NOTICE OF LAND USE DECISION

You may have received this because you are an adjacent property owner, and this notice is required to be provided pursuant to ORS 215.416. The proposal is identified in this decision and will be located on the subject property.

Coos County Planning
60 E. Second St.
Coquille, OR 97423
http://www.co.coos.or.us/
Phone: 541-396-7770
Fax: 541-396-1022

This decision notice is required to be sent to the property owner(s), applicant(s), adjacent property owners (distance of notice is determined by zone area – Urban 100 feet, Rural 250 feet, and Resource 750 feet), special taxing districts, agencies with interest, or person that has requested notice. Please read all information carefully as this decision. (See attached vicinity map for the location of the subject property).

Date of Notice:	**Wednesday, May 03, 2023**
File No(s):	ACU-23-020
Proposal:	Request for a land use authorization for a Single-Family Dwelling within the Natural Hazard-Liquefaction overlay
Property Owner(s):	Robert Eck
Staff Planner:	Crystal Orr, Associate Planner

Decision: **Approved with Conditions.** All decisions are based on the record. This decision is final and effective at close of the appeal period unless a complete application with the fee is submitted by the Planning Department at 5 p.m. on **Thursday, May 18, 2023**. Appeals are based on the applicable land use criteria found in the Coos County Zoning and Land Development Ordinance (CCZLDO) General Compliance with *Sections 1.1.300 Compliance with Comprehensive Plan and Ordinance Provisions and 6.1.125 Lawfully Created Lots or Parcels.* Single Family Manufactured Dwelling is subject to CCZLDO Use Table in *Section 4.3.200(25) Dwelling- Manufactured Single Family subject to a Compliance Determination (CD) subject to (27)(f), as well as Section 4.3.225 General Siting Standards & 4.3.230 Additional Siting Standards (1) Urban Residential. Natural Hazard Liquefaction is subject to CCZLDO Section 4.11.132 Natural Hazards.* **Civil matters including property disputes outside of the criteria listed in this notice will not be considered. For more information, please contact the staff planner listed in this notice.**

Property Information

File Number:	ACU-23-020
Applicant:	Robert Eck
Account Number:	733108
Map Number:	27S1336A0-01100
Property Owner:	ECK FAMILY REVOCABLE LIVING TRUST ECK, ROBERT J & JOHNSON, ROBYN R CO TTEE 110 W 17TH ST COQUILLE, OR 97423-1003
Situs Address:	110 W 17TH ST COQUILLE, OR 97423
Acreage:	1.03 Acres
Zoning:	URBAN RESIDENTIAL-2 (UR-2)
Special Considerations:	COQUILLE URBAN GROWTH BOUNDARY (CGB) FLOODPLAIN (FP)

Notice shall be posted from May 3, 2023 until 5:00 PM May 18, 2023

NATURAL HAZARD - EARTHQUAKE - LIQUEFACTION (NHEQL)
WET MEADOW WETLAND (WM)

The purpose of this notice is to inform you about the proposal and decision, where you may receive more information, and the requirements if you wish to appeal the decision by the Director to the Coos County Hearings Body. Any person who is adversely affected or aggrieved or who is entitled to written notice may appeal the decision by filing a written appeal in the manner and within the time period as provided below pursuant to Coos County Zoning and Land Development Ordinance (CCZLDO) Article 5.8. If you are mailing any documents to the Coos County Planning Department the address is 250 N. Baxter, Coquille OR 97423. Mailing of this notice to you precludes an appeal directly to the Land Use Board of Appeals.

Mailed notices to owners of real property required by ORS 215 shall be deemed given to those owners named in an affidavit of mailing executed by the person designated by the governing body of a county to mail the notices. The failure of the governing body of a county to cause a notice to be mailed to an owner of a lot or parcel of property created or that has changed ownership since the last complete tax assessment roll was prepared shall not invalidate an ordinance. **NOTICE TO MORTGAGEE, LIENHOLDER, VENDOR OR SELLER: ORS CHAPTER 215 (ORS 215.513) REQUIRES THAT IF YOU RECEIVE THIS NOTICE, IT MUST PROMPTLY BE FORWARDED TO THE PURCHASER.**

Staff tries to post all applications on the website at the following link:
https://www.co.coos.or.us/community-dev/page/planning-department

The application and all documents and evidence contained in the record, including the staff report and the applicable criteria, are available for inspection, at no cost, in the Planning Department located at 225 North Adams Street, Coquille, Oregon. Copies may be purchased at a cost of 50 cents per page. If you would like to view the record in this matter, please make an appointment. The decision is based on the application submittal and information on record. The name of the Coos County Planning Department representative to contact is Crystal Orr, Associate Planner and the telephone number where more information can be obtained is **(541) 396-7770**.

Failure of an issue to be raised in a hearing, in person or in writing, or failure to provide statements of evidence sufficient to afford the Approval Authority an opportunity to respond to the issue precludes raising the issue in an appeal to the Land Use Board of Appeals.

Reviewed by: Crystal Orr Digitally signed by Crystal Orr Date: 2023.05.02 14:02:52 -07'00' **Date: Wednesday, May 03, 2023**
Crystal Orr, Associate Planner

This decision is authorized by the Coos County Planning Director, Jill Rolfe based on the staff's analysis of the Findings of Fact, Conclusions, Conditions of approval, Application and all evidence associated as listed in the exhibits.

EXHIBITS
Exhibit A: Conditions of Approval
Exhibit B: Vicinity Map
The following exhibits are on file at the Coos County Planning Department and may be accessed by contacting the department. All noticeable decisions are posted on the website for viewing when possible.
Exhibit C: Staff Report -Findings of Fact and Conclusions
Exhibit D: Geological Report

EXHIBIT "A"

The applicant shall comply with the following conditions of approval with the understanding that all costs associated with complying with the conditions are the responsibility of the applicant(s) and that the applicant(s) are not acting as an agent of the county. If the applicant fails to comply or maintain compliance with the conditions of approval the permit may be revoked as allowed by the Coos County Zoning and Land Development Ordinance. Please read the following conditions of approval and if you have any questions contact planning staff.

CONDITIONS OF APPROVAL

1. All applicable federal, state, and local permits shall be obtained prior to the commencement of any development activity. If there were comments from any other agency were provided as part of this review, it is the responsibility of the property owner to comply.
2. Pursuant to CCZLDO § 5.9.100, a Zoning Compliance Letter shall be required prior to the commencement of construction of the proposed dwelling. This authorization is based on conditions of approval and the conditions that are required to be completed prior obtaining the ZCL are defined in this section. Pursuant to CCZLDO § 4.6.110, § 4.6.130 and § 4.6.140. To show compliance with this section the applicant shall submit a letter with the following items to request that staff find the following conditions have been satisfied:
    a. The property owner is responsible for ensuring compliance, and land use authorization shall remain recorded in the chain of title. The statement needs to include language that the purchaser of the property has been provided a copy of the land use approval containing all conditions or restrictions understands the obligation and agrees to fulfill the conditions unless a modification is approved as provided in this ordinance. The property owner is responsible for ensuring compliance, and land use authorization. The recorded deed convent shall be recorded with the County Clerk and copy provided to the Planning Department.
    b. The landowner(s) shall submit, and sign, a hazard disclosure statement that addresses the following:
        i. The property is subject to potential natural hazards and that development thereon is subject to risk of damage from such hazards;
        ii. The property owner has commissioned an engineering geologic report for the subject property, a copy of which is on file with Coos County Planning Department, and that the property owner has reviewed the engineering geologic report and has thus been informed and is aware of the type and extent of hazards present and the risks associated with development on the subject property;
        iii. The property owner accepts and assumes all risks of damage from natural hazards associated with the development of the subject property.
    c. A certification of compliance: Permitted development shall comply with the recommendations in the required engineering geologic report. Certification of compliance shall be provided to the director by the applicant as follows:
        i. Plan Review Compliance: Building, construction or other development plans shall be accompanied by a written statement from a certified engineering geologist stating that the plans comply with the recommendations contained in the engineering geologic report for the approved Geological Assessment Review.
        ii. Inspection Compliance: Upon the completion of any development activity for which the engineering geologic report recommends an inspection or observation by a certified engineering geologist, the applicant shall provide to the director a written statement from the certified engineering geologist indicating that the development activity has been completed in accordance with the applicable engineering geologic report recommendations.

iii. Final Compliance: Upon completion of development requiring an engineering geologic report, the applicant shall submit to the director:
    1. A written statement by a certified engineering geologist indicating that all performance, mitigation, and monitoring measures specified in the report have been satisfied; and,
    2. If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer.

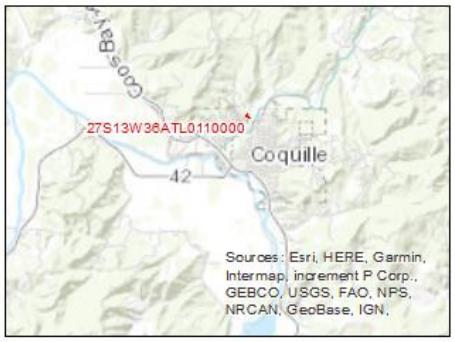
d. The applicant shall, prior to the issuance of a zoning compliance letter, record on the title to the subject property a notification that includes a description of the measures or improvements and that also specifies the obligation of the property owners to refrain from interfering with such measures or improvements and to maintain them.

e. Section 5.2.700 Development Transferability - Unless otherwise provided in the approval, a land use approval that was obtained through a conditional use process shall be transferable provided the transferor files a statement with the Planning Director signed by the transferee. This document shall be recorded in the chain of title of the property, indicating that the transferee has been provided a copy of the land use approval containing all conditions or restrictions understands the obligation and agrees to fulfill the conditions, unless a modification is approved as provided in this ordinance. The property owner is responsible for ensuring compliance, and land use authorization shall remain recorded in the chain of title to alert a purchaser that development was approved subject to conditions and possible restrictions.

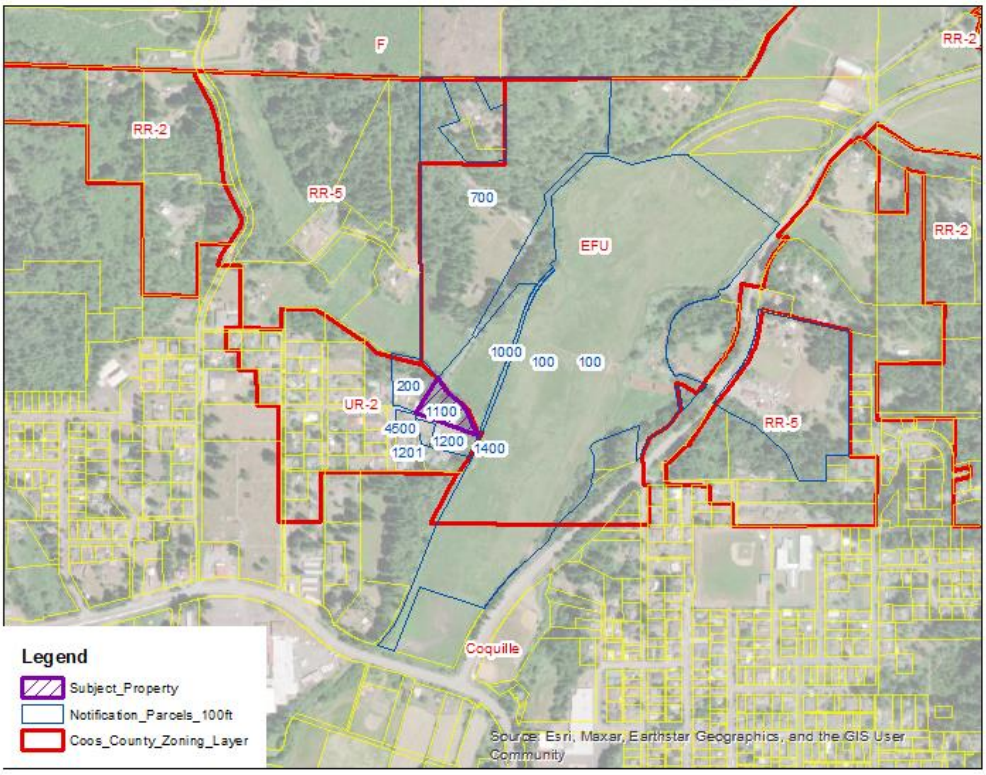
EXHIBIT "B"
VICINITY MAP & PLOT PLAN

COOS COUNTY PLANNING DEPARTMENT

Mailing Address: 225 N. Adams, Coquille, Oregon 97423
Physical Address: 60 E. Second, Coquille Oregon
Phone: (541) 396-7770
TDD (800) 735-2900



File:	ACU-23-020
Owner:	Robert Eck
Date:	May 2, 2023
Location:	Township 27S Range 13W Section 36ATL 1100
Proposal:	Administrative Conditional Use



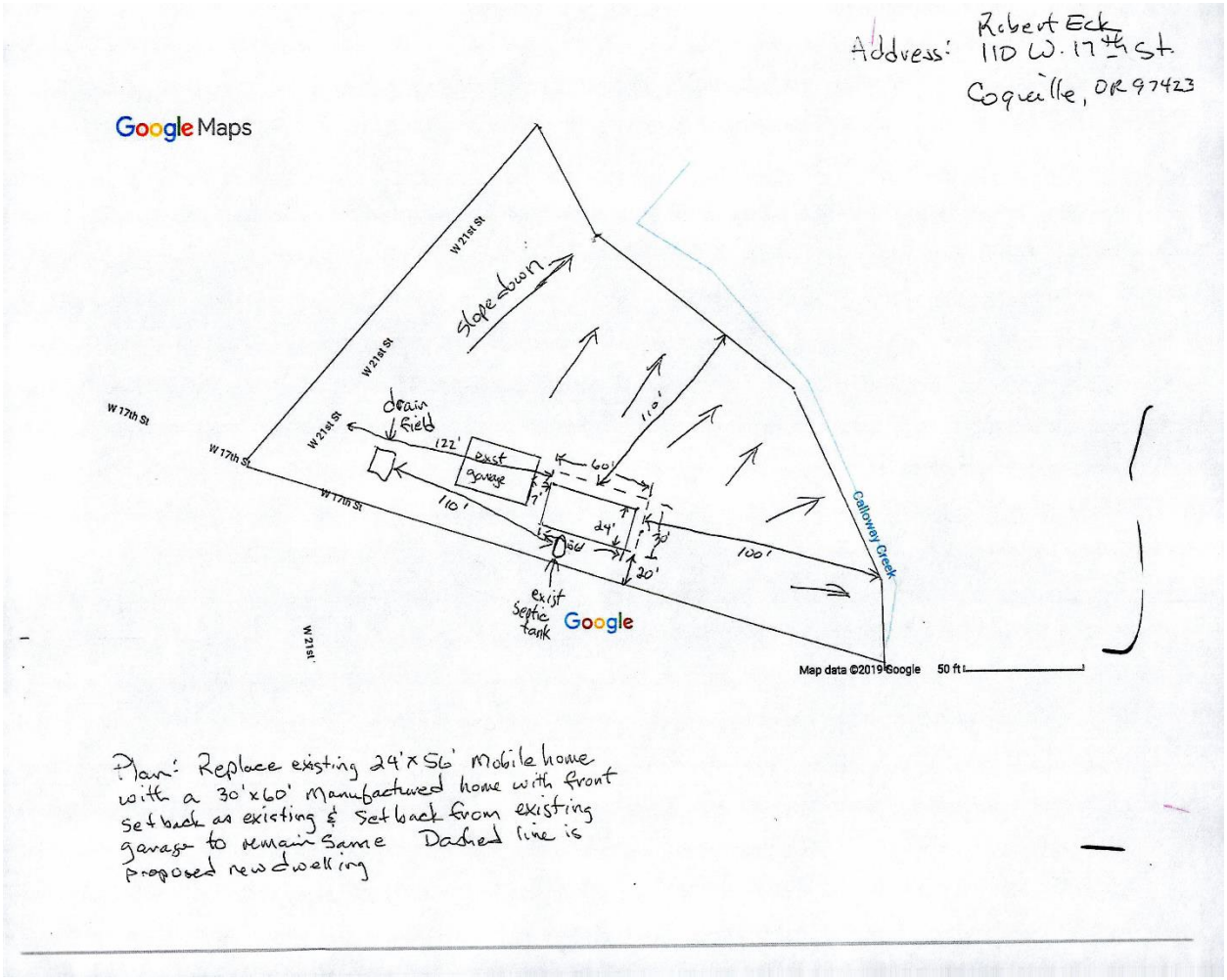
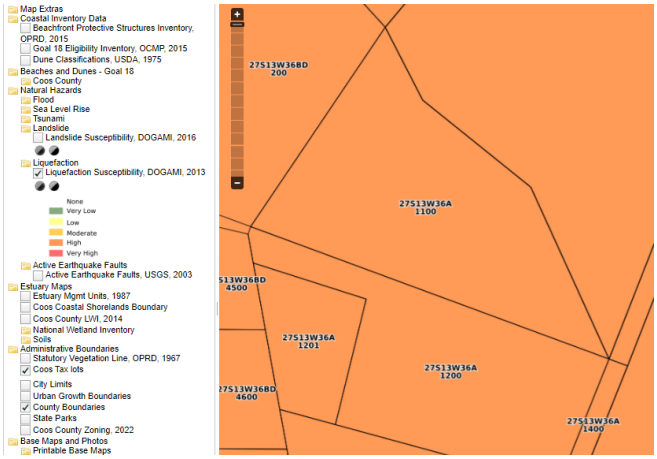

Address: Robert Eck
110 W. 17th St
Coquille, OR 97423
Google Maps
W 21st St
W 17th St
slope down
drain field
exist garage
122'
110'
60'
24'
30'
20'
100'
Galloway Creek
exist septic tank
Google
Map data ©2019 Google
50 ft
Plan: Replace existing 24'x56' mobile home with a 30'x60' manufactured home with front setback as existing & setback from existing garage to remain same Dashed line is proposed new dwelling

EXHIBIT "C"
STAFF REPORT
FINDINGS OF FACT AND CONCLUSIONS

I. PROPOSAL AND BACKGROUND/PROPERTY HISTORY INFORMATION AND PRIOR COMPLIANCE:

A. PROPOSAL: Request for Planning Director Approval to site a replacement dwelling within the Urban Residential-2 zone. This parcel is within the special considerations Natural Hazards High Liquefaction inventoried area as provided by Coos County Zoning and Land Development Ordinance CCZLDO § 4.11.132 which requires a Geologic Assessment Report as described in Article 5.11.



B. BACKGROUND/PROPERTY HISTORY: This property has an existing Manufactured Dwelling that was sited in 1973, which is prior to the Coos County Zoning and Land Use Ordinance and an Accessory Structure that was sited with planning approval in 1995 through a Zoning Compliance Letter (ZCL-95-350). A Single-Family Manufactured Dwelling is permitted within this zone but due to the fact that the site is located within the Natural Hazards Special Development area a conditional use is required. On August 24, 2018 a Conditional Use (ACU-18-019) was approved to allow the dwelling to be replaced within the High Liquefaction Natural Hazard. The development was not implemented within the allowed timeframe, the property owners are now ready to place a dwelling and submitted this application.

C. LOCATION: The subject property is located north of the city of Coquille within the Urban Growth Boundary and addressed as 110 W 17th St.

D. ZONING: This property is zoned Urban Residential-2 (UR-2).

ARTICLE 4.2 – ZONING PURPOSE AND INTENT
SECTION 4.2.100 RESIDENTIAL
Urban Residential (UR)
There are three Urban Residential (UR) zoning districts: Urban Residential-1 (UR-1); Urban Residential-2 (UR-2); and Urban Residential – Multi Family (UR-M). The intent of the Urban Residential Districts is to include conventional, urban density housing (single family/multi-family) plus cluster housing and planned unit developments.

The purpose of the "UR-1" district is to provide for urban residential areas that are exclusively limited to conventional single-family dwellings. Detached conventional single-family dwellings clustered in planned unit developments are consistent with the objectives of the "UR-1" district.
This district shall only be used within Urban Growth Boundaries and Urban Unincorporated Community boundaries.

The purpose of the "UR-2" district is to provide for urban residential areas that are designed to accommodate single family dwellings, mobile homes and two-family dwellings. Clustered planned unit developments, including multi-family dwellings, are consistent with the objectives of the "UR-2" district. The "UR-2" district shall only be used within Urban Growth Boundaries and Urban Unincorporated Community boundaries.

The purpose of the "UR-M" district is to provide for high density urban residential areas necessary to accommodate opportunities for the construction of multiple-family dwellings, primarily necessary to meet the needs of low- and moderate-income families. The "UR-M" district shall only be used within Urban Growth Boundaries and Urban Unincorporated Community boundaries.

E. SITE DESCRIPTION AND SURROUNDING USES: This property is located off of W 17th Street just outside the city limits of Coquille which is in an area that is residentially developed. The parcels in all directions except for north and east are like size parcels with single family dwellings. The parcels to the north and east appear to be larger parcels being used for farm uses. The property is a larger urban zoned property and is sloped to the northeast. There is some flood plain on the lower portion of the property but no development is planned to be located in that area.

F. COMMENTS: There have not been any comments received for this review as the date of the release of this report.

II. GENERAL PROPERTY COMPLIANCE:

A. COMPLIANCE PURSUANT TO SECTION 1.1.300:

It shall be unlawful for any person, firm, or corporation to cause, develop, permit, erect, construct, alter or use any building, structure or parcel of land contrary to the provisions of the district in which it is located. No permit for construction or alteration of any structure shall be issued unless the plans, specifications, and intended use of any structure or land conform in all respects with the provisions of this Ordinance, unless approval has been granted by the Hearings Body.

FINDING: Staff has reviewed the property history and the county finds at the time of this report; the property is complaint with the Coos County Zoning and Land Development Ordinance. This does not mean that there is not additional information that was unavailable during this review that would make the properties non-complaint.

B. SECTION 6.1.125 LAWFULLY CREATED LOTS OR PARCELS:

"Lawfully established unit of land" means:

1. The unit of land was created:

a. Through an approved or pre-ordinance plat;

b. Through a prior land use decision including a final decision from a higher court. A higher court includes the Land Use Board of Appeals;

c. In compliance with all applicable planning, zoning and subdivision or partition ordinances and regulations at the time it was created.

d. By a public dedicated road that was held in fee simple creating an interviewing ownership prior to January 1, 1986;

e. By deed or land sales contract, if there were no applicable planning, zoning or subdivision or partition ordinances or regulations that prohibited the creation.

f. By the claim of intervening state or federal ownership of navigable streams, meandered lakes or tidewaters. "Navigable-for-title" or "title-navigable" means that ownership of the waterway, including its bed, was passed from the federal government to the state at statehood. If a waterway is navigable-for-title, then it also is generally open to public use for navigation, commerce, recreation, and fisheries.

FINDING: The unit of land was created pursuant to Section 6.1.125.1.b through a previously approved land use decision (ACU-18-019).

III. STAFF FINDINGS AND CONCLUSIONS:

IV. APPROVAL CRITERIA & FINDINGS OF FACT

Staff addressed the special considerations natural hazard Liquefaction. The criteria is listed below and then the findings.

- ***SECTION 4.11.132 NATURAL HAZARDS (BALANCE OF COUNTY POLICY 5.11)***
  Coos County has inventoried the following hazards:
    - *Flood Hazard*
      - *Riverine flooding*
      - *Coastal flooding*
    - *Landslides and Earthquakes*

- *Landslide Susceptibility*
- *Liquefaction potential*

- *Tsunamis*
- *Erosion*
  - *Riverine streambank erosion*
  - *Coastal*
    - *Shoreline and headlands*
    - *Wind*
- *Wildfire*

Purpose Statements:
Coos County shall regulate development in known areas potentially subject to natural disasters and hazards, so as to minimize possible risks to life and property. Coos County considers natural disasters and hazards to include river and coastal flooding, landslides, liquefaction potential due to earthquakes, fault lines, tsunamis, river bank erosion, coastal erosion along shorelines and headlands, coastal erosion due to wind, and wildfires, including those areas affected by gorse.

This strategy shall be implemented by enacting special protective measures through zoning and other implementing devices, designed to minimize risks to life and property associated with new development and substantial improvements. The determination of whether a property is located in one of the above referenced potentially hazardous areas shall be made by the reviewing body (Planning Director, Planning Commission, Board of Commissioners, or any designee based upon adopted inventory mapping). A specific site may not include the characteristics for which it is mapped. In these circumstances staff shall apply § 4.11.132.ii.2m.

a. *Flooding: Coos County shall promote protection of valued property from risks associated with river and coastal flooding along waterways in the County through the establishment of a floodplain overlay zone (/FP) that conforms to the requirements for participation in the National Flood Insurance Program. See Sections 4.11.211-257 for the requirements of this overlay zone. See Sections 4.11.211-257 for the requirements of this overlay zone.*

FINDING: This parcel has floodplain as an overlay, the proposed development is not located within this overlay. Therefore, Staff finds the criteria is not applicable.

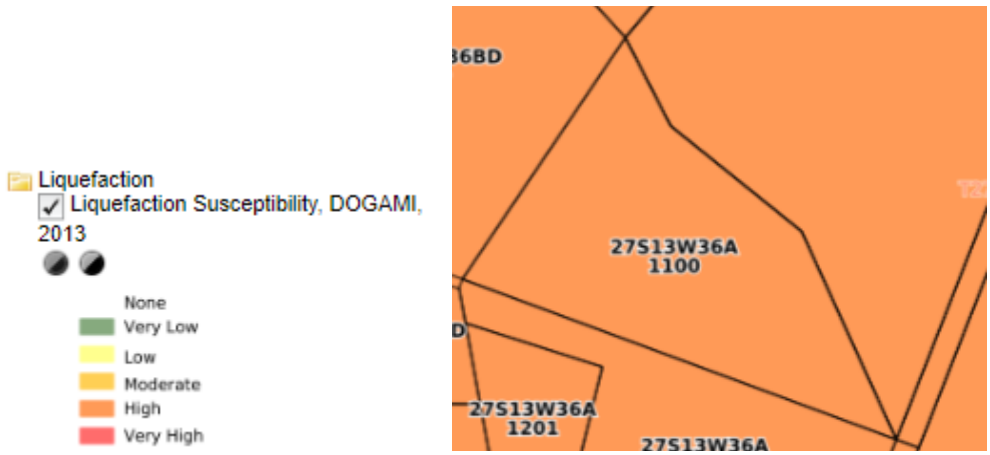
b. *Landslides and Earthquakes*

Landslides: Coos County shall promote protection to life and property in areas potentially subject to landslides. New development or substantial improvements proposed in such areas shall be subject to geologic assessment review in accordance with section 4.11.150. Potential landslide areas subject to geologic assessment review shall include all lands partially or completely within "very high" landslide susceptibility areas as mapped in DOGAMI Open File Report O-16-02, "Landslide susceptibility map of Oregon."

Earthquakes: Coos County shall promote protection of life and property in areas potentially subject to earthquake hazards. New development or substantial improvements in mapped areas identified as potentially subject to earthquake induced liquefaction shall be subject to a geologic assessment review as set out in this section. Such areas shall include lands subject to "very high" and "high" liquefaction identified in DOGAMI Open File Report O-13-06, "Ground motion, ground deformation, tsunami inundation, co-seismic subsidence, and damage potential maps for the 2012 Oregon Resilience Plan for Cascadia Subduction Zone Earthquakes."

Coos County shall continue to support Oregon State Building Codes to enforce any structural requirements related to landslide and earthquakes. Staff will notify Oregon State Building Codes by providing a copy of the geologic assessment report with the Zoning Compliance Letter.

FINDING: The proposed development is within the High Earthquake Liquefaction Overlay Zone as shown on the map (tax lot 1100). Therefore, a report to address the hazard was required.



4.11.150 Geological Hazards special development Review Standards

Applications for a geologic hazard review may be made concurrently with any other type of application required for the proposed use or activity. A review of the property must be conducted prior to any ground disturbance. All geologic hazard assessment reports shall include a description of the qualification of the licensed professional or professionals that prepared the assessment.

The applicant shall present a geologic hazard assessment report (geologic assessment) prepared by a qualified licensed professional competent in the practice of geosciences, at the applicant's expense, that identifies site specific geologic hazards, associated levels of risk, and the suitability of the site for the use and/or activity in view of such hazards. The geologic assessment shall include the required elements of this section and one of the following:

a. *A statement that the use and/or activity can be accomplished without measures to mitigate or control the risk of geologic hazard to the subject property resulting from the proposed use and/or activity;*
b. *A statement that there is an elevated risk posed to the subject property by geologic hazards that requires mitigation measures in order for the use and/or activity to be undertaken safely sited on the property; or*
c. *A certification that there are no high or very high geological hazards present on site. If such is certified by a licensed professional then an Administrative Conditional Use application is not required. Coos County is not liable for any type of certification that a geological hazard is not present on site.*

FINDING: The applicant submitted a geologic hazard assessment report written by Eric Oberbeck. Mr. Oberbeck (#1332) stamped, and signed, this report as an Oregon Certified Engineering Geologist. The report is dated March 14, 2018, with an addendum dated February 18, 2023 verifying that the findings and recommendations are still applicable.

Based on Mr. Overbeck report, the applicable criteria are Section 4.11.150(b) of the ordinance: *b. A statement that there is an elevated risk posed to the subject property by geologic hazards that requires mitigation measures in order for the use and/or activity to be undertaken safely sited on the property.*

4.11.155 Geological Assessment review

Geologic Assessment Review: The applicant(s) shall complete the following review to determine compliance with this section. This type of review requires a conditional use application and shall follow the administrative procedures for conditional uses found in Article 5 of the CCZLDO.

1. *Except for activities identified in Subsection 2 of this section, as exempt, any new development or substantial improvement in an area subject to the provisions of this section shall require a Geologic Assessment Review.*

2. *The following development activities are exempt from the requirement for a Geologic Assessment Review:*
    a. *Maintenance, repair, or alterations to existing structures that do not alter the building footprint or foundation and do not constitute substantial improvement as defined in Chapter II.*
    b. *An excavation and/or fill which is less than two feet in depth, or which involves less than twenty-five cubic yards of volume;*
    c. *Exploratory excavations under the direction of a certified engineering geologist or registered geotechnical engineer;*
    d. *Construction of structures for which a building permit is not required;*
    e. *Yard area vegetation maintenance and other vegetation removal on slopes less than 25%;*
    f. *Forest operations subject to regulation under ORS 527 (the Oregon Forest Practices Act);*
    g. *Maintenance and reconstruction of public and private roads, streets, parking lots,*

driveways, and utility lines, provided the work does not extend outside of the previously disturbed area;

h. *Maintenance and repair of utility lines, and the installation of individual utility service connections;*
i. *Emergency response activities intended to reduce or eliminate an immediate danger to life, property, or flood or fire hazard;*
j. *Construction/erection of beachfront protective structures subject to regulation by the Oregon Parks and Recreation Department under OAR 736, Division 20; and*
k. *Any development or activity to be conducted on a site for which a certified engineering geologist has determined that there are no high or very high geologic hazards present. Coos County is not liable for any type of certification that a geologic hazard is not present on site.*

3. *Application, review and appeals for a Geologic Assessment Review shall be in accordance with the requirements for administrative conditional use review as set forth in Article 5.2. Applications for a Geologic Assessment Review may be made prior to or concurrently with any other type of application required for the proposed use or activity. Geologic Assessment Review shall be completed prior to any ground disturbance.*

4. *All applications for Geologic Assessment Review shall be accompanied by an engineering geologic report prepared by a certified engineering geologist at the applicant's expense.*

A. *<u>ENGINEERING GEOLOGIC REPORTS</u>*

1. *Engineering geologic reports required pursuant to this section shall be prepared by a certified engineering geologist licensed in the State of Oregon. Such reports shall be prepared consistent with standard geologic practices and employing generally accepted scientific and engineering principles. The content of such reports shall be generally consistent with the applicable provisions of "Guideline for Preparing Engineering Geologic Reports," 2nd Edition, 5/30/2014, published by the Oregon Board of Geologist Examiners.*

2. *Properties abutting the ocean shore that are located in a mapped regulated hazard area shall include the following additional information:*
    a. *Site description:*
        i. *The geological history and stabilization measures of the site including any previous riprap or dune grading, erosion events, or exposed trees on the beach.*
        ii. *Topography, including elevations and slopes on the property itself.*
        iii. *Vegetation cover.*
        iv. *Subsurface materials – the nature of the rocks and soils.*
        v. *Conditions of the seaward front of the property, particularly for sites having a sea cliff.*
        vi. *Description of streams or other drainage that might influence erosion or locally reduce the level of the beach.*
        vii. *If the site is located on or adjacent to a estuarine water body or Coastal Lake including the Coastal Shoreland Boundary the following additional information shall be included:*
            1. *Presence of drift logs or other flotsam on or within the property.*
            2. *Proximity of nearby headlands that might block the longshore movement of beach sediments, thereby affecting the level of the beach in front of the property.*

3. *Description of any shore protection structures that may exist on the property or on nearby properties.*
4. *Presence of pathways or stairs from the property to the beach.*
5. *Existing development including modification of soil or vegetation on the site, particularly any which might alter the resistance to wave attack.*
6. *Average widths of the beach during the summer and winter.*
7. *Median grain size of beach sediment.*
8. *Average beach slopes during the summer and winter.*
9. *Elevations above mean sea level of the beach at the seaward edge of the property during summer and winter.*
10. *Presence of rip currents and rip embayment that can locally reduce the elevation of the fronting beach.*
11. *Presence of rock outcrops and sea stacks, either offshore or within the beach zone.*
12. *Information regarding the depth of beach sand down to bedrock at the seaward edge of the property.*

b. *Analyses of Erosion and Flooding Potential on the site:*
   i. *Analysis of DOGAMI beach monitoring data for the site (if available,) all activities affecting shoreline erosion and possible mass wasting, including weathering processes, land sliding or slumping.*
   ii. *Calculation of wave run-up beyond mean water elevation that might result in erosion of the sea cliff or foredune (see Stockdon, 2006).*[1]
   iii. *Evaluation of frequency that erosion-inducing processes could occur, considering the most extreme potential conditions of unusually high water levels together with severe storm wave energy.*
   iv. *For areas subject to dune-backed shorelines, use an established geometric model to assess the potential distance of property erosion, and compare the results with direct evidence obtained during site visits, aerial photo analysis, or analysis of DOGAMI beach monitoring data.*
   v. *For bluff-backed shorelines, use a combination of published reports, such as DOGAMI bluff and dune hazard risk zone studies, aerial photo analysis, and fieldwork to assess the potential distance of property erosion.*
   vi. *Description of potential for sea level rise, estimated for local area by combining local tectonic subsidence or uplift with global rates of predicted sea level rise.*

c. *Determination of legal restrictions of shoreline protective structures (Goal 18 prohibition, local conditional use requirements, priority for non-structural erosion control methods).*

d. *Assessment of potential reactions to erosion events, addressing the need for future erosion control measures, building relocation, or building foundation and utility repairs.*

e. *The assessment should include recommendations:*
   i. *Use results from the above analyses to establish setbacks (beyond any minimums set by this section or the underlying zone), building techniques, or other*

[1] Stockdon, H. F., Holman, R. A., Howd, P. A. and Sallenger, A. H., 2006, Empirical parameterization of setup, swash, and runup: Coastal Engineering, 53, p 573-588.

mitigation measures to ensure an acceptable level of safety and compliance with all local requirements.

ii. *Recommend a foundation design, or designs, that render the proposed structures readily moveable.*

iii. *Recommend a plan for preservation of vegetation and existing grade within the setback area, if appropriate.*

iv. *Include consideration of a local variance process to reduce the building setback on the side of the property opposite the ocean, if this reduction helps to lessen the risk of erosion, bluff failure or other hazard.*

v. *Recommend methods to control and direct water drainage away from the ocean (e.g. to an approved storm water system); or, if not possible, to direct water in such a way so as to not cause erosion or visual impacts.*

3. *Engineering geologic reports required by this section shall include a statement from the preparer of the report that all of the applicable content requirements of this subsection have been addressed or are not applicable to the review.*

4. *Engineering geologic reports required by this section shall be valid for a period of five years from the date of preparation of such report. No extensions to this time line shall be granted.*

B. <u>DECISIONS ON GEOLOGICAL ASSESSMENT REVIEWS</u>

A decision on a Geologic Assessment Review shall be based on the following standards:

1. *The engineering geologic report shall meet the content standards set forth in within this Section.*
2. *In approving a Geologic Assessment Review, the decision maker may impose any conditions which are necessary to ensure compliance with the provisions of this section or with any other applicable provisions of the Coos County Zoning and Land Development Ordinance.*
3. *In the event the decision maker determines that additional review of the engineering geologic report by an appropriately licensed and/or certified professional is necessary to determine compliance with this section, Coos County may retain the services of such a professional for this purpose. The applicant shall be responsible for all costs associated with the additional review. The results of that evaluation shall be considered in making a decision on the Geologic Assessment Review.*

C. <u>DEVELOPMENT STANDARDS FOR USES SUBJECT TO GEOLOGIC ASSESSMENT REVIEW</u>

In addition to the conditions, requirements and limitations imposed by a required engineering geologic report, all uses subject to a geologic assessment review shall conform to the following requirements:

1. *Historical, Cultural, and Archaeological Resources: All activities and uses subject to Geologic Assessment Reviews proposed for areas of historical, cultural, or archaeologically sensitive areas, as identified on the Coos County Comprehensive Plan Map, shall require consultation with the appropriate local Tribe prior to the commencement of any and all ground disturbing activity. Proof of this consultation shall be provided as a part of application submission.*
2. *Hazard Disclosure Statement: All applications for new development or substantial improvements subject to Geologic Assessment Review shall provide a Hazard Disclosure Statement signed by the property owner that acknowledges:*
    a. *The property is subject to potential natural hazards and that development thereon is subject to risk of damage from such hazards;*
    b. *The property owner has commissioned an engineering geologic report for the subject property, a copy of which is on file with Coos County Planning Department, and that the property owner has reviewed the engineering geologic report and has thus been informed*

and is aware of the type and extent of hazards present and the risks associated with development on the subject property;

c. The property owner accepts and assumes all risks of damage from natural hazards associated with the development of the subject property.

3. *Mitigation measures: If on-site structural mitigation measures are required as a condition of approval, the applicant shall, prior to the issuance of a zoning compliance letter, record on the title to the subject property a notification that includes a description of the measures or improvements and that also specifies the obligation of the property owners to refrain from interfering with such measures or improvements and to maintain them.*
4. *Safest site requirement: All new structures shall be located within the area most suitable for development based on the least exposure to risk from hazards as determined by an engineering geologist as part of an engineering geologic report prepared in accordance with Section 4.11.150 through 4.11.155. Notwithstanding the provisions of the underlying zone, as necessary to comply with this requirement, any required yard or setback may be reduced by up to 50% without a variance.*
5. *Certification of compliance: Permitted development shall comply with the recommendations in the required engineering geologic report. Certification of compliance shall be provided to the director by the applicant as follows:*
    a. Plan Review Compliance: Building, construction or other development plans shall be accompanied by a written statement from a certified engineering geologist stating that the plans comply with the recommendations contained in the engineering geologic report for the approved Geological Assessment Review.
    b. Inspection Compliance: Upon the completion of any development activity for which the engineering geologic report recommends an inspection or observation by a certified engineering geologist, the applicant shall provide to the director a written statement from the certified engineering geologist indicating that the development activity has been completed in accordance with the applicable engineering geologic report recommendations.
    c. Final Compliance: Upon completion of development requiring an engineering geologic report, the applicant shall submit to the director:
        i. A written statement by a certified engineering geologist indicating that all performance, mitigation, and monitoring measures specified in the report have been satisfied; and,
        ii. If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer.

Finding: The application was received March 29, 2023 and deemed complete April 24, 2023. The applicant provided a report from Cascadia Geoservices, INC dated March 14, 2018, with an addendum dated February 18, 2023 certifying that the findings and recommendations provided for in the prior report are still applicable. The Geological Report is valid for five (5) years, which is the date the Conditional Use will expire (February 18, 2028). The report was developed after a site visit was performed. The property is located in the Natural Hazards Liquefaction area which means the soils are of some concern for development and special considerations need to be given to ensure the development will not adversely impact the subject property as well as immediate adjacent properties. The geological assessment provided by Cascadia Geoservices, INC addresses this hazard.

Staff was unable to locate the hazard disclosure statement as required by (C)(2). As a conditional

of approval, the landowner must sign and submit a hazard disclosure statement.

The assessment states that the property is located in an area that is highly influenced by regional seismicity due to its proximity to the Cascadia Subduction Zone. The report further states that the liquefaction potential was assessed based on the information obtained from borings and using the parameters suggested in the 2015 ODOT Geotechnical Design Manual. According to their analysis the site will experience a Peak Ground Acceleration during a design seismic event of 1.1 g. Based on the nature of the soils the engineers encountered in their hand augured borings and the indicated depth to groundwater, their opinion was that the soils at the site have a low liquefaction potential.

The engineer stated that the LIDAR technology they use to reveal topography indicated that the site is on a level area that is generally smooth and blocky which may be due to the orientation of bedding. The LIDAR indicated that there are no breaks in topography, re-routed drainages and no anomalous landforms indicative of recent slope movement on the subject property. The report further stated that based on a review of US Geological Survey Maps there are no geologically young faults in the area which will impact the site.

The report explained that the building site is a suitable site for the proposed dwelling provided that the applicant follows the recommendations for developing the site.

Staff did not find a timeline of inspections within the application or geological report. However, a conditional zoning compliance letter will be issued and a final one will not be received until the applicant submits a letter from the project engineer stating that all recommendations related to the dwelling have been satisfied.

Stripping of vegetation should be avoided, as it may lead to increased soil erodibility and less evaporation of soil moisture.

All work shall be conducted on the subject parcel to ensure adjacent properties are not affected. The report information supplied explains how to site the Dwelling while limiting future ground movement and foundation issues that may come up from wet soils and water runoff.

The geotechnical report was prepared by Eric Oberbeck, Registered Oregon Geologist (G1332) and Rick Thrall, Geotechnical Engineer (12,910). Both have provided professional qualifications and are employed by Cascadia Geoservices, INC.

With the suggestions made in the Geotechnical Report and by staff the Dwelling can be sited to meet the criteria.

The applicant will receive a Conditional Zoning Compliance Letter to allow permits from Department of Environmental Quality for septic and State Building Codes to be obtained. Once all of the development conditions have been satisfied then a final Zoning Compliance Letter will be issued. DEQ may require a permit for the discharge of storm water.

The applicant shall submit a written statement from a Certified Engineering Geologist that the building plans complied with all the recommendations of the geologic engineering report. The geologic engineering report recommended *"a representative from CGS be retained to observe general excavation, stripping, fill placement, footing subgrades, and subgrades and base rock for floor slabs*

and pavements". **The applicant shall to provide** *"Certification of compliance"* **to the director with a written statement from a certified engineering geologist indicating that the development activity has been completed in accordance with the applicable engineering geologic report recommendations. Upon completion of development requiring an engineering geologic report, the applicant shall submit to the director: i. A written statement by a certified engineering geologist indicating that all performance, mitigation, and monitoring measures specified in the report have been satisfied; and, ii. If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer.**

4.11.131 Significant Wildlife Habitat (Balance of County Policy 5.6)

- Wetlands
    - Wetlands – Lands with hydric[2] soils and wetland plants
    - Wet Meadows in current agricultural use
    - Cranberry Bogs
    - Farm Ponds, Mill Ponds and Other Man-Made Water Bodies
    - Wetlands Formerly in Agricultural use; Potential Reclamation

FINDING: This parcel has Wet Meadow as a Special Development Consideration; the proposed development is not located within this overlay. Therefore, Staff finds the criteria is not applicable.

VI. DECISION:

There is evidence to determine the soils on this property are stable and can support the proposal to site a Single-Family Dwelling. There are conditions that apply to this use that can be found at Exhibit "A".

VII. EXPIRATION AND EXTENSION OF CONDITIONAL USES

1. *Time frames for conditional uses and extensions are as follows:*
    a. *All conditional uses within non-resource zones are valid four (4) years from the date of approval; and*
    b. *All conditional uses for dwellings within resource zones outside of the urban growth boundary or urban unincorporated community are valid four (4) years from the date of approval.*
    c. *All non-residential conditional uses within resource zones are valid (2) years from the date of approval.*
    d. *For purposes of this section, the date of approval is the date the appeal period has expired and no appeals have been filed, or all appeals have been exhausted and final judgments are effective.*
    e. *Additional extensions may be applied.*

2. *Extensions are subject to notice as described in § 5.0.900(2) and appeal requirements of 5.8 for a Planning Director's decision.*

    All Geologic Assessments are valid as prima facie evidence of the information therein contained

[2] *Hydric soil* is soil which is permanently or seasonally saturated by water, resulting in anaerobic conditions, as found in wetlands.

for a period of five (5) years. Coos County assumes no responsibility for the quality or accuracy of such reports.

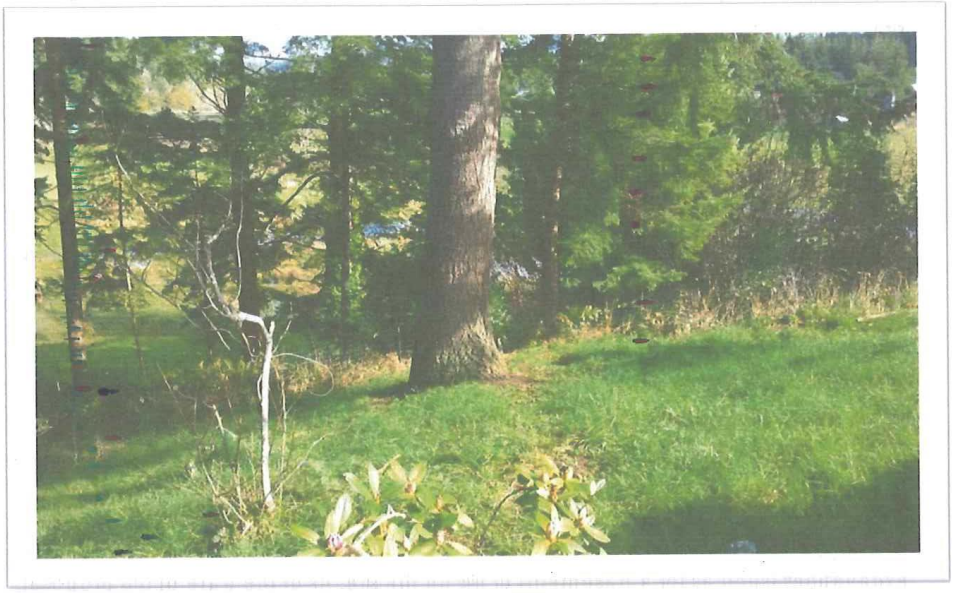
This conditional use is for a residential conditional use within a non-resource zone and is valid for five years from the date of the Geological Assessment **(February 18, 2028)**.

VIII. NOTICE REQUIREMENTS:

A notice of decision will be provided to property owners within 100 feet of the subject properties, special districts, and DLCD.

Exhibit D
Geo-technical Report

CASCADIA GEOSERVICES, INC.
190 6th Street
PO Box 1026
Port Orford, Oregon 97465
D. 541-332-0433
C.541-655-0021
Email: info@cascadiageoservices.com
www:cascadiageoservices.com



Geotechnical Site Assessment for Residential Development
110 17th Street
Coquille, OR 97423

Prepared for Mr. Bob Eck
110 17th Street
Coquille, Oregon 97423
Sent via e-mail: xsf2@aol.com

March 14, 2018
CGS Project No 17123

INTRODUCTOIN

Cascadia Geoservices, Inc. (CGS) is pleased to submit this Geotechnical Site Assessment Report for a portion of your 17th Street property located in Coquille, Oregon (see Figure 1, Location Map). The home site (site or subject property) is part of a developed lot which is currently the site of a trailer. We understand that you are proposing to remove the trailer and develop the site with a single-family residence. This report summarizes our project understanding, site investigation including subsurface explorations and provides our conclusions and recommendations for developing the site.

PROJECT UNDERSTANDING

Our understanding is based on email and telephone correspondence with you beginning on December 7, 2017 and on a site visit to the subject property on December 18, 2017. Our understanding is further based on a second site visit on February 5, 2018 at which time a geologic reconnaissance of the site was conducted and two hand augered borings were completed.

We understand that you are proposing to develop the site with a single-family residence. The site is currently occupied by a trailer which we understand will be removed. Based on a site plan provided to us by you, we understand that the residence will be a single-story wood frame structure which will have a footprint of 54 X 57 feet. And, we understand that the new residential structure will be placed at the approximate elevation of the existing trailer and that you are not proposing any deep excavations (such as for a basement) or fills on the site. As of the date of this proposal, CGS was not provided with construction documents for the residential structure.

SURFACE DESCRIPTION

The site is located within the Coast Range Physiographic region of southwestern Oregon and is part of Tax Lot 1100, T27N, R13W, Sec 36A. Tax Lot 500 is 1.03 acres. The building site is generally level to gently sloping to the north and is bordered to the south by 17th Street and to the north by Calloway Creek. The site is at an elevation of 57 feet Above Mean Sea Level and is 40 feet above Calloway Creek. The slope north of the site grades from 25 degrees near the top and steepens to 40 degrees near the bottom (Photo 1). A portion of the slope below the site has been terraced and is assumed to be

fill which was placed when the site was developed. The site was observed to be stable at the time of our site visit with no ground cracks or scarps visible.

Based on mapping done by others[1],[2], soils at the site consist of silty clay loam soil (Langlois silty clay loam-Map Unit 34) which is derived from alluvium. These overlay surficial Quaternary fluvial terrace deposits of unconsolidated to semi-consolidated flat lying and elevated river alluvium.

SUBSURFACE EXPLORATIONS

In order to analyze the soils at the site, CGS excavated two hand augered borings (borings) during our February 5, 2018 site visit. Hand augered borings were used for subsurface explorations due to access issues. The borings were logged by an Oregon Certified Engineering Geologist from our Port Orford, Oregon office. The borings were excavated to observe subsurface conditions across the site and to collect soil and rock samples for later analysis. The locations of the hand augered borings are shown on Figure 2, Site Map. The hand augered borings were excavated to a depth of between 3.0 and 6.4 feet below ground surface (bgs).

Subsurface Conditions Encountered

The material encountered in the hand augered borings was similar between the borings. From 0 to 2.8 feet bgs in Hand Augered Boring 1 (HA-1), we encountered soft dark brown organic silt with some fine gravel: damp. At 2.8 feet bgs, this becomes soft to medium stiff tan clay with trace gravel and burnt wood; damp. This clay is noted as being medium plasticity. We infer that this is fill which was used to elevate and level the site. At 4.5 feet bgs in HA-1, we encountered medium dense light tan clayey fine sand: damp. At 5.5 feet bgs, this becomes very stiff fine sandy clay; damp. We infer that these are Quaternary fluvial terrace deposits as identified by others[2].

In Hand Augered Boring 2 (HA-2), from 0.0 to 2.0 feet bgs, we encountered medium stiff dark brown silt: damp. We infer that this is silty clay loam soil identified by others[1]. At 2.0 feet bgs, we encountered stiff tan clay: damp, medium plasticity, medium toughness of

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[1] USDA United State Department of Agriculture. Natural Resource Conservation Service Web Soil Survey retrieved from http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

[2] Beaulieu, J. D., & Hughes, P. W. (1975). Environmental Geology of Western Coos and Douglas Counties, Oregon. Oregon Department of Geology and Mineral Industries, Bulletin 87 (p. 148).

thread. At 3.0 feet bgs, this becomes fine sandy clay. We infer that these are Quaternary fluvial terrace deposits as identified by others[2].

A pocket penetrometer was used by CGS to test the relative consistency of the surficial soils collected from the borings. In general, the dark brown organic silt with some fine gravel which was encountered from 0.0 to 2.8 feet bgs in TP-1 and the underlying tan clay with trace fine gravel and burnt wood produced a pocket penetrometer reading of less than 1.0 tsf[3] and was determined to be soft to medium stiff. The underlying fine sandy clay produced a pocket penetrometer reading of from 1.0 to 2.0 tsf and was determined to be stiff to very stiff. The dark brown silt encountered from 0.0 to 2.0 feet bgs in HA-2 produced a pocket penetrometer reading of .25 to .50 tsf and was determined to be soft to medium stiff. At 2.0 feet bgs in HA-2, the tan clay returned a reading of less than 1.0 tsf and was determined to be stiff.

Our analysis of the subsurface conditions on the site is based on the soils encountered in our borings and is summarized as follows:

Fill: From 0 to 4.5 feet bgs in HA-1. Fill consists of soft dark brown organic silt with some fine gravel: damp and soft to medium stiff tan clay with trace gravel and burnt wood; damp. The clay is noted as being medium plasticity.

Silty Clay Loam Soil: From 0.0 to 2.0 feet bgs in HA-2, medium stiff dark brown silt: damp

Quaternary fluvial terrace deposits: Beginning at 4.5 feet bgs in HA-1 and at 2.0 feet bgs in HA-2, medium dense light tan clayey fine sand: damp. At 5.5 feet bgs in HA-1, this becomes very stiff fine sandy clay; damp. In HA-2 beginning at 2.0 feet bgs, stiff tan clay: damp becoming at 3.0 feet bgs fine sandy clay.

LABORATORY ANALYSIS

Selected samples collected from the hand augered borings were packaged in moisture tight bags and shipped to our laboratory in Woodland, Washington where they were classified in general accordance with the Unified Soil Classification System, Visual-Manual Procedure. In addition, water content (ASTM D698) and Atterberg Limits (ASTM D4318) were determined for select samples. The results are summarized below in

[3] compressive strength with pocket penetrometer; in tons per square foot (tsf)

Table 1. The Lab Analysis Reports for the samples are provided at the back of this report as Attachment 3.

TABLE 1 - Laboratory Analysis

Sample ID	Hand Augered Boring Depth (feet)	Type of Soil	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	USCS Symbol[4]
SS-2	HA-1 (4.5)	Clayey Sand	49.7				SC
SS-3	HA-1 (5.5)	Sandy Clay	44.5	76	49	27	CH
SS-5	HA-2 (2.0)	Clay	52.7				CH
SS-6	HA-2 (3.0)	Sandy Clay	46.8				SC

The indicated high natural moisture content of 34.4% in near the plastic limit. We infer, that the liquid limit indicates the clays' intrinsic water-holding capacity and that the clay can absorb significant additional amounts of water if the existing moisture conditions change during construction.

Based on our experience with these soils, which are derived from weathering of sedimentary rocks, these clay soils typically exhibit low to moderate volume change in response to changing moisture content. Thus, it is our opinion that the underlying clays should not be exposed to moisture changes as a result of the proposed construction.

GROUNDWATER

Based on a review of well logs in the area, the primary groundwater aquifer is believed to be approximately 50 feet below ground surface. This coincides with the observed elevation of Calloway Creek. Groundwater was not encountered in either hand augered boring. The soil samples collected in the hand augered borings were observed to be damp.

It should be noted that groundwater levels will rise during periods of heavy rainfall and associated slope runoff. We also anticipate that limited perched groundwater may be present at or near the contact of native soils and underlying surficial deposits. We infer that groundwater follows topography and that the hydraulic gradient is to the north

towards Calloway Creek. We further note that we did not observe evidence of near surface groundwater such as hydric soils or plants on the site.

SEISMIC DESIGN CRITERIA

The subject property is located in an area that is highly influenced by regional seismicity due to its proximity to the Cascadia Subduction Zone (CSZ). Recent studies[4] indicate that the southern CSZ has generated maximum credible earthquakes with a Moment Magnitude (Mm) of 8.7 or greater every 200 to 300 years. Time dependent probabilities currently range up to 40% in 50 years for a southern segment rupture.

The seismic design criteria for this project is based on the 2015 National Earthquake Hazard Reduction Program (NEHRP) and is taken from the USGS Design Maps Summary Report.[5] The seismic design criteria, in accordance with the IBC, are summarized in Table 2 below. A Partial Seismic Design Map Detailed Report is included at the end of this report as Attachment 4[6].

Table 2: 2015 NEHRP Seismic Design Parameters

Seismic Design Parameters	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	S_s = 1.587 g	S_1 = 0.798 g
Site Class	D = Stiff Soil (Determined)	
Site Coefficient	F_a = 1.0	F_v = 1.7
Adjusted Spectral Acceleration	S_{MS} = 1.587 g	S_{M1} = 1.357 g
Design Spectral Response Acceleration Parameters	S_{DS} = 1.058 g	S_{D1} = 0.904 g
Peak Ground Acceleration	PGA = 1.1 g	

GEOLOGIC HAZARDS

Based on a review of the Statewide Landslide Information Layer for Oregon (SLIDO2)[7], the site is not within a previously identified landslide, earthflow or debris flow complex.

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[4] Goldfinger, C., et al. (2012). Turbidite Event History—Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone. U.S. Geologic Survey (USGS), Professional Paper: 1661-F.

[5] USGS Design Maps Summary Report accessed from their website at http://ehp2earthquake.wr.usgs.gov/designmaps in May 2016.

[6] For the complete report, please contact out office.

[7] (SLIDO). Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Landslide Information Database for Oregon, from http://www.oregongeology.org/sub/slido/index.htm

The slope bordering the site to the north has been identified as having a high susceptibility to landsides which indicates that future landslides are likely. Upon further review, it is CGS's opinion that the level area where the home site is located is not part of the area deemed to be highly susceptible to landslides. It is our experience working on similar sites in the coast range that ridgelines and other topographically high areas such as this site are typically stable whereas the slopes flanking these landforms are susceptible to slope movement. This includes fill slope north of the site.

A review of LIDAR[8] for the area, a surveying technology that reveals topography by illuminating the ground with laser light, indicates that the site is on a level area which is bordered to the north by Calloway Creek. The LIDAR indicates that topography on the site is generally smooth and blocky which may be due to the orientation of bedding. The LIDAR indicates that there here are no breaks in topography, re-routed drainages and no anomalous landforms indicative of recent slope movement on the subject property. Based on a review of US Geological Survey Maps[9], there are no geologically young faults in the area which will impact the site.

There is now a consensus among earth scientists that much of the western US coastline, including the entire southern Oregon coast, is in an area which has been seismically active in the recent geologic past. Our understanding of these forces is evolving and has been heightened by witnessing recent earthquakes and tsunamis in similar tectonic settings in Northern Indonesia (2005) and in Northern Japan (2011). In order to protect people living in seismically active areas within the state, the state has recently updated and released the 2017 Oregon Residential Specialty Code.[10] It is our opinion that new homes such as you are proposing to build should adopt these updated standards.

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[8] (LIDAR). Oregon Department of Geology and Mineral Industries (DOGAMI) LIDAR from http://www.oregongeology.org/lidar/index.htm

[9] U.S. Geologic Survey (USGS), Quaternary Faults Web Mapping Application, retrieved May 15, 2017 from http://earthquake.usgs.gov/hazards/qfaults/imsintro.php

[10] Oregon Residential Specialty Code, 2014, State of Oregon, viewed on December 26, 2015 at http://ecodes.biz/ecodes_support/free_resources/oregon/11_residential/11_orresidential_main.html

Liquefaction

Liquefaction potential was assessed based on the information obtained from our borings and using the parameters suggested in the 2015 ODOT Geotechnical Design Manual. According to our seismic analysis, the site will experience a Peak Ground Acceleration (PGA) during a design seismic event of 1.1 g. Based on the nature of the soils encountered in our hand augered borings and the indicated depth to groundwater, it is our opinion that the soils at the site have a low liquefaction potential.

Based on recent mapping and modeling done by the State of Oregon[11], the site is not within the Tsunami Inundation Zone. It is uncertain whether regionally, access roads will be impacted during a tsunami. As a matter of safety procedure, CGS recommends that you check Local Resources and the State of Oregon's Department of Mineral Industries (DOGAMI) Tsunami Resource Center for current information regarding Tsunamis preparedness and emergency procedures.

SETBACK

The 2017 Oregon Residential Specialty Code[10], Section R. 403.1.9.1 (code) requires that buildings adjacent to descending slope surfaces be founded in firm material with an embedment and setback from the slope surface sufficient to provide vertical and lateral support for the footing without detrimental settlement. When determining setbacks, the code recommends a minimum setback of at least the smaller of H/3 and 40 feet for descending slopes and the smaller of H/2 and 15 feet from ascending slopes[12].

Based on our surface and subsurface observations and on current building codes[10], we recommend that the perimeter house foundation be setback from the moderate to steep descending slope north of the house a minimum of 17 feet. This distance should be measured from the break in slope. We have shown these setbacks on Figure 2, Site Map and have marked them on the ground with wooden lath (Photo 2).

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[11] Local Source (Cascadia Subduction Zone) Tsunami Inundation Map Port Orford, Oregon. 2012. STATE OF OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES view at http://www.oregongeology.org

[12] H= the height of the slope

DISCUSSION AND RECOMMENDATIONS

Feasibility

It is CGS's opinion that the proposed structure can be supported on conventional spread footings provided the site is prepared in accordance with our recommendations. We base these recommendations on our work experience involving similar sites in similar settings. The use of conventional shallow foundations is feasible provided that the footings are deepened and are set on the medium dense light tan clayey fine sand, sandy clay and tan clay encountered at 4.5 feet bgs in HA-1 and at 2.0 feet bgs in HA-2.

Because of concerns about future slope stability, we further recommend that the northern perimeter foundation be set back a minimum of 17 feet from the moderate to steep descending slope north of the proposed house. We have shown these setbacks on Figure 2, Site Map. And, we recommend that all surface and near surface discharge water from rain gutters, perimeter drains and surface grading be diverted away from the slope north of the site.

DESIGN

Spread Footing Design Recommendations

All surfaces with building foundations or pavement areas should be prepared in accordance with the Site Preparation section of this report. The building foundations may be installed on either medium dense light tan clayey fine sand, sandy clay and tan clay encountered at 4.5 feet bgs in HA-1 and at 2.0 feet bgs in HA-2 or on engineered fill which is set on these soils. Continuous wall and isolated spread footings should be at least 2 and 3 feet wide, respectively. The bottom of exterior footings should be at least 18 inches below the lowest adjacent exterior grade. The bottom of interior footings should be established at least 12 inches below the base of the floor slab.

Footings bearing on medium dense light tan clayey fine sand, sandy clay and tan clay should be sized for an allowable bearing capacity of 1,500 pounds per square foot (psf). This is a net bearing pressure. The weight of the footing and overlying backfill can be disregarded in calculating footing sizes. The recommended allowable bearing pressure applies to the total of dead plus long-term-live loads, and this bearing pressure may be doubled for short-term loads such as those resulting from wind or seismic forces.

Based on CGS's estimates, and assuming the subgrade is properly prepared, total post-construction settlement was calculated to be less than one (1) inch, with post-construction differential settlement of less than 0.5 inches over a 50-foot span for maximum column and perimeter footing loads of less than 75 kips and 3 kips per linear foot.

Lateral loads on footings can be resisted by passive earth pressure on the sides of the structures and by friction at the base of the footings. An allowable passive earth pressure of 200 pounds per cubic foot (pcf) may be used for footings confined by native soils and new structural fills. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance. For footings in contact with native soils, use a coefficient of friction equal to 0.35 when calculating resistance to sliding.

A CGS geotechnical engineer (or their representative) should confirm suitable bearing conditions and evaluate all footing subgrades. Observations should also confirm that loose or soft material, organics, unsuitable fill and old topsoil zones are removed. Localized deepening of footing excavations may be required to penetrate any deleterious materials.

If construction occurs during wet weather, we recommend that a thin layer of compacted, crushed rock be placed over the footing subgrades to help protect them from disturbance due to foot traffic and the elements.

The footings should be founded below an imaginary line projecting at a 1 horizontal to 1 vertical (1H:1V) slope from the base of any adjacent, parallel utility trenches. The footings must be embedded so that a minimum of 40 feet of horizontal distance is between the face of the footings and the moderate to steep slopes to the north and west.

Floor Slabs

Satisfactory subgrade support for building floor slabs can be obtained from the medium dense light tan clayey fine sand, sandy clay and tan clay subgrade prepared in accordance with our site preparation recommendations. Once prepared, an 8-inch-thick layer of imported granular material should be placed and compacted over the prepared subgrade. Imported granular material should be crushed rock or crushed gravel that is fairly well graded between coarse and fine, contains no deleterious

materials, has a maximum particle size of one (1) inch, and has less than 5 percent by weight passing the U.S. Standard No. 200 Sieve. Material recommendations are provided below.

Retaining Structures

CGS's retaining wall design recommendations are based on the following assumptions: 1) the walls are conventional, cantilevered, retaining walls; 2) the walls are less than 8 feet in height; 3) the backfill is drained; and 4) the backfill has a slope flatter than 4H:1V. Evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

Unrestrained site walls that retain native soils or structural fill should be designed to resist equivalent fluid pressures of 34 pcf where back slopes are flatter than 4H:1V. If retaining walls are restrained from rotation prior to being backfilled, the equivalent fluid pressure should be increased to 50 pcf. For embedded building walls, a superimposed seismic lateral force should be calculated based on a dynamic force of $6H^2$ pounds per lineal foot of wall (where H is the height of the wall in feet) and applied at 0.6H from the base of the wall. If other surcharges (e.g., slopes steeper than 4H:1V, foundations, vehicles, etc.) are located within a horizontal distance from the back of a wall equal to twice the height of the wall, then additional pressures will need to be accounted for in the wall design. Our office should be contacted for appropriate wall surcharges based upon actual magnitude and configuration of the applied loads.

The wall footings should be designed in accordance with the guidelines provided in the Spread Footing Design Recommendations section of this report.

These design parameters have been provided assuming that back-of-wall drains will be installed to prevent buildup of hydrostatic pressures behind all walls. If a drainage system is not installed, then our office should be contacted for revised design forces.

The backfill material placed behind the walls and extending a horizontal distance equal to at least half of the height of the retaining wall should consist of granular retaining wall backfill as specified in the Structural Fill section of this report.

A minimum 12-inch-wide zone of drain rock extending from the base of the wall to within 6 inches of finished grade should be placed against the back of all retaining walls. Perforated collector pipes should be embedded at the base of the drain rock. The drain rock should meet the requirements provided in the Structural Fill section of this

report. The perforated collector pipes should discharge at an appropriate location away from the base of the wall. The discharge pipe(s) should not be tied directly into storm water drain systems unless measures are taken to prevent backflow into the wall's drainage system.

Settlements of up to one (1) percent of the wall height commonly occur immediately adjacent to the wall, as the wall rotates and develops active lateral earth pressures. Consequently, we recommend that construction of flat work adjacent to retaining walls be postponed at least four weeks after backfilling of the wall, unless survey data indicates that settlement is complete prior to that time.

CONSTRUCTION

Site Preparation

The existing near-surface root zone should be stripped and removed from the project site in all proposed building, fill, and pavement areas, and for a 5-foot margin around such areas. The stripping depths will be variable and will likely vary based on proximity to existing trees and shrubs and on the thickness of the overlying fill. The actual stripping depth should be based on field observations at the time of construction. Stripped material should be disposed of or stockpiled for use in landscaped areas.

Trees and shrubs should be removed from all improvement areas. In addition, root balls should be grubbed out to the depth of the roots, which may exceed 3 feet bgs. Depending on the methods used to remove the root balls, considerable disturbance and loosening of the subgrade could occur during site grubbing. We recommend soil disturbed during grubbing operations be removed to expose firm, undisturbed subgrade. The resulting excavations should be backfilled with structural fill.

Building and wall foundations, floor slabs, and pavements can be installed on either firm bedrock subgrade or engineered fill. The existing surficial fill at the site has a variable consistency and is not suitable for construction. The old fill and any soft areas should be removed to a firm layer and replaced with structural fill.

Probing

Following stripping, excavation, and site preparation and prior to placing structural fills, the exposed excavated surface and the footing or slab subgrade should be evaluated

by probing. A member of our geotechnical staff should carry out the probing. Soft or loose zones identified during the field evaluation should be compacted to an unyielding condition or be excavated and replaced with structural fill.

Wet-Weather/Wet-Soil Conditions

Trafficability on the exposed soils may be difficult during or after extended wet periods or when the moisture content of the surface soil is more than a few percentage points above optimum. Soils disturbed during site-preparation activities, or soft or loose zones identified during probing should be removed and replaced with compacted structural fill.

Excavation

Subsurface conditions at the project site show predominately medium dense light tan clayey fine sand, sandy clay and tan clay to the depths explored. Excavations in these soils may be readily accomplished with conventional earthwork equipment.

Trench cuts in native materials should stand vertical to a depth of approximately 4 feet, provided no groundwater seepage is present in the trench walls. Open excavation may be used to excavate trenches with depths between 2 and 8 feet with the walls of the excavation cut at a slope of 1H:1V, provided groundwater seepage is not present and with the understanding that some sloughing may occur. The trenches should be flattened to 1. 5H:1V if excessive sloughing occurs or seepage is present.

Groundwater was not encountered during site exploration. However, during the wet months of the year, some shallow perched groundwater may be expected. If shallow groundwater is observed during construction, use of a trench shield (or other approved temporary shoring) is recommended for cuts that extend below groundwater seepage or if vertical walls are desired for cuts deeper than 4 feet. If shoring or dewatering is used, CGS recommends that the type and design of the shoring and dewatering systems be the responsibility of the contractor, who is in the best position to choose systems that fit the overall plan of operation. These excavations should be made in accordance with applicable Occupational Safety and Health Administration and State regulations.

Final Grading

As indicated, the footing backfill should be graded to drain away from the structure and away from the slopes north of the house.

Building Codes

We recommend that your home design be reviewed for adherence to the local building codes as set forth in the 2017 Oregon Residential Specialty Code.

MATERIALS

Fills should be placed over subgrade that has been prepared in conformance with the Site Preparation section. A wide range of material may be used as structural fill; however, all material used should be free of organic matter or other unsuitable materials and should meet the specifications provided in the 2015 Oregon Standard Specifications for Construction, Oregon Department of Transportation (ODOT, SS 2015), depending on the application. A brief characterization of some of the acceptable materials and our recommendations for their use as structural fill is provided below.

Native Soils

The native soils are suitable for use as general fill, provided they are properly moisture conditioned and meet the requirements of ODOT SS 00330.12 – Borrow Material. Fills derived from native soils should not be placed beneath footings or building slabs. In order to adequately compact the soil, it may be necessary to moisture condition the soil to within 2 to 3 percentage points of the optimum moisture content.

When used as structural fill, native soils should be placed in lifts with a maximum uncompacted thickness of 6 to 8 inches and compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557.

Imported Granular Material

Imported granular material used during periods of wet weather or for access roads, building pad or footing subgrades, staging areas, etc., should be pit or quarry run rock, crushed rock, or crushed gravel and sand, and should meet the specifications provided in ODOT SS 00330.12 – Borrow Material, and ODOT SS 00330.13 – Selected General Backfill. The imported granular material should also be fairly well graded between

coarse and fine material and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve.

Imported granular material should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and be compacted to not less than 92 percent of the maximum dry density, as determined by ASTM D 1557. During the wet season or when wet subgrade conditions exist, the initial lift should be approximately 18 inches in uncompacted thickness and should be compacted by rolling with a smooth-drum roller without using vibratory action.

Where imported granular material is placed over soft-soil subgrades, we recommend a geotextile be placed as a barrier between the subgrade and imported granular material. Depending on site conditions, the geotextile should meet ODOT SS 02320.10 – Geosynthetics, Acceptance, for soil separation or stabilization. The geotextile should be installed in conformance with ODOT SS 00350.40 – Geosynthetic Construction, General Requirements.

Trench Backfill

Trench backfill placed beneath, adjacent to, and for at least 2 feet above utility lines (i.e., the pipe zone) should consist of well-graded granular material with a maximum particle size of 1.5 inches and less than 10 percent by weight passing the U.S. Standard No. 200 Sieve and should meet the standards prescribed by ODOT SS 00405.12 – Pipe Zone Bedding. The pipe zone backfill should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department.

Within roadway alignments or beneath building pads, the remainder of the trench backfill should consist of well-graded granular material with a maximum particle size of 2.5 inches, less than 10 percent by weight passing the U.S. Standard No. 200 Sieve, and should meet standards prescribed by ODOT SS 00405.14 – Trench Backfill, Class A or B. This material should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department. The upper 2 feet of the trench backfill should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557.

Outside of structural improvement areas (e.g., roadway alignments or building pads), trench backfill placed above the pipe zone may consist of general fill materials that is free of organics and materials over 6 inches in diameter, and meet the standards prescribed by ODOT SS 00330.12 – Borrow Material, and ODOT SS 00405.14 – Trench Backfill, Class C, D, or E. This general trench backfill should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department.

Stabilization Material

Stabilization rock should consist of imported granular material that is well graded, angular crushed rock consisting of 4- or 6-inch-minus material with less than 2 percent passing the U.S. Standard No. 4 Sieve. The material should be free of organic matter and other deleterious material.

Retaining Wall Backfill

Backfill material placed behind retaining walls and extending a horizontal distance of 0.5H, where H is the height of the retaining wall, should consist of select granular material meeting the requirements of ODOT SS 00510.12 – Granular Wall Backfill. We recommend the select granular wall backfill be separated from general fill, native soil, and/or topsoil using a geotextile fabric which meets the requirements provided in ODOT SS 02320.10 – Geosynthetics, Acceptance. The geotextile should be installed in conformance with ODOT SS 00350.40 – Geosynthetic Construction, General Requirements.

The wall backfill should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D 1557. However, backfill located within a horizontal distance of 3 feet from the retaining walls should only be compacted to approximately 90 percent of the maximum dry density, as determined by ASTM D 1557. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as a jumping jack or vibratory plate compactors). If flat work (sidewalks or pavements) will be placed atop the wall backfill, we recommend that the upper 2 feet of material be compacted to 92 percent of the maximum dry density, as determined by ASTM D 1557.

Trench and Retaining Wall Drain Backfill

Backfill in a 2-foot zone against the back of retaining walls and for subsurface trench drains should consist of drain rock meeting the specifications provided in ODOT SS 00430.11 – Granular Drain Backfill Material. The drain rock should be wrapped in a geotextile fabric that meets the specifications provided in ODOT SS 02320.10 – Geosynthetics, Acceptance, for soil separation and/or stabilization. The geotextile should be installed in conformance with ODOT SS 00350.40 – Geosynthetic Construction, General Requirements.

Footing Base

Imported granular material placed at the base of retaining wall footings should be clean crushed rock or crushed gravel, and sand that is fairly well graded between coarse and fine. The granular materials should contain no deleterious materials, have a maximum particle size of 1.5 inches, and meet the requirements of ODOT SS 00330.14 – Selected Granular Backfill. The imported granular material should be placed on one lift and compacted to not less than 92 percent of the maximum dry density, as determined by ASTM D 1557.

Floor Slab Base Aggregate

Base aggregate for floor slabs should be clean crushed rock or crushed gravel. The base aggregate should contain no deleterious materials, meet specifications provided in ODOT SS 00330.14 – Selected Granular Backfill, and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve. The imported granular material should be placed in one lift and compacted to at least 95 percent of the maximum dry density, as determined by ASTM D 1557.

CONSTRUCTION OBSERVATIONS

Satisfactory pavement and earthwork performance depends on the quality of construction. Sufficient monitoring of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. We recommend that a representative from CGS be retained to observe general excavation, stripping, fill placement, footing subgrades, and subgrades and base rock for floor slabs and pavements.

Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated.

PROFESSIONAL QUALIFICATIONS

Eric Oberbeck has been a practicing Registered Oregon Geologist (G1332) since 1992 and an Oregon Certified Engineering Geologist (E1332) since 2013. Since November 2012, he has been the senior principal engineering geologist for Cascadia Geoservices, Inc. and prior to this, from 2008 until 2012, he worked first as a project geologist and then senior geologist with PBS Engineering and Environmental, Inc. in their Coquille, Oregon office. As such, he has worked extensively on engineering geology projects throughout the Pacific Northwest including Coos and Curry Counties. He holds a Bachelor of Science Degree in Geology from Sonoma State University (1979) and has completed graduate studies towards a master's degree in geology from the Colorado School of Mines (1982 to 1984).

Rick Thrall, PE, GE, is a Geotechnical Engineer currently registered in the State of Oregon as both a Civil Engineer and a Geotechnical Engineer. Dr. Rick Thrall has over 30 years of geotechnical engineering experience, with 25+ years of experience in the Pacific Northwest. Rick has served as a project manager and design engineer on unique combined geotechnical and civil engineering projects involving buildings, bridges, dams, landslides, levees, transportation routes, water supply and pumping facilities, park facilities, and pipelines. During that time, he has developed an emphasis for successfully undertaking projects which are both technically challenging and organizationally difficult.

LIMITATIONS

The opinions, comments, and conclusions presented in this report are based upon information derived from our literature review, historical topographic map and aerial photograph review, and on our site observations. Conditions between, or beyond, our site observations may vary from those encountered. It is possible that soil, rock, or groundwater conditions could vary between or beyond the points explored.

The scope of services for this subsurface exploration and reports did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, if conditions have changed due to natural causes or construction operations at or adjacent to the site, or if the basic project scheme is significantly modified from that assumed, this report should be reviewed to determine the applicability of the conclusions and recommendations. Land use, site conditions (both on and off site), or other factors may change over time and could materially affect our findings. Therefore, this report should not be relied upon after two years from its issue, or in the event that the site conditions change.

The southern Oregon coast is subject to intense Pacific Ocean storms, subduction zone earthquakes, and tsunamis. As such, we cannot predict nor preclude the possibility of a catastrophe. By necessity, the current and future owners of this property must assume the risks associated with any "act of God" and hold harmless their realtors, professional consultants, contractors, and involved regulatory agencies.

We appreciate the opportunity to provide our services and trust that this report meets your requirements at this time. Please contact us at 541-655-0021 so we can further assist in any way.

Sincerely,

Cascadia Geoservices, Inc.

Eric Oberbeck, CEG
Expires May 31, 2018

Frederick G. Thrall, PE, GE
Expires June 30, 2018

Photos

Figures

Figure 1, Site Location

Figure 2, Site Reconnaissance Map

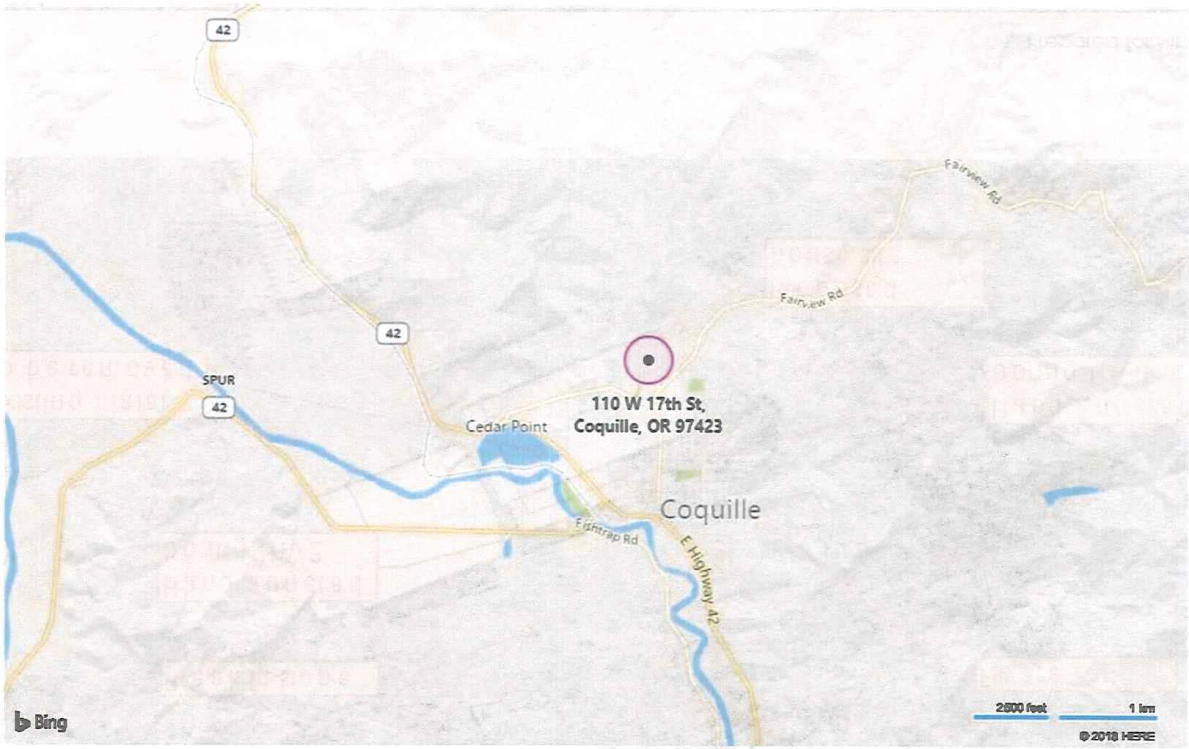
Attachments

Attachments Attachment 1 – Abbreviated USDA Soils Report

Attachment 2- Summary Test Pit Logs

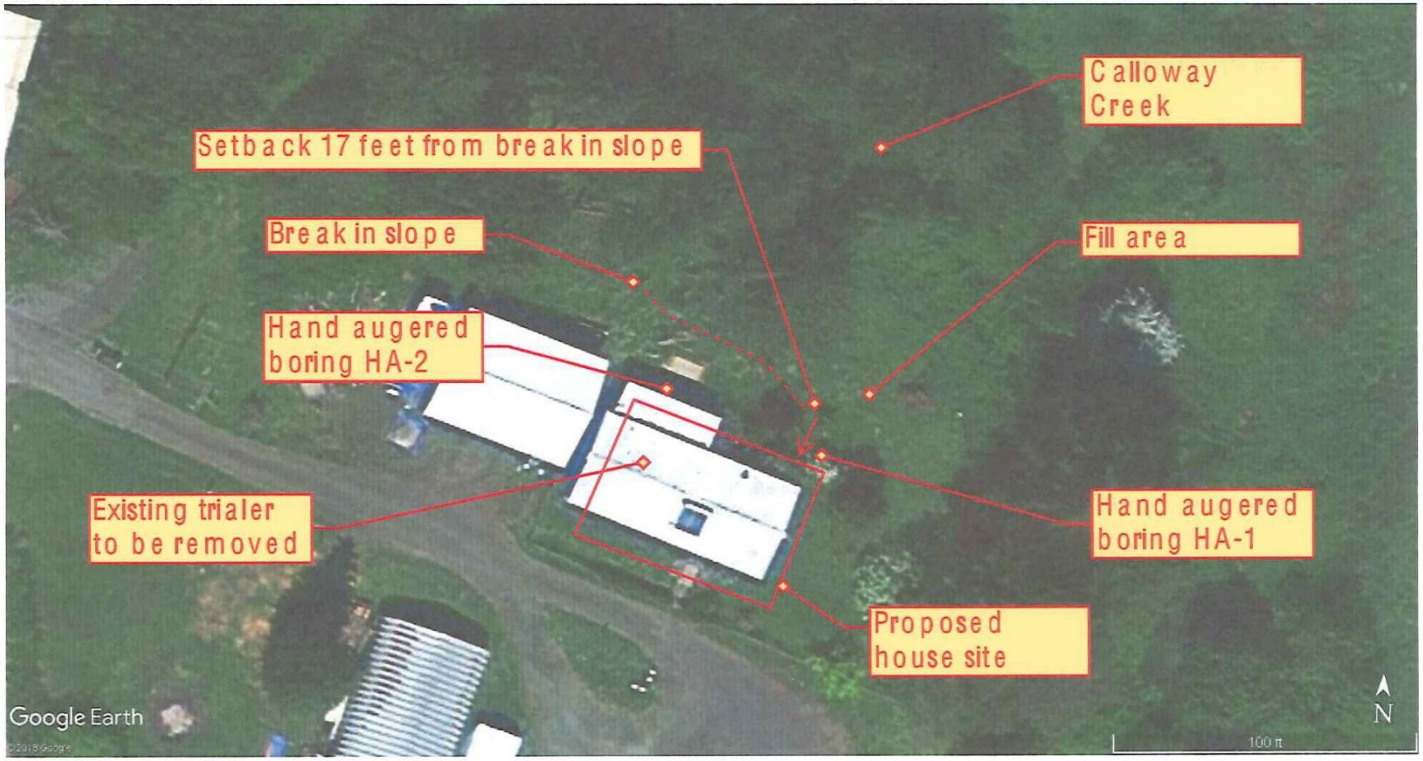
Attachment 3 – Laboratory Test Sheets

Attachment 4 – Abbreviated Seismic Design Map Detailed Report



Prepared for Mr. Bob Eck

CASCADIA Geoservices Geologists and Engineers	Project: 17123 March, 2018	**Location Map** 110 17th Street Coquille, OR 97423	**Figure 1**



Prepared for Mr. Bob Eck

CASCADIA Geoservices, Geologists and Engineers	Project: 17123 March, 2018	**Site Map** 110 17th Street Coquille, OR 97423	**Figure 2**

CASCADIA Geoservices — Geologists and Engineers	Bob Eck 110 17th Street Coquille, OR 97423	**Photographic Log**
	Date: March, 2018	Cascadia Geoservices, Inc. Project No: 17123

Photo No:	1
Direction Photo is Taken: East	
Photo Description:	
Slope north of house site	

Photo No:	2
Direction Photo is Taken: South	
Photo Description:	
Set back from slope marked on the ground	

Attachment 1-USDA Soils Report (Partial)

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Coos County, Oregon

January 9, 2018


Custom Soil Resource Report
Soil Map
Calloway Creek
Bridd Creek
34
63B
W 17th St
21st St
Soil Map may not be valid at this scale.
Map Scale: 1:943 if printed on A landscape (11" x 8.5") sheet.
Meters
Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84
N
9

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 1:20,000.

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: Coos County, Oregon
Survey Area Data: Version 12, Oct 6, 2017

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 15, 2016

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
34	Langlois silty clay loam	1.6	86.7%
63B	Wintley silt loam, 0 to 8 percent slopes	0.2	13.3%
Totals for Area of Interest		**1.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Coos County, Oregon

34—Langlois silty clay loam

Map Unit Setting

National map unit symbol: 21nm
Elevation: 0 to 40 feet
Mean annual precipitation: 50 to 80 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Langlois and similar soils: 80 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Langlois

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 10 inches: silty clay loam
H2 - 10 to 28 inches: silty clay
H3 - 28 to 60 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Other vegetative classification: Very Poorly Drained (G004AY019OR)
Hydric soil rating: Yes

Minor Components

Chetco

Percent of map unit: 7 percent
Landform: Deltas, flood plains
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Very Poorly Drained (G004AY019OR)
Hydric soil rating: Yes

Coquille
Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Very Poorly Drained (G004AY019OR)
Hydric soil rating: Yes

63B—Wintley silt loam, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: 21qh
Elevation: 50 to 420 feet
Mean annual precipitation: 60 to 80 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Wintley and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wintley

Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 5 inches: silt loam
H2 - 5 to 48 inches: silty clay loam
H3 - 48 to 61 inches: very gravelly loam

Properties and qualities
Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Attachment 2 -Hand Augered Boring Logs

TABLE 1 SOILS
FIELD CLASSIFICATIONS

SOIL DESCRIPTION FORMAT	
(1) consistency,	(9) structure,
(2) color,	(10) cementation,
(3) grain size,	(11) reaction to HCL,
(4) classification name [secondary PRIMARY additional];	(12) odor,
(5) moisture,	(13) groundwater seepage,
(6) plasticity of fines,	(14) caving,
(7) angularity	**(15) (unit name and/or origin),**
(8) shape,	

Note: Bolded items are the minimum required elements for a soil description.

1. CONSISTENCY - COARSE-GRAINED

TERM	SPT (140-LB. HAMMER)[1]	D & M SAMPLER (140-LB. HAMMER)[1]	DYNAMIC CONE PENETROMETER PENETRATION RATE SAMPLER (DCP)[4,5,6]	FIELD TEST (USING ½-INCH REBAR)
Very loose	0 – 4	0 – 11	0 – 2	Easily penetrated when pushed by hand
Loose	4 – 10	11 – 26	2 – 5	Easily penetrated several inches when pushed by hand
Medium dense	10 – 30	26 – 74	6 – 31	Easily to moderately penetrated when driven by 5 lb. hammer
Dense	30 – 50	74 – 120	32 – 42	Penetrated 1-foot with difficulty when driven by 5 lb. hammer
Very dense	>50	>120	>43	Penetrated only few inches when driven by 5 lb. hammer

1. CONSISTENCY - FINE-GRAINED

TERM	SPT (140-LB. HAMMER)[1]	D & M SAMPLER (140-LB. HAMMER)[1]	DYNAMIC CONE PENETROMETER PENETRATION RATE SAMPLER (DCP)[5,6]	POCKET PEN.[2]	TORVANE[3]	FIELD TEST
Very soft	<2	<3	<2	<0.25	<0.13	Easily penetrated several inches by fist
Soft	2 – 4	3 – 6	2 – 3	0.25 – 0.5	0.13 – 0.25	Easily penetrated several inches by thumb
Medium stiff	5 – 8	7 – 12	4 – 7	0.50 – 1.0	0.25 – 0.5	Can be penetrated several inches by thumb with moderate effort
Stiff	9 – 15	13 – 25	8 – 16	1.0 – 2.0	0.5 – 1.0	Readily indented by thumb but penetrated only with great effort
Very stiff	16 – 30	26 – 65	17 – 27	2.0 – 4.0	1.0 – 2.0	Readily indented by thumbnail
Hard	>30	>65	>28	>4.0	>2.0	Difficult to indent by thumbnail

1 Standard penetration resistance (SPT N-value); Dames and Moore (D & M) sampler, number of blows/ft. for last 12" and 30" drop. Unconfined
2 compressive strength with pocket penetrometer; in tons per square foot (tsf).
3 Undrained shear strength with torvane (tsf).
4 Up to maximum medium-size sand grains only.
5 Dynamic cone penetration resistance; number of blows/inch.
6 Reference: George F. Sowers et. al. "Dynamic Cone for Shallow In-Situ Penetration Testing of In-Situ Soils, ASTM STP 399, ASTM, , pg. 29. 1966.

2. COLOR

Use common colors. For combinations use hyphens. To describe tint use modifiers: pale, light, and dark. For color variations use adjectives such as "mottled" or "streaked". Soil color charts may be required by client. **Examples:** red-brown; or orange-mottled pale green; or dark brown.

3. GRAIN SIZE

DESCRIPTION		SIEVE*	OBSERVED SIZE
boulders		–	>12"
cobbles		–	3" – 12"
gravel	coarse	¾" – 3"	¾" – 3"
	fine	#4 – ¾"	4.75 mm (0.19") – ¾"
sand	coarse	#10 – #4	2.0 – 4.75 mm
	medium	#40 – #10	0.425 – 2.0 mm
	fine	#200 – #40	0.075 – 0.425 mm
fines		<#200	<0.075 mm

4. CLASSIFICATION NAME

* Use of #200 field sieve encouraged for estimating percentage of fines.

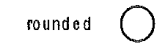
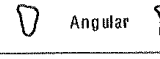
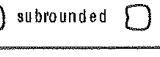
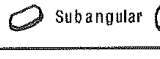
	NAME AND MODIFIER TERMS	CONSTITUENT PERCENTAGE	CONSTITUENT TYPE
Coarse grained	GRAVEL, SAND, COBBLES, BOULDERS	>50%	PRIMARY
	sandy, gravelly, cobbley, bouldery	30 – 50%	secondary
	silty, clayey*	15 – 50%	
	with (gravel, sand, cobbles, boulders)	15 – 30%	additional
	with (silt, clay)*	5 – 15%	
	trace (gravel, sand, cobbles, boulders)		
	trace (silt, clay)*	<5%	
Fine grained	CLAY, SILT*	>50%	PRIMARY
	silty, clayey*	30 – 50%	secondary
	sandy, gravelly		
	with (sand, gravel, cobbles, boulders)	15 – 30%	additional
	with (silt, clay)*		
	trace (sand, gravel, cobbles, boulders)	5 – 15%	
	trace (silt, clay)*		
Organic	PEAT	50 – 100%	PRIMARY
	organic (soil name)	15 – 50%	secondary
	(soil name) with some organics	5 – 15%	additional

* For classification and naming fine-grained soil: dry strength, dilatancy, toughness, and plasticity testing are performed (see Describing Fine-Grained Soil page 2). Confirmation requires laboratory testing (Atterberg limits and hydrometer).

TABLE 1 SOILS
FIELD CLASSIFICATIONS

5. MOISTURE	
TERM	FIELD TEST
dry	absence of moisture, dusty, dry to touch
moist	contains some moisture
wet	visible free water, usually saturated

6. PLASTICITY OF FINES
See "Describing fine-grained Soil" on Page 2.

7. ANGULARITY	
 rounded	 Angular
 subrounded	 Subangular

8. Shape	
TERM	OBSERVATION
flat	particles with width/thickness ratio >3
elongated	particles with length/width ratio >3
flat and elongated	particles meet criteria for both flat and elongated

9. STRUCTURE	
TERM	OBSERVATION
stratified	alternating layers >1 cm thick, describe variation
laminated	alternating layers <1 cm thick, describe variation
fissured	contains shears and partings along planes of weakness
slickensides	partings appear glossy or striated
blocky	breaks into lumps, crumbly
lensed	contains pockets of different soils, describe variation
homogenous	same color and appearance throughout

10. CEMENTATION	
TERM	FIELD TEST
weak	breaks under light finger pressure
moderate	breaks under hard finger pressure
strong	will not break with finger pressure

11. REACTION TO HCL	
TERM	FIELD TEST
none	no visible reaction
weak	bubbles form slowly
strong	vigorous reaction

12. ODOR
Describe odor as organic; or potential non-organic* *Needs further investigation

13. GROUNDWATER SEEPAGE
Describe occurrence (i.e. from soil horizon, fissures with depths) and rate: slow (<1 gpm); moderate (1-3 gpm); fast (>3 gpm)

14. CAVING			
Describe occurrence (depths, soils) and amount with term			
Test Pits	minor (<1 ft³)	moderate (1-3 ft³)	Severe (>3 ft³)

15. (UNIT NAME/ORIGIN)
Name of stratigraphic unit (e.g. Willamette Silt), and/or origin of deposit (Topsoil, Alluvium, Colluvium, Decomposed Basalt, Loess, Fill, etc.).

DESCRIBING FINE-GRAINED SOIL				
	FIELD TEST			
NAME	PLASTICITY (A BELOW)	DRY STRENGTH (B BELOW)	DILATANCY REACTION (C BELOW)	TOUGHNESS OF THREAD (D BELOW)
SILT	non-plastic, low	none, low	rapid	low
SILT with some clay	low	low, medium	rapid, slow	low, medium
clayey SILT	low, medium	medium	slow	medium
silty CLAY	medium	medium, high	slow, none	medium, high
CLAY with some silt	high	High	none	high
CLAY	high	very high	none	high
organic SILT	non-plastic, low	low, medium	slow	low, medium
organic CLAY	medium, high	medium to very high	none	medium, high

A. PLASTICITY	
TERM	OBSERVATION
non-plastic	A 1/8" (3-mm) thread cannot be rolled at any water content.
low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be re-rolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
high	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be re-rolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

B. DRY STRENGTH	
TERM	OBSERVATION
none	Dry specimen crumbles into powder with mere pressure of handling.
low	Dry specimen crumbles into powder with some finger pressure.
medium	Dry specimen breaks into pieces or crumbles with considerable finger pressure.
high	Dry specimen cannot be broken with finger pressure. Will break into pieces between thumb and a hard surface.
very high	Dry specimen cannot be broken between thumb and a hard surface.

C. DILATANCY REACTION	
TERM	OBSERVATION
none	No visible change in the specimen.
slow	Water appears slowly on surface of specimen during shaking and doesn't disappear or disappears slowly upon squeezing.
rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

D. TOUGHNESS OF THREAD	
TERM	OBSERVATION
low	Only slight hand pressure is required to roll the thread near the plastic limit. The thread and lump are weak and soft.
medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and lump have medium stiffness.
high	Considerable hand pressure is required to roll the thread to near the plastic limit. The thread and lump have very high stiffness.

TABLE 2
KEY TO TEST PIT AND BORING LOG SYMBOLS

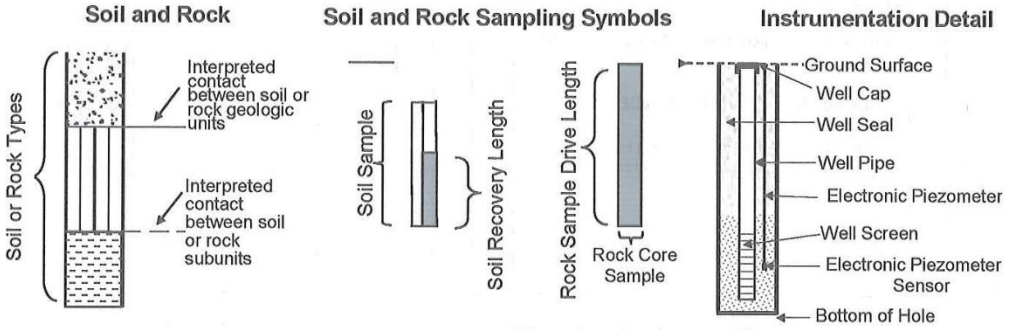
SAMPLE NUMBER ACRONYMS/WATER SYMBOLS

DM - Dames & Moore Sampler
GR - Grab or Bulk Samples
OS - Osterberg (Piston) Sampler
C - Rock Core
SA - Screen Air Sampling
SW - Screen Water Sampling
SS - SPT Standard Penetration Drive Sampler (ASTM D1586)
ST - Shelby Tube Push Sampler (ASTM D1587)

Water Level During Drilling/ Excavation

Water Level on Date Measured

LOG GRAPHICS/INSTALLATIONS



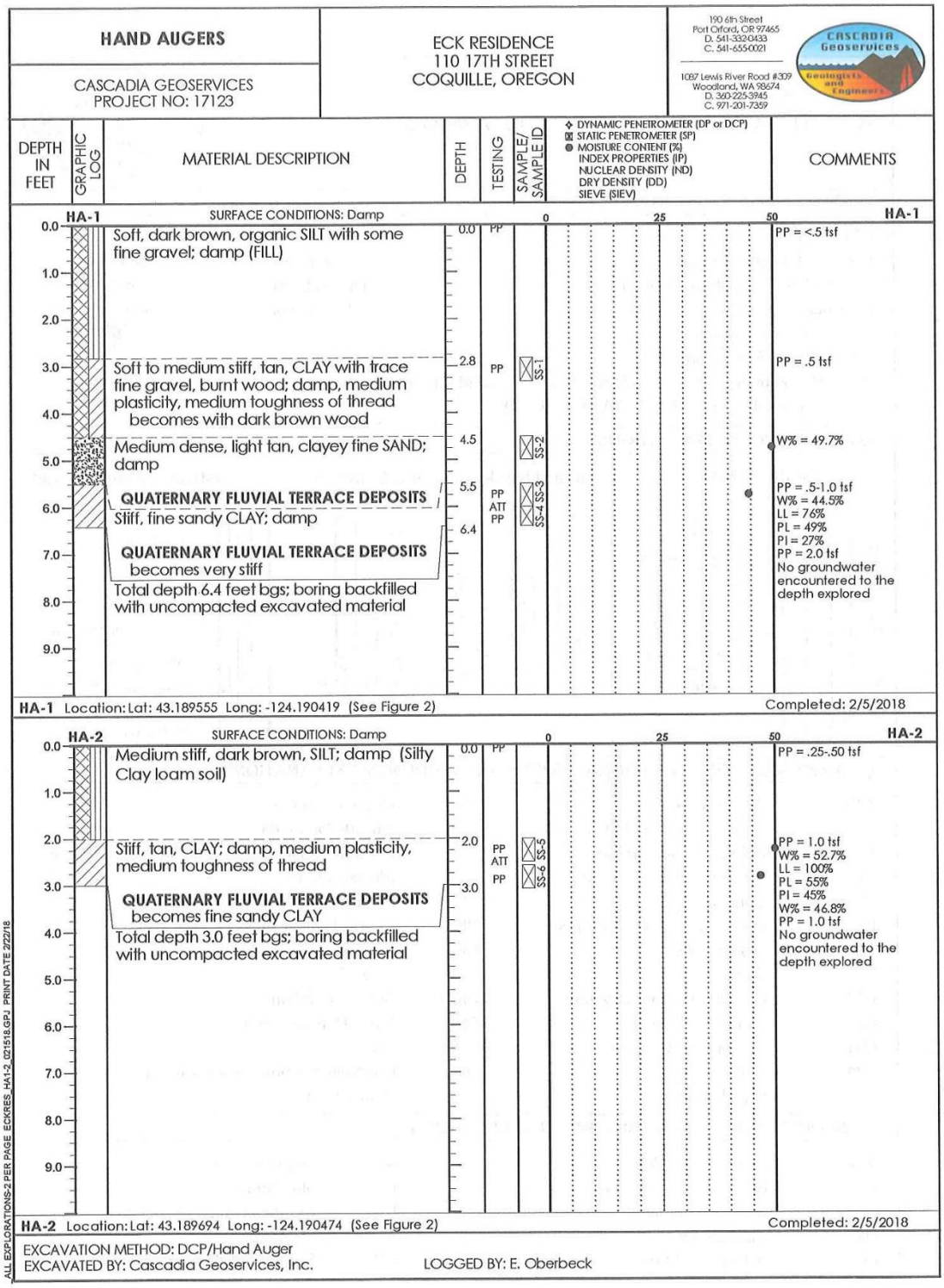
GEOTECHNICAL FIELD & LABORATORY TESTING/ACRONYM EXPLANATIONS

ATT	Atterberg Limits	OC	Organic Content
AMSL	Above Mean Sea Level	OD	Outside Diameter
BGS	Below ground surface	P200	Percent Passing U.S. Standard No. 200 Sieve
CBR	California Bearing Ratio	PI	Plasticity Index
CON	Consolidation	PL	Plasticity Limit
DCP	Dynamic Cone Penetrometer	PP	Pocket Penetrometer
DD	Dry Density	RES	Resilient Modulus
DS	Direct Shear	SC	Sand Cone
GPS	Global Positioning System	SIEV	Sieve Gradation
HCL	Hydrochloric Acid	SP	Static Penetrometer
HYD	Hydrometer Gradation	TOR	Torvane
kPa	kiloPascal	UC	Unconfined Compressive Strength
LL	Liquid Limit	VS	Vane Shear

ENVIRONMENTAL TESTING/ACRONYM EXPLANATIONS

ATD	At Time of Drilling	ND	Not Detected
BGS	Below ground surface	NS	No Sheen
CA	Sample Submitted for Chemical Analysis	PID	Photoionization Detector Headspace Analysis
HS	High Sheen		
MS	Moderate Sheen	PPM	Parts Per Million

Rev. 10/2015


HAND AUGERS
CASCADIA GEOSERVICES
PROJECT NO: 17123
ECK RESIDENCE
110 17TH STREET
COQUILLE, OREGON
190 6th Street
Port Orford, OR 97465
O. 541-332-0433
C. 541-655-0021
1087 Lewis River Road #309
Woodland, WA 98674
O. 360-225-3945
C. 971-201-7359
CASCADIA Geoservices
Geologists and Engineers
DEPTH IN FEET
GRAPHIC LOG
MATERIAL DESCRIPTION
DEPTH
TESTING
SAMPLE/ SAMPLE ID
DYNAMIC PENETROMETER (DP or DCP)
STATIC PENETROMETER (SP)
MOISTURE CONTENT (%)
INDEX PROPERTIES (IP)
NUCLEAR DENSITY (ND)
DRY DENSITY (DD)
SIEVE (SIEV)
COMMENTS
HA-1
SURFACE CONDITIONS: Damp
Soft, dark brown, organic SILT with some fine gravel; damp (FILL)
PP = <.5 tsf
Soft to medium stiff, tan, CLAY with trace fine gravel, burnt wood; damp, medium plasticity, medium toughness of thread becomes with dark brown wood
PP = .5 tsf
Medium dense, light tan, clayey fine SAND; damp
W% = 49.7%
QUATERNARY FLUVIAL TERRACE DEPOSITS
Stiff, fine sandy CLAY; damp
PP = .5-1.0 tsf
W% = 44.5%
LL = 76%
PL = 49%
PI = 27%
PP = 2.0 tsf
QUATERNARY FLUVIAL TERRACE DEPOSITS
becomes very stiff
Total depth 6.4 feet bgs; boring backfilled with uncompacted excavated material
No groundwater encountered to the depth explored
HA-1 Location: Lat: 43.189555 Long: -124.190419 (See Figure 2)
Completed: 2/5/2018
HA-2
SURFACE CONDITIONS: Damp
Medium stiff, dark brown, SILT; damp (Silty Clay loam soil)
PP = .25-.50 tsf
Stiff, tan, CLAY; damp, medium plasticity, medium toughness of thread
PP = 1.0 tsf
W% = 52.7%
LL = 100%
PL = 55%
PI = 45%
W% = 46.8%
PP = 1.0 tsf
QUATERNARY FLUVIAL TERRACE DEPOSITS
becomes fine sandy CLAY
Total depth 3.0 feet bgs; boring backfilled with uncompacted excavated material
No groundwater encountered to the depth explored
HA-2 Location: Lat: 43.189694 Long: -124.190474 (See Figure 2)
Completed: 2/5/2018
EXCAVATION METHOD: DCP/Hand Auger
EXCAVATED BY: Cascadia Geoservices, Inc.
LOGGED BY: E. Oberbeck
ALL EXPLORATIONS-2 PER PAGE ECKRES_HA1-2_021518.GPJ PRINT DATE 2/22/18

Attachment 3-Lab Analysis

CASCADIA Geoservices
Geologists and Engineers

Water Content Determination

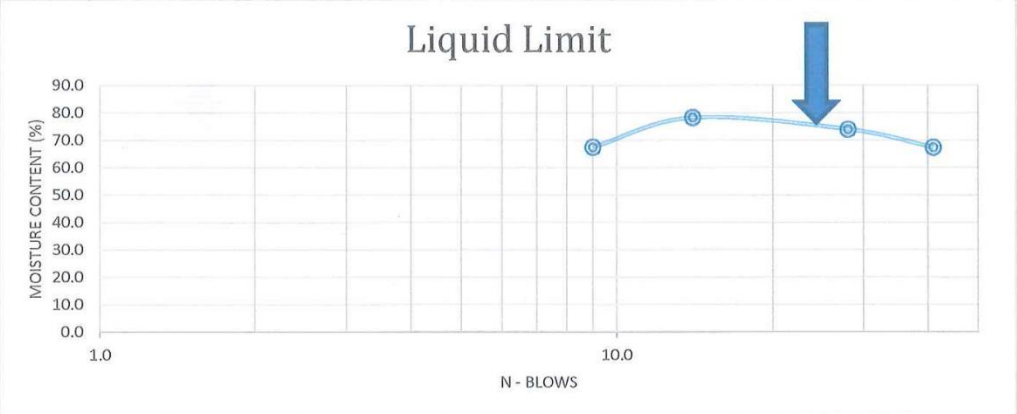
ASTM D2216

Project Name: Eck			Project Number: 17123		
Recorded By: J Thrall			Date: February 9, 2018		
Remarks:					
Sample Designation	**SS-2 HA-1**	**SS-3 HA-1**	**SS-5 HA-2**	**SS-6 HA-2**	
Sample Depth	**4.5'**	**5.5'**	**2'**	**3'**	
Pan Number	E	F	G	H	
Wt. Wet Soil +Pan (g)	75.12	69.17	73.94	82.01	
Wt. Dry Soil +Pan (g)	56.75	54.11	55.34	62.29	
Wt. Water (g)	18.37	15.06	18.6	19.72	
Wt. Pan (g)	19.79	20.27	20.04	20.13	
Wt. Dry Soil (g)	36.96	33.84	35.3	42.16	
Water Content (%)	49.7	44.5	52.7	46.8	
Sample Designation					
Sample Depth					
Pan Number					
Wt. Wet Soil +Pan (g)					
Wt. Dry Soil +Pan (g)					
Wt. Water (g)					
Wt. Pan (g)					
Wt. Dry Soil (g)					
Water Content (%)					
Sample Designation					
Sample Depth					
Pan Number					
Wt. Wet Soil +Pan (g)					
Wt. Dry Soil +Pan (g)					
Wt. Water (g)					
Wt. Pan (g)					
Wt. Dry Soil (g)					
Water Content (%)					

Atterberg Limits Determination

ASTM D4318

Project Name: Eck		**Project Number: 17123**		
Recorded By: J Thrall		**Date: February 12, 2018**		
Sample Designation: SS-3 HA-1 (5.5)				
Remarks:				
Test Number	1	2	3	4
Liquid Limit				
Pan Number	I	H	J	K
Wt. Wet Soil +Pan (g)	52.87	45.54	50.68	53.42
Wt. Dry Soil +Pan (g)	39.67	34.37	37.6	40.01
Wt. Water (g)	13.2	11.17	13.08	13.41
Wt. Pan (g)	20.11	20.09	19.9	20.1
Wt. Dry Soil (g)	19.56	14.28	17.7	19.91
Water Content (%)	67.5	78.2	73.9	67.4
Number of Drops (N)	9.0	14.0	28.0	41.0
Plastic Limit				
	L	M	N	
Wt. Wet Soil +Pan (g)	46.59	51.16	42.46	
Wt. Dry Soil +Pan (g)	37.91	40.83	35.06	
Wt. Water (g)	8.68	10.33	7.4	
Wt. Pan (g)	20.18	20.01	20.05	Plastic Limit (%)
Wt. Dry Soil (g)	17.73	20.82	15.01	Average (%)
Water Content (%)	49.0	49.6	49.3	49.3

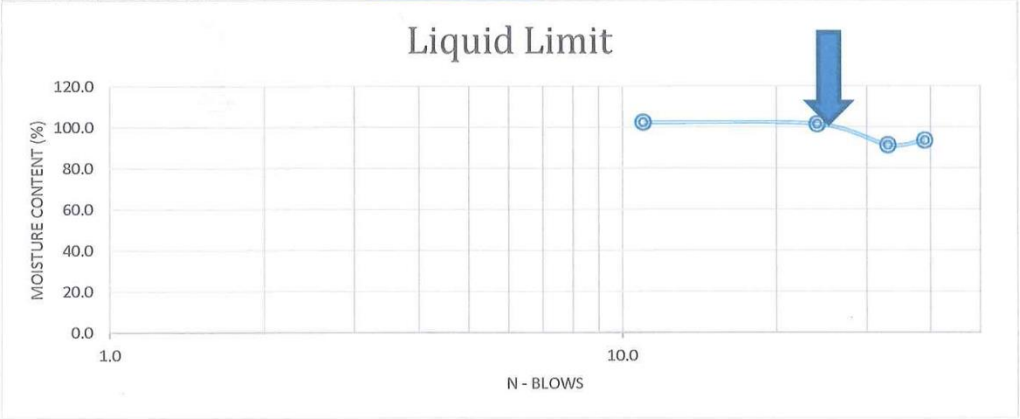


Liquid Limit (%)	76
Plastic Limit (%)	49
Plastic Index (%)	27

Atterberg Limits Determination

ASTM D4318

Project Name: Eck		**Project Number: 17123**		
Recorded By: J Thrall		**Date: February 9, 2018**		
Sample Description: SS-5 HA-2 (2.0)				
Remarks: drop the high wc plastic limit result...(yellow highlight)				
Test Number	1	2	3	4
Liquid Limit				
Pan Number	O	P	S	R
Wt. Wet Soil +Pan (g)	47.84	52.16	49.01	51.33
Wt. Dry Soil +Pan (g)	33.73	35.99	35.1	36.32
Wt. Water (g)	14.11	16.17	13.91	15.01
Wt. Pan (g)	19.95	20.05	19.86	20.26
Wt. Dry Soil (g)	13.78	15.94	15.24	16.06
Water Content (%)	102.4	101.4	91.3	93.5
Number of Drops (N)	11.0	24.0	33.0	39.0
Plastic Limit				
	Q	T	U	
Wt. Wet Soil +Pan (g)	34.79	37.47	34.72	
Wt. Dry Soil +Pan (g)	29.44	31.21	29.42	
Wt. Water (g)	19.8	6.26	5.3	
Wt. Pan (g)	19.95	20.03	19.71	Plastic Limit (%)
Wt. Dry Soil (g)	9.49	11.18	9.71	Average (%)
Water Content (%)	208.6	56.0	54.6	55.3



Liquid Limit (%)	100
Plastic Limit (%)	55
Plastic Index (%)	45

Attachment 4-Seismic Design Report (Partial)

U.S. Geological Survey - Earthquake Hazards Program

110 17th Street Coquille, OR 97423

Latitude = 43.190°N, Longitude = 124.191°W

Location

Reference Document

2015 NEHRP Provisions

Site Class

D (determined): Stiff Soil

Risk Category

I or II or III

S_S =	1.587 g	S_{MS} =	1.587 g	S_{DS} =	1.058 g
S_1 =	0.798 g	S_{M1} =	1.357 g[1]	S_{D1} =	0.904 g[1]

[1] Since the Site Class is D and $S_1 \geq 0.2$ g, site-specific ground motions might be required. See Section 11.4.7 of the 2015 NEHRP Provisions.

Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site class as Site Class , based on the site soil properties in accordance with Chapter 20.

Table 20.3-1 Site Classification

Site Class	$\bar{v}_S$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20 • Moisture content w ≥ 40%, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft^2 = 0.0479 kN/m^2

Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Risk-targeted Ground Motion (0.2 s)

$C_{RS}S_{SUH} = 0.871 \times 1.823 = 1.587$ g

Deterministic Ground Motion (0.2 s)

$S_{SD} = 2.069$ g

$S_S \equiv$ "Lesser of $C_{RS}S_{SUH}$ and S_{SD}" $= 1.587$ g

Risk-targeted Ground Motion (1.0 s)

$C_{R1}S_{1UH} = 0.854 \times 0.935 = 0.798$ g

Deterministic Ground Motion (1.0 s)

$S_{1D} = 1.052$ g

$S_1 \equiv$ "Lesser of $C_{R1}S_{1UH}$ and S_{1D}" $= 0.798$ g

Table 11.4-1: Site Coefficient F_a

	Spectral Reponse Acceleration Parameter at Short Period					
Site Class	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S = 1.25$	$S_S \geq 1.50$
A	0.8	0.8	0.8	0.8	0.8	0.8
B (measured)	0.9	0.9	0.9	0.9	0.9	0.9
B (unmeasured)	1.0	1.0	1.0	1.0	1.0	1.0
C	1.3	1.3	1.2	1.2	1.2	1.2
D (determined)	1.6	1.4	1.2	1.1	1.0	1.0
D (default)	1.6	1.4	1.2	1.2	1.2	1.2
E	2.4	1.7	1.3	1.2*	1.2*	1.2*
F	See Section 11.4.7					

* For Site Class E and $S_S \geq 1.0$ g, see the requirements for site-specific ground motions in Section 11.4.7 of the 2015 NEHRP Provisions. Here the exception to those requirements allowing F_a to be taken as equal to that of Site Class C has been invoked.

Note: Use straight-line interpolation for intermediate values of S_S.

Table 11.4-2: Site Coefficient F_v

Site Class	Spectral Response Acceleration Parameter at 1-Second Period					
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 = 0.50$	$S_1 \geq 0.60$
A	0.8	0.8	0.8	0.8	0.8	0.8
B (measured)	0.8	0.8	0.8	0.8	0.8	0.8
B (unmeasured)	1.0	1.0	1.0	1.0	1.0	1.0
C	1.5	1.5	1.5	1.5	1.5	1.4
D (determined)	2.4	2.2 [1]	2.0 [1]	1.9 [1]	1.8 [1]	1.7 [1]
D (default)	2.4	2.2 [1]	2.0 [1]	1.9 [1]	1.8 [1]	1.7 [1]
E	4.2	3.3 [1]	2.8 [1]	2.4 [1]	2.2 [1]	2.0 [1]
F	See Section 11.4.7					

[1] For Site Class D or E and $S_1 \geq 0.2$ g, site-specific ground motions might be required. See Section 11.4.7 of the 2015 NEHRP Provisions.

Note: Use straight-line interpolation for intermediate values of S_1.

Note: Where Site Class B is selected, but site-specific velocity measurements are not made, the value of F_v shall be taken as 1.0 per Section 11.4.2.

For Site Class = D (determined) and $S_1 = 0.798$ g, $F_v = 1.700$

Site-adjusted MCE_R (0.2 s)

$$S_{MS} = F_a S_S = 1.000 \times 1.587 = 1.587 \text{ g}$$

Site-adjusted MCE_R (1.0 s)

$$S_{M1} = F_v S_1 = 1.700 \times 0.798 = 1.357 \text{ g}$$

Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

Table 11.8-1: Site Coefficient for F_{PGA}

	Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration					
Site Class	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA = 0.50	PGA ≥ 0.60
A	0.8	0.8	0.8	0.8	0.8	0.8
B (measured)	0.9	0.9	0.9	0.9	0.9	0.9
B (unmeasured)	1.0	1.0	1.0	1.0	1.0	1.0
C	1.3	1.2	1.2	1.2	1.2	1.2
D (determined)	1.6	1.4	1.3	1.2	1.1	1.1
D (default)	1.6	1.4	1.3	1.2	1.2	1.2
E	2.4	1.9	1.6	1.4	1.2	1.1
F	See Section 11.4.7					

Note: Use straight-line interpolation for intermediate values of PGA

Note: Where Site Class D is selected as the default site class per Section 11.4.2, the value of F_{pga} shall not be less than 1.2.

For Site Class = D (determined) and PGA = 0.786 g, F_{PGA} = 1.100

Mapped MCE_G

PGA = 0.786 g

Site-adjusted MCE_G

$PGA_M = F_{PGA}PGA = 1.100 \times 0.786 = 0.865$ g

clayey find sand. We recommend that CGS be retained to inspect the foundation sub grade prior to construction.

And we recommend that guidelines for draining the site be followed and that surface and subsurface drain outfalls be directed away from the moderate to steep slope north of the site.

Please note that all other findings and recommendations as provided for in the earlier report are still valid and should be followed. Please let us know if there is anything else we can help with regarding acquiring your building permit.

Sincerely,

Eric 2. Oberbeck

Eric Oberbeck, RG/CEG

Cascadia Geoservices, Inc.
190 6th Street
PO Box 1026
Port Orford, Oregon 97465
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February 18, 2023

Mr. Bob Eck
110 17th Street
Coquille, Oregon 97423
Sent via e-mail: xsf2@aol.com

Addendum to Geotechnical Site Assessment for Residential Development
110 17th Street
Coquille, OR 97423
CGS Project No 17123

Dear Mr. Eck,

Cascadia Geoservices, Inc. (CGS) is pleased to provide you with this Addendum to our Geotechnical Site Assessment for Residential Development Report dated March 14, 2018 for your property at 110 17th Street in Coquille, Oregon. We understand that Coos County is requesting that you provide them with an updated geotechnical report. We further understand that you are now proposing to install a manufactured home on the site and that the original plan as described in the earlier report was to build a wooden framed "stick built" structure.

Based on our review, it is our opinion that the findings and recommendations provided for in the earlier report are still applicable. Those recommendations include that you set back the northern edge of the concrete foundation slab which will support the manufactured home a minimum distance of 17 feet from the break in slope north of the house site. This setback is shown on Figure 2 of the earlier report. We understand based on our conversation with you on February 13, 2023, that the manufactured home which you intend to site on your property will allow you to observe this setback.

We further recommend, as stated in the report, that the upper soft organic silt and clay fill be removed from under the footprint of the concrete slab and that the foundation be set on mechanically compacted structural fill above the underlying medium dense