inches thick)		Mod.							
1			Fill - brown silt with few to little sand, rootlets, wood chips and charcoal pieces, dry, medium stiff to very stiff	GRAB 1			2.5	9	89			possible tilled soils
2			Silt (ML) - brown to reddish brown sandy silt with decomposed rock fragments (black to red) and few gravel, moist, very stiff to hard	GRAB 2				36	60			
3					Hard		4.5+					scraping on hard soil
4												
5												
6			dark brown to red to orange to gray decomposed basalt encountered	GRAB 3				28	98			practical digging refusal on hard soil/decomposed rock
7												
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 6 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-2

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 895
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (10-inches thick)		Easy							
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry, medium stiff to very stiff									possible tilled soils
2			Silt (ML) - orange-brown to reddish brown sandy silt with decomposed rock fragments (black to red), moist, very stiff to hard	GRAB 1	Mod.		4.5+	50				
3												
4				GRAB 2				24				
5												
6			dark brown to red to orange to gray decomposed basalt encountered	GRAB 3	Hard			36				
7												practical digging refusal on hard soil/decomposed rock
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 8 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-3

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 914
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (12-inches thick)		Mod.							
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry, medium stiff to very stiff	GRAB 1				10				possible tilled soils
2												
3												
4			Silt (ML) - brown silt with few sand and gravel, decomposed rock fragments (black to red), moist, very stiff to hard	GRAB 2	Hard			15	94			
5			dark brown to red to orange to white decomposed basalt encountered	GRAB 3				15				
6				GRAB 4				19	95			
7												practical digging refusal on hard soil/decomposed rock
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 7 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-4

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 884
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (6-inches thick)		Easy							
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry, medium stiff to very stiff		Mod.							possible tilled soils
2												
3			Silt (ML) - reddish brown sandy silt with decomposed rock fragments (black to red), moist, very stiff to hard									
4				GRAB 1	Hard			41				
5												
6				GRAB 2				43				
7				GRAB 3				44				practical digging refusal on consolidated soil
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 8 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-5

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 870
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (6-inches thick)		Easy	5						
1			Fill - brown sandy silt with rootlets, wood chips and charcoal pieces, dry, medium stiff to hard			5, 12						possible tilled soils
2						10, 12						
3					Mod.	16, 39						
4						32, 47						
5			Silt (ML) - reddish brown sandy silt with decomposed rock fragments (black to red), moist, hard	GRAB 1		50		39				drive probe refusal at 5-inches
6												
7					Hard							
8				GRAB 2				44				
9												practical refusal due to excavator reach
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe terminated at a depth of approximately 5 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-6

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 857
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (6-inches thick)		Easy							
1			Fill - brown silty sand with rootlets, wood chips and broken rock pieces, dry, medium dense to very dense									possible tilled soils
2												
3					Mod.							
4			boulder encountered	GRAB 1				12	39			practical digging refusal on boulder
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 4 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-7

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 840
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (8-inches thick)		Easy							
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry, medium stiff to very stiff white plastic debris encountered (abandoned pipe)									possible tilled soils
2												
3			Silt (ML) - orange-brown to reddish brown sandy silt with decomposed rock fragments (black to red), moist, very stiff to hard		Mod.							
4				GRAB 1				41				
5					Hard							practical digging refusal on hard soil/decomposed rock
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 6 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-8

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 833
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (10-inches thick)		Easy	6, 5						
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry, medium stiff to very stiff	GRAB 1		11, 16, 18, 21, 24, 29		12				possible tilled soils
4			Silt (ML) - light brown to brown silt with few sand, decomposed rock fragments (black to red), moist, very stiff to hard	GRAB 2	Mod. / Hard	50		24	91			drive probe refusal at 2-inches
9			weathered rock fragments encountered	GRAB 3				24				practical refusal due to excavator reach

Notes: Test pit terminated at a depth of approximately 9.5 feet bgs. Drive probe terminated at a depth of approximately 4.5 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-9

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 859
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (8-inches thick)		Easy							
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry to moist, medium stiff to very stiff									possible tilled soils
2												
3					Mod.							
4			Silt (ML) - brown to dark brown silt with few sand, decomposed rock fragments (black to red), moist, very stiff to hard	GRAB 1				44				
5				GRAB 2	Hard			44				practical digging refusal on hard soil/decomposed rock
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 5.5 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-10

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 876
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (6-inches thick)		Easy	7						
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry to moist, medium stiff to hard metal debris and wood debris encountered			6 7 22						possible tilled soils
2			4-inch thick tree root encountered			49						
3						43 49 50						drive probe refusal at 3-inches
4			Silt (ML) - gray-brown to dark brown silt with few to little sand and gravel, decomposed rock fragments (black to red), moist, hard		Mod.							
5				GRAB 1				29	90			
6					Hard							
7												
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 7 feet bgs. Drive probe terminated at a depth of approximately 4 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

Appendix C: Test Pit TP-11

Earth Engineers, Inc.

Client: Legacy Development Group
Project: Proposed Spring Street Subdivision
Site Address: Tax Lot No. 0310247500400
White Salmon, Klickitat County, Washington
Location of Exploration: See Appendix B
Logged By: Jacqui Boyer

Report Number: 21-071-1
Excavation Contractor: Legacy Development Group
Excavation Method: Excavator with 2 foot toothed bucket
Excavation Equipment: Takeuchi TB240
Approximate Ground Surface Elevation (ft msl): 860
Date of Exploration: October 15, 2021

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches (0 20 40 60)	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Remarks
0			Topsoil - light brown sandy silt with rootlets, dry to moist (8-inches thick)		Easy							
1			Fill - light brown sandy silt with rootlets, wood chips and charcoal pieces, dry to moist, medium stiff to very stiff	GRAB 1	Mod.			9				possible tilled soils
2												
3												
4			Silt (ML) - red to brown sandy silt with decomposed rock fragments (black to red), dry to moist, very stiff to hard	GRAB 2	Hard			8	81			practical digging refusal on hard soil/decomposed rock
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

Notes: Test pit terminated at a depth of approximately 5 feet bgs. Groundwater was not encountered at the time of the exploration. Test pit loosely backfilled with excavated soil on 10/15/2021. Approximate elevation interpolated from survey titled "Property Boundary Survey for Curtis Homes" prepared by Terra Surveying, dated December 2020.

APPENDIX D: SOIL CLASSIFICATION LEGEND

APPARENT CONSISTENCY OF COHESIVE SOILS (PECK, HANSON & THORNBURN 1974, AASHTO 1988)				
Descriptor	**SPT N_{60} (blows/foot)***	**Pocket Penetrometer, Qp (tsf)**	**Torvane (tsf)**	**Field Approximation**
Very Soft	< 2	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	2 – 4	0.25 – 0.50	0.12 – 0.25	Easily penetrated several inches by thumb
Medium Stiff	5 – 8	0.50 – 1.0	0.25 – 0.50	Penetrated several inches by thumb w/moderate effort
Stiff	9 – 15	1.0 – 2.0	0.50 – 1.0	Readily indented by thumbnail
Very Stiff	16 – 30	2.0 – 4.0	1.0 – 2.0	Indented by thumb but penetrated only with great effort
Hard	> 30	> 4.0	> 2.0	Indented by thumbnail with difficulty

* Using SPT N_{60} is considered a crude approximation for cohesive soils.

APPARENT DENSITY OF COHESIONLESS SOILS (AASHTO 1988)	
Descriptor	**SPT N_{60} Value (blows/foot)**
Very Loose	0 – 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	> 50

MOISTURE (ASTM D2488-06)	
Descriptor	**Criteria**
Dry	Absence of moisture, dusty, dry to the touch, well below optimum moisture content (per ASTM D698 or D1557)
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table, well above optimum moisture content (per ASTM D698 or D1557)

PERCENT OR PROPORTION OF SOILS (ASTM D2488-06)	
Descriptor	**Criteria**
Trace	Particles are present but estimated < 5%
Few	5 – 10%
Little	15 – 25%
Some	30 – 45%
Mostly	50 – 100%
Percentages are estimated to nearest 5% in the field. Use "about" unless percentages are based on laboratory testing.	

SOIL PARTICLE SIZE (ASTM D2488-06)	
Descriptor	**Size**
Boulder	> 12 inches
Cobble	3 to 12 inches
Gravel - Coarse Fine	¾ inch to 3 inches No. 4 sieve to ¾ inch
Sand - Coarse Medium Fine	No. 10 to No. 4 sieve (4.75mm) No. 40 to No. 10 sieve (2mm) No. 200 to No. 40 sieve (.425mm)
Silt and Clay ("fines")	Passing No. 200 sieve (0.075mm)

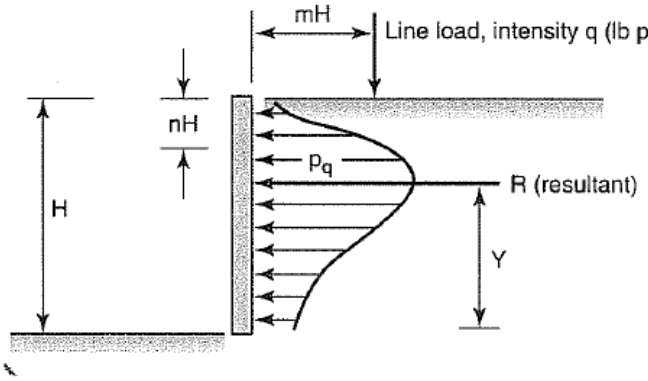
UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)				
Major Division			**Group Symbol**	**Description**
Coarse Grained Soils (more than 50% retained on #200 sieve)	**Gravel** (50% or more retained on No. 4 sieve)	Clean Gravel	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with fines	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	Sand (> 50% passing No. 4 sieve)	Clean sand	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly-graded sands and gravelly sands, little or no fines
		Sand with fines	SM	Silty sands and sand-silt mixtures
			SC	Clayey sands and sand-clay mixtures
Fine Grained Soils (50% or more passing #200 sieve)	**Silt and Clay** (liquid limit < 50)		ML	Inorganic silts, rock flour and clayey silts
			CL	Inorganic clays of low-medium plasticity, gravelly, sandy & lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silt and Clay (liquid limit > 50)		MH	Inorganic silts and clayey silts
			CH	Inorganic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Earth Engineers, Inc.

GRAPHIC SYMBOL LEGEND		
GRAB		Grab sample
SPT		Standard Penetration Test (2" OD), ASTM D1586
ST		Shelby Tube, ASTM D1587 (pushed)
DM		Dames and Moore ring sampler (3.25" OD and 140-pound hammer)
CORE		Rock coring

APPENDIX E: SURCHARGE-INDUCED LATERAL EARTH PRESSURES FOR WALL DESIGN

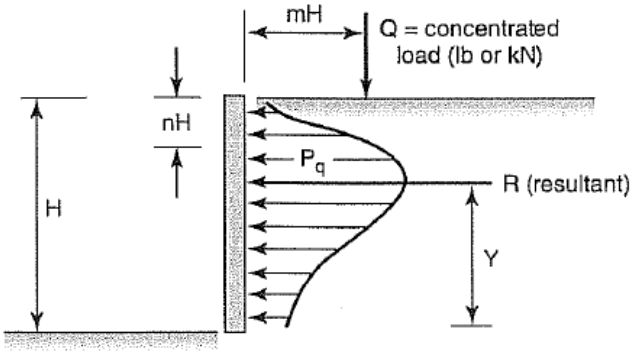
LINE LOAD (applicable for retaining walls not exceeding 20 feet in height):



m	R	Y
0.2	0.55q	0.60 H
0.4	0.55q	0.58 H
0.6	$\frac{0.64q}{m^2+1}$	0.52 H

Figure 16-28 Pressure distribution against vertical wall resulting from line load of intensity *q*.

CONCENTRATED POINT LOAD (applicable for retaining walls not exceeding 20 feet in height):



m	R	Y
0.2	$0.78\frac{Q}{H}$	0.59 H
0.4	$0.78\frac{Q}{H}$	0.59 H
0.6	$0.48\frac{Q}{H}$	0.48 H

Figure 16-27 Pressure distribution against vertical wall resulting from point load, *Q*.

AREAL LOAD:

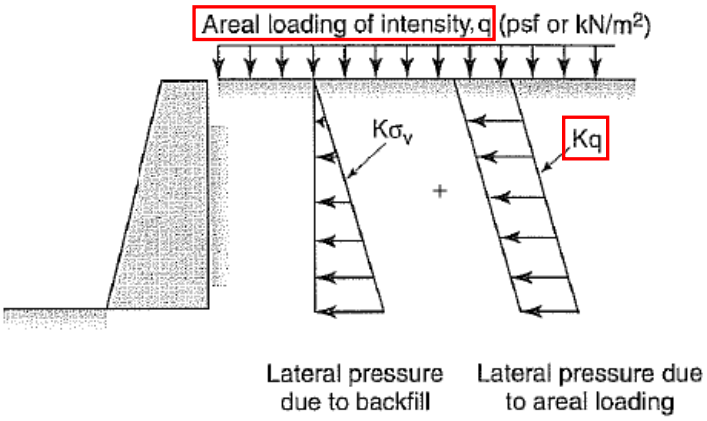
Figure 16-26 Influence of areal loading on wall pressures.

use K=0.4 for active condition (i.e. top of wall allowed to deflect laterally)

use K=0.9 for at-rest condition (i.e. top of wall not allowed to deflect laterally)

Resultant, R = K * q * H

Where H = wall height (feet)



Source of Figures: McCarthy, D.F., 1998, "Essentials of Soil Mechanics and foundations, Basic Geotechnics, Fifth Edition."